

CAPITALISM, ECOLOGICAL DESTRUCTION AND MAINSTREAM
ENVIRONMENTAL ECONOMIC THEORY:
A RADICAL CRITIQUE

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University of Missouri-Kansas City, 2014

ABSTRACT

This dissertation contributes to heterodox environmental economics by providing a unique and thorough critique of mainstream environmental economic theory. This dissertation draws on insights developed by radical political economy, primarily the insights of Marx and Marxism, to highlight the flaws in mainstream environmental economic theory and their applicability for solving climate change and the biodiversity crisis in practice. The radical critiques provided in this dissertation further enhance the disciplines understanding of capitalist society and its institutions. Most importantly, these critiques attempt to alter the discourse and stimulate the development of alternative theories that might have the potential to solve environmental problems in practice. Finally, this dissertation begins the new discursive process by showing the potential

alternative cooperative relations of production hold for environmental, economic and social sustainability. This is done by analyzing worker-owned cooperatives and common property relations as they exist in capitalist economies and their role in transitioning out of a capitalist system.

The faculty listed below, appointed by the Dean of the School of Graduate Studies, have examined a dissertation titled “Capitalism, Ecological Destruction and Mainstream Environmental Economic Theory: A Radical Critique,” presented by William Vincent Fisher, candidate for the Doctor of Philosophy degree, and certify that in their opinion it is worthy of acceptance.

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DEDICATION

To my nephews Søren and Kormák so you can live in a world with the beauty
and inspiration of nature and feel the pull of a wild steelhead.

The most unpardonable sin in
society is independence of thought.

EMMA GOLDMAN

CHAPTER 1

INTRODUCTION

The genesis of the modern environmental movement in the United States is often credited to the publication of Rachel Carson's book *Silent Spring* (1962). Since that time a growing awareness has arisen concerning the role industrialization has played in ecological destruction and its potential ramifications for environmental and social sustainability. Over the course of the last half-century the natural science literature surrounding ecological destruction has reached a crescendo and warns of dire consequences if left unaddressed.

While the social and ecological ramifications of climate change have become part of the everyday lexicon, climate change is only one macro-ecological issue concerning planetary sustainability. Rockstrom et al. highlight nine planetary boundaries threatened by human activity including biodiversity destruction, ocean acidification, fresh water use, ozone depletion, chemical pollution, nitrogen and phosphorous cycling, among others (2009; see Foster et al. 2010, p. 14-15). Each of these threatens human civilization and must be reconciled with human productive activity so as to guarantee social and environmental sustainability into the future.

Resulting from the rising consciousness concerning anthropogenic ecological destruction and the need to alter human interaction with the planet, the sub-discipline of environmental economics has emerged in an attempt to rectify the imbalance between capitalist production and environmental degradation. Most, though not all, neoclassical

environmental economists recognize that some markets have misallocated resources in such a way that the resulting production has over-polluted the environment and diminished the potential for human and environmental sustainability. As a result, an enormous amount of literature has emerged in order to address environmental economic issues.

Three Mainstream Solutions to Environmental Problems

There are three mechanisms with which mainstream environmental economists attempt to deal with the problem of environmental degradation. These are externality theory, privatization and technological advance. One of these theories, or some combination of each, is claimed to be both necessary and sufficient for solving environmental problems. Each attempts to reconcile market-based capitalist production with long-term environmental sustainability. While the market currently might be misallocating resources, causing the market to fail, with the proper alteration of incentives for market participants the market can achieve a correct allocation of resources, thus reducing pollution and environmental degradation. Articulating the perspective of mainstream economics and environmental destruction as a problem with the market, Nicholas Stern remarks, “climate change presents a unique challenge for economics: it is the greatest example of market failure we have ever seen” (2007, p. 1). The problem then is how to get the market to work correctly.

This leads to another commonality between all mainstream environmental economists, their unwillingness to call into question the capitalist economy itself as the

root cause of environmental destruction. While mainstream environmental economists can differ tremendously concerning the role of government, the need to reduce income inequality, both in a country and between countries, and other social justice and environmental concerns, none are willing to question capitalism and the perpetual growth that is required by the capitalist system. As a result, mainstream economists are constrained in their ability to develop theories that attempt to deal with environmental issues. Referring to liberal and conservative mainstream thought concerning the environment, James T. Campen notes, “in spite of their differences, however, conservatives and liberals share a number of basic beliefs and assumptions—most fundamentally, their belief in the desirability and inevitability of capitalism—which justify regarding them jointly as constituting a *mainstream* intellectual and political framework that is accepted by the great majority of U.S. economists” (1986, p. 8).

Radical Political Economy

Theorists falling under the heading of radical political economy encompass a “wide range of economists, who may variously describe themselves as Post Keynesian, Kaleckian, Marxian, radical political economists, institutionalist, Sraffian, classical and post-classical” (Arestis and Sawyer 1994, p. xiii). While there are often disagreements between these different schools of thought there are also many similarities. This dissertation will rely primarily on the Marxian tradition in economics but will also draw from other radical traditions. Because of this we will highlight a few of the most

important elements of radical political economy that allow for a better explanation and understanding of society.

Radical political economists reject the idea that the most important element for understanding society resides in exchange relationships, the theoretical starting point for mainstream economists. Instead, economic theory should begin by analyzing the production process and the allocation and distribution of the social surplus generated by production. “Control over the surplus depends on the power relations in the economy concerned...the conditions of production strongly influence the efficiency of an economy and the general well-being of the working population. Conflict at the workplace is an important element of the antagonistic nature of capitalism” (Arestis and Sawyer 1994, p. xv). In capitalism, control over the production, allocation and distribution of the social product is in the hands of a minority group who own the means of production. The relationship between classes, according to Marx determines the complexion of many social phenomena.

The specific economic form in which unpaid surplus-labour is pumped out of direct producers, determines the relationship of rulers and ruled, as it grows directly out of production itself and, in turn, reacts upon it as a determining element. Upon this, however, is founded the entire formation of the economic community which grows up out of the production relations themselves, thereby simultaneously its specific political form. It is always the direct relationship of the owners of the conditions of production to the direct producers—a relation always naturally corresponding to a definite stage in the development of the methods of labour and thereby its social productivity—which reveals the innermost secret, the hidden basis of the entire social structure, and with it the political form of the relation of sovereignty and dependence, in short, the corresponding specific form of the state (1967, p. 791).

Thus, the class relationships of capitalism, the relationship of exploitation of labor by capital, is fundamental in understanding the rest of the political and institutional relationships in a capitalist society.

Many radical economists believe that mainstream economics failure to grasp the true nature of capitalist society results from their unwillingness, or inability, to grasp the class-based nature of capitalist production. By beginning their analysis with exchange, mainstream economists fail to recognize the class based and exploitative nature of capitalist economies. Calling this vulgar economics, Karl Marx believed that mainstream economists could never recognize the systemic and exploitative elements of capitalism.

Once for all I may here state, that by classical political economy, I understand that economy, which, since the time of W. Petty, has investigated the real relations of production in bourgeois society, in contradistinction to vulgar economy, which deals with appearances only, ruminates without ceasing on the materials long since provided by scientific economy, and there seeks plausible explanations of the most obtrusive phenomena, for bourgeois daily use, but for the rest, confines itself to systematizing in a pedantic way, and proclaiming for everlasting truths, the trite ideas held by the self-complacent bourgeoisie with regard to their own world, to them the best of all possible worlds (Marx 1906, p. 93).

By beginning in exchange, mainstream economists misunderstand the antagonistic nature of the capitalist system instead viewing capitalism as a harmonious social system.

This sphere that we are deserting, within whose boundaries the sale and purchase of labour-power goes on, is in fact a very Eden of the innate rights of man. There alone rule Freedom, Equality, Property and Bentham. Freedom, because both buyer and seller of a commodity, say of labour-power, are constrained only by their own free will. They contract as free agents, and the agreement they come to, is but the form in which they give legal expression to their common will. Equality, because each enters into relation with the other, as with a simple owner of commodities, and they exchange equivalent for equivalent. Property, because each disposes only of what is his own. And Bentham, because each looks only to himself. The only force that brings them together and puts them in relation with

each other, is the selfishness, the gain and the private interests of each. Each looks to himself only, and no one troubles himself about the rest, and just because they do so, do they all, in accordance with the pre-established harmony of things, or under the auspices of an all-shrewd providence, work together to their mutual advantage, for the common weal and in the interest of all (Marx 1906, p. 195).

By only seeing exchange relationships prevents mainstream economics from recognizing important power relationships and relationships of domination. By recognizing these important elements of capitalist society radicals believe they can provide a better understanding of the nature of capitalism and a more realistic representation of reality in a capitalist society.

Relating to their class analysis, radicals recognize that the driving force of the entire economic system is rooted in the need for capitalists to accumulate capital. As Philip Arestis and Malcolm Sawyer state,

The term radical political economy is used to encompass a range of different schools of thought which could be said to share the common theme of production, in contrast to the exchange focus of neoclassical and Austrian economics. It is concerned with the generation and use of the surplus, leading to an interest in dynamics, income distribution, growth and development. Underlining this interest—as the fundamental determinant of these aspects—is *capital accumulation* (1994, p. xix, emphasis added).

The accumulation of capital is the capitalist imperative and determines the “laws of motion” of the capitalist economy.

In Marx’s analysis accumulation is not simply promoted by the capitalists’ drive for profit. Competition forces individual entrepreneurs to accumulate and invest, as this is the only way to survive in the market...The competitive struggle...is the main factor which induces firms to introduce technical innovations in the form of a progressive mechanization of the productive process (Sardoni 1994, p. 2).

The drive to accumulate also determines the business cycle, unemployment, the search

for new markets, colonialism and the role of the state. The requirement of continuous accumulation for the reproduction of the capitalist system molds the legal/political process and ensures the perpetual growth of the system.

Finally, radical political economists recognize the historical nature of capitalist economies and understand that capitalism was neither inevitable nor is amaranthine. Thus, radical political economists are not constrained, like mainstream economists, by an unwillingness to question the capitalist system. For radical economists many of the root causes of social and environmental problems reside in the nature of the capitalist system itself, driven by the need to accumulate capital and the class-class based nature of the capitalist system. Thus, while progressive politics can alleviate some of the ills caused by the capitalist system, they cannot abolish these injustices. “Radicals view most major economic and social problems as deeply rooted in the structure of basic capitalist institutions, rather than as representing remediable flaws in the functioning of those institutions” (Campen 1986, p. 8). As a result, radical political economists often advocate transitioning out of the capitalist system.

Research Scope and Focus

This interdisciplinary dissertation will draw heavily on insights developed from radical political economy outlined above, in order to provide insight into the failure of mainstream economics to combat two macro-ecological problems. The two macro-ecological crises that will be considered in this dissertation are global climate change and the biodiversity crisis. It has long been understood by natural scientists, politicians and

social theorists, that each crisis threatens the existence of human civilization. As a result, each crisis must be solved in order to ensure the viability of environmental, social and economic sustainability. In addition, each proposed solution by mainstream environmental economics has been known since these ecological crises have arisen. Yet each of these crises, rather than being solved continues to get worse. Investigating this fact is the overarching motivation of this dissertation.

This interdisciplinary dissertation sets as its task two important objectives. First, a radical critique of the three solutions proposed by mainstream economists in order to show why each fails in its ability to solve climate change and the biodiversity crisis. Second, this dissertation will attempt to provide insights into possible alternatives to capitalist production that will enhance the possibility of solving ecological problems.

Outline

The structure of this dissertation is as follows; first, we will highlight the problem of climate change and the biodiversity crisis, then will provide an overview of the three mainstream environmental economic solutions to environmental problems and contain a radical critique of each solution, finally, we will propose a radical solution that will enhance societies ability to solve climate change and the biodiversity crisis.

In chapter 2 of this dissertation we will develop a history of environmental understanding surrounding climate change and the biodiversity crisis from the natural science literature. The purpose of this is three-fold. First, it allows the reader to understand the significance of each problem as they have transpired historically and

recognize the growing concerns of natural scientists. Second, it highlights the increasing severity of each crisis and the recognition that each needs to be dealt with through political action. Finally, most importantly, the chapter highlights that even though each crisis has been well known for decades, climate change and the biodiversity crisis continue to dramatically worsen. This continuing degradation has occurred despite the proposed solutions of mainstream economists. Thus, an evaluation of the practical possibility of these solutions must be evaluated.

Chapter 3 begins the evaluation of mainstream environmental economic theory. Externality theory is the most popular theory amongst mainstream environmental economists for guiding policy concerning climate change. These policies include taxing carbon emissions and cap-and-trade. As each solution provided by externality theory requires state intervention, a philosophy of the state is required. In this chapter we will outline the principles of externality theory and then provide a radical critique of externality theory through a critique of the state in capitalist economies. Recognizing the non-neutral nature of the state in capitalist economies prevents society from implementing these policies in practice.

Chapter 4 turns to privatization theory as articulated by Garrett Hardin in his famous article “The Tragedy of the Commons” (1968). The tragedy of the commons underlies much of the push towards privatizing resources and provides the theoretical justification for enclosing common property. Often private property is seen as the only remedy for ecological destruction. Only through private property relations are

individuals properly incentivized to preserve environmental sustainability. We will provide multiple radical critiques of the privatization theory.

The final mainstream solution—technological optimism—will be outlined in chapter 5. Technological optimism—the reliance on technological advance to solve environmental problems—is the most popular solution among progressive liberals. It also has support from conservatives. While the mechanisms for achieving technological solutions between conservatives and liberals can differ tremendously ultimately they both rely on technological advance to reduce our dependence on natural resources and enhance environmental sustainability. Because of this we will evaluate two thinkers who represent each of these groups and highlight their tremendous similarity. These two thinkers are Julian Simon and Thomas Friedman. After outlining each thinker’s position we will provide a critique of the reliance on technological advance as a solution to climate change and the biodiversity crisis.

Chapter 6 concludes this dissertation by developing a perspective on how to transition out of a capitalist economy and into a post capitalist environmentally sustainable society. This chapter will draw on Marx’s insight on social transition and the need for political movements geared toward social change. We will highlight two alternative production relations, worker-owned cooperatives and common property relations, and their potential for enhancing both the transition out of capitalism and environmental sustainability. We will also highlight problems each face while operating in a world dominated by capitalist relations of production. In addition, an emphasis will

be placed on social movements and their ability to alter the nature of the state. Finally, we will develop a few key characteristics of what a post capitalist “utopia” would look like should society transition out of capitalism.

CHAPTER 2

CLIMATE CHANGE AND THE BIODIVERSITY CRISIS

Introduction

According to James Gustave Speth, “the two megatrends in environmental deterioration are increasing pollution and biological impoverishment” (2004, p. 23). Or, simply, the two primary macro problems faced by the global community are global climate change and the reduction in biodiversity.¹ The importance of highlighting the current and potential future state of each is to recognize the severity of the problems we as a community face. Solving one problem to the neglect of the other is, in essence, to create a palliative for the conditions necessary for sustainability of human life on the planet. More importantly, by recognizing *both* problems an attempt can be made to change the popular discourse amongst progressives who primarily focus on global climate change, towards attempting to address both issues. As Eileen Crist (2007) articulates in her paper “Beyond the Climate Crisis: A Critique of Climate Change Discourse”, the debate on climate change has diverted attention from other ecological catastrophes facing our planet. By setting the terms of the ecological debate in such a fashion, “it encourages the restriction of proposed solutions to the technical realm, by powerfully insinuating that the needed approaches are those that directly address the problem; and it detracts attention

¹ While it is impossible to circumscribe global climate change and reduction in biodiversity into completely separate spheres, as the former has dramatic implications for the latter (see Hansen 2008), it is a useful distinction to make. This distinction allows for the recognition of each as a problem that must be solved. Furthermore, this exemplifies the extreme level of interconnectedness that ecosystems and the biosphere necessarily maintain.

from the planet's ecological predicament as a whole, by virtue of claiming the limelight for the one issue that trumps all others" (Crist 2007., p.33). The biodiversity crisis is the true "holocaust" according to Crist (2007, p. 36) and E. O. Wilson (1999a, p. 259). Crist states that, "biodepletion predates dangerous greenhouse-gas buildup by decades, centuries, or longer, and will not be stopped by a technological resolution of global warming...a resolution of the climate quandary will not put an end to—will barely address—the ongoing destruction of life on earth" (2007, p. 36). Hence the need to address both issues and widen the popular ecological discourse.

This chapter will look at both of these ecological trends from a historical perspective. The importance of putting these issues in a historical perspective is to highlight the trends in each debate and to show specifically when each was understood as a serious problem that needed to be dealt with. Moreover, historical analysis provides a fuller understanding of the problems at hand. Thus, the ultimate purpose of this chapter is to highlight the fact that each ecological problem has been studied for some time and has been understood by both scientists and policymakers as extremely serious. Lastly, a section on the current state of the biodiversity and climate change crises will highlight the lack of substantial action on each problem.

A Brief History of Global Climate Change

The 1800's were a time of immense change in both the social and natural environment. That century saw the initial results of revolutions in the natural sciences, especially biology and chemistry, and the results of the bourgeois revolution politically and in the

social production process, primarily seen in the large scale advance in productive capability which gave the era its name; the Industrial Revolution. The demographic requirements that accompanied the Industrial Revolution were such that enormous populations amassed in urban centers. With this came previously unseen pollution problems regarding the discharge of both human and industrial waste into the local environment causing the decimation of local waterways and spreading disease throughout the laboring classes (Ridgeway 1970, Chapter 2). Most inquiries into the consequences of industrialization and the pollution stemming there from were isolated to the environments of surrounding areas. However, some scientists began to analyze the larger impacts of increased industrialization.

This broader scope received its impetus from a litany of works calling into question long-standing geophysical and biological beliefs. For example, William Thompson in 1862, published his paper “On the Age of the Sun’s Heat” which set out the scientific basis that the world was far older than previously believed (1862, pp. 388-393). This provided the timeframe needed to rectify the drastic alterations in species that natural selection required in Charles Darwin’s *Origin of Species*, published in 1859. In addition, Louis Agassiz (1840) published his article “On glaciers, and the evidence of their having once existed in Scotland, Ireland, and England” which hypothesized that ice ages had occurred in the past meaning that at certain times in the earths history the global temperature of the earth was a great deal colder than it was in the 1800’s. Thus, the

question arose “what determines the average temperature of a planet like the Earth” (Weart 2008, p. 2).²

Theorizing in the 1820’s Joseph Fourier began explain the temperature of the earth by the dissipation of infrared radiation out into space (1824; 1827). However, Fourier began to understand that the gases in the atmosphere prevented some of the radiation from escaping into space thus allowing for the earth’s temperature to be much warmer than it otherwise would have been (Weart 2008, pp. 2-3). This was the foundation from which the phenomenon known as the “greenhouse effect” was built (Weart 2008, p. 3).

The first person to link the “greenhouse effect” with carbon dioxide (CO₂) emissions was the physicist John Tyndall in the 1860’s. According to Tyndall, the nature of CO₂ was different than other atmospheric gasses in that it was not clear and thus trapped radiation in the earth’s atmosphere (Weart 2008, p. 4). “A bit of CO₂ is found in the earth’s atmosphere, and although it is only a few parts in ten thousand, Tyndall saw how it could bring a warming” (Weart 2008, pp. 3-4). However, Tyndall was not concerned with linking the large increase in CO₂ emissions resulting from the Industrial Revolution to the possibility of anthropogenic global warming. What Tyndall really wanted to explain was the phenomenon of previous ice ages that was enormously controversial around this time.

² As this is a vast topic spanning many years any brief summary will leave a great deal out. Much of the following history is drawn from the book by Spencer Weart (2008), *The Discovery of Global Warming*. For anyone interested in a detailed history of climate change, this book provides a very good overview.

Like Tyndall, the Swedish scientist Svante Arrhenius in 1896 hypothesized that the increases in CO₂ would increase the amount of heat and thus water vapor in the atmosphere (Weart 2008, p. 5). “Because water vapor is the truly potent greenhouse gas, the additional humidity would greatly enhance the warming” (Weart 2008, p. 5). The reverse would also be true and, as a result, could possibly explain ice ages. Thus, Arrhenius was one of the first scientists to articulate that through feedbacks, small increases in CO₂ could dramatically alter global temperature. Even though Arrhenius was primarily concerned with explaining ice ages thinking that increases in global temperature would not be a problem for humanity, he had “calculated that doubling the CO₂ in the atmosphere would raise the Earth’s temperature some 5° or 6°C” (Weart 2008, p. 6). There were, however, many problems with the empirical tests conducted by Arrhenius, and “by 1910 most scientists thought Arrhenius’s speculation was altogether wrong” (Weart 2008, p. 7).

Over the course of the next half-century many scientists, both professional and amateur, developed innumerable theories in an attempt to explain the historical existence of ice ages. However, most were seen as mere pseudo-scientists, fundamentally lacking in their ability to explain or predict accepted natural phenomena. Perhaps more importantly, all went against the conventionally held belief that the natural environment was fundamentally stable and self-equilibrating (Weart 2008, p. 8). As a result, the study of climate change essentially stagnated in the first half of the 1900’s.

There was however one person who developed a theory of climate change that, in hindsight, could be called a precursor to modern climate change theories (Weart 2008, p. 2). This person was Guy Stewart Callendar. Callendar gathered data about the level of CO₂ in the atmosphere and noticed that it had increased. Furthermore, he drew the connection between increases in CO₂ and the increases in global temperatures. In 1938 he presented the findings of his article, "The Artificial Production of Carbon Dioxide and Its Influence on Climate" to a skeptical audience at the Royal Meteorological Society (Callendar 1938). His findings were astonishing for what they told were the causes of global temperature increases. As Weart explains, "Callendar told the meteorologists that he knew what was responsible. It was us, human industry. Everywhere that we burned fossil fuels, we emitted millions of tons of carbon dioxide gas (CO₂), and that was changing the climate" (Weart 2008, p. 2). While these findings were shocking, Callendar's conclusions were tamed, as he did not think that significant global temperature change would occur for centuries.

The real momentum and the foundational science that lead to the flowering of climate change science of the past 30 years was established between 1950 and 1980. The 1950's saw a number of advances both empirically and theoretically. In addition, at the end of the decade we see the first warnings from the scientific community that global climate change, if not controlled could have severe consequences for life on the planet.

Gilbert Plass took up where Callendar left off, shoring up some of the misgivings of Callendar's speculations. In 1956 Plass published an article relating the level of

carbon emissions to changing global temperatures. There were aspects of Plass' work that were certainly lacking, however "Plass realized that adding more CO₂ in an upper layer [of the atmosphere] would indeed make a difference" (Weart 2008, p. 23). Unlike many old criticisms of climate change, that the *level* of CO₂ did not matter, Plass' research "did prove a central point: the greenhouse effect could not be dismissed with the old argument" (Weart 2008, p. 24). The level of CO₂ in the atmosphere did matter. However, like Callendar, Plass believed that significant warming would not happen for a number of centuries.

Around the same time another myth surrounding the stability of the global climate and the increases in CO₂ emissions was being debunked. It had been previously believed that, no matter how much CO₂ increased through anthropogenic or natural causes, the ocean would absorb this increase leaving the level of carbon in the atmosphere relatively unchanged. It is true that the world's oceans act as a large sink absorbing CO₂. However, Roger Revelle, an oceanographer, and Hans Suess, an expert in the newly emerging radiocarbon dating, were to publish a paper in 1957 showing that oceans would not be able to absorb these increases in CO₂ indefinitely (Weart 2008, p. 28). While there were inconsistencies in their work and they did not grasp the severity of climate problem fully, Revelle's and Suess's found that,

although it was true that most of the CO₂ molecules added to the atmosphere would wind up in ocean surface water within a few years, most of these molecules (or others already in the oceans) would promptly be evaporated back out. Revelle calculated that in sum, the ocean surface could not really absorb much gas—barely one-tenth the amount his earlier calculations had predicted (Weart 2008, p. 28).

Thus, the ability of the oceans to regulate the level of CO₂ in the atmosphere could not be relied upon as an equilibrating mechanism. However, empirical evidence was still needed to show that CO₂ in the atmosphere was in fact rising.

Revelle assigned the task of accurately measuring CO₂ levels in the atmosphere to a scientist named Charles D. Keeling. Keeling meticulously undertook this difficult task and published some of his results in 1960.³ The results of Keeling's research would be highly important because many "experts believed any rise of CO₂ would be too slow to matter for a long time to come, and it probably couldn't happen at all" (Weart 2008, p. 25). What Keeling (1960) found, almost immediately, was that CO₂ levels were rising. "His first twelve months of data hinted that a rise could be seen in just that one year...In 1960, with two full years of Antarctic data in hand, Keeling reported that the baseline CO₂ level had risen. The rate of the rise was approximately what would be expected if the oceans were not swallowing up most industrial emissions" (Weart 2008, p. 35). Keeling (1970) continued his research, gathering more and more data, and this data showed that each year the level of CO₂ in the atmosphere increased. As Weart correctly states, "Keeling's data put a capstone on the structure built by Tyndall, Arrhenius, Callendar, Plass, and Revelle and Suess...No longer could a well-informed scientist dismiss out of hand the possibility that our emissions of greenhouse gases would warm the Earth" (2008, p. 37). Moreover, "other scientists too began to feel a mild concern as

³ Getting accurate measurements of this kind are more difficult than it would appear at first sight, as changes in wind, weather, or industrial output on any given day will change the level of CO₂ being measured.

they gradually assimilated the meaning of Plass's and Revelle's difficult calculations. Adding CO₂ to the atmosphere could change the climate after all. And the changes might arrive not in some remote science-fiction future, but within the next century" (Weart 2008, p. 29).

During the 1950's amongst the scientific community, the severity of anthropogenic climate change was embryonic. Its birth would come in the 1960's and 1970's and its full maturity thereafter. In the 1960's and 1970's there emerged a substantial discourse surrounding global climate change. Many scientific findings occurred in these two decades that would lead to the consensus that emerged in the late twentieth and early twenty-first century. The three major themes that emerged in this period, other than the general acceptance of the discourse, were: 1) the almost infinite complexity surrounding the global climate change issue, 2) an attempt to understand the tempo and scope of prior climatic changes, and 3) the recognition of anthropogenic causes of global climate change.

Prior to the 1960's and 1970's there was an overwhelming consensus that climate shift equivalent to ice ages could only occur gradually and thus anthropogenic climate change would be a problem in the very distant future, if at all. During the 1960's and 1970's, however, many scientists began understanding the rapidity with which prior climate shifts had occurred. Ried Bryson (1974) and a number of scientists working with him found evidence in a number of circumstances that climate shifts were far more rapid than previously believed.

Up to this point, when climate scientists spoke of ‘rapid’ change they had meant something happening in as little as a thousand years...Looking at hundreds of radiocarbon dates spanning the past dozen millennia, the group arrived at a disturbing general conclusion. Periods of ‘quasi-stable’ climate ended in catastrophic ‘discontinuities’ when ‘dramatic climate change occurred in a century or two at most’” (Weart 2008, p. 69).

This perspective began to gain acceptance in the scientific community. Furthermore, it brought to the fore that climate change was not necessarily a far off event. Climate change needed to be dealt with sooner rather than later.

At a conference in Boulder, Colorado a scientist by the name of Peter Weyl developed the vitally important theory surrounding the “thermohaline circulation” of the oceans (Weart 2008, pp. 60-61; Weyl 1968). The crux of this theoretical perspective was that the melting of the ice sheets and glaciers would release enormous amounts of fresh water into the ocean and thus change the salinity and density of the ocean. If the melting changed the salinity “the surface layer would no longer be dense enough to sink. The entire circulation that drove cold water south along the sea bottom could lurch to a halt. Without the compensating drift of tropical waters northward, a new glacial period might begin” (Weart 2008, p. 61). This research not only showed the fundamental interconnectedness of the global climate but it also showed that, through feedbacks, the global climate could be altered significantly in much shorter time periods than previously assumed.

Around the same time, two extremely important and influential methods of peering into the past were being developed. The drilling of ice cores into the Greenland and Antarctic ice sheets and the drilling of deep-sea cores were revealing a history of

climate changes previously unseen. “The preliminary study of ice cores, published in 1969, showed variations that indicated changes of perhaps 10°C. Comparisons of Greenland and Antarctic cores showed the climate changes were truly global coming at essentially the same time in both hemispheres” (Weart 2008, p. 71). Analysis of ice cores was confirming what was emerging from the deep-sea cores. Glacial periods were much more numerous than previously thought and could occur on a much shorter time frames.

At a conference in Stockholm Sweden in 1971 a group of natural scientists converged to discuss specifically the anthropogenic causes and consequences of climate change. The conference bore the title “Study of Mans Impact on Climate” and “was the first major conference to focus entirely on that subject” (Weart 2008, p. 68). While there was no ultimate consensus at this conference, “the widely read report concluded with a ringing call for attention to humanity’s emissions of particle pollutants and greenhouse gasses. The climate could shift dangerously ‘in the next hundred years,’ the scientists declared, ‘as a result of man’s activities’” (Weart 2008, p. 68). Interestingly, the realization that humans could induce climate changes and that these changes could be swift and catastrophic, lead scientist to attempt to predict when the next ice age, not warming, would occur.

For a century their profession had concerned itself above all with ice ages. Their field studies were devoted to measuring the swings between warm and glacial epochs. Home at their desks, they attacked the grand challenge of explaining what might cause these swings. Now that they were beginning to turn their attention from the past to the future, the most natural meaning to attach to ‘climate change’ was the next swing into cold (Weart 2008, p. 77).

Understanding that anthropogenic climate change was actually warming the globe would have to wait until the late 1970's.

By the late 1970's the ability to model the climate had made great strides, although it was still quite simplistic compared to the extreme complexity of the natural climate. One thing that began to be agreed upon, however, was that the *natural* tendency of the climate at that time was cooling. "But the course of events was no longer natural. More and more scientists were coming to feel that greenhouse warming was the main thing to worry about...the greenhouse effect from increased CO₂ must dominate in the end" (Weart 2008, p. 99). Thus, the 1970's saw the shift from a focus on cooling to a focus on warming.

The later half of the 1970's was the turning point of discourse on climate change.⁴ In 1976 congress held hearings on the issue of global climate change, bringing forth a number of scientists to testify. In addition, "the 1977 National Academy of Sciences report on 'Energy and Climate' kept up the pressure with its announcement that catastrophic warming might be in store...[and] they did drive home a general truth: the threat of climate change was intimately connected with energy production" (Weart 2008, p. 102). Also in 1977 the head of the National Oceanic and Atmospheric Administration Robert White issued an assessment stating, "we now understand that industrial wastes, such as carbon dioxide released during the burning of fossil fuels, can have consequences

⁴ Oreskes and Conway (2010) place the date squarely on 1979 (see, p. 170). However, it appears that Weart (2008) would put the date around 1976.

for climate that pose a considerable threat to future society...The scientific problems are formidable, the technological problems, unprecedented, and the potential economic and social impacts, ominous” (quoted in Oreskes and Conway 2010, p. 172). Furthermore, a study by the “Jasons”—a group of intellectuals that studied scientific phenomena and sent many of their findings to policy makers in Washington D.C.—came to similar conclusions adding that a doubling of CO₂ could raise global temperatures by 2.4°C (Oreskes and Conway, p. 171).⁵ The result of all this was to set up a group of climatologists headed by Jule Charney, a premiere meteorologist at the Massachusetts Institute of Technology, to study the results of the Jasons’ study.

In 1979 the report from the group headed by Charney came out. “Their conclusion was unequivocal: the models were telling the truth” (Weart 2008, p. 100). In an attempt to put numbers on the level of temperature change that would occur should CO₂ emissions double, the group “declared they had rather high confidence that in the next century the Earth would warm up by about 3°C, plus or minus 50 percent, that is, 1.5°-4.5°C” (Weart 2008, p. 100). Thus, in 1979 Washington was well aware of the potential consequences of climate change and its anthropogenic roots.

During the 1980’s a growing literature emerged around other gasses that had the potential to alter the earth’s climate. Perhaps the greatest of these was methane gas. Methane is a gas that is naturally produced in a number of biological processes but also

⁵ “Perhaps more worrying than the average temperature increase was the prospect of ‘polar amplification’—that warming would be greater, maybe a lot greater, at the poles. In their model [the Jasons], the poles warmed by 10°C to 12°C—a colossal amount” (Oreskes and Conway 2010, pp. 171-172).

has anthropogenic causes through the burning of natural gas. One study in 1988 found that “the methane level had increased by 11 percent in the previous decade alone. And each molecule of the gas had a greenhouse effect about twenty times that of a molecule of CO₂” (Weart 2008, p. 125). Moreover, there were dramatic feedbacks that could release massive quantities of trapped methane gas should global temperatures increase. For example, the arctic tundra contains substantial methane in its permafrost layers that, if allowed to thaw, could release enormous amounts of methane into the atmosphere.

Also during the 1980’s the ice core at the Soviet Vostok Station in Antarctica was a major milestone in understanding climate change and its relationship to the level of CO₂ in the atmosphere. “In each glacial period, the level of CO₂ in the atmosphere had been lower than during the warm periods in between—lower by as much as 50 percent...The Vostok core tipped the balance in the greenhouse-effect controversy, nailing down an emerging scientific consensus: the gas did indeed play a central role in climate change” (Weart 2008, pp. 125-126). The major causes of these dramatic shifts in the level of CO₂ and methane in the atmosphere were due to natural feedbacks from the oceans, defrosting tundra, and other feedback mechanisms. However, human induced increases in CO₂ could cause the same phenomenon.

In addition, other ice cores that had been in operation began to confirm not only that climate change occurred when more greenhouse gasses were in the air but also that temperature changes had occurred abruptly. A study published in 1982 of Greenland ice cores by Dansgaard et al., showed that “a dramatic cooling of rather short duration,

perhaps only a few hundred years” had occurred (1982, p. 1273; Weart 2008, p. 134). In addition, Hans Oeschger “was now analyzing a layers of lake-bed clay near his home in Bern, Switzerland. That was far indeed from Greenland, but his group found ‘drastic climatic changes’ that neatly matched the ice records” (Weart 2008, pp. 134-135). Furthermore, in 1985 a study by Wallace Broecker et al., confirmed that the thermohaline conveyor could easily be shut down causing dramatic changes in global temperature (Weart 2008, p. 136). Broecker, had “also pointed out evidence that such a shutdown had actually happened...[and] in 1987 he wrote that we had been treating the greenhouse effect as a ‘cocktail hour curiosity,’ but now ‘we must view it as a threat to human beings and wildlife’” (Weart 2008, pp. 136-137).

The 1980’s and 1990’s saw the rise of “action” oriented organizations and conferences to deal with the looming crisis. In 1987 the Montreal Protocol was signed by many of the world’s governments in an effort to restrict the emission of “specific ozone-damaging chemicals” (Weart 2008, p. 148). This protocol dealt primarily with chlorofluorocarbons (CFC’s) and was highly successful in preventing their use (Speth 2004, p. 55). In 1988, a meeting of scientists was called to Toronto to deal specifically with climate change. Titled the “World Conference on the Changing Atmosphere: Implications for Global Security”, this conference was important in that, “for the first time a group of prestigious scientists called on the world’s governments to set strict, specific targets for reducing greenhouse gas emissions...By 2005, said the experts, emissions ought to be pushed some 20 percent below the 1988 level” (Weart 2008, p.

149). Also in 1988, due to pressures from scientists and the general public, the Intergovernmental Panel on Climate Change (IPCC) was formed.

The IPCC was formed as a unique organization, “composed largely of representatives of the world’s governments...It was neither a strictly scientific nor a strictly political body” (Weart 2008, p. 153). Because the IPCC had representation from many governments with many different interests, consensus within the group was naturally conservative. Weart gives a worthwhile account of the process the IPCC goes through:

Independent task forces addressed each of the chief scientific issues. Experts reviewed the latest research publications and drafted reports. In informal workshops, additional experts debated every detail for days on end...All through 1989, 170 scientists in a dozen workshops labored to craft statements that none could fault on scientific grounds. These reports went through yet another review that gathered comments from virtually every significant climate expert in the world...The scientists’ findings then had to be endorsed unanimously by the official government delegates, many of whom were not scientists at all. The most passionate in arguing for a strong statement were representatives of small island nations, who feared that rising seas would eventually erase them from the map. Far more powerful were the oil and coal industries, represented by governments of nations living off fossil fuels...This was not mainstream science so much as lowest-common-denominator science. But when the IPCC finally announced its conclusions, every word had solid credibility (Weart 2008, p. 156).

The first report of the IPCC was issued in 1990 and concluded that the globe had in fact been warming and that greenhouse gasses in the atmosphere were increasing but hesitated to draw further conclusions (Houghton et al. 1990, p. xi.). However, the report did recommend that steps be taken to “get a start on reducing the risk, a broad hint that governments should act” (Weart 2008, p. 157). The IPCC was to come out with new reports on the state of the global environment roughly every five years.

In 1992, a conference was called for the meeting of the world's governments to address the potential problems associated with climate change. The "Earth Summit" held in Rio de Janeiro, Brazil set the stage for a broad coalition to limit greenhouse gas emissions on a global scale. However, "the agreement's evasions and ambiguities left so many loopholes that policy makers could avoid meaningful action" (Weart 2008, p. 162).

Three years later, in 1995, the next IPCC report was published. This report concluded, amongst other things, that "the balance of evidence suggests that there is a discernible human influence on global climate" (Houghton et al. 1995; Weart 2008, p. 164). Similarly, the IPCC report predicted that a doubling of the level of CO₂ in the atmosphere would cause a 1.5° to 4.5°C change in global temperature (Weart 2008, p. 165). This was the same conclusion as both the "Jasons" and the Charney reports a decade and a half earlier.

The last major gathering of governments regarding climate change that occurred in the 1990's took place in Kyoto, Japan. The culmination of these talks, in 1997, was the now infamous Kyoto Protocol. According to the Kyoto Protocol, developed countries were to dramatically reduce their greenhouse gas emissions by 2010 (Weart 2008, p. 166). Unfortunately, special interest groups and politicians in the United States, the world's largest contributor to greenhouse gas induced climate change, prevented measures in the Kyoto Protocol from being enacted. "With little debate, American politicians avoided any policy change that might move toward meeting the Kyoto targets. Most other nations took that as an excuse to carry on likewise with business as usual"

(Weart 2008, p. 167). Thus, the Kyoto Protocol was useless in curtailing greenhouse gasses.

Ironically, just as the evidence in support of dramatic human induced climate change had accumulated, governmental rejection of policies to curtail this climate change also increased. Weart provides a very good synopsis of the changing scientific consensus over the course of the last half of the twentieth century.

Swings of temperature that experts in the 1960s believed must take tens of thousands of years, in the 1970s thousands of years, and in the 1980's hundreds of years, could actually happen in a few decades. During the last glacial period, Greenland had sometimes warmed as much as 7°C in the space of less than fifty years. During the Younger Dryas transition, spectacular shifts in the entire North Atlantic climate were visible within only five snow layers—that is, five years! (2008, p. 174).

Computer models, ice core drilling, work on the thermohaline conveyor, ocean cores, all were pointing in the same direction. Furthermore, statistics showed that “1995 was the warmest year on record for the planet as a whole, and...1997 broke that record, and 1998 yet again (Weart 2008, p. 175).

Concluding this brief history of climate change was the 2001 report from the IPCC. In this report, “new scientific evidence demolished objections from industry-oriented skeptics and persuaded even the most recalcitrant officials” (Weart 2008, p. 178). The report opens by stating that “there is new and stronger evidence that most of the observed warming observed over the last 50 years is attributable to human activities...Both temperature and sea level are projected to continue to rise throughout the twenty-first century for all scenarios studied” (Houghton et al. 2001, p. ix). In addition,

later in the report, “the projected rate of warming is much larger than the observed changes during the twentieth century and is very likely to be without precedent during at least the 10,000 years, based on palaeoclimate data” (Houghton et al. 2001, p. 13). In other words, the IPCC’s conservative perspective is; the world is getting warmer, humans are the cause and the projected change in global temperature based on the best models and estimates have not been seen in human history.

The Present

Now that we have a glimpse into the history surrounding the science of climate change we will assess where the global community stands at present. The purpose of analyzing the present as it relates to the past knowledge and warnings surrounding global climate change is to recognize progress, or lack there of, in solving the problems at hand.

Regarding global temperature, the 2007 IPCC report stated, “eleven of the last twelve years (1995-2006) rank among the 12 warmest years in the instrumental record of global surface temperature (since 1850)” (Soloman et al. 2007, p. 5). In addition, it is estimated that global temperature has increased by 0.76°C over the same time period (Soloman et al. 2007). The bold statement that “warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level” highlights that as of 2007 things have gotten worse (Soloman et al. 2007, p. 5).

According to the National Aeronautic and Space Administration’s (NASA) “key indicators” for global climate change, Arctic sea ice is deteriorating by roughly 11.5

percent per decade and 2010 was the third lowest level in recorded history—behind 2007 and 2008 (NASA 2012). In addition to sea ice, “Data from NASA's Grace satellite show that the land ice sheets in both Antarctica and Greenland are losing mass. The continent of Antarctica has been losing more than 100 cubic kilometers (24 cubic miles) of ice per year since 2002” (NASA 2012). Furthermore, many of the worlds glaciers are receding and many of the worlds natural fresh water sources are being threatened. The loss of land ice and the warming of the globe are contributing to sea level rises. If the global response to anthropogenic causes of global climate change were heeding the scientific warnings, we would expect to see a reduction in of fossil fuel emissions. So what has happened in practice, to curtail the causes of global climate change?

As our brief history has shown, it has been known for some time that CO₂ is a main contributor to global climate change. The main anthropogenic causes of CO₂ emissions in the atmosphere are the burning of fossil fuels such as coal and oil. Thus, in order to curtail the effects of global warming we must reduce the burning of fossil fuels. According to David Spratt and Philip Sutton, “human activity has increased the level of carbon dioxide in the air by 38 per cent from the 1750 pre-industrial level of 280 parts per million [ppm]: by 2008, it was at 387 parts per million” (2008, p. 76). According to the National Oceanic and Atmospheric Administration (NOAA) global CO₂ levels in the atmosphere have increased from 338 ppm in 1980, a year after the “seminal year” of climate change discovery (Oreskes and Conway 2010, p. 170), to over 389 ppm in 2010 (NOAA 2012).

According to United States Energy Information Administration (2012) statistics global consumption of oil in 1980 was 36.119 billion barrels of oil per day.⁶ In 2010 the total global consumption of oil was 87.075 billion barrels per day. Spanning nearly the same time period, the emissions from the consumption of oil globally went from 8825 million metric tons to over 10887 million metric tons in 2009. Consumption of natural gas, a cleaner though not clean source of energy went from 52943 billion cubic feet in 1980 to over 106763 billion cubic feet in 2009. CO₂ emissions from consuming this natural gas went from 3086 million metric tons in 1980 to 6031 million metric tons in 2009. Lastly, coal consumption, the dirtiest form of energy, went from 4,124,516 thousand short tons⁷ in 1980 to 7,577,379 thousand short tons in 2009. Global CO₂ emissions from the consumption of coal were 6,522 million metric tons in 1980 and 13,393 million metric tons in 2009.

It is quite apparent from the data that both consumption of fossil fuels and the emissions of CO₂ resulting there from have increased dramatically since the pivotal year of 1979. This could be explained however, by the increased development of many “less developed” countries. Certainly a country that was already industrialized and a center for research on global climate change would reduce consumption of fossil fuels and emissions of CO₂ into the atmosphere. For this we turn to the United States.

⁶ All energy consumption and emissions numbers are from the United States Energy Information Administration.

⁷ A short ton is equal to 2,000 pounds as is typically used in the United States.

United states consumption of oil in 1980 was 17.056 billion barrels a day. In 2008 oil consumption was 19.497 billion barrels a day.⁸ CO₂ emissions from the consumption of oil went from 2271 million metric tons in 1980 to 2443 million metric tons in 2008. Consumption of natural gas increased from 19877 billion cubic feet in 1980 to 23227 in 2008. The resulting emissions of CO₂ from the burning of natural gas went from 1069 million metric tons in 1980 to 1250 million metric tons in 2008. Finally, coal consumption in the U.S. increased dramatically from 702,729 thousand short tons in 1980 to 1,127,998 thousand short tons in 2008. And the resulting CO₂ emissions from burning that coal increased from 1,484 million metric tons in 1980 to 2,139 million metric tons in 2008. Thus, one can see that even in the United States, consumption of fossil fuels and emissions resulting there from have increased instead of decreased since that seminal year of 1979.

In addition to CO₂ emissions, methane and nitrous oxide gasses have steadily increased. According to Spratt and Sutton, “since 1750, the have increased by 150 per cent, and about half a billion tones of methane are added each year, mostly as a consequence of human activity” (2008, p. 77). Nitrous oxide has increased by only 16 per cent since 1750 however, “the gas has an effect three hundred times more powerful than

⁸ One should take note that the consumption of oil fluctuates dramatically in the U.S. mirroring recession, as one would expect. For example, in 1980 oil consumption was 17.056 billion barrels a day yet, in 1983, after the effects of the “Volker shock” consumption was only 15.231 billion barrels a day. This reduction cannot be attributed to proactive environmental policies. In addition, at the height of the recent financial bubble in 2005, the U.S. was consuming 20.802 billion barrels of oil per day. The important point to be made here is that oil consumption has increased and not decreased as would be required to curtail global climate change.

carbon dioxide, making its overall contribution to global warming about one-tenth that of carbon dioxide” (Spratt and Sutton 2008, p. 78). When combined, “the effect of all the Kyoto gasses together is calculated to be equivalent to 455 parts per million of carbon dioxide” (Spratt and Sutton 2008, p. 79).

In conclusion, while the consensus surrounding the causes of global climate change have been known for decades, global greenhouse gas emissions have steadily increased.⁹ Actions that have been enacted to curtail the causes of global climate change have not done what they have set out to do. Thus, an alternative route is needed if we are to solve our global climate change problem. However, climate change is not the only major ecological problem that the world faces. The reduction in biodiversity is also a major problem that we must tackle if life on the planet is to exist with some semblance of today. It is to this crisis that we now turn.

A Brief History of the Biodiversity Crisis

As stated earlier, the second macro-environmental catastrophe the earth faces is the reduction in biological diversity. E. O. Wilson, a leading biologist and advocate of

⁹ We do not maintain that there is a consensus in the scientific community concerning the *consequences* of global climate change. There is disagreement among the scientific community about the predicted effects of climate change on ecosystems, different plant and animal life, and its affect on human life on the planet. This is akin to the debate on Darwinian evolution that occurs in the biological community (Oreskes 2007). “The first major global assessment of climate change science in six years has concluded that changes in the atmosphere, the oceans and glaciers and ice caps show *unequivocally* that the world is warming” (World Meteorological Organization 2007, p. 1). Furthermore, there is an overwhelming consensus in the scientific community that, not only is climate change occurring, but that it is an anthropogenic phenomenon (Oreskes 2004, p. 1686). Thus, we do maintain is that the there is a consensus in the scientific community concerning the *cause* of global climate change.

biological preservation, defines biodiversity as, “the variety of organisms considered at all levels, from genetic variants belonging to the same species through arrays of species to arrays of genera, families, and still higher taxonomic levels; includes the variety of ecosystems which comprise both the communities of organisms within particular habitats and the physical conditions under which they live” (Wilson 1999b, p. 36). However, presenting a history of the biodiversity crisis is much more difficult than that posed by climate change. One reason is that a history of biodiversity starting prior to 1986 is anachronistic. This neologism occurred in that year. A second reason is, as Crist (2007) correctly articulates, the biodiversity crisis does not receive the same notoriety as climate change. Thus, any history of the biodiversity crisis really must begin as a history of the conservation movement and the science surrounding extinction. The study of the conservation movement is much narrower than what has become the holistic approach assigned to biodiversity but will provide an important background for the emergence of biodiversity studies in the latter part of the twentieth century. For this reason we will focus our attention on some of the important studies, figures and movements surrounding conservation and extinction. This will take us to 1986 when the term biodiversity was coined. This brief history will surely leave out works that others would deem important in the study of biodiversity.¹⁰ Yet, the purpose of this brief history is to give insight into

¹⁰ The best historical account of the conservation movement in the United States and Western Europe is Mark V. Barrow, Jr.’s (2009) book *Nature’s Ghosts: Confronting Extinction from the Age of Jefferson to the Age of Ecology*. Much of what follows will be drawn from this book.

the present situation and to highlight both the severity of the situation and the fact that the problems of extinction and reduction in biodiversity have been understood for some time.

Human beings have perhaps contemplated the interconnectedness of their living environment since they acquired the consciousness that separates themselves from other animals. We could therefore start any history at least as far back as the ancient Greeks or Mesopotamians for whom we have early writings on the subject. However, with the explosion of scientific inquiry that accompanied the Enlightenment period the study of what we now call geology and biology are the forbearers of modern-day biodiversity studies. This is where we shall begin.

The eighteenth and nineteenth century saw the flowering of natural science, or natural philosophy, and its practitioners that were attempting to explain the natural world “as it was” and as it had historically been. This era saw many important figures from Charles Darwin, Alfred Russel Wallace, Lord Kelvin, George Cuvier and Charles Lyell. These figures attempted to put together theories explaining the natural world and were hypothesizing about how the world obtained its present characteristics. One of the most perplexing issues, and the genesis of the conservation movement, was the existing fossil record.

The fossil records called into question the dominant theological position concerning the natural order of the world and the immutable design of god. The fossil records showed that many different animals that once inhabited the earth appeared to have died off (see Barrow 2009, Ch 1). The existence of fossils however, did not mean

that these animals did not exist in some hitherto unexplored land. It was not until the work of George Cuvier that it became definitive that certain animals had in fact become extinct. However, it should be noted that, even with the acknowledgement that animals had become extinct in the past, there still was a resounding consensus that animal extinction was unproblematic for existing society.

John Fleming (1824) was the first person to highlight the link the fossil record and the decline in contemporary animal populations (Barrow 2009, p. 44). In his article, “Remarks Illustrative of the Influence of Society on the Distribution of British Animals”, Fleming argued that as human society progressed so too did their impact on the natural world and that this could cause extinctions. Fleming’s perspective was supported by Charles Lyell (1832) in his *Principles of Geology* who said, “the annihilation of a multitude of species has already been effected, and will continue to go on hereafter, in a still more rapid ratio, as the colonies of highly civilized nations spread themselves over unoccupied land” (quoted in Foreman 2004, p. 48). However, Fleming and Lyell would both argue that while anthropogenic extinctions occurred, extinction was a naturally occurring phenomenon it was not a serious problem and that the animal population would ultimately return to equilibrium (Barrow 2009, pp. 44-45).

During the first half of the nineteenth century evidence mounted as to the anthropogenic causes of extinction. The three animals of primary focus were the dodo, the moa, and the great auk (see Barrow 2009, Ch 2). All of these birds had supposedly been seen previously by humans yet were now considered extinct. The great auk was the

least controversial as many Europeans still living at that time had seen this large bird. The great auk was prized first as a food source for sailors and later for their hides because of their growing scarcity. In search of these birds,

the three fishermen who landed on Eldey in June 1844 found only two great auks and managed to capture both; in the process they also smashed an auk egg they found. While numerous observers claimed to have spotted the species after 1844, these were not only the final two specimens to be collected but also the last incontrovertible evidence of the great auk's existence in the wild (Barrow 2009, pp. 61-62).

In addition to over hunting and the commodification of flora and fauna, destruction of habitat and the introduction of nonnative species began surfacing as a cause of the extinction of species.

Based on their joint discovery of evolution by natural selection, Darwin and Wallace “were among the first to appreciate the fact that, with minor variations, the same basic process that led to the extinction of the dodo had been occurring on hundreds of islands around the world since Europeans first set foot on their shores” (Barrow 2009, p. 75). For example, in his book *The World of Life*, Wallace (1911) wrote, “I am convinced that the rapidity of...the extinction of so many large Mammalia is actually due to man's agency” (quoted in, Leakey and Lewin 1995, p. 172). As shown above, other natural scientists, as they were now called, had hypothesized the same thing prior to Wallace but “when Wallace embraced the notion of human-induced extinction early in this century, he gave it important support. Nevertheless, the question of climatic versus human impact

continued to be debated” (Leakey and Lewin 1995, p. 173).¹¹

In the United States, others were beginning to sound the alarm about mans effect on nature. George Perkins Marsh (1864), in his masterful book *Man and Nature*, highlighted the dramatic effects of man on nature. Through the advance of civilization, according to Marsh, man’s destruction of nature became much more efficient. Marsh was also one of the first to take an “ecological” approach to nature, highlighting the fundamental interconnectedness of all aspects of nature (Barrow 2009, pp. 88-89).

In the latter half of the nineteenth century and the beginning of the twentieth century crises were occurring in the United States to native animals. Most notable were the demise of the passenger pigeon, the ivory billed woodpecker and the decimation of the bison, to name a few. However, there also arose movements to conserve native species. Most of these groups concerned themselves with particular species, mostly fauna, yet were important in the emerging conservation movement.

The Audubon Society was established 1886 by the naturalist George Bird Grinnell. This society was concerned with the fate of birds and strove to protect the nations dwindling bird populations. The Audubon Society, along with the American Ornithologist’s Union, was integral in passing the Lacey Act in 1900 which provided federal government funds for “the restoration of wild bird populations, to regulate the importation of foreign animals, and most importantly to prohibit the interstate shipment of ‘wild animals and birds’ taken in violation of state law” (Barrow 2009, p. 105).

¹¹ For a good overview of anthropogenic causes of mass extinction by ancient societies see Foreman (2004, Chapter 3).

Throughout the twentieth century the federal government would also set aside certain tracts of land as wildlife preserves or national parks.

Around this same time other key organizations and agreements emerged. One was the International Committee for Bird Protection, which sought out to protect bird species through coordinated efforts between countries. The American Committee for International Wild Life Protection compiled evidence of the growing plight of “birds and mammals around the globe” (Barrow 2009, p. 166). The London Conferences of 1900 and 1933 sought to protect the decimation of African wildlife. The conference of 1933 established national parks in Africa and set up “strict limitations on the activities allowed within them” (Barrow 2009, p. 151). The Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere, which was ratified by eleven countries by 1947, sought cooperation between American Nations on migratory birds and the preservation of native species (Barrow 2009, p. 199). Much of the early legislation, while providing important stepping stones and holding the potential for preservation of species, lacked enforcement rules and allowed for countries to decide their own level of preservation.

In addition, throughout the first half of the twentieth century there was a shift in the way in which nature was perceived. This movement began looking at nature from an ecological perspective, taking a holistic approach that was similar to the ideas put forth by Marsh (1864). This new perspective was critical of the killing of predator species for the preservation of their prey and influential in preserving whole areas for the propagation of many different species.

The 1960's and 1970's were pivotal decades for legislation, scientific publications, and social movements that forced new legislation. Perhaps the most important popular work in this area was Rachel Carson's publication *Silent Spring* in 1962. In *Silent Spring*, Carson highlighted that the use of chemicals in the production process was decimating entire populations of species. No creature was spared from the use of such chemicals as DDT and there emerged a public outcry for action on these issues. Furthermore, *Silent Spring* was one of the main impetuses for the creation of the United States Environmental Protection Agency in 1970.

The public support for environmental preservation reached a fever pitch in the 1970's. The first Earth Day was held on April 22, 1970, in which "more than twenty million Americans participated in activities ranging from teach-ins and community cleanup drives to guerilla actions aimed at corporate polluters" (Barrow 2009, p. 327). Many existing organizations drew from existing public sentiment and many new organizations emerged. Each pushed for further legislation to protect the environment. As a result, there was "an outpouring federal environmental legislation in the early 1970s, including not only the National Environmental Policy Act, but also the Clean Air Act Amendments, the Federal Water Pollution Control Act Amendments, the Federal Environmental Pesticide Control Act, the Marine Mammal Protection Act, and many others" (Barrow 1009, p. 327).

In 1972 the Convention Concerning the Protection of the World Cultural and Natural Heritage (WHC) was passed which "provides an international framework for the

protection of natural and cultural areas” (Kunich 2003, p. 50). This convention was one of the first international attempts at preserving areas deemed universally important for humanity. The natural areas to be preserved according to the convention are:

natural features consisting of physical and biological formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view; geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science or conservation; natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation, or natural beauty (quoted in Kunich 2003, p. 51).

However, the primary governing bodies of the WHC are the states themselves. Thus, designation of such sites and the enforcement of the preservation of these sites lie with the states, thus annulling any international pressures. As John Charles Kunich states, “nations that are predisposed to take effective action to preserve their natural and cultural heritage will do so...Those that lack the predisposition will find ample room for discretion and exception in the introductory clause to justify a very comfortable inaction” (2003, p. 52). There have, however, been a number of places that have been designated as World Heritage sites and are thus, given access to funding for preservation.¹²

In this same decade an important and encompassing piece of legislation was passed in the United States in an effort to prevent the extinction of species. The Endangered Species Act of 1973 replaced and amended the Endangered Species Preservation Act of 1966 and the Endangered Species Conservation Act of 1969 and

¹² For brevity, we will not delve further into the benefits and shortcomings, of which there are many, of the WHC. A good analysis of the WHC, its positive aspects and its shortcomings is presented in Kunich (2003, chapter 3).

provided more protection for nearly all endangered species. “Except for a few actual or potential pests...the legislation itself offered the same strong protection to *all* vanishing animals—regardless of size or class—and (after further study) even to plants” (Barrow 2009, p. 342, emphasis in original). However, the Endangered Species Act was geared towards plants and animals whose populations were severely diminished and did little to address the root causes that threatened these species.¹³ Furthermore, many supporters of the Endangered Species Act viewed it as legislation “to protect big animals and beautiful birds—not disgusting beetles and other vermin” (Foreman 2004, p. 52). Unfortunately, this mentality is foolish when attempting to preserve biodiversity.¹⁴

As the science surrounding the reduction of biodiversity and the rates of extinctions of flora and fauna became more evident, recognition of the severity of the ecological crisis grew. The 1970’s and 1980’s were important decades for understanding the mechanisms that contributed to the destruction of species.

In the late 1970s and through the 1980s, the first convincing estimates were made of the rate of tropical deforestation, which translated to the areal loss of habitat where most of living diversity is concentrated. This information led to disturbingly high estimates of the rates of loss of species in these forests...It became clear that the decline of Earth’s biodiversity was serious. Worse, unlike toxic pollution and ozone depletion, it cannot be reversed” (Wilson 1997, pp. 1-2).

One such work was *The Sinking Ark*. In 1979, Norman Myers published his book

¹³ The Act does prohibit commerce in endangered species and also addresses poaching, which is a significant risk for certain species.

¹⁴ In 1975 an international agreement was passed called The Convention on International Trade in Endangered Species of Wild Flora and Fauna. This convention prohibits trade in endangered species and is similar to the Endangered Species Act in the United States.

The Sinking Ark. This book “was the first to call widespread attention to the impending catastrophe of deforestation” and the resulting extinctions that would follow (Leahey and Lewin 1995, pp. 234-235). Much of the data that Myers put forth was debated, and there was disagreement over the rate of deforestation and the rate of extinctions following there from. However, no one could argue against the fact that deforestation was occurring and the consequences of such deforestation, while not known, could not be disregarded without further study.

During the 1980’s scientists refined their understanding of the causes of the reduction in biodiversity and potential threats to biodiversity. One key area that garnered attention was the relationship between habitat area and species survival. Extending the work of Norman Myers (1979), John Teborgh and Blair Winter (1980) addressed this issue in their article “Some Causes of Extinctions”, and showed that “extinction is strongly area dependent” (quoted in Foreman 2004, p. 48). As habitat area decreases the percentage of species that the area contains decrease with it. Or conversely, as habitat increase so to will the percentage of species within it. Moreover, “the species relationship has been shown with birds, mammals, reptiles, and other kinds of animals” (Foreman 2004, p. 48). This research has dramatic consequences for the way in which human actions, such as logging of forests or conservation efforts, impact the ability for a region to support biodiversity.¹⁵

¹⁵ The species-area studies have also led to a rule of thumb that scientists use for estimating species loss based on area destruction. The rule is “that if a habitat is cut by

Another important discovery that occurred in the 1980's was also based on the work of Norman Myers. Myers (1988) introduced the concept of "hot spots" into the biodiversity discourse. In his article "Threatened Biotas: 'Hot Spots' in Tropical Forests", Myers highlighted the importance of small areas around the globe that were extremely rich in biodiversity. Myers noted that "while these 'hotspot' areas comprise less than 3.5 percent of remaining primary forests, they harbour over 34,000 endemic plant species (27 percent of all plant species in tropical forests and 13 percent of all plant species worldwide). They also feature 700,000 endemic animal species and possibly several times more" (Myers 1988, p. 187). Because of the biological density of these regions, any destruction of this habitat will result in dramatic rates of extinction.¹⁶

In 1986 the term Biodiversity was coined. This neologism came out of a conference held in Washington D.C. titled the National Forum on BioDiversity, and was put on by the National Academy of Sciences and the Smithsonian Institution (Wilson 1997, p. 1). The motivation of this conference was to call attention to the looming biodiversity crisis and to gather an interdisciplinary group of researchers to address some of the major issues that the biodiversity crisis posed. This group concluded that "the species extinction crisis is a threat to civilization second only to the threat of thermonuclear war" (Leakey and Lewin 1995, p. 235).

90 percent, it will lose 50 percent of its species, or if 50 percent of the area is lost, 10 percent of the species will disappear" (Foreman 2004, p. 49).

¹⁶ Note that while tropical forests have generally been the areas given the "hot spot" designation, other areas could fall under this designation. However, "they simply have not been subjected to much analysis for hotspots. For example, coral reefs are likely to feature hotspots" (Myers 1997, p. 126).

In 1992 the United Nations Conference on Environment and Development was held in Rio de Janeiro. Emerging from the discussions surrounding the environment was the Convention on Biological Diversity. “The CBD [Convention on Biological Diversity] established three main goals: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources” (Kunich 2003, p. 46). This convention was the first global convention that dealt with biodiversity as a whole as opposed to specific species or specific areas. At the conference over 150 governments signed the agreement which addressed “all aspects of biodiversity, including access to biological resources, biotechnology, and financial resources” (Kunich 2003, p. 46). However, the wording of the agreement was characteristically vague and primarily left enforcement up to the very countries committing the violations. As Kunich correctly states, “nations are left to decide for themselves whether they have the ‘conditions and capabilities’ that generate these duties, and whether any given actions are ‘possible’ or ‘appropriate’” (Kunich 2003, p. 46). Thus, the tangible results from individual nations have been negligible. On the positive side, there has been roughly \$1 billion invested in biodiversity preservation and restoration projects internationally (Kunich 2003, p. 48).

The Present

Now that we have a brief background into the history of the biodiversity crisis we will assess the state of biodiversity at present. The purpose of doing so is to establish how well society has done in preserving biodiversity given the knowledge of the problem

and prior legislative attempts to reverse the trend. In what follows we will list off a number of species whose populations have diminished dramatically. This will provide a representative sample of the current state of biodiversity.

Fauna

Mammals are some of the best-studied groups in the animal world. They are also significantly threatened by habitat destruction and overharvesting. According to the 2004 International Union for the Conservation of Nature (IUCN) “Red List of Threatened Species: A Global Species Assessment”, 23% of all mammal species studied are threatened with extinction (Baillie et al. 2004, p. 11). A particular example of this is wild cats. According to Dave Forman, “of the thirty-seven species of wild cats that still exist in the world, sixteen (41 percent) are listed as endangered by the United States...African lion populations have crashed since 1980—from two hundred thousand to twenty three thousand today. Numbers of African cheetahs are down to a mere fifteen thousand” (2004, p. 54). This is due primarily to shooting and poisoning by ranchers and farmers (Forman 2004, p. 54).

Another example, the great apes, are similarly in trouble. “In the last fifty years, bonobos, chimps, and gorillas have declined by half, and orangutans have declined by perhaps half in the last decade” (Forman 2004, p. 55). Habitat destruction and harvesting meat for market have played a large part in the decimation of the ape population. “In Gabon, the center of gorilla and chimpanzee populations along with the Democratic Republic of Congo, the apes ‘have declined 56% since 1983’” (Forman 2004, p. 55).

Fish populations have diminished nearly across the board. Some of the oceanic populations that have been hit hardest are, naturally, the ones that serve as food sources for people. According to Gerald Smith, “the biomass of top predatory fishes has diminished by more than two-thirds in the past five decades” (quoted in Forman 2004, p. 76). The most popular fishes in the Northeastern United State, haddock, cod, and flounder, populations collapsed in the 1980’s and 1990’s. This has also had dramatic consequences for the predators that prey on these fish. For example, Northeastern shark populations have crashed by over 50% in a decade and a half (Forman 2004, see also Baum et al. 2003). Industrial fishing, or “over harvesting” is largely the culprit (Baillie et al. 2004, p. xxiii). In addition to catching the target fish, industrial fishing catches what is euphemistically called bycatch, or unwanted aquatic species, which are systematically destroyed. This number has been estimated to be 17 times larger than the target fish (Gillelan 2002-2003). The IUCN claims that roughly 18% of all sharks, rays and chimaeras are also threatened with extinction (Baillie et al. 2004, p. xxi). Furthermore, the habitat that many fish species rely on, such as coral reefs, are being destroyed. “Before 1998, an estimated 11 percent of the world’s known reefs had been destroyed by human activities, but the warming associated with the 1997-1998 El Niño event severely damaged another 16 percent, and coral reef scientists are resetting their agendas to focus more on climate change” (Speth 2004, p. 57; see Normile 2000).

Freshwater environments have also suffered at the hands of human “progress”. In North America over the last 100 years, there have been “extinctions of 3 genera, 27

species, and 13 subspecies of fishes” (Miller et al. 1989). If one includes all freshwater fauna it is estimated that “123 freshwater animal species have been recorded as extinct in North America. Hundreds of additional species of fishes, mollusks, crayfishes, and amphibians are considered imperiled” (Ricciardi et al. 1999, pp. 1220). Furthermore, the freshwater ecosystems that have been decimated range from lakes to streams to wetlands, and have occurred in all corners of the continent (Nott et al. 1995, p. 15). As Myers articulates:

In the United States, for instance, half of the 5.8million km of rivers and streams are polluted to a significant degree, and 360,000km have been channelized in the name of flood control, while 75,000 sizeable dams block nearly every river outside Alaska, leaving only 2% of rivers free-flowing. As a result, 20% of species of fish, 36% of crayfish, and 55% of mussels are endangered or have become extinct (Myers 1997, p. 126).

The primary causes of population reduction and extinctions in the freshwater ecosystems in North America are habitat destruction, however, overfishing, invasive species and pollution have also significantly contributed (Ricciardi et al. 1999, pp. 1220). Furthermore, the IUCN states, that “27% of the freshwater species assessed in eastern Africa were listed as threatened” (Baillie et al. 2004, p. xxi).

Populations of anuran (frog and toad) species have not seen the levels of extinctions that other species have seen but their total population numbers have declined dramatically. According to Nott et al., only five of the roughly 4000 species “are thought to have become extinct in the last century. Ecologists, however, have observed drastic population declines and disappearances—yet to be classified as extinctions—of many more species in the last 25 years. Currently, 89 amphibian species are classified as at

risk” (1995, p. 15). These drops have occurred on every continent excluding Antarctica. The IUCN claims that amphibians are the “most threatened vertebrates. Not only are amphibians significantly more threatened than other assessed vertebrate groups, but they also have a higher proportion of species on the verge of extinction” (Baillie et al. 2004, p. xxi). Moreover, the trend in the status of amphibian populations has declined consistently since 1980. The primary cause of this decline, other than habitat destruction, is pollution (Baillie et al. 2004, p. xxiii).

Finally, bird species have suffered declines and extinctions at the hands of men. The most popularly known are the passenger pigeon, the heath hen and the California condor. However, many species of birds are in peril today. As Forman states, “some nine thousand species of birds are alive today, and 108 are known to have become extinct since 1600” (2004, p. 52). According to the IUCN, 12% of all bird species are threatened with extinction (Baillie et al. 2004). Furthermore, “for birds the RLI [Red List Indices] demonstrates that their status has deteriorated steadily since 1988” (Baillie et al. 2004, p. xxii). While habitat destruction is the primary cause of reduced bird populations, birds are also very susceptible to over harvesting and invasive species.

Flora

Plant species too are not exempt from human influence. According to the IUCN, while there is difficulty in retrieving unbiased data on plants, they do have good data on certain, better-studied plant species. The two groups that the IUCN has sufficient data for are conifers and cycads. “For the conifers, 25% of the species are listed as threatened...For

cycads, 52% of the species are listed as threatened” (Baillie et al. 2004, p. 29).¹⁷ While other groups of flora are less well known and require further study there have been estimates that “as many as half of the world’s plant species may qualify as threatened with extinction” (Pittman and Jorgensen 2002, p. 989).

Specific examples of massive plant extinctions have also been well documented. In the Cape Floristic Region of southern Africa roughly 8,500 species of fynbos are native. Of these “thirty-six species have become extinct in the Region in the last hundred years, and some 618 species are currently deemed to be ‘at risk of extinction’” (Nott et al. 1995, p. 14). Another example is that of Ecuador’s Andean foothills in the 1980’s. This relatively remote area was discovered in 1978 to have ninety new species of plants. However, soon after, the “ninety species of plants became extinct in a virtual instant, when the forested ridge on which they grew was cleared for agricultural land...the ridge...is called Centinela, and among ecologists the name has become synonymous with catastrophic extinction at human hand” (Leakey and Lewin 1995, p. 242). These are two extreme examples, however, one could find a plethora of others.

This section has provided a few statistics on the current state of biodiversity. These have been put forth to highlight the crisis surrounding biodiversity and to show that, while legislation has been passed and certain victories have been won, ultimately the state of biodiversity is diminishing and the measures to curtail the negative affects of

¹⁷ “Whether these gymnosperm groups are representative of what is happening to plants generally is debatable. However, both are relatively ancient lineages and clearly illustrate very different threats and trends” (Baillie et al. 2004, p. 28).

human progress on biodiversity have ultimately done little in practice to address the biodiversity crisis

Conclusion

In this chapter we have provided brief histories of both the global climate change and biodiversity crises. In addition to noting some of the important scientific literature surrounding both crises, we also attempted to highlight the political knowledge of each crisis and some important legislative attempts to curtail each crisis. The purpose for doing so is to bring to the fore that both crises have been understood as such for some time and that those in power have recognized the need for action. Finally, we provided a present state of each crisis to highlight that neither the biodiversity crisis nor global climate change have been solved. In fact, each is deteriorating more with each passing year. The past and present attempts to curtail each crisis is succinctly summed up by Speth:

the results of two decades of international environmental negotiations are disappointing...Thus far, the climate convention is not protecting climate, the biodiversity convention is not protecting biodiversity, the desertification convention is not preventing desertification, and even the older and stronger Convention on the Law of the Sea is not protecting fisheries (2004, pp. 95-96).

In the chapters that follow we will attempt to elaborate on a few reasons why such inaction is occurring.

CHAPTER 3

EXTERNALITY THEORY AND THE STATE IN CAPITALISM

Introduction

In the words of John Maynard Keynes,

the ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed the world is ruled by little else. Practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist. Madmen in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back (2007, p. 383).

While Keynes probably overemphasizes the role of economic theory in policy-making and underplays the power of vested interests and preservation of the status quo, he makes an important point. When society has social problems that need to be solved we often turn to theory to help solve them.

Regarding environmental policy there is a perennial conflict, between economic production and environmental preservation. Thus, environmental economic theory has emerged as a sub-discipline within economics to attempt to resolve this conflict and preserve both economic growth and the environment. Within environmental economics there are three pillars that are utilized to address nearly all environmental problems that our world faces. These three are externality theory, privatization theory, and technological advance, or what we will call technological optimism. Since these three are the primary methods espoused for solving all environmental problems, they must be evaluated for their potential in solving our two macro-environmental problems—global

climate change and the biodiversity crisis. In the three chapters that follow we will provide a basic overview of each of the three pillars and also a critique of each.

Externality Theory

The first fundamental tenant of environmental economic theory is externality theory. This tenant has received a great deal of attention from economists and is the primary theory drawn from to solve environmental problems. As we will see, the policy recommendations that arise from externality theory range from intervention by governments in the form of taxation, subsidies, or the imposition of quotas, to no intervention into the private market system allowing “the market” to solve the problem. In this section we will provide an overview of some of the important ideas of externality theory.

Originally externality theory gained notoriety with A. C. Pigou’s book *The Economics of Welfare*, published in 1920. In this book Pigou highlighted the fact that under certain conditions of production the private net product and the social net product diverged. In other words, the net gains that were made from the private production of goods and services were greater than actual net benefit society received. This divergence could only occur if private production enterprises were not recognizing the total costs of production and thus, passed some of the costs of production on to the public. This results in the costs and prices of commodities not properly reflecting the actual costs of production thus, the economy is not allocating resources efficiently.

Generally, social costs occur on the latter end of the production process, or what Eban Goodstein (2005) calls waste products, or “sinks”.¹⁸ In the vernacular these waste products are referred to as pollution. Pollution is a negative externality defined as “a cost of a transaction not borne by the buyer or the seller” (Goodstein 2005, p. 32). As neither the buyer nor seller is forced to recognize the “true costs,” prices do not reflect these costs. Because prices in neoclassical theory are the ultimate arbiter of economic efficiency, with inaccurate pricing the market system cannot be sending proper signals to market participants and thus efficient allocation of resources cannot be occurring. The results arising from firms not having to face the costs of negative externalities are:

1) the output of the commodity is too large, 2) too much pollution is produced, 3) the prices of the products responsible for pollution are too low, 4) as long as the costs are external, no incentives to search for ways to yield less pollution per unit of output are introduced by the market, 5) recycling and reuse of the polluting substances are discouraged because release into the environment is so inefficiently cheap (Tietenberg 1994, pp. 37-38).

In essence, the products contributing to the pollution are “underpriced” (Goodstein 2005, p. 33).¹⁹ Once these costs are accounted for, “the market” will solve the problem of pollution and efficiently allocate resources.

¹⁸ In addition to social costs, society can have social benefits that that are not accounted for in the production and sale of a commodity. Therefore, the price of these commodities does not reflect the “true” benefit that society receives from its production and sale. The result being that the market will not produce enough of these “goods”. Because carbon emission and pollution are what concern this work we will only be dealing with negative externalities.

¹⁹ Note that there is a good deal of overlap between social cost theory and privatization theory. For example, one of the reasons given as to why social costs are not imposed is due to the fact that air and water are “free” goods, i.e. commonly owned. As Goodstein

Since Pigou, externality theory has been refined and has taken on distinct principles. A vast literature has developed on the effects of social costs, how to measure social costs, and what should be done, if anything, to force firms to recognize the negative effects of production on society. There are four primary mechanisms with which to account for these social costs. These four are: 1) impose taxes on the amount of pollution emitted, 2) provide subsidies to pay firms to not pollute, 3) use marketable emissions permits (Cropper and Oates 1992, p. 676; Dales 1968, p. 800), 4) permit “free market” mechanisms to solve the problem by allowing litigation to settle differences (Coase 1960).

According to neoclassical environmental economic theory, all environmental problems are based on so-called “market failures”. As Tietenberg states, “Its intellectual genesis is to be found in the realization that the behavioral sources of the pollution problem could be traced to an ill-defined set of property rights” (1980, p. 391). Echoing Tietenberg regarding water pollution, Dales says, “We can now re-formulate the water problem [pollution of water] and blame its complexity not on nature and the laws of fluids, but on man and his failure to devise property rights to the use of natural water systems” (1968, p. 792). The logic behind this problem of pollution is that with a proper

states, “from an economic point of view, many pollution problems arise because environmental resources such as rivers are, by their nature, commonly owned” (2005, p. 34). Thus, firms do not have to recognize the costs from polluting these “free” goods. In addition, we will see in the following chapter that Coase’s argument is more relevant to the problem of privatization or the “tragedy of the commons” approach.

pricing of assets, the market would be able to allocate the proper amount of pollution to each asset.

Yet the existence of a natural pricing system depends crucially on the institution of ownership. What is not owned cannot be priced since prices are payments for property rights or rights to the use of an asset. In the course of allocating property rights to assets among different owners, the price system in fact transforms most potential ‘technological externalities’ into ‘pecuniary externalities,’ a synonym for prices (Dales 1968, p. 792).

The goal of neoclassical externality theory is thus to force the pricing mechanism to work “as if” the market would naturally have generated prices of pollution and thus allocate efficiently the proper amount of pollution to the natural environments.

Taxation

The first method of attempting to curtail pollution is through a tax on pollution. As Cropper and Oates state, “the policy implication of this result is clear. Polluting agents need to be confronted with a ‘price’ equal to the marginal external cost of their polluting activities to induce them to internalize at the margin the full social costs of their pursuits” (1992, pp. 679-680). The tax will then allow the “true price” of goods to be reflected by the “true costs” associated with producing those goods.²⁰ This would result in a higher costs and higher prices for the polluting good. This in turn would decrease the quantity demanded and result in a lower overall quantity of pollution in the environment. In addition, there would be an incentive for firms to invest in pollution reducing

²⁰ There is some disagreement in the literature surrounding compensation for damages. As Coase (1960), shows, under certain circumstances there is no need for compensation. For Cropper and Oates (1992) victims compensation would alter the Pareto optimal equilibrium and thus compensation must not occur.

technologies to reduce their costs and increase their demand. The ultimate outcome being that pollution is reduced through market mechanisms and efficient allocation of resources and economic welfare is maximized.

Subsidies

Subsidies are another policy tool that can be utilized in order to internalize negative externalities. Subsidies are very similar to taxes in the way they promote pollution control, efficient allocation of resources while minimizing costs. The motivation behind subsidies is to provide a monetary incentive to not produce the pollution in the first place. The difference between taxation and subsidies depend on whether the governing body would prefer to use the carrot or the stick in order to achieve social goals. In a purely competitive market where all neoclassical assumptions hold taxation and subsidies should work in exactly the same fashion and achieve exactly the same outcome. However, according to neoclassical theory, subsidies and taxes do not work in the same fashion if certain conditions are not met.

Again, the argument revolves around the model utilized and slight alterations of the underlying assumptions of neoclassical theory for its justification. For example, if the industry is one that produces significant amounts of pollution “subsidies increase profits, while taxes decrease them. The policy instruments thus have quite different implications for the long-run, entry-exit decisions of firms” (Cropper and Oates 1992, p. 681). As the level of profit determines the correct number of firms in a market, distortions of this kind will mean that too many firms will enter a heavy polluting industry should subsidies be

the tool used to curtail pollution. Thus, “unit subsidies are not a fully satisfactory alternative to Pigouvian taxes” (Cropper and Oates 1992, p. 682). Similarly Dales finds that,

if a subsidy of so much per ton of waste reduced is set, extra profits will accrue to those firms that can reduce their wastes at a cost per ton that is less than the subsidy provided, and no change in relative prices of goods is necessary...Secondly, the subsidization scheme provides no incentive to choose production methods that reduce the amount of waste generated (and may indeed have the opposite effect!), whereas the charging scheme provides incentives both to reduce waste and improve the technology of treating waste before it is discharged (1968, p. 801).

To reiterate the point, through the use of taxes or subsidies the market can be forced to recognize the true costs of pollution and thus allow for optimal levels of pollution, resource allocation and welfare maximization.

Pollution Permits

The third method for accounting for social costs is through marketable emissions permits. This is better known in today’s vernacular as “cap-and-trade” or pollution permits. Generally this theory espouses that some authority, i.e. the federal or state governments, issue a certain amount of pollution permits that constrain the aggregate level of pollution and allow these permits to be traded between firms (Cropper and Oats 1992, p. 682). For example,

the government’s decision is, let us say, that for the next five years no more than x equivalent tons of waste per year are to be discharged into the waters [or air] of region A. Let it therefore issue x pollution rights and put them up for sale...Since x is less than the number of equivalent tons of waste being discharged at present the rights will command a positive price...Firms that found that their actual production was likely to be less than their initial estimate of production would

have rights to sell, and those in the contrary situation would be in the market as buyers (Dales 1968, p. 801).

This would create a market for tradable permits and allow firms, depending on their pollution demands, to acquire a cost effective amount of permits. Ideally, these permits would be freely traded among firms allowing those firms that have excess permits to profit by the sale of these to firms that have a shortage.

The virtues of the market mechanism are that no person, or agency, has to *set* the price—it would be set by the competition among buyers and sellers of rights—and that the price in the market automatically ‘allows for’ the regional growth (or decline) factor. If the region experiences demographic or industrial growth the price of rights will automatically rise and induce existing dischargers to reduce their wastes in order to make room for the newcomers (Dales 1968, p. 801).

Ultimately, this “system provides an incentive for emitters to adopt new control techniques which can clean up more emissions at lower cost (since they can sell the resulting excess permits), which in turn stimulates the development of these techniques” (Tietenberg 1980, p. 392).

As with taxation and subsidies, advocates of tradable permits differ in their opinions on the methods of issuing and enforcement of the permits. For example, Tietenberg (1980) shows in his survey article that under differing market and enforcement conditions different requirements are needed in the permitting process. Cropper and Oats come to the conclusion that “a combination of price and quantity instruments can, in a setting of imperfect information, provide a larger than expected welfare gain than an approach relying on either policy instrument alone” (1992, p. 683). However, all advocates of tradable permits believe that by creating a market for tradable

pollution permits will be superior to a control system with coercive government restrictions. As Tietenberg claims, moving “to a system based on transferable discharge permits promises the potential for achieving a better quality of air than currently enjoyed with a substantially lower commitment of resources to pollution control” (1980, p. 391).

Ronald Coase

The final solution to the externality problem is put forth by Ronald Coase, in his influential article, “The Problem of Social Cost” published in 1960. Coase begins his article with two examples in which increasing crop damage occurs to a farmer by the introduction of individual heads of cattle by a rancher. His examples articulate that, under perfect competition and assuming “the pricing system works smoothly” (1960, p. 2), i.e. no transaction costs, it does not matter who is liable for the damages, the two parties will negotiate and come to an economically efficient conclusion to the problem of social costs. Ultimately, Coase concludes from his examples, in the long-run the outcomes are “the same whether or not the cattle-raiser is held responsible for the crop damage brought about by his cattle” (Coase 1960, p. 8). Baumol provides a concise synopsis of Coase’s position, “that (in the relatively unimportant cases) where only a small number of decision makers is involved, a process of voluntary bargaining and side payments among those concerned by an externality may produce an optimal allocation of resources, even in the absence of liability for damage” (1972, p. 308).

Recognizing the likelihood of zero transaction costs is “a very unrealistic assumption” (Coase 1960, p. 15) Coase proceeds to analyze the different mechanisms

that will produce cost-minimizing optimal solutions to the externality problem. One possibility is to have government implement regulations to force groups to recognize their behavior (Coase 1960, p. 17). However, because the government is in essence a monopoly and not forced to participate in the market system subject to competition, in most cases governmental regulation is an inefficient mechanism for curtailing social costs. According to Coase, the only cases in which government should intervene and regulate the market are cases in which “a large number of people are involved and in which therefore the costs of handling the problem through the market or the firm may be high” (Coase 1960, p. 18). However, economists who rely on government as the primary institution to internalize negative externalities, Coase believes, “have tended to overestimate the advantages which come from government regulation” (Coase 1960, p. 18). Moreover, while government intervention in the market can have its place, the overarching theme of Coase’s article is that if left to its own devices the market will come to an optimal conclusion to the social cost problem.

Each of these four methods of solving the social cost problem recognize that under certain situations the net public product and the net social product diverge. In other words, under certain conditions gains are privatized while costs are socialized. In each of these methods the theory attempts to internalize the costs of negative externalities, either through taxation, subsidization, sale of permits, or as Coase argues, through the direct bargaining of market participants. Furthermore, all of these methods attempt to find the optimum level of production (optimum allocation of resources) and the optimum level of

pollution. As Coase succinctly states, “the aim of such regulation should not be to eliminate smoke pollution but rather to secure the optimum amount of smoke pollution, this being the amount which will maximize the value of production” (Coase 1960, p. 42). The argument then becomes which policy is the best at solving the problem.²¹ Lastly, the first three methods require some authority to implement the policy either by taxing or subsidizing the polluting industries, or by issuing pollution permits.

A Brief Note on Coase

Before moving on to the critique of externality theory we must briefly address the Coasian argument. As articulated above, Coase’s argument relies primarily on well-defined private property rights, small numbers of participants affected by the externality and near zero transaction costs. As a result, Coase’s argument might be best placed in the chapter on privatization theory rather than in the chapter on externality theory. However, because Coase is explicitly dealing with externalities and the way private markets can deal with externalities in an efficient manner, generally without government intervention, we have chosen to include his theory in this chapter. It should be noted that criticisms of environmental destruction, in particular biodiversity loss, even with well-defined private property rights, is applicable to Coase. Those criticisms will be addressed in the next chapter.

²¹ For example, Thomas Crocker, one of the founders of cap-and-trade theory believes that cap-and-trade cannot solve global climate change due to the many complexities of the problem. Instead Crocker is for a tax on carbon in order to reduce emissions and combat climate change (see Hilsenrath 2009).

Concerning Coase's argument in this chapter three more points must be made. First, because of the nature of climate change and the fact that it involves many individuals, in fact all individuals alive and unborn, who are affected by climate change, and all individuals and companies that emit greenhouse gasses, the idea that transaction costs could be minimal is unwarranted. Thus, as Coase himself recognized, his theory is not applicable to such large environmental issues such as climate change. As Robin Hahnel states, "all textbooks acknowledge, as did Coase, that negotiations are likely to fail in the presence of high *transaction* costs" (2011, p. 107).

Second, for important mitigating steps to be made through private market negotiations, even if we assume minimal transaction costs, those affected by pollution must be able to quantify the damages resulting from the other party's pollution activities. This is virtually impossible in reality, when dealing with climate change, because of the extreme complexity in predicting the damages resulting from this issue.²² For example, it is impossible to credit a single storm event to climate change that destroys property, but the overall number and severity of storms is going to increase over time. Does the property owner have recourse for a certain percentage of the damages of a single storm event? How can the property owner receive compensation when they cannot prove that a certain event was caused by increased levels of carbon in the atmosphere?

This situation becomes infinitely more complex when one attempts to account for time and space. Because, most of the property damage from climate change is to occur in

²² This is precisely the point made by two neoclassical economists, Robert Pindyck and Nicholas Stern, concerning the economic costs of climate change ("Hot Air" 2013, p. 78).

the future and affects different regions differently, depending on what model one is using, how does someone quantify their children's unknowable losses? Do the parents negotiate today for the unknown damages to property of their children in the future? Who do they negotiate with? There are numerous emitters of greenhouse gasses globally that should be subject to Coasian litigation from individuals whose property is damaged by climate change. At best, Coase's theorem can only address problems with a known and quantifiable amount of property damage, where there are few participants and minimal transaction costs, and where pollution has already occurred. None of these circumstances hold when dealing with climate change.²³

Finally, even assuming that all of the issues articulated above can be addressed in practice, because Coase's argument requires well-defined property rights and enforcement of contractual obligations, Coase's theory requires the body overseeing these institutions, the Judiciary, to be a neutral arbiter of these rights and responsibilities. However, as will be shown, the state in capitalist societies is not a neutral body. As a result, the Judicial Branch, because it is an institution of the state, cannot simply be assumed to be neutral.²⁴

²³ Nor do they hold for destruction of biodiversity. However, biodiversity and the inability of private property to deal with the biodiversity crisis, will be dealt with in the following chapter.

²⁴ For an extensive critique of Coase's theory that goes much further than simply the recognition of the problem faced when an externality has many participants and high transaction costs (see Hahnel 2011, Chapter 6).

Critique

Neoclassical externality theory is open to many critiques. Before moving to our most substantial and unique critique of externality theory we will highlight some of the most important criticisms of neoclassical externality theory. While these criticisms are important and certainly call into question the use of these theories to guide policy, our inclusion of these will be cursory. The reason for our brief mention of these critiques is two-fold. First, they have been made elsewhere and do not contribute anything new to the study of externality theory, yet are important for anyone interested in investigating externality theory and are necessary for a thorough review of the of the subject. Second, we only briefly articulate some of the internal critiques because our focus is on the practical possibility of implementing the policies recommended by the theory. Thus, it is the motivation of our radical critique to show that, even taken on its own terms, externality theory has very little possibility of being implemented in practice.

Serious internal criticisms of neoclassical externality theory have been raised by a number of individuals.²⁵ For example, when such realistic phenomena as market failures

²⁵ It should be noted, because neoclassical externality theory, and the resulting ability of neoclassical externality theory to solve ecological problems, utilizes neoclassical production and demand theory in its assessment of efficient solutions to the problems of externalities it is susceptible to the same criticisms of the derivation of the production function, utility function, derivation of the demand curve and supply curve (see Keen 2001). In addition, where externality theory utilizes Pareto optimality to justify its contribution to socially optimal outcomes, critiques of Pareto optimality are relevant to the internal consistency of the theory (Hicks 1939; Kaldor 1939; Dobb 1969). In other words, because of the theoretical flaws in the foundation of neoclassical economic theory, the claims made by neoclassical externality theory are also in question.

resulting from non-competitive market structures and income inequality, the efficiency criteria for externality theory become very difficult to justify (Campen 1986, p. 70). For example, the “theory of the second best” articulated by R. G. Lipsey and Kelvin Lancaster (1956-1957) “demonstrates that when one or more of the assumptions necessary to prevent market failure are violated somewhere in the economy, then applying the criteria of theoretical welfare economics will not necessarily bring about increased welfare” (Campen 1986, p. 71). In addition, when income inequality is taken into account, policy reversal is possible (Scitovsky 1941; Graaff 1975).²⁶

Other important criticisms of externality theory have drawn on the omnipresence of externalities to almost all commodity production. For example, E. K. Hunt has articulated

since the vast majority of productive and consumptive acts are social, i.e., to some degree they involve more than one person, it follows that they will involve externalities. Our table manners in a restaurant, the general appearance of our house, our yard or our person, our personal hygiene, the route we pick for a joy ride, the time of day we mow our lawn, or nearly any one of the thousands of ordinary daily acts, all affect, to some degree, the pleasures or happiness of others. The fact is...externalities are totally pervasive (1980, p. 244).

Hunt believes that neoclassical externality theory’s “absolute inability to handle pervasive externalities should more than suffice to convince any reasonable person of its

²⁶ Policy reversal is a phenomenon where one policy is chosen based on recommended Pareto improvement criteria. Yet after this policy is implemented the other policy also satisfies Pareto improvement criteria. As James T. Campen explains, “consider a project that would result in a change from economic situation A to situation B. It is possible both that this change could meet the potential Pareto improvement criterion, in that the gains of the gainers exceed the losses to the losers, *and*, once situation B was reached, that a change from B back to situation A could also satisfy the PPIC” (1986, p. 71).

utter irrelevance” (Hunt 1986, p. 246; see also D’Arge and Hunt 1971; Hunt and D’Arge 1973; Hahnel and Albert 1990, pp. 61-68).

Echoing some of what Hunt and Hunt and D’Arge have written, but also adding empirical evidence, K. William Kapp (1971), in his book *The Social Cost of Private Enterprise*, shows the pervasiveness of social costs in the production process. Moreover, Kapp emphasizes that when production is conducted for private benefit the nature of production is to externalize as many costs as possible. This increases private gain, which in capitalism, equates to an increase in profitability of firms.

While each of these criticisms is important for articulating the shortcomings of neoclassical externality theory, our criticism will take a different tack. Because neoclassical economists dominate the discipline and are, as of yet, unwilling to abandon externality theory, we will investigate the practical possibility of implementing any of the proposed policy solutions generated by externality theory. Because externality theory relies on an authority to coercively internalize negative externalities, the most natural starting point for our criticism is the State.

Marx’s Critique of Hegel’s Philosophy of the State

The first three methods of social cost theory—taxation, subsidization and pollution credits—all rely on a governmental authority to impose restrictions on the offenders. As a result, each requires that the State maintain the resolve to implement and enforce policies restricting the pollution that occurs. Thus, neoclassical externality theory assumes that the government is neutral theoretically and does not serve the interests of

any particular group in society. “In an open, non-dictatorial, and rationally governed society all government expenditures are made ultimately in pursuit of a single objective, the improvement of human welfare or well-being in that society. This lofty goal is above dispute” (Freeman quoted in Campen 1986, p. 112).²⁷ However, the neutrality of the state is seldom investigated empirically by environmental economists. According to Marx and Engels,

empirical observation must in each separate instance bring out empirically, and without any mystification and speculation, the connection of the social and political structure with production. The social structure and the state are continually evolving out of the life-process of definite individuals, however, of these individuals, not as they may appear in their own or other people’s imagination, but as they *actually* are” (1976, p. 41).

Thus, our radical critique of externality theory will investigate the neutrality of the state as it exists in capitalism according drawing on Marx’s critique of Hegel’s conception of the state.

Marx’s critique is apposite for our discussion. For, “if it could be analytically proved that the objective arrangements of the state are just so many particular interests parading under the banner of the general and the universal, the whole imposing edifice of Hegelian political philosophy [and externality theory] would tumble down” (Avineri

²⁷ James T. Campen notes, “mainstream economists regard government (they are not likely to use the term *state*) as an essentially neutral entity that seeks to promote the common interests of society’s members and to mediate among groups whose interests may conflict.” Adding, “the perspectives of liberals and conservatives are equally ahistorical, and both take as given the basic social relations and institutional structures of capitalism” (1986, p. 111).

1968, p. 17). Moreover, any theoretical construct that has little chance of translating into practice either needs to be reworked or discarded.

Like many political philosophers before him, in *The Philosophy of Right*, Hegel attempts to solve the social dualism between individual egoism and the general will. The mechanism with which Hegel solves this problem is the idealized state. Hegel's goal is "to apprehend and portray the state as something inherently rational" (Hegel quoted in O'Malley 1970, p. xlvi). Through the state the general will of the population supersedes the egotistical will of civil society and a harmony of interests emerges in which the "Idea" of the state is realized. According to Joseph O'Malley, "to show that the apparent opposition within modern political society is in fact overcome in the modern state is to show the rationality of the modern state, to show that the actual is rational" (1970, p. xlvi). Thus, "the main achievement of Hegel's political philosophy was its attempt to construct the state as an entity abstracted from the social and historical forces which create and condition it in empirical reality. Hegel did this by depicting civil society as the clash of the social forces, to be transcended by the universality of the state" (Avineri 1968, p. 17).

Through the *actual* institutional composition of the Prussian state Hegel establishes the harmony between civil society and the general will. In *The Philosophy of Right*, the institutions that assure social harmony are:

- (1) a monarch who comes to the throne by birth, and thus independently of political factions;
- (2) an extensive bureaucracy of salaried civil-servants, who constitute an estate or class whose aims are identical with those of the state itself;
- and (3) an Assembly of Estates, in which representatives of the crown and the

executive power meet with representatives of the civil estates to deliberate and determine the way in which the aims of the state and civil society shall be reconciled (O'Malley 1970, p. xlviiii).

Through the reconciliation of the estates, the state ensures that the general will overcomes any particular will of civil society.

Marx's work, *Critique of Hegel's Philosophy of Right*, is a meticulous and interminable piece in which Marx dissects paragraphs of Hegel's *The Philosophy of Right*. However, in the *Critique* Marx provides useful criticisms relevant to any criticism of a neutral philosophy of the state. While Marx's criticisms are many and diverse, for brevity we will highlight those most relevant to the present study.

Marx's overarching theme in the *Critique* is to show that Hegel's speculative philosophy of the state is both internally and externally inconsistent, and thus Hegel's conclusion that the state represents the general will of the people is incorrect. "In Marx's words, Hegel...confronts civil society as a sphere of 'materialism' with the 'idealism' or 'spiritualism' of the state" (Avineri 1968, p. 18). While Hegel is correct in recognizing the unique dualistic nature of modern society, of a public and private sphere, according to Marx, Hegel is incorrect to assume that in the public sphere the egoism of civil society is overcome. By assuming the idealistic state Hegel fails to recognize that members of civil society control the state in their own interest. If Hegel proceeded from his accurate materialist conception of civil society to a materialist analysis of the state he would have realized the contradictions in his theory. This is precisely what Marx highlights in the *Critique*.

In the Assembly of Estates, where the aims of civil society are reconciled with the aims of the state, the bureaucracy, according to Hegel represents the general will of the people. However, the bureaucracy that Hegel posits as the representation of the general will, Marx shows to be an illusion. Marx does this through an analysis of the people who comprise the bureaucracy. Summing up Marx's position on the bureaucracy, Avineri states, "delegates are elected in order to serve the general interest of society, but in practice they tend to be unashamed spokesmen for their particular interests, and the mediation between the particular and the general never really takes place" (1968, p. 18). In the *Critique*, Marx "condemns the bureaucracy as a closed corporation, a kind of civil society within the state, which transforms the universal aims of the state into another form of private interest. It is a 'pseudo-universal' class whose members disdainfully regard popular life as material to be manipulated in the pursuit of their own careers" (O'Malley 1970, p. lii; see Marx 1970, pp. 44-54). According to Avineri, Marx "shows that Hegel's discussion of the state ignores the social context of human relationship at the same time as it rationalizes existing social organization. In Hegel's theory, the state is described as if it can be discussed without a simultaneous reference to the individuals whose roles it organizes" (1968, p. 17).²⁸ In other words, according to Hegel, the bureaucracy is necessary to prevent vested interests from obtaining and maintaining their egoistic hegemony over the state and society. For Hegel, showing that society has a

²⁸ In the *Critique* we begin to see Marx working out his own theory of a universal class that truly would represent the general will of the population. This would eventually emerge as the proletariat in Marx's later works (see O'Malley 1970, pp. lii-liv).

bureaucracy is sufficient to assume that it works for the general will. Yet, for Marx the failure of Hegel to understand the bureaucracy as it exists in reality, also fails to understand that the bureaucracy does not function so as to serve the general will.²⁹

From the *Critique* we can begin to see the foundation of principles that would become central to Marx's own philosophy of the state.³⁰ The state, according to Marx, is the political organization that reflects the property and class relations of those that comprise society. For Marx, according to Avineri, the "state and property are thus incontestably shown to be interlocked with one another. Far from being protected from the claims and pressures of property and civil society, the state reflects, according to Marx, property relations and class differences" (1968, p. 31). In the *German Ideology*, Marx and Engels make this point clearly:

Through the emancipation of private property from the community, the state has become a separate entity, alongside and outside civil society; but it is nothing more than the form of organization which the bourgeois are compelled to adopt, both for internal and external purposes, for the mutual guarantee of their property and interests. The independence of the state is only found nowadays in those countries where the estates have not yet completely developed into

²⁹ There is another similarity here between Hegel and other liberal philosophers. Because of the necessary conflicts that exist in class society the bureaucracy becomes necessary to assure that one class does not dominate another in the public arena. Liberal philosophers believe that they can circumvent the underlying economic inequality of the system through political equality. However, without altering the underlying economic inequality, political equality will forever elude them. Thus, even in a society where the bureaucracy supposedly represents all stake-holders in the economy and appears to work for the general will, still represents the will of the ruling class.

³⁰ While never systematically formulated into a general philosophy of the state, there are main principles that both Marx and Engels adhered to throughout their lives that can be viewed as an incomplete philosophy of the state.

classes...where consequently no section of the population can achieve dominance over the others (1976, p. 99).

Moreover,

since the state is the form in which the individuals of a ruling class assert their common interests, and in which the whole civil society of an epoch is epitomized, it follows that all common institutions are set up with the help of the state and are given a political form. Hence the illusion that law is based on the will, and indeed on the will divorced from its real basis—on *free* will (1976, p. 99).

The neutrality of the state is thus an illusion. It is however a necessary illusion for maintaining the power relation of the ruling over the ruled. Again from *The German Ideology*,

The individuals who rule in these conditions—leaving aside the fact that their power must assume the form of the *state*—have to give their will, which is determined by their definite conditions, a universal expression as the will of the state, as law, an expression whose content is always determined by the relations of this class, as the civil and criminal law demonstrates in the clearest possible way. Just as the weight of their bodies does not depend on idealistic will or on their arbitrary decision, so also the fact that they enforce their own will in the form of law, and at the same time make it independent of the personal arbitrariness of each individual among them, does not depend on their idealistic will (1976, p. 348).

In much of the Marxian literature on the state, there are two principle and compatible approaches to understanding the capitalist state. The instrumentalist approach, best summarized by the work of Ralph Miliband (1969), shows that the state is controlled directly by the capitalist class. This occurs because members of the capitalist class hold high positions in government, or by maintaining influential, though indirect, control over those in positions of power. In his debate with Miliband, Nicos Poulantzas (1969) articulates the structural approach to the state, arguing that the state will be forced

to act in the interest of capital, even if the state is not comprised of members of the capitalist class. In other words, the capitalist state is constrained to do the bidding of the capitalist class by its very nature.³¹ Investigating whether the state is comprised of members of the capitalist class and if the state acts in the interest of this class even when prominent positions in the government are not comprised of members of the capitalist class can validate both of these claims.

Empirical Evidence Against the Neutrality of the State

Rather than assuming the neutrality or non-neutrality of the state we will attempt to see if Marx's critique of Hegel's assumption of the state's neutrality is justifiable as it relates to the role of the state in the United States historically. In particular we will look at the Federal Government of the United States and whether or not the historical tendencies of this institution are to enact and preserve legislation that favors the business class rather than acting according to the general will of the population. If the state can be shown to not be neutral, and in fact generally supports the prerogatives of business interests, this will support our claim that externality theory has little possibility of succeeding in practice. However, before we move on to a historical analysis of the symbiotic relationship between government and business, or between the ruling class and the capitalist class, to use Marx's terms, we must elaborate on a couple of things.

First, a distinction must be made between "the state" and "the government". The state is a conglomeration of different public institutions that reside over public life.

³¹ For an overview of the debate and the differing perspectives on the state see Clyde W. Barrow (1993) (see also Carnoy 1984; Jessop 1982).

These include the military, police, the prison system and bureaucratic agencies, in addition to the legislative, executive and judicial branches of government. The government on the other hand comprises an aspect of the state but is resigned to controlling legislative and judicial processes, while maintaining certain levels of authority on other parts of the state like the military and certain bureaucratic agencies. While the “philosophy of the state” of both Hegel and Marx encompass the entirety of the state, we will focus simply on the government, in particular the federal government in the way Marx focused on Hegel’s bureaucracy. We do this because the systems of “checks and balances” in the United States government is often touted as a guarantee that no one group or class will be able to dominate social policy. Moreover, since the population gained the right to directly elect members of the House of Representatives, the Senate and the Executive branch of the federal government, these bodies are extolled as representing the interests of the general will.³² In addition, at the federal level the government has a great deal of control over other parts of the state apparatus. Thus, the tripartite institutional system of the federal government—the legislative, executive and judicial bodies—are supposed to act in similar fashion to Hegel’s bureaucracy articulated above.

Second, it should be noted that any theory, and especially a theory as broad as a “philosophy of the state” will not be able to capture all scenarios that occur in every

³² The “general will” as the term will be used going forward can be thought of synonymously with the larger public interest. This is the basic idea behind the democratic ideal that no one group in society is allowed to take precedence over the will of the majority.

circumstance and time period. For example, we can see historically, certain instances in which the state moves seemingly against business interests, enacting legislation that is in the interest of the majority of the population. Yet, in nearly every historical case in which socially beneficial legislation is enacted, it has been enacted not through the benevolence of the legislative or executive body but through massive social pressure based on social unrest and popular upheaval. This brings up an important issue regarding the state in general and government in particular. Both the state and the government are susceptible to the general will of the population if the population exerts enough pressure on the government through massive social organization that forces the government to enact progressive legislation.³³ However, it can be shown that this is an exception. The tendency is for government to work in the interest of the capitalist class, i.e. ensuring the continued accumulation of capital and ensuring the reproduction of the capitalist system (Campen 1986).³⁴

Third, the adequacy of a theory should be judged based on whether it elaborates on certain fundamental relationships and highlights the nature and logic of what it has set out to show. In other words, a successful theory should shed light on the structural

³³ Interestingly, in none of the externality theory literature will one find any recommendation that the government become more democratic or that support for social upheaval and formation of a mass movement be started to force government and thus business to recognize social costs.

³⁴ Campen notes that accumulation and reproduction can come into conflict based on particular interest of members of the capitalist class and thus “there is no guarantee that the state will always be successful in promoting the needs of the capitalist class as a whole” (1986, p. 113).

relationships and the regular workings of that which it is articulating. We feel that Marx's theory of the state does just this. In what follows we will attempt to show, through the use of historical examples that the marriage between business and the state is the rule rather than the exception and thus that the possibility of implementing externality theory through a government mandate is a virtual impossibility, at least as the political situation in the United States stands at present.

As the liberal philosopher John Dewey said, politics is “the shadow cast on society by big business” (quoted in Chomsky 2004, p.15). In fact, the control of government by the wealthy and business was a fundamental principle of the constitution of the United States. James Madison, perhaps the most influential founding father in drafting and promoting the constitution, “held that power must be delegated to ‘the wealth of the nation,’ ‘the more capable set of men,’ who understand that the role of government is ‘to protect the minority of the opulent against the majority’” (Chomsky 2004, p. 7). Moreover, of the people who attended the secret Constitutional Convention “virtually all...were merchants and planters, or their legal spokesmen—representing in a direct sense the life and experience of less than 10 per cent of the American people” (Mendelson 1960, p. 11). The Federalists, who were the conservative group of founding fathers, were very concerned with controlling “the great beast,” as Alexander Hamilton labeled the populous (quoted in Mendelson 1960, p. 9). Another member of the Federalist group John Jay summarized their position by saying that “the people who own the country ought to govern it” (quoted in Mendelson 1960, p. 7).

In *Federalist Paper # 10*, Madison argues that with a strong central government “it will be more difficult for all who feel it to discover their own strength, and to act in unison with each other...The influence of factious [class] leaders may kindle a flame within their particular States, but will be unable to spread a general conflagration through the other States” (quoted in, Zinn 1999, p. 97). The people who needed to be controlled were the lower classes, i.e. the majority of the population who could threaten private property and the necessary inequality that corresponds to it. By using their majority position this class could democratically seek an equitable distribution of the countries wealth.

The primary mechanisms for assuring property's superiority over majority rule were the different branches of the federal government. Madison wanted the House of Representatives, to represent the people through elections but “was intent on removing the first branch of the legislature as much as possible from the passions and excesses of the people” (Nedelsky 1990, p. 53). Representatives in the House should “not simply implement, but to refine the views of their constituents...[and] resist unjust schemes that would violate the rights of property” (Nedelsky 1990, p. 53). The Senate was to be a smaller body and thus less susceptible to popular influence. “Madison particularly wanted the Senate to prevent the popular branch [the House] from violating property rights” (Nedelsky 1990, p. 56). They should resist the “leveling spirit” of the masses. Finally, the Executive branch was to be the final check should the legislative branches enact legislation against private property. Thus, for the conservative Federalists, the

system of “checks and balances,” based on a strong central government was a mechanism for controlling the people so that they did not interfere with the undertakings of the privileged elite (Mendelson 1960, p. 10).³⁵

The Federalists carried the day and the constitution was ratified maintaining the majority of the Federalist positions. As Arthur Selwyn Miller, in his study of law and corporations states,

the myth to the contrary notwithstanding, the state has never been hostile to business interests (to economic wealth) in the United States. The Constitution itself provides ready illustration in the clause prohibiting states from making laws impairing the obligation of contracts—a provision designed to protect creditors and to proscribe legislature from interfering with private agreements (1976, p. 42).

Thus, from its inception the goal of the government was not to separate the interest of the wealthy and government but a marriage between the two.

This is not to say, as Charles Beard’s (1925) work *An Economic Interpretation of the Constitution of the United States*, that the members of the Constitutional Convention can be divided into two distinct groups whose members voted for or against ratification of the Constitution based strictly on their personal interests. According to Beard, the group of Federalists who ultimately had their version of the Constitution ratified, drafted

³⁵ With ratification of the constitution the federal government was “made to supercede the states at least in areas important to conservatives. States were forbidden to impair the obligations of contracts (for example via ‘stay laws’), issue paper money, make debts payable in anything but gold or silver coin, or to impose specified burdens upon commerce (Article I, Sec. 10)...On the affirmative side, the Constitution gave the new government fiscal independence and extensive authority, including power to promote and protect both domestic and foreign commerce (Article I, Sec. 8)” (Mendelson 1960, p. 14).

the Constitution to strictly benefit their own property holdings and sought entirely their own personal gain.

Beard's strong position has been systematically addressed by Forest MacDonald (1958) in *We the People*. In this book, MacDonald shows that the individuals voting for and against ratification were interspersed between the two groups in their allegiances to merchants, farms, personal property, government debt, slave holdings, etc., and thus did not vote according to these holdings. Ultimately MacDonald concludes, "it is therefore not even theoretically possible to devise a single set of alignments on the issue of ratification that would explain the contest as one in which economic self-interest was the principal motivating force" (1958, p. 398). While Beard's thesis can be seen as simplistic and untrue in fundamental details, this does not negate the fact that ultimately the Constitution adopted was a pro-property document. Ultimately, following Madison and the Federalists, the Constitution and governmental institutions derived there from accomplished their goal of protecting private property, inequality, and elite governmental control, while subordinating the democratic rights of majority rule (see Nedelsky 1990).

Since its birth, the governing bodies of the federal government have adhered to the principles of Madison. This should come as no surprise as those that could vote initially did not make up a majority of the population, i.e. they had to be white, male, and own property. In addition, those that became members of each branch of the federal government, while at times paying lip service to the majority, were often not from the economic background of the majority. A summary of those comprising the Democratic

and Whig parties in the period of “Jacksonian Democracy” is presented by Douglas Miller:

Although both parties aimed their rhetoric at the people and mouthed the sacred shibboleths of democracy, this did not mean that the common man ruled America. The professional politicians coming to the fore in the twenties and thirties, though sometimes self-made, were seldom ordinary. Both major parties were controlled largely by men of wealth and ambition. Lawyers, newspaper editors, merchants, industrialists, large landowners, and speculators dominated the Democrats as well as the Whigs (quoted in, Zinn 1999, pp. 216-217).

Protection of industry and the business class often took the form of tariff protection. From 1791 to 1820 tariffs were raised from 5% to 40% on average, in order to protect the “infant industries” of the north (Chang 2008, pp. 49-51). During the Civil War, “Congress was passing and Lincoln was signing into law a whole series of acts to give business interest what they wanted...The Republican Platform of 1860 had been a clear appeal to businessmen” (Zinn 1999, p. 238).³⁶ In 1861 the federal government passed the Morrill Tariff which increase already high tariffs on foreign goods. Tariffs would remain extremely high for the next half-century, protecting American business interests from competition. As Ha-Joon Chang shows, “tariffs on manufactured imports

³⁶ It should also be noted that during the Civil War, “anyone” could avoid conscription by paying \$300. Obviously the only people who could do this were the wealthy. Thus, they were able avoid military service and make enormous fortunes by selling the government goods during the war. Some of the most recognizable names in American business history and other “commercial houses imposed at high prices shoddy material and semi-putrid food upon the very army and navy that fought for their interests” (Myers 1937, p. 188). For example J. P. Morgan “bought five thousand rifles for \$3.50 each from an army arsenal, and sold them to a general in the field for \$22 each. The rifles were defective and would shoot off the thumbs of the soldiers using them. A congressional committee noted this in the small print of an obscure report, but a federal judge upheld the deal as the fulfillment of a valid legal contract” (Zinn 1999 p. 255).

remained at 40-50% until the First World War, and were the highest of any country in the world” (Chang 2008, p. 54). In particular, tariff protection was highly lucrative for U.S. Steel, a J. P. Morgan company. Morgan ensured his success, “by making sure Congress passed tariffs keeping out foreign steel; by closing off competition and maintaining the price at \$28 a ton; and by working 200,000 men twelve hours a day for wages that barely kept their families alive” (Zinn 1999, p. 257).

In the middle of the nineteenth century big business, especially the railroads used their power to obtain massive handouts from the government. As Howard Zinn articulates,

railroad men traveled to Washington and to state capitals armed with money, shares of stock, free railroad passes. Between 1850 and 1857 they got 25 million acres of public land, free of charge, and millions of dollars in bonds—loans—from the state legislatures. In Wisconsin in 1856, the LaCrosse and Milwaukee Railroad got a million acres free by distributing about \$900,000 in stocks and bonds to fifty nine assemblymen, thirteen senators, the governor. Two years later the railroad was bankrupt and the bonds were worthless (1999, p. 220).

In addition, during the Civil War “over 100 million acres were given by Congress and the President to various railroads, free of charge” (Zinn 1999, p. 238).³⁷

In the first one hundred and fifty years after the war of independence the law too was utilized to serve the interest of business. Early on the Supreme Court utilized “its self-assumed power to invalidate actions of other government agencies” in the interest of

³⁷ This does not begin to show the enormous amounts of corruption that revolved around the railroads especially later in the century giving the railroad men the title “robber barons”. The corruption, it should be added, was legitimized and seldom prosecuted by the government. Enormous land giveaways, the issuance of overpriced bonds or watered stock were the favorite weapons of these men (see Zinn 1999, pp. 254-255).

business (Miller 1976, p. 48). This meant that the governing body instead of blindly interpreting the law, actually used their power to overturn popular legislation, when seldom enacted, to preserve business interests. “The law...has never been passive or colorless. It has been employed, overtly or covertly, as the means to compel adherence to the values of those who hold economic wealth. This may be seen in both constitutional law and in the private law of contracts, torts, property, and crimes” (Miller 1976, p. 41). Citing two court cases, *Fletcher v. Peck* and the *Dartmouth College Case*, as particular examples of the Supreme Court upholding contracts, even fraudulent in the former case, Miller states, “between 1809 and 1861 the Supreme Court in thirty-seven decisions declared state acts unconstitutional. Of them almost half—eighteen—were based on the obligation-of-contracts clause” (1976, p. 42). Again, according to Miller,

these decisions [*Fletcher v. Peck* and the *Dartmouth College Case*] are fundamental; they set the intellectual pattern for subsequent judicial action. The development took two forms: first, the uncritical acceptance of arguments made by corporation lawyers was clearly evident in the post-Civil War period; and second, the Justices felt free to find new rights buried within the cryptic clauses of the Constitution. The further point is that the Supreme Court was the object of pressure group tactics designed to advance property rights; that is, the target of litigation. That it succumbed quite easily to the blandishments of lawyers for business interests should not be considered astonishing. Judges, historically and contemporaneously, have been drawn from the “ruling class” in the United States, and it would be odd indeed if they did not generally reflect the values of that group (1976, p. 44).

This statement is echoed by Justice Samuel F. Miller: “it is vain to contend with judges who have been at the bar the advocates for forty years of railroad companies, and all the forms of associated capital, when they are called upon to decide cases where such interests

are in contest. All their training, all there feelings are from the state in favor of those who need no such influence” (quoted in Miller 1976, p. 46).

With the *state-granted* rights to incorporate, and protection early on from the courts, corporations began to increase vastly in both number and in size. With this growth, corporations increasingly wielded their power to curry more favors from the courts. One particularly egregious example of the way law was distorted revolved around the Fourteenth Amendment to the constitution.

The Fourteenth Amendment was originally adopted in order to give rights to freed slaves after the civil war. However, business sought to utilize the amendment in their favor. The Supreme Court began to interpret the Fourteenth Amendment as a pro-corporation amendment culminating in corporations receiving the liberties of a person under the constitution. By the 1890’s,

the Supreme Court had accepted the argument that corporations were ‘persons’ and their money was property protected by the due process clause of the Fourteenth Amendment. Supposedly, the Amendment had been passed to protect Negro rights, but of the Fourteenth Amendment cases brought before the Supreme Court between 1890 and 1910, nineteen dealt with the Negro, 288 dealt with corporations (Zinn 1999, p. 261).

Thus, “the freed slaves were forgotten; replacing them in the eyes of the Court were the business corporations” (Miller 1976, p. 45). Summarizing the overarching role the courts played in support of business and corporations against the interests of labor, Miller concludes that,

one would have to be naïve indeed if he supposed that the Justices did not know what they were doing. Of course they did. They freely struck down statutes designed to ameliorate working conditions as violative of due process (liberty of

contract) in as high-handed an example of judicial fiat as has ever been seen...The Supreme Court encouraged business to organize collectively but created obstacles out of the whole cloth to prevent labor from doing so (Miller 1976, pp. 45-46).

The same thing was occurring in tort law. Tort law has as its foundation, that “a person who willfully or negligently harms another’s person or property must answer by paying money damages. The analogue of contract, which is a consensual obligation, a tort is a nonconsensual legal obligation” (Miller 1976, p. 47). Thus, certain aspects of tort law should encompass workers rights and safety from negligent producers that caused worker injuries. However, early in the countries history this did not occur. “In tort law judges created doctrines of ‘contributory negligence,’ ‘assumption of risk,’ and the ‘fellow servant rule,’ all of which served to insulate the enterprise from liability. By ‘freely’ taking a job, said the judges, the workers ‘assumed the risk’ of any accident that might occur” (Miller 1976, p. 47). Summarizing the legal system in the industrializing United States, Miller states,

as with constitutional law, so with the private law of contracts, of property, and of torts. Judge-made rules in those fundamental categories had the result to transferring the social costs of private enterprises from the enterprise itself to the workingman or to society at large. Tort law provides apt illustration. Under its doctrines, a person who willfully or negligently harms another’s person or property must answer by paying money damages...Who, then, bore the costs, in accidents and in deaths, of the new industrialism? Not the businessman. Not the corporation. The worker himself. (Often those workers were children.) And who bore the costs of pollution and other social costs? Society at large. (Miller 1976, p. 47).

This relieved businessmen from any liability to their workers while the courts allowed for the extremely harmful working conditions to continue unabated.

Some may point to progressive legislation of the so-called “Progressive Era” of American politics, enacted to protect consumers and other small producers against the large and powerful corporate and monopoly interests, as examples where the state intervened on behalf of the majority against large business interests. One such piece of legislation was the Sherman Anti-Trust Act enacted in 1890. Allegedly established to curtail monopoly power, this act was rendered essentially useless against such goals (Zinn 1999, p. 260). The Sherman Anti-Trust Act was however, very successful as a tool against labor unions which the courts deemed “illegal combinations.” The Supreme Court in 1911, ruled that only “unreasonable” monopoly action would be curtailed, allowing many monopolies to stay in place (Miller 1976, p. 66).³⁸ In *United States v. Swift & Co. 1932* the Court held that “bigness in and of itself was no violation of the antitrust laws...thus insuring that no legal barrier—constitutional or statutory—existed for the growth of supercorporations” (Miller 1976, p. 66). The same can be said for the creation of the Interstate Commerce Commission, where Attorney General Richard Olney, in an attempt to persuade the railroads to embrace the Commission, stated “the part of wisdom is not to destroy the Commission, but to utilize it” (quoted in Miller 1976, p. 67). Referring to the bill that established the Interstate Commerce Commission, Richard White notes, “it was never entirely clear whether it was an antimonopoly measure or a

³⁸ Some “unreasonable” monopolies were dismantled under the act. For example, Standard Oil Company was broken up into smaller organizations resulting from monopolistic practices by the company. However, many monopolies were left in place and of those prosecuted almost no one was sent to prison.

way to weaken the thrust of antimonopoly; whether it was a railroad measure or a blow to at the railroads” (2011, p. 356).

The big bankers of the time, while wanting more stability in the economy, were more than willing to receive generous gifts from the government. For example, one bank in the Morgan family was allowed to issue U.S. government bonds to the tune of \$260 million dollars. This sounds legitimate until one realizes, as Zinn points out, “the government could have sold the bonds directly; it chose to pay the bankers \$5 million in commission” for their services (1999, p. 255). In 1895, a number of prominent banks sold gold reserves to the federal government in exchange for cheap U.S. Treasury bonds. Fortunately, “the bankers immediately resold the bonds at higher prices, making \$18 million profit” (Zinn 1999, p. 256). Another stark example of the way government supported business and the banks, yet was unwilling to support the populous is articulated by Zinn:

In 1887, with a huge surplus in the treasury, [Grover] Cleveland vetoed a bill appropriating \$100,000 to give relief to Texas farmers to help them buy seed grain during a drought. He said: ‘Federal aid in such cases...encourages the expectation of paternal care on the part of the government and weakens the sturdiness of our national character.’ But that same year, Cleveland used his gold surplus to pay off wealthy bondholders at \$28 above the \$100 value of each bond—a gift of \$45 million (1999, p. 259).

The New Deal era under the administration of Franklin Delano Roosevelt is a unique period in American history. Some of the most progressive legislation in American history was passed at this time, countering our claim that the government works in the interest of the capitalist class. However, the seemingly abnormal behavior

of the government in this era can be attributed to the crisis of capitalism that emerged during the Great Depression, which brought with it enormous popular unrest in addition to a crisis amongst members of the capitalist class as to how to solve the problem.

Amidst the Great Depression, with massive unemployment, massive social upheaval, the recent Bolshevik Revolution of 1917 in Russia and the rise of Fascism in Germany and Italy there was enormous pressure on the government to preserve capitalism. Roosevelt articulated his fear clearly in one of his “Fireside Chats” delivered to the American people in 1938:

Democracy has disappeared in several other great nations-not because the people of those nations disliked democracy, but because they had grown tired of unemployment and insecurity, of seeing their children hungry while they sat helpless in the face of government confusion and government weakness through lack of leadership in government. Finally, in desperation, they chose to sacrifice liberty in the hope of getting something to eat (1992, p. 118).

During the Great Depression the unemployed organized protests, that “were virtually all radical-led, largely by open communists” (Goldfield 1989, p. 1270). Farmers revolted against the low market prices for their produce and against the banks that were attempting to foreclose on their property (Goldfield 1989, p. 1271). Labor was organizing strikes under communist leadership and the influence of the Industrial Workers of the World. In 1935, John L. Lewis broke away from the conservative American Federation of Labor and started a more militant Congress of Industrial Organizations. “The labor insurgency, with its accompanying conflict and violence caused by intransigent company resistance, had reached proportions truly alarming to the economic and political elites” (Goldfield 1989, p. 1273). Frances Fox Piven and Richard

A. Cloward summarize the social climate of the time: “the spread of destitution itself was no great force; for a considerable period of time elites remained aloof from the suffering in their midst. But then the destitute became volatile, and unrest spread throughout the country. It was only when these conditions, in turn, produced a massive electoral convulsion that government responded” (1971, pp. 76-77). Thus, the position of Roosevelt and some others in congress “was that government regulation was necessary to constrain, limit, and control the increasingly militant labor movement” in order to preserve the capitalist system (Goldfield 1989, p. 1274).

The great social turmoil that emerged during the Great Depression also created divisions between members within the business class and within government as to how to solve the problems of capitalism. The divisions between elites in the Democratic Party and the Republican Party, states Domhoff, were based on the fact that “the leaders of the two parties [had] intra-class differences” (1967, p. 86). The controversy between parties over the New Deal expressed these differences. Some members of the business community were staunchly opposed to the New Deal while others supported it. The position of politicians supporting the New Deal is summarized by Representative Connery in 1935 who supported the National Labor Relations Act.

Dr. Lederer, [an opponent of the act and representative of the Petroleum Industry] I believe personally that the big corporations, like the Standard Oil Company, the Shell Oil Company, and these big textile industries, and the automobile industry, are very short-sighted...They regard us as enemies of the employers, as actually being inimical to the employers, when we are not. What we are trying to do, Dr. Lederer, is to save those corporations from communism and bloodshed, and, Dr. Lederer, the Government wants them to give labor of the United States a fair deal. The American Federation of Labor, to which you referred, is the bulwark that is

holding back communism in the United States among the workers...They are keeping men in line who, if they did not have that union, would say ‘All right, we get no protection from the government; we are slaves to our employers. Let us go out like they did in Russia and let us turn the government upside down and take the money away from these fellows...I am surprised that the big employers cannot see that, and do not regard the committee as their friend rather than an enemy (quoted in Goldfield 1989, p. 1276).

This statement represents the split between members within the capitalist class. Some of viewed progressive legislation as serving the interest of their class and others did not. In addition, while Roosevelt lost some wealthy supporters when he enacted the New Deal, such as Vincent Astor, “most rich backers remained with him, and several more joined the ranks” (Domhoff 1967, p. 93). Those capitalists that remained loyal to the Democratic Party saw the benefit of the New Deal in maintaining the capitalist system and increasing both demand and profit in their industries.³⁹

While there was internal class conflict over the New Deal, those of wealth and means still comprised the ruling class. In his study that examines the period between 1932 and 1964 titled *Who Rules America?*, G. William Domhoff shows “the fundamental fact that the American upper class is a governing class” (1967, p. 2). Importantly, Domhoff’s study pays particular attention to the Democratic Party. Popularly viewed as the counter to the Republican Party which is categorized as the party of “big business”, Domhoff states the fact is “that the Democratic Party is controlled by different members

³⁹ As mentioned above, while the *tendency* for both the government and the state is to act according to the interest of the business class, government is *potentially* susceptible to popular social pressures. This is one reason the business community feels it necessary to spend enormous amounts of money influencing government in their favor (for a study of business reaction to the New Deal, see Fones-Wolf 1994).

of the same elite group...The facts are that the Democratic Party appeals to the common man for its support but is controlled by aristocrats” (1967, pp. 85-86). Thus, it is safe to assume that, devoid of the massive popular social pressure that emerged during the Great Depression and divided the capitalist class, the tendency of government would have been to side with a more unified capitalist class.

Lastly, the most egregious examples in history of government intervention on behalf of business interests are wars or coups waged on foreign leaders. While the official reasons given by politicians for military intervention in foreign countries are rarely, if ever, explicitly articulated to the public as being based on promotion of business interests, there is ample evidence that economic interests play a dominant role. Many military interventions have been waged to either protect investments abroad or to provide markets for surplus goods produced in America (Zinn 1999, p. 314). For example, the “intervention” into Hawaii in 1893 to overthrow the independent Queen Liliuokalani was conducted primarily for the sugar interests in the region, after the queen sought to give her people rights that would be contrary to the sugar interests (Kinzer 2006, chapter 1). Military intervention in Cuba in 1898 was touted as an intervention for Cuban emancipation from Spanish rule. However, total emancipation of the Cuban people “struck fear into the hearts of American businessmen, who had more than \$50 million invested on the island” (Kinzer 2006, p. 36). Thus, through the forced implementation of the Platt Amendment, the U.S. could control Cuba by continuously “maintaining submissive local regimes” (Kinzer 2006, p.42). Intervention in the Philippines in 1899

was justified privately by President McKinley, “saying he was acting to seize ‘the commercial opportunity’” (Kinzer 2006, p. 47). The government of Nicaragua was overthrown in 1909 in a coup orchestrated by the U.S. and instigated by U.S. timber and mining companies (Kinzer 2006, pp. 64-68). Many more examples exist; the “opening of Japan” (with gunboats) in 1854, the coup to overthrow the democratically elected prime minister of Iran in 1953 for access to oil (Kinzer 2003), the coup in Guatemala in 1956 at the behest of United Fruit (Schlesinger and Kinzer 1999),⁴⁰ the coup in Chile in 1973 primarily for mining interests (Kinzer 2006, Chapter 8). This is just to name a few of the best-documented and most egregious examples of United States government intervention abroad in favor of business interests.

1970’s to the Present

Instead of diminishing, the power of big business over government policy has increased dramatically over the past three decades. In their important study *Who Runs Congress* (1975), the authors show the enormous amount of power business maintains over Congress and the legislative process. As Ralph Nader writes in his Introduction, of

⁴⁰ As Kinzer notes, “Few companies have ever been as closely interwoven with the United States government as United Fruit was during the mid-1950s. [John Foster] Dulles had, for decades, been one of its principal legal counselors. His brother, Allen, the CIA director, had also done legal work for the company and owned a substantial block of its stock. John Moors Cabot, the assistant secretary of state for inter-American affairs, was a large shareholder. So was his brother, Thomas Dudley Cabot, the director of international security affairs in the State department, who had been United Fruit’s president. General Robert Cutler, head of the National Security Council, was its former chairman of the board. John J. McCloy, the president of the International Bank of Reconstruction and Development, was a former board member. Both undersecretary of state Walter Bedell Smith and Robert Hill, the American ambassador to Costa Rica, would join the board after leaving government services” (2006, pp. 129-130).

the members of Congress, “many use their office to enrich themselves...Many work for special interests to secure their reelection resources or massage their egos and lust for power...Special interests long ago learned that gifts, free trips, cash, and women lavished on key committee or other Congressional staff can result in the desired behavior by the boss without much risk of exposure” (1975, pp. x-xi).⁴¹ In their recent book *Winner-Take-All-Politics* (2010), Jacob S. Hacker and Paul Pierson, argue that there was a dramatic shift in American domestic policy that occurred in 1978. This shift reversed the economic policies of social protection for the poor and the checks on the exorbitant fortunes of the rich that emerged with the New Deal. These policies have created enormous income inequality in the United States over the last three decades.

Contrary to conventional wisdom which figures that government can only affect income through taxation, Hacker and Pierson show that big business and the wealthy elite have been able to influence government policies that dramatically affect both their pre-tax income and their after-tax income (2010, pp. 43-45). The three primary ways in which pre-tax income was affected, according to Hacker and Pierson, was through the systematic destruction of unions (and thus the destruction of the social safety net),

⁴¹ Often the lines distinguishing big business and government are not easily decipherable. Many people in government, after they leave or are removed, go on to have extremely lucrative careers as lobbyists or working directly in the private sector. In other circumstances members of government who have business holdings use their position to help themselves and their contributors out. For example, Joel Broyhill, a congressman from Virginia in the early 1970’s, who maintained a “net worth of \$3.8 million, about \$2.5 million has come from real estate investments”, and due to his position on the Ways and Means Committee, he “made sure during his twelve-year tenure...that the Internal Revenue Code would benefit...real estate developers, builders, and investors” (Green et al. 1975, p. 11). Many of whom contributed to his election campaign.

increasing executive compensation, and the deregulation of the financial sector (Hacker and Pierson 2010, pp. 56-70). All of these were established by the friendly relationship between wealthy groups, big-business and the federal government.

In addition to influencing the pre-tax income of wealthy Americans and big business, government set out to reduce the tax burden of these groups, thus greatly enhancing their after-tax income and profits. Justified by the fallacious “trickle-down” economic policies, over the last three decades both corporations and the wealthiest one percent of Americans have seen their tax rate diminish dramatically (Hacker and Pierson 2010, pp. 48-51). According to William Greider, between 1977 and 1990 the federal government enacted seven major pieces of tax legislation and “the tax burden on the richest 1 percent of the population fell cumulatively by a staggering 36 percent...[while] families in the very middle of the income ladder experienced a 7 percent increase in their federal tax burden” (1992, p. 80). In addition, between 1980 and 1988, corporate income taxes were reduced by 23 percent (Greider 1992, p. 94). Greider also puts the landmark date of regressive taxation at 1978 and states that, since then both Republican and “Democratic majorities have supported this great shift in tax burden every step of the way” (Greider 1992, p. 94; see Johnston 2003). Highlighting the double standard in the tax system, David Cay Johnston writes,

the rules that governments set for their tax systems, and the degree to which they enforce them, also affect who prospers. Congress lets business owners, investors and landlords play by one set of rules, which are filled with opportunities to hide income, fabricate deductions and reduce taxes. Congress requires wage earners to operate under another, much harsher set of rules in which every dollar of income from a job, a savings account or a stock dividend is reported to the government,

and taxes are withheld from each paycheck to make sure wage earners pay in full (2003, p. 10).

At the same time the redistributive policies that favor the poor have been eviscerated. “Between 1980 and 2003, for example, the percentage by which government taxes and benefits reduced inequality (as measured by the Gini index, a common inequality standard) fell by more than a quarter” (Hacker and Pierson 2010, p. 52).⁴²

One of the main tactics utilized by big business to influence government to enact legislation in their favor, or more often to thwart progressive legislation is through lobbying. A lobbyist is technically defined as “anyone who works to influence decisions by public officials—including a concerned citizen who writes his congressman urging a vote for stricter air pollution laws...But the way the armies of special interest agents have largely monopolized these guarantees into tools for private government has made ‘lobbyist’ synonymous with corruption, shiftiness, and improper influence” (Green et al. 1975, p. 29). However, the “corruption, shiftiness, and improper influence” in many cases is entirely legal and should be viewed as the normal course of affairs between business and government.

Generally masked beneath spurious titles, such as the National Wetlands Coalition, an oil and gas lobby (Korten 1995, p. 143) these groups spend massive

⁴² David Cay Johnston (2003), in his book *Perfectly Legal*, highlights the many ways in which the wealthy have found ways to avoid paying taxes through loopholes or rewriting tax laws, in order to shift the tax burden away from the wealthy and shifted the burden onto the middle and lower income groups in society. All of which has been conducted during both Republican and Democratic administrations.

amounts of money to influence government in their favor.⁴³ The “astronomical” figures reported from the 1973 lobbying efforts of Congress of \$9.7 million, with an “estimated five thousand or more full-time lobbyists in Washington,” (Green et al. 1975, p. 29) appear quaint when compared with today. According to the Center for Responsive Politics, the total lobbying dollars spent in 2011 were \$3.31 billion, more than doubling from 1998 to 2011 (“Lobbying Database”). “This figure...almost certainly dramatically understates true expenditures to influence policy” (Hacker and Pierson 2010, p. 114). The total number of lobbyists in 2011 amounted to 12,655 persons (“Lobbying Database”). The largest contributions have come from the pharmaceutical and health industry amounting to \$2.323 billion from 1998 to 2011. Over this same period, the electric utilities industry, ranked third, contributed \$1.555 billion and the oil industry, ranked fifth, contributed \$1.223 billion (“Top Industries”). Specifically, the coal mining industry spent \$18,152,107 hoping to ensure that coal is continuously used as a primary source of electricity for years to come (“Coal Mining”).

The power of these lobbies should not be underestimated. These groups have enormous resources, both financial and in the form of gigantic staffs of professionals who are able to influence legislators. Their staffs, far larger than most congressional staffs, are well equipped and can provide congressmen with large amounts of information in

⁴³ In addition to the National Wetland Coalition, “corporate-sponsored Consumer Alert fights government regulations on product safety. Keep America Beautiful attempts to give its sponsors, the bottling industry, a green image by funding antilitter campaigns, while those same sponsors actively fight mandatory recycling legislation” (Korton 1995, p. 143).

support of their cause. According to Green et al., this is “why congressmen so often have to depend on the superior manpower of lobbies to suggest solutions to problems, draft legislation, provide the evidence for it, help develop legislative strategy, persuade the rest of Congress to go along, and even raise the problems in the first place” (1975, p. 31). For example,

when fully mobilized, oil [the oil lobby] can send into action lawyers from the most respectable law firms, public relations consultants, numerous ex-government officials, newsmen who serve as ‘advisers,’ company executives, corporate legal departments, admen from advertising agencies, government officials in several of the executive departments, trade association representatives, and—though only a small fraction of the total—men who actually register as lobbyists (Green et al., p. 32).

Much of these efforts are utilized to maintain the already pro-business status quo. As member of the Senate Finance Committee explains, “By and large, the big contributions come from the privileged. They’re not asking for any new privileges. Therefore, a man can say, ‘Sure, I got a lot of money from the oil companies, but they never ask me for anything.’ That’s because what they want is protection of the status quo” (quoted in Green et al. 1975, p. 12). However, if the status quo becomes threatened many of these companies put enormous pressure on legislators to kill any bill that threatens their privileged positions. One example given by Green et al. very relevant to today, was in the case of the oil industry’s successful attempt to quash legislation eliminating the subsidies given by the government to the oil industry (1975, p. 12). Similarly, the Automobile lobby vigorously fought against increasing environmental standards on cars and U.S. Steel in 1972, fighting against better water pollution

standards, assured that legislation “was perforated by loopholes preferential to industrial polluters” (Green et al. 1975, p. 12).⁴⁴ These examples provide justification for the claim by Senator Joseph Clark, whose “evenhanded assessment that the Republican and Democratic campaign finance committees are ‘prisoners of the lobbies’” (Green et al. 1975, p. 45).

In addition to lobbying, businesses have set up other organizations to influence government, with a great degree of success. One such organization is the Business Roundtable. First organized in 1972, the Business Roundtable is a group comprised of executives of some of the largest corporations; banks, insurance companies, retailers, transportation companies, and utilities (Korten 1995, p. 144). The organization uses its weight to influence politicians to pass legislation that the Roundtable deems important. The Business Roundtable utilized its power to wage a major public relations campaign in support of the North American Free Trade Agreement (NAFTA) which eventually

⁴⁴ As one of many examples in his great work *Who Will Tell the People?*, William Greider explains how in 1990 the auto industry mobilized enormous lobbying resources surrounding clean-air legislation (1992, pp. 37-38). In addition, “for twenty years, whenever the government has attempted to improve auto safety or environmental protection through new regulation, the auto industry has always made similar groans—satisfying tougher standards would be impossible without dire social economic consequence. The industry warnings have always proved to be false” (Greider 1992, p. 37). Moreover, “the new Clean Air Act enacted in 1990 was a moral travesty. It permits oil, chemical and steel companies dispensing toxic air pollution to kill as many as ten people in one hundred thousand in neighborhood surrounding their factories, refineries and mills (and gives companies twenty years to achieve this standard)” (Greider 1992, p. 56).

passed.⁴⁵ Countless other groups such as the Brookings Institute, the Heritage Foundation and the American Enterprise Institute that are well-funded pro-business organizations. While the stated mission of the Heritage Foundation is to intentionally sway public opinion in a conservative direction, the Brookings Institute and the American Enterprise Institute maintain some semblance of impartiality. However, as Greider correctly states, “a reasonable inference is that major business enterprises will not pay large sums of money, year after year, to people whose ‘ideas’ cannot be useful to corporate political interests” (1992, p. 48). And in fact their ideas have become very useful in providing government with the justification for pro-business legislation, or scuttling progressive legislation.

The formation of the Pacific Legal Foundation that occurred in 1973 is another example of corporations drawing on their massive resources to prevent progressive legislation. As David Korten articulates, the Pacific Legal Foundation, receiving eighty percent of its income from corporations, “specialized in defending business interests against ‘clean air and water legislation, the closing of federal wilderness areas to oil and

⁴⁵ Many of the legitimate concerns of the American public such as the environment, jobs and immigration were the focus of the public relations attack and Americans were assured their concerns would be met. However, as Korton shows, “Nine of the USA*NAFTA state captains (allied Signal, AT&T, General Electric, General Motors, Phelps Dodge, United Technologies, IBM, ITT, and TRW) were among the U.S. corporations that according to the Inter-Hemispheric Resource Center, had already shipped up to 180,000 jobs to Mexico during the twelve years prior to the passage of NAFTA. Some among the NAFTA captains were corporations that had been cited for violating workers rights in Mexico and for failing to comply with worker safety standards. Many were leading polluters in the United States and had exported to or produced in Mexico products that were banned in the United States” (1995, p. 145).

gas exploration, workers' rights, and corporate taxation” (1995, p. 142). In these endeavors corporations have been highly successful.

The intense lobbying and the formation of pro-business groups virtually ensures that government will vote according to particular class interests. In a study conducted by Marten Gilens, the author sought out the relationship between public policy choices by the government and its relationship to the opinions of different income groups in the economy. What Gilens found was “that when Americans with different income levels differ in their policy preferences, actual policy outcomes strongly reflect the preferences of the most affluent but bear virtually no relationship to the preferences of the poor or middle-income Americans” (2005, p. 778). Gilens concludes with a profound remark, stating, “a government that is democratic in form but is in practice only responsible to its most affluent citizens is a democracy in name only” (Gilens 2005., p. 794).

In a related study, Larry M. Bartels analyzed the voting records of senators in the late 1980's and early 1990's. Bartel's breaks up the constituent groups that these senators represent into income brackets and measures the senator's votes against the views of their constituents. What he finds is “senators in this period were vastly more responsive to affluent constituents than to constituents of modest means” (Bartels 2008, p. 253). In fact, the study shows that the, “views of constituents in the upper third of the income distribution received about 50% more weight than those in the middle third, with even larger disparities on specific salient roll call votes. Meanwhile, the views of constituents in the bottom third of the income distribution received no weight at all in the

voting decisions of their senators” (Bartels 2008, p. 254). Moreover, the responsiveness of senators to the lowest third of the income brackets is negative. Thus, the perspectives of the poor constituents are actually likely to get the opposite vote by their senator. This occurs with both Democratic and Republican senators.⁴⁶

Lastly, those that comprise the government are not, nor have ever been, representative of the make-up of American society. In the 1970 election, “of the fifteen major candidates in the seven largest states eleven were millionaires. The four who were not lost” (Green et al. 1975, p. 5). Today the situation is the same. A USA Today online article shows, “roughly 11% of Congress have net worth of more than \$9 million...That’s enough to put them in the top 1% of wealth” in the country (Korte and Schouten). While this percentage might not seem startling, “Congress also has 250 millionaires” and the median net worth of members of Congress is “\$891,506, almost nine times the typical household” (Korte and Schouten). As Green et al. state, “the average congressman is not the average American” (1975, p. 52). Moreover, “the fact that members of Congress come almost exclusively from professions that serve mostly

⁴⁶ Poll data often show that the majority of Americans support a specific policy that is not even considered in the political arena. For example, a Gallup Poll taken around the time of the 1992 presidential election assessing public opinion on taxes showed that “only 10 percent of the people favored higher taxes on Social Security benefits; 66 percent opposed higher gasoline taxes; 69 percent opposed a national sales tax. If there must be a tax increase, the citizens said, tax the upper-income brackets. Raising income taxes on those earning more than \$80,000 a year was favored by 82 percent of the public. Neither Dukakis nor Bush seemed interested in that solution. Business and financial leaders were, not surprisingly, overwhelmingly opposed” (Greider 1992, p. 84).

business itself gives the corporate community a several-step head start over other citizens in making Congress work for them” (Green et al. 1975, p. 52).

Conclusion

According to Marx, to understand the tendencies of the state one must understand who the state is comprised of and who the state serves. This must be conducted through a historical analysis and an analysis of the state of the contemporary state. While our history is certainly incomplete—a multiple volume work could be written on the topic—it does lend empirical support for Marx’s critique of Hegel’s philosophy of the state. It is not enough to invoke an ideal state as an institution willing to conduct itself in the best interests of society in general. In other word, as we have shown, it is invalid to merely assume the states neutrality, as externality theory does, in order to substantiate their theoretical conclusions. For our purposes, it has been important to show that the state is not, nor ever has been, a neutral player in the affairs of the country. Moreover, as externality theory requires that the state impose pecuniary penalties or restrictions on polluters in order to maintain an “efficient” level of pollution in the environment, there is little chance of these being enacted in practice because of the relationship between the state and business.

CHAPTER 4

PRIVATIZATION AND THE TRAGEDY OF THE COMMONS

Privatization Theory

Privatization theory as it applies to neoclassical environmental economics gets its main impetus from Garrett Hardin's (1968) article "The Tragedy of the Commons".⁴⁷ In this article Hardin presents a case for why the "commons," common property available to certain members of a society, are the main contributor to the Malthusian problem of population growth.⁴⁸ Furthermore, Hardin argues that the commons are the primary reason why pollution and environmental destruction occur today.

The tragedy of the commons is a well-recognized theory in popular discourse. People, who are rational utility maximizing agents, understand that they can benefit by exploiting the commons for their own purposes. Take Hardin's example of the cattle-man utilizing the commons for grazing his cattle (1968, p. 1244). The cattle-man recognizes that the benefit to him of adding one more head of cattle outweighs the cost of destruction of the commons because the costs do not accrue to him. The result is:

the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another; and another...But this is the

⁴⁷ As noted in the previous chapter, there is a great deal of similarity between Hardin's piece and Coase (1960). Coase's theory mirrors Hardin's in many ways and should thus, be considered as a theory of privatization and externality theory.

⁴⁸ As Feeny et al. note, Hardin "was neither alone nor novel in making the argument" (1990, p. 2). Others that made similar arguments include Lloyd (1968) who "made the same point in a series of lectures in the 1830's" (Feeny et al. 1990, p. 2). Gordon (1954) and Scott (1955) "are usually credited with the first statement of the conventional theory of the commons, although Hardin does not mention them" (Feeny et al. 1990, p. 2).

conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit—in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all (Hardin 1968, p. 1244).

As this relates to problems of pollution, Harden says:

The calculations of utility are much the same as before. The rational man finds that his share of the cost of the wastes he discharges into the commons is less than the cost of purifying his wastes before releasing them. Since this is true for everyone, we are locked into a system of “fouling our own nest,” so long as we behave only as independent, rational, free-enterprisers (1968, p. 1245).

Thus, the ultimate problem of environmental degradation is common property.

The tragedy of the commons “is averted by private property, or something like it” (Hardin 1968, p. 1245). In this situation each person is forced to recognize the consequences of their actions and thus, does not commit their original harms. As for pollution of the air and water, because they are not easily privatized, the costs should be internalized much like the proponents of externality theory claim. According to Hardin, “we institute and (grumblingly) support taxes and other coercive devices to escape the horror of the commons” (1968 p. 1247).

For Hardin, it is futile to appeal to people’s conscience in an effort to prevent the tragedy of the commons. Society must privatize all that can be privatized, and create coercive responsibilities for the public to act in a certain way. These responsibilities are based on coercive property right enforcements. The example Hardin gives is the bank robber. “Consider bank-robbing. The man who takes money from a bank acts as if the bank were a commons. How do we prevent such action? Certainly not by trying to

control his behavior solely by a verbal appeal to his sense of responsibility” (1968, p. 1247). What prevents the robbery of the commons according to Hardin, is private property and punishment for infringing on private property. Furthermore, even though the system of private property is potentially unjust and inequitable, “the alternative of the commons is too horrifying to contemplate. Injustice is preferable to total ruin” (Hardin 1968, p. 1247).

The conclusions of Hardin’s analysis can be summed up in this long but lucid citation about man’s population and pollution problem:

The commons, if justifiable at all, is justifiable only under conditions of low-population density. As the human population has increased, the commons has *had to be abandoned* in one aspect or another.

First we abandoned the commons in food gathering, enclosing farm land and restricting pastures and hunting and fishing areas. These restrictions are still not complete throughout the world.

Somewhat later we saw that the commons as a place for waste disposal would also have to be abandoned...we are still struggling to close the commons to pollution by automobiles, factories, insecticide sprayers, fertilizing operations, and atomic energy installations (Hardin 1986, p. 1248; emphasis added).

To summarize, according to Hardin, in order to solve problems of pollution and population growth is to privatize all resources for which there is demand. Furthermore, while air and water are difficult to privatize, we should attempt to privatize as much of these two goods as possible. However, it is unlikely that we will be able to privatize all air and all water, so the second best alternative is to use externality theory on the resources that cannot be privatized.

Critique

Hardin's fable about the enclosure of the commons is susceptible to many criticisms. In what follows we will focus primarily on three. The first critique will be a brief historical account of the enclosure of the commons in England from the sixteenth century to the nineteenth century. The second critique will show that, in fact, if one attempts to get at the root-cause of environmental destruction and the extinction of many species, it is not the lack of private property but the commodification of nature in pursuit monetary gain. This, in combination with an open-access institutional arrangement has caused the collapse of species and biodiversity. Finally, the third critique will focus on the inability of the "tragedy of the commons" approach to understand the workings of a modern capitalist system whose debt obligations provide serious structural constraints on any attempt at preserving biodiversity even under complete privatization. As Hardin notes, "we are still struggling to close the commons to pollution by automobiles" and he recognizes the difficulties of strictly defined private property rights in the atmosphere.⁴⁹ As a result Hardin's theory is primarily applicable to the biodiversity crisis and not global climate change. Thus, the relevance of Hardin's theory to curtailing the destruction of biodiversity will be the focus of our critique.

⁴⁹ For a perspective that the atmosphere cannot be a global commons, see Buck (1998). For the opposing view that the atmosphere is a global commons and should be considered as such see Soroos (1997).

History of the Enclosure Movement

Hardin does not investigate the history of different commons but draws a logical conclusion from his assumptions that the commons were privatized as a result of vast over-exploitation.⁵⁰ However, the numerous histories of the enclosure movements in England show the commons were not enclosed due to their over-exploitation. The primary reason for enclosing the commons was to increase the monetary reward for landlords, generally in the form of increasing rents. As Peter Linebaugh states, “Hardin’s premise depends on absolute egoism and denies several millennia of experience in the mutuality and negotiation of communing” (2008, p. 10, see also McCay and Acheson 1987; Rose 1994; McCay 1996). In what follows we will provide an overview of the enclosure movement in England. As this topic has been extensively written about, this section will be brief but will serve to refute Hardin’s story concerning the enclosure of the commons.⁵¹

⁵⁰ As Thomas Dietz et al. state, Hardin “missed the point that many social groups, including the herders on the commons that provided the metaphor for his analysis, have struggled successfully against threats of resource degradation by developing and maintaining self-governing institutions” (2003, p. 1907; see McCay and Acheson 1987; Ostrom 1990).

⁵¹ Other countries too have experienced enclosure of common land. In many of these cases the primary reasons for enclosing the commons is to provide for private benefits to those receiving the property or they are used as a mechanism for forcing those that rely on the commons into a subordinate position. In India under British rule in the 1880s and during a major famine event many commons were enclosed to produce the indigo, a crop that could fetch a high market price and thus a high tax for the crown (Davis 2001, p. 321). The poor relied heavily on the commons for their survival. Also under British rule, “common lands...were either transformed into taxable private property or state monopolies. Free goods, in consequence, became either commodities or contraband.

The commons historically have been an integral part of life in many rural communities. This was certainly the case in England for centuries and the enclosing of common land was the source of bitter struggle and resentment from the peasantry towards the aristocracy. In fact, the commons were deemed so important that a portion of the *Magna Carta* known as the “Charter of the Forest” specifically names certain “unalienable” rights that humans maintained toward the commons (Linebaugh 2008). This was primarily because the commons were at least as vital to the survival of the peasants as human rights such as the right not to be tortured or *habeas corpus*.

Contrary to Hardin’s portrayal, the commons were a diverse set of property relations among different groups in rural society. There were primarily three different types of property that all fell under the heading “common land.” “There were (1) the arable fields, (2) the common meadowland, and (3) the common or waste” (Hammond and Hammond 1912, p. 28). Each of these types of land maintained specific property relations within the community as to who could use the different commons and what types of actions could be conducted on them. As J. L. Hammond and Barbara Hammond, in their work *The Village Labourer 1760-1832* wrote, a typical arable field was,

divided into strips, with different owners some of whom owned few strips and some many. The various strips that belonged to a particular owner were scattered among the fields. Strips were divided from each other, sometimes by a grass band called a balk, sometimes by a furrow. They were cultivated on a uniform system by agreement, and after harvest they were thrown open to pasturage. The common meadow land was divided up by lot, pegged out, and distributed among

Even cow dung was turned into a revenue source for Queen Victoria” (Davis 2001, pp. 326-327). Other examples of modern enclosures are very briefly given in Peter Linebaugh’s book *The Magna Carta Manifesto* (2008, pp. 2-5).

the owners of the strips; after the hay was carried, these meadows, like the arable fields, were used for pasture. The common or waste, which was used as a common pasture at all times of the year, consisted of woodland, sometimes of roadside strips, and sometimes of commons in the modern sense (Hammond and Hammond 1912, p. 28).

In addition to the different types of commons there were diverse groups within rural society who had different rights to use particular commons. “In a normal village there would be (1) a Lord of the Manor, (2) Freeholders, some of whom might be large proprietors, and many small, both classes going by the general name of Yeomanry, (3) Copyholders, (4) Tenant Farmers, holding by various sorts of tenure, from tenants at will to farmers with leases for three lives, (5) Cottagers, (6) Squatters, and (7) Farm Servants, living in their employers’ houses” (Hammond and Hammond 1912, p. 28). Use of the different commons resided in different groups. The tenants maintained the right to use portions of the common fields and the Lord of the Manor “owned” the common or waste. Others like copyholders, were “entitled to occupy it [land] by the possession of a perpetual or very long lease” (Mantoux 1947, p.147). This right of usufruct did not allow any group to dispose of the land as they wished. For example, the Lord of the Manor “was obliged to leave enough of the waste for the needs of his tenants” (Hammond and Hammond 1912, p. 29). Moreover, “no farmer, however large his holdings or property, or however important his social position, was at liberty to cultivate his strips as he pleased” (Hammond and Hammond 1912, p. 30). These decisions, along with the dates of common pasturage, though differing from manor to manor, were made by the groups living in the village. Contrary to Hardin’s story of the cattle ranchers who continuously

adds cows bringing ruin to the commons and thus, ruin to all, “a man was seldom entitled to place an unlimited number of cattle, sheep or pigs on the common...As a rule, each owner had a right of pasture for a definite number of animals” (Montaux 1947, p. 154). Thus, the commons, rather than functioning according to Hardin’s presentation, were governed by complex social relationships and rights of access.

For the poor, the commons often meant the difference between life and death. While the poor had far fewer rights to the commons than did the richer members of society, the commons, especially the wastes were vital for their survival. Often the poor had the right to access “wastes” to gather both food and fuel (Montaux 1947, p. 153). “In some districts, each family occupying a house was allowed to graze two or three beasts on the common: a precious help to poor people whose fortune consisted of a cow, a few fowls, and a pig that was to be killed when winter set in” (Montaux 1947, p. 155). However, the plight of the rural poor in England changed dramatically with the enclosure movements. Not only did the poor lose their ability to occupy the commons and maintain their right of pasturage, the enclosure of the commons “would transform them and the labourers from upright members of a community, with a distinct set of *rights*, into inferiors dependent on the rich (Hobsbawm 1968, p. 81).

The enclosure of the commons occurred over many centuries in England. Beginning in the thirteenth century and culminating in the eighteenth century, the enclosure movements coincided with the encroachment by and ultimate dominance of the capitalist system. Rather than being enclosed to avoid “total ruin” (Hardin 1968, p.

1247), that “freedom in a commons brings ruin to all” (Hardin 1968, p. 1244), the enclosure of the commons were enacted and justified for two primary reasons; greed and social discipline (Thompson 1963, p. 219). As Karl Polanyi states, “Enclosures have appropriately been called a revolution of the rich against the poor” (1944, p. 35).

According to Paul Mantoux,

much land had already changed hands at the time of the Reformation, when the appropriation of Church property took place. Those who benefited by it were the great landlords. Success spurring them on, they sought to complete their fortunes by dividing the commons among themselves. That division was begun all over England, and was achieved, in most cases, by sheer force (1947, p. 156).

Moreover, the landed aristocracy was the ruling class in British society and thus was able to control the politics of the country. As a result, they were in a unique position to ensure the enclosure of the commons, and guarantee the enormous wealth that followed the enclosures.

The enclosure movements were highly lucrative for landlords. In a number of cases the newly enclosed commons were converted into grazing lands for sheep (Mantoux 1947, p. 156). This supported the woolen industries in England. In other cases the enclosed land was turned into highly lucrative agricultural land. During the 1700’s the class of landlords began to use agricultural improvement as a justification for enclosing the commons. Increases in productivity were important as the social goals of farming were being transformed. According to Mantoux, the peasant farmer looked upon farming as a way of life, who tolerated fallow land and crop rotation. “But to the modern farmer, who looks upon agriculture as a business undertaking and recons up exactly his

expense and profits, the compulsory waste on the one hand, and on the other, the sheer impossibility of doing anything whatever to increase the produce, are simply intolerable” (1947, p. 1969).

With profit and rent as motivating forces, agricultural productivity did increase. As E. P. Thompson states, in his book *The Making of the English Working Class*, “the spirit of agricultural improvement in the eighteenth century was impelled less by altruistic desires to banish ugly wastes or—as the tedious phrase goes—to ‘feed a growing population’ than by the desire for fatter rent-rolls and larger profits” (1963, p. 217). Landlord’s rents increased substantially. Between 1794 and 1799 “the average rental value of the arable land enclosed rose...from 6s. 6d. to 20s. an acre; and average rentals in the parish were more than trebled” (Thompson 1963, p. 218). In addition, during the Napoleonic Wars landlords benefited greatly from higher prices of agriculture.

As the Industrial Revolution and wage-labor progressed the argument for further enclosing the commons based on social discipline also advanced. Previously, feudal relations maintained the notion that human beings had a right to subsistence. However, reminiscent of Marx’s famous lines in *The Communist Manifesto*, capitalist society had “pitilessly torn asunder the motley feudal ties” (2008, p. 5). As Karl Polanyi (1944) hypothesized, the feudal rights to subsistence could not be maintained under a system that “commodified” both land and labor. Thus, as the capitalist class ascended and the notion of *laissez-faire* gained a foothold in political economy, many began to argue “that uneconomic farms should go out of business until only economic ones were left, and that

the surplus poor should not be uneconomically maintained, but driven out to find such employment as those who had jobs to offer would give them, at whatever wage the market would demand” (Hobsbawm 1968, p.79). Market discipline should and would be forced on the indolent peasantry and over the centuries the social safety net was to be dismantled. The conclusion of the enclosure of the commons, according to Douglas Dowd, meant “all goods and services would be up for sale; thus it also meant the elimination of traditional social protections. A major result of all this was a class of powerless, dispossessed farmers, able to survive only by ‘welfare’ or *defacto* slave labor” (2004, p. 21).

The enclosure of the commons is not a settled historical event in the historical record. There are still many issues surrounding the enclosure movements that are argued by historians today. However, there does appear to be a consensus that the position of Hardin, that the commons were enclosed in order to prevent total ruin by greedy commoners, was not at all the reason for enclosing the English commons. Whether one agrees with the statement by E. P. Thompson, that “enclosure (when all the sophistications are allowed for) was a plain enough case of class robbery, played according to fair rules of property and law laid down by a Parliament of property owners and lawyers” (1963, p. 218) is unimportant for our argument. What is important, and what this section has highlighted, is that in fact the commons were enclosed for reasons other than the ones given by Hardin.

Capitalist Production and Environmental Destruction

If we are to attempt to get at the root of the environmental degradation as it relates to the “tragedy of the commons” as Hardin presents it, we must look at the underlying motivation of those destroying the biodiversity of the commons. As an aside, the “commons” that Hardin refers to are really open-access areas, with “resources that can be exploited by anyone without limit” (Swaney 1990, p. 452).⁵² Open-access is much different from the formal commons of say England in the thirteenth to nineteenth century, which had strict rules as to access and methods of use in the commons.⁵³ In his article, “three times Hardin refers to the ‘rational’ herdsman: it is a fantasy. What he most likely means is the selfish herdsman or the lonely herdsman, because, in history, the commons is always governed. The pinder, the Hayward, or some other officer elected by the commoners will impound that cow, or will fine that greedy shepherd who puts more than his share into the commons” (Linebaugh 2010, p. 16). However, while Hardin is wrong in assuming that these two types of property relations are in essence the same, we will grant him a very charitable interpretation and analyze his key reason for environmental degradation of open access lands and the need to privatize them.

⁵² “Overharvesting was assured whenever a resource was effectively an open-access resource” (Ostrom 2007, p. 242). But open-access differs tremendously from common property as will be articulated in what follows.

⁵³ As Dietz et al. clearly articulate, “Human motivation is complex, the rules governing real commons do not always permit free access to everyone, and the resource systems themselves have dynamics that influence their response to human use” (2002, p. 3).

Regarding species extinction and biodiversity destruction, E. O. Wilson asserts, “the noble savage never existed. Eden occupied was a slaughterhouse. Paradise found is paradise lost” (2003, p. 102). While there is evidence that species extinction has followed man’s arrival to new lands, there is also evidence that many societies have lived sustainably with their ecological surroundings (Wilkinson 1973). No matter which side of this debate one falls on, what is beyond dispute is the increasing rate of extinctions and the decimation of biodiversity has dramatically accelerated with the rise of capitalism. Many reasons could be given for this acceleration but the primary one which we will focus on is the commodification of nature, or in Marxian terms the transformation of use-values into exchange-values. In other words, activities that used to be evaluated on the basis of value-in-use, in capitalist economies become valued by their ability to fetch a monetary reward. As Marx stated in the *Communist Manifesto*, capitalism “has left remaining no other nexus between man and man than naked self-interest, than callous ‘cash payment’. It has drowned the most heavenly ecstasies of religious fervor, of chivalrous enthusiasm, of philistine sentimentalism, in the icy water of egotistical calculation. It has resolved personal worth into *exchange value*” (2008, p. 5; emphasis added).

Marx frequently made the distinction between use-value and exchange-value. Everything that human beings have used throughout history, under every type of social arrangement, contains within it a use-value. However, under capitalism there emerges a dualistic nature to the things humans use. They have become commodities. As

commodities, i.e. anything produced for sale, these new “things” contain both a use-value and an exchange-value. Moreover, in capitalism, exchange-value becomes the driving motivation of the production process. Referring to the circuit of capitalist production, M-C-M’, Marx states that capitalism’s “leading motive, and the goal that attracts it, is therefore mere exchange value” (1906, p. 167).⁵⁴ In other words, the object of production and exploitation is not the usefulness of the commodity but its ability to be turned into money. This is distinct from simple commodity production, which utilizes money as a medium of exchange, or C-M-C’,

selling in order to buy—is a means of carrying out a purpose unconnected with circulation, namely, the appropriation of use-values, the satisfaction of wants. The circulation of money as capital is, on the contrary, an end in itself, for the expansion of value takes place only within this constantly renewed movement...Use-values must therefore never be looked upon as the real aim of the capitalist; neither must the profit on any single transaction. The restless never-ending process of profit-making alone is what he aims at. This boundless greed after riches, this passionate chase after exchange-value, is common to the capitalist and the miser” (Marx 1906, pp. 169-171).

In his article Hardin assumes, as Peter Linebaugh states, “the world is governed by ‘dog eat dog’, not ‘one and all’” (2010, p. 16). Or, in other words, Hardin assumes *a priori*, a capitalist economy, and further assumes that everyone behaves like a capitalist. As a capitalist pursues exchange-values primarily, it becomes rational for a capitalist to act exactly in the manner that Hardin assumes. “His was capitalist thinking, and his class markers were made with remarkable candor” (Linebaugh 2010, p. 15). Yet, if one is

⁵⁴ Money here refers to money as capital, or money as a store of value, rather than as simply a medium of exchange. When viewed as capital, in the capitalist system, money becomes the driving force of the system, the ultimate objective being to increase *ad infinitum*, the amount of money that one can accumulate.

attempting to get at the root cause of environmental degradation, which Hardin appears to be attempting, is not the root cause capitalist behavior, whether the property is private, common, or open-access? In other words, is not the pursuit of exchange-value at the root environmental destruction even in Hardin's fable? Moreover, the pursuit of exchange-value is a cultural phenomenon and not an inevitable outcome stemming from the unalterable human condition. As Donald Worster articulates, concerning farmers in the Dust Bowl,

The American plainsmen, it must be made clear, were as intelligent as the farmers of any part of the world. They were by no means the first to overrun the limits of their environment. But the reason they did so must be explained not by that vague entity "human nature," but rather by the particular culture that shaped their values and actions. It is the hand of culture that selects our innate human qualities and thereby gives variety to history (1979, p. 94).

Hardin proceeds in his Neo-Malthusian analysis of the tragedy of the commons by providing the reader with an ethical lesson.

The morality of an act is a function of the state of the system at the time it is performed. Using the commons as a cesspool does not harm the general public under frontier conditions, because there is no public...A hundred and fifty years ago a plainsman could kill an American bison, cut out only the tongue for his dinner, and discard the rest of the animal. He was not in any important sense being wasteful. Today, with only a few thousand bison left, we would be appalled at such behavior (1968, p. 1245; emphasis in original).

However, here again Hardin does not delve into the historical roots of the decimation of the bison. Leaving aside the anti-ecological anthropocentrism, Hardin has distorted the historical plight of the bison while drawing on use-value in the bison's demise when exchange-value played the much greater role.

In an earlier paragraph Hardin tells a similar story about the demise of species and the destruction of habitat resulting from the commons.

In an approximate way, the logic of the commons has been understood for a long time, perhaps since the discovery of agriculture or the invention of private property in real estate. But it is understood mostly only in special cases which are not sufficiently generalized. Even at this late date, cattlemen leasing national land on the western ranges demonstrate not more than an ambivalent understanding, in constantly pressuring federal authorities to increase the head count to the point where over grazing produces erosion and weed dominance. Likewise, the oceans of the world continue to suffer from the survival of the philosophy of the commons. Maritime nations still respond automatically to the shibboleth of the 'freedom of the sea.' Professing to believe in the 'inexhaustible resources of the oceans,' they bring species after species of fish and whales closer to extinction (1968, p. 1245).

In this statement, some of what Hardin says is surely true, as all useful myths must have a degree of truth to make them believable. No doubt the seas are overly exploited and the overgrazing of cattle can be very detrimental to ecosystems on "western ranges." However, the detrimental effects of these activities, at their roots, are not based on the failed "philosophy of the commons" or better a failed philosophy of open access. The motivation behind each and every example that Hardin gives is the pursuit of money resulting from the commodification of nature. Some historical examples and explanations will provide support for our claim.

The history of the North American bison and its demise as a species is multifaceted.⁵⁵ Before the settlement of Europeans on the North American continent

⁵⁵ Not only were bison hunted for commercial reasons but many bison were killed for no other reason than the entertainment of killing the animals (McDaniel and Gowdy 1998). In addition, the federal government sought to use the demise of the bison as a method for pursuing their anti-Native American policy. As many Native Americans relied heavily

there were 50-60 million bison roaming the plains. Native Americans coexisted with the bison for centuries and realized the importance, the use-value, of the bison for their survival. As a result, many Native American tribes killed only what they could use and used what they killed. This changed with the “discovery” of America and the expansion of European settlers across the American plains.

Along with the expansion of Europeans across the plains came capitalism and the necessary requirements of the capitalist system, i.e. the commodification of nature and the desire for exchange-value. During the nineteenth century there emerged great markets for bison parts. Pelts were utilized for fashion and warmth, and bison tongue was eaten as a delicacy. As a result, hunters began eradicating the bison in large numbers. “Hunting of bison under European influence increased steadily in the mid-1800s and their numbers were greatly reduced by 1870. In 1871, bison hides began to be used for commercial leather with about three million animals killed annually” (McDaniel and Gowdy 1998). Technological factors such as the railroads and refrigeration enabled bison hides and meat to be carried over long distances. People could make a decent living by slaughtering the bison and stripping them of their valuable parts. Ultimately the bison were saved from extinction by the efforts of conservationist who protected the bison.

The passenger pigeon provides another example of an extinction brought about by commodification. Hunted primarily for their meat for market the passenger pigeon’s

on the bison for their survival, the demise of the bison meant that Native Americans were forced to succumb to federal treaties.

numbers fell from roughly 5 billion birds in the fifteenth century to their extinction in the 1914 (McDaniel and Gowdy 1998). The majority of the birds were killed in the nineteenth century. In fact,

the worst of the mass slaughter took place in the 1860s and 1870s. The scale of the operation can be judged by figures that seem almost incredible but which were carefully recorded as part of a perfectly legal and *highly profitable commerce*. On just one day in 1860 (23 July) 235,200 birds were sent east from Grand Rapids in Michigan...In 1869, Van Buren County, also in Michigan sent 7,500,000 birds to the east (Ponting 1991, p. 169; emphasis added).

The ease with which the birds could be shot and the highly lucrative nature of the market for these birds ultimately spelled their demise.

Similarly, many ocean species have become severely threatened from over-fishing by human beings. As McDaniel and Gowdy (1998) show the population of Atlantic Bluefin Tuna has declined dramatically over the last 40 years. These fish fetch a high price in Japanese markets due in large part to the status granted to those who can afford to eat them. As a result of the fish's extraordinary monetary value, it has become extremely profitable for fisherman to catch as many as possible, even to the point of pushing these fish to the brink of extinction. Ultimately, the "populations of a number of species have been substantially reduced because the *price* was right to do so" (McDaniel and Gowdy 1998, emphasis added). These are just three examples of how commodification and monetary returns have caused the collapse of species. Countless other examples exist.

While perhaps a case can be made that human behavior based on greed and the pursuit of monetary returns *in combination* with an "open-access" type of property

relationship can spell disaster for biodiversity and individual species, Hardin does not consider that commodification played an over-arching role. Moreover, Hardin's assumption of a "rational", i.e. innately greedy, human nature assumes that everyone behaves as a capitalist but fails to make the connection between this particular conception and the pursuit of exchange-value. Ultimately, Hardin fails to recognize the social origins of both the commodification of nature and the social relations surrounding common property relations. This leads him to view the tragedy of the commons as an inevitable consequence of human nature.⁵⁶ Thus, Hardin fails to distinguish between what is a fundamental aspect of capitalism and what is fundamentally human.

Debt and The Tragedy of Privatization

The last issue that we will address is debt and the constraints debt places on biodiversity preservation. This section will continue the notion set forth in the last section that the

⁵⁶ Yet as Worster articulates, concerning the causes of the Dust Bowl, "throughout man's history he has now and then upset the ecological order, sometimes because he has had to do so in order to make a new home for himself, sometimes because he has been ignorant... It would be easy then, to dismiss the American experience on the plains as merely another case of human misjudgment, greed, innate aggression, or stupidity. Man has repeatedly fouled his own nest, some maintain; he is forever capable of considerable violence toward nature, he is everywhere materialistic, and he has never paid much attention to the environmental consequences of his deeds. The historian, though persuaded by such arguments to be realistic about human behavior, cannot be ready to let explanation rest there: it is, in the first place, too comprehensive—what explains all may explain nothing. It is also an excessively pessimistic way of thinking about man and the rest of nature, ignoring as it does the many examples of harmonious relations. The American plainsmen, it must be made clear, were as intelligent as the farmers of any part of the world. They were by now means the first to overrun the limits of their environment. But the reason they did so must be explained not by that vague entity "human nature," but rather by the particular culture that shaped their values and actions. It is the hand of culture that selects our innate human qualities and thereby gives variety to history" (Worster 1979, p. 94).

ultimate objective of capitalist production is the ability to turn commodities into money, M-C-M'. We will take this issue of money a step further when we introduce the structural constraints debt places on the production process. In doing so we will have added another layer of realism to our understanding of capitalism and the constraints capitalism places on ecological preservation. Ultimately, we will attempt to show that, even if Hardin's fallacious assumptions put forth in his article hold, i.e. that the only way to escape the tragedy of the commons is through privatization, that in fact Hardin's neglect of debt in capitalist economies makes privatization and biodiversity preservation virtually impossible in practice. However, first we will briefly articulate what requirements must hold in order for privatization to be able to solve the biodiversity crisis.

In Hardin's story, as the commons enact their tragedy on the world through perverse incentives that are "rational" to the individual but ruinous to the group, the only institution that will prevent total collapse is private property. Individuals who own private property have the incentive to maintain just the right amount of commodity X so as to preserve the integrity of the environment, thus enabling this individual to produce commodity X in perpetuity. However, as we have seen, biodiversity is not subject to the same environmental constraints as say raising cattle or corn farming. A cattle rancher or a corn farmer could theoretically raise cattle or corn sustainably in perpetuity while completely decimating the level of biodiversity. In fact, this is the problem behind monoculture, a common practice on private farms. Thus, for privatization to be able to

solve the biodiversity crisis the owner of the private property must be willing to preserve the biodiversity of the land or water that s/he has acquired. For example, the timber industry must be just as concerned with the preservation of the spotted owl as it is with tree cutting. Or the corn farmer must fight to maintain the rodents, insects, birds and reptiles as well as produce the corn that s/he will sell. Yet, as we articulated in the last section, the motivation of capitalist production is not the maintenance of biodiversity for many of these species cannot readily be turned into money. In fact, many species are summarily destroyed *because* they detract from the productivity of their crops that can be turned into money. Thus, the likelihood of preserving biodiversity through privatization in a capitalist economy is highly unlikely.

Capitalist culture and the drive to accumulate are the reasons why capitalist agriculture leads towards ecological destruction. As Donald Worster writes, in his book *Dust Bowl*,

in their [the Midwestern agriculturalist] behavior towards the land, capitalism was the major defining influence. From the beginning of settlement, the plainsman was intent on turning the land to more and more gainful use. Like American agriculturalists elsewhere, he increasingly came to view farming and ranching as a business, the objects of which were not simply to make a living, but to make money (1979, p. 6).

The drive to accumulate, coupled with the use of monoculture farming and destructive technologies, were the primary contributors to the most severe man-made ecological catastrophe in United States history. All of which were privately owned.

Worster provides three maxims concerning the role of nature in capitalist production. First, "*Nature must be seen as capital*. It is a set of economic assets that can

become a source of profit or advantage, a means to make more wealth” (Worster 1979, p. 6). Second, “*Man has a right, even an obligation, to use this capital for constant self-advancement.* Capitalism is an intensely maximizing culture, always seeking to get more out of the natural resources of the world than it did yesterday” (Worster 1979, p. 6). Third, “*The social order should permit and encourage this continual increase of personal wealth.* It should free individuals (and corporations as collective individuals) from encumbrances on their aggressive use of nature” (Worster 1979, p. 6). This is precisely the M-C-M’ conception of capitalist production.⁵⁷ These types of behaviors make ecological destruction, even on private property, almost inevitable.⁵⁸ However, biodiversity preservation becomes a virtual impossibility when we introduce debt into the analysis.

Debt is a fundamental characteristic of a capitalist economy.⁵⁹ A debt by definition is a promise to repay something in the future in return for receiving something

⁵⁷ During the Dust Bowl, “the sod had been destroyed to make farms to grow wheat to get cash” (Worster 1979, p. 13).

⁵⁸ It should be noted that governmental regulation has helped in restoring the natural grasses and maintain the stability of the Midwestern plains and agriculture. However, the government intervention and New Deal era agricultural practices were not implemented, as Hardin asserts, to avoid the “tragedy of the commons”, but set the task of “safeguarding, with public power, privately owned and privately worked land” (Worster 1979, p. 186).

⁵⁹ At its most basic level, capitalism requires debt because capitalism requires money. Money is debt. The creation of money establishes a debtor/creditor relationship. As Stephanie Bell states, “it is because money is at once an asset (credit) and a liability (debt) that it is treated as a balance sheet operation” (2001, 150; see Innes 1913). Moreover, the vast majority of money in circulation is bank money that is created

now. In a capitalist economy where money is the ultimate arbiter of acquisition, debts are overwhelmingly denominated in the money of account. In other words, when a debt is issued in capitalist economies one receives a certain amount of money today with the obligation to pay a certain amount of money to the lending party in the future. Moreover, debt obligations contain specific time requirements for repayment of the debt. For example, many basic debt obligations, like mortgages, have a monthly payment that must be paid in order to avoid delinquency, and ultimately foreclosure. While some debt obligations can be more easily restructured or refinanced than others, ultimately the debt must be repaid within a certain time frame to avoid foreclosure or bankruptcy.

Because of debtor's obligation, debt creates a situation in which the farmer, timber harvester, or rancher, even in the highly unlikely scenario that they wanted to pursue production based on preservation of biodiversity as opposed to monetary rewards, could not do so. By taking on debt obligations agriculturist are now forced to acquire money no matter the cost to the environment, in order to pay off their debts. Thus, despite the motivations of the producer towards biodiversity preservation, these desires become subsumed under the dictates of the market system. For if they do not acquire money, they will not be able to pay their debts and they are foreclosed upon.

American farming history contains many examples of overbearing debt burdens placed on farmers. Because of the long time frame between planting and bringing their crops to market farmers rely on debt in order to produce. Debts often are required to

through the creation of debt. Thus, the entire monetary system establishes webs of debtor/creditor relations.

acquire the farm, the seed for planting, farm equipment, and the farmer's subsistence until they can sell their crops. The surplus revenue is then used to service their debts and perhaps make a profit. While debt is a constant problem for farming, debt becomes a particular problem during times of crisis.

In the late nineteenth century the populist movement arose as way for farmers to unite in order to deal with the many problems they faced. Farmers across the country were suffering tremendously from the vicissitudes of the market. Prices on agricultural produce dropped steadily from 1880 to 1897 (Hicks 1931, p. 56). The great "Robber Barons" of the era were extorting money from the farmers by charging high rates to transport farmer's crops across the country. Both of these helped exacerbate the debt burden of farmers and "it was the grinding burden of debt...that aroused the farmers, both southern and western, to action" (Hicks 1931, p. 81). The story of the typical farmer was told by the *Pioneer Press* in 1884:

A farmer with only a few dollars in his pocket comes out here and takes a claim. It only costs \$15 for the preliminary fees, and he has six months to make his improvements. These improvements usually consist of a sod shanty, a well four feet deep, and from five to twenty acres of breaking. When he has done this much he can mortgage his farm for sufficient money to prove up and buy a horse or two. When he is known to be in possession of this amount of property, his credit is good for a plow and he obtains his seed by giving a mortgage on his crop in advance. Then he goes in debt for the necessary machinery to harvest his crop, and by the time his grain is ready to sell he is pretty well buried under a pile of debts. He takes his wheat to market, of course firmly believing that it is nothing less than No. 1 hard, but the elevator man's eagle eye promptly discovers that it has been "frosted" or is "damp" and instead of getting 80 cents a bushel, as he expected, he is forced, from his necessities, to sell for what he can get. It is then that he begins to kick. The sun which shone so brightly upon him in the spring is now obscured by two or three blanket mortgages; and he sits down in his lonely cabin on the bleak prairies and imagines that he is being ground down by the

despotic heel of monopoly. Therefore he kicks, and keeps on kicking, and never ceases till he's dead or out of debt (Quoted in Hicks 1931, p. 82).

This was the constant plight of farmers. However, in hard times these debts would become more than most farmers could bear.⁶⁰

During the late nineteenth century the outcome for debt riddled farmers was often foreclosure. Through the foreclosure process the farmer “could expect nothing less than the loss of all his property...In the late eighties and the early nineties foreclosures came thick and fast” (Hicks 1931, p. 84). Many farmers lost their land. In Kansas, for example, “from 1889 to 1893 over eleven thousand farm mortgages were foreclosed” (Hicks 1931, p. 84). The result was a major consolidation of farmland.

The late nineteenth century is not unique in the history of farming in the United States as it relates to the correlation between debt and crisis. The exuberance surrounding the economic prosperity of the “roaring twenties” in the United States was not shared by many American farmers. Prior to the Great Depression many farmers were

⁶⁰ Interestingly there is a great deal of correlation between Hyman Minsky's (1985) “Financial Instability Hypothesis” and farming. While Minsky's work revolved around modern industrialized capitalist industry and modern financial markets the unfolding of farm crises follow similar principles. With the large debt burdens that farmers maintain they are highly susceptible to any aggravation of the market. Increasing interest rates or falling prices can set the cascading effect in motion where farmers attempt to roll over their debts and are forced to increase their debt burdens further, as they are no longer able to service their debts out of income flows. “When the farmer could no longer obtain money on his real estate, he usually mortgaged his chattels, with the result that in many localities nearly everything that could carry a mortgage was required to do so” (Hicks 1931, p. 83). Many farmers would eventually “sell position to make position.” However, instead of selling machinery or portfolio assets they would sell their cattle or horses. During the 1920s and 1930s many farmers “crippled their own farming operations by selling livestock to meet debts when the livestock was needed to make their farms profitable operating business units” (Case 1960, p. 175).

in dire straights. While other areas of the American economy were doing well in the 1920s “farm debt distress, however, had been a serious problem throughout the period” (Case 1960, p. 173). For example, “in the early 1920s a survey of 60,000 farm owners showed that 4 per cent had lost farms by foreclosure action or bankruptcy; 4.5 per cent had voluntarily deeded their farms to creditors; and 15 per cent were virtually bankrupt. In many marginal areas more than 25 per cent of all farmers had failed in the three-year period from 1920 to 1923” (Case 1960, p. 173).

Similar to the late 1800s the early 1900s farmers were forced to take on numerous mortgages in order to cultivate their land and provide for subsistence to their families. Each maintained the hope of being able to pay off their creditors after taking their product to market. For many farmers in the Midwest, World War I “left them with huge machinery debts to pay. For a while overseas markets remained good, prices stayed above \$2.00 [a bushel for wheat], and there was no worry” (Worster 1979, p. 92). However, “with any failure in current income to meet farm-operating expenses and the heavy interest commitments and taxes, the new farm owner soon began to owe secondary creditors, including the implement dealer, the grocer, the doctor, and others” (Case 1960, p. 174). Some farmers were forced to sell their properties or were foreclosed on, but others were able to barely subsist and maintain ownership of their farms. The situation changed with the onset of the Great Depression when agriculture prices dropped. As a

result of falling prices, farmers could not pay their loans and many were forced into bankruptcy and foreclosed upon.⁶¹

Recently the situation for farmers concerning their relative indebtedness has gotten worse. With the advance of farm technology and thus the reliance on higher priced machinery, farmers have increasingly relied on debt to finance the purchasing of this machinery.

Farm firms have relied increasingly on debt financing to finance the operating inputs and capital assets used in farm production. For example, from 1950 to 1978 the number of farm real estate transfers on which debt was incurred increased from 58% to 89%. Over the same time, debt as a percentage of purchase price increased from 57% to 76% on those debt-financed purchases. Likewise, the proportion of total capital purchases financed with debt capital increased from 17% in 1950 to 50% in 1978 (Lins and Duncan 1980, p. 1051).

In addition, “the ratio of debt outstanding to net cash income has trended upward over time, implying a higher proportion of net farm income must be allocated to debt service. Thus, farmers are increasingly exposed to cash flow stress” (Lins and Duncan 1980, p. 1051).

Thus, debt is a real constraint on farmers. Even if a farmer wanted to produce in a way so as to preserve the biodiversity on his or her land and not produced primarily for monetary gain, debt forces the farmer into such monetary production. As debts are denominated in the money of account and debts maintain that repayment of a certain amount at a certain time, the farmer must produce for money or lose their property. The

⁶¹ Interestingly, “as the survivors saw it, their salvation depended on more, not fewer, machines, so they could achieve greater economies of scale” (Worster 1979, p. 92). Thus, debt was creating the somewhat paradoxical situation that, as prices fell, farmers plowed under more land, produced more crops and went further into debt.

implication being that the decision to produce in such a way as to preserve biodiversity is no longer an option that the farmer can pursue. By neglecting debt Hardin not only neglects a fundamental aspect of a capitalist system, but also neglects the ability for private property to solve complex ecological problems, such as the biodiversity crisis, in practice.

Conclusion

In conclusion we have attempted to provide a synopsis of privatization theory as it relates to Garrett Hardin's famous article "The Tragedy of the Commons". This article has been important in environmental economic theory as a justification for privatization in order to prevent the over-exploitation of the world's natural resources. The justification being that common property brings about total ruin, while privatization provides the proper incentives for environmental sustainability.

The critiques of Hardin's article have shown that Hardin's theory fails in many ways. First, Hardin fails to tell a historically accurate account of both the commons and the historical reasons for enclosing the commons. Second, we have shown that even under open access property relations, it is not until humans viewed nature according to exchange-value or monetary gain that we see the dramatic increases to the decimation of species that Hardin writes about. Moreover, Hardin does not even consider that commodification could be the source of environmental destruction. Lastly, we showed that even if privatization occurred as Hardin recommends, the existence of debt virtually assures that production will not be carried out with the goal of ecological preservation.

Debt requires the producer to produce for monetary reward in order to service their debt, despite their potential desire to preserve biodiversity. Ultimately we have shown that Hardin's theory of the tragedy of the commons and privatization will not be able to solve the problems of biodiversity.

CHAPTER 5

TECHNOLOGICAL OPTIMISM⁶²

The final theoretical perspective that will be critiqued is “technological optimism.”⁶³

Technological optimism is a title given to a group of thinkers who rely on advances in technology to curtail the problems of environmental destruction. Concisely summarizing the position of technological optimists, James E. Krier and Clayton P. Gillette write,

If the world is running short of food, we can count on technological innovation to increase the productivity of agricultural land and the acreage of arable land itself, through better seeds, better fertilizers, herbicides and pesticides, and better irrigation techniques. If environmental quality is threatened, more effective pollution-control technology can be developed to deal with the problem. If fossil fuels are growing short, technology can reduce the costs of discovery and extraction. It can also provide fuel substitutes, natural or synthetic (1985, p. 407).

⁶² It should be noted that there is a good deal of crossover between externality theory and technological optimism. For example, externality theorists believe that technological advance will occur when negative externalities are accounted for in the “true” cost of production. Once firms are forced to recognize these costs they will invest in cleaner technologies to avoid having to pay for the pollution generated during the production process.

⁶³ We use “technological optimism” here as a synonym for Ecological Modernization Theory (EMT). As Maarten Hajer explains, ecological modernization “does not call for any structural change but is in this respect, basically a modernist and technocratic approach to the environment that suggests that there is a techno-institutional fix for the present problems” (quoted in Foster et al. 2010, p. 41). However, technological optimism gets to the root of the perspectives held by this group of social thinkers and we feel is a more apt term.

The theoreticians falling under this heading sometimes disagree fundamentally over issues such as the level of government intervention into the market, but agree that human ingenuity through the advancement in productive methods of production will ultimately solve any ecological problems that arise. They do not, however, view the imperative of economic growth that capitalist market economies require and the ecological destruction that comes with it as undermining their position.⁶⁴

The two thinker's whose theories we will present here are Thomas Friedman and Julian Simon. Understanding these two thinkers is important because superficially they appear to be diametrically opposed in their perspectives concerning the present and future states of the environment, the need for government intervention into the market, global population growth, etc. In essence, they represent, in the vernacular sense, the political liberal and conservative sides of the debate over environmental problems. Yet, both believe technology will solve the problems of climate change and biodiversity destruction. As a result, the perspectives of each of these thinkers, and the theories that they propose, set the mainstream edges of the spectrum of political discourse as to how to

⁶⁴ Some economists have pointed out that economic growth differs from growth of material inputs. For example, Robin Hahnel states, "the claim that infinite growth of capitalist accumulation of *surplus value* is impossible on a finite planet is no more compelling than the claim that infinite growth of *GDP* is impossible on a finite planet. In both cases, those who make the claim, failing to realize that value is not matter, carelessly apply reasoning to value as if it were matter" (2011, p. 80). While certainly correct, in theory, this is predicated on the notion that we can somehow dematerialize the production process so that economic production does not coincide with material production. In practice this has not occurred in reality. While major gains in resource efficiency per unit have been made, the resulting aggregate resource use has continuously and steadily increased, an issue that will be explicitly dealt with below.

solve ecological problems.⁶⁵ While Friedman is not an academic, understanding his ideas are extremely important for any attempt to solve climate change and biodiversity loss in practice. This is primarily because of the large audience, comprised of mostly progressive individuals who are seriously concerned with ecological destruction, who read his works. Progressives will be important for building a broad social movement to combat ecological destruction, and because of the false sense of security that Friedman provides through his technological solutions, he prevents progressives from needing to question the systemic nature of capitalist ecological destruction.

Today the main thrust of environmental social science has shifted to ecological modernization—a managerial approach that sees sustainable technology, sustainable consumption, and market-based solutions (indeed “sustainable capitalism”) as providing the answers. Here, social scientists parallel the stance of mainstream environmental technocrats—such as Thomas Friedman, Fred Krupp of the Environmental Defense Fund, Ted Nordhaus and Michael Shellenberger from the Breakthrough Institute, as well as Newt Gingrich—who propose that a green industrial revolution, rooted in technological innovation and efficiency, will produce a green society. For this group, new “green markets” will enhance economic growth, which remains the real objective (Foster et al. 2011, p. 19).

It is in the technological fixes provided by Friedman to his progressive audience, which prevent the need to question the system, that, to borrow a phrase from Marx, Friedman does enormous mischief. The two sections that follow will present the ideas of Simon and Friedman.

⁶⁵ Both Simon and Friedman represent different aspects of Ecological Modernization Theory (EMT). Friedman represents the strong version of EMT while Simon represents weak EMT (see Davidson 2012).

Julian Simon's *The Ultimate Resource 2*

Julian Simon, in his book *The Ultimate Resource 2*, attempts to show that *all* of the problems humans face concerning resource scarcity, environmental degradation and ecological destruction are myths. According to Simon, “metals, foods, and other natural resources have become more available rather than more scarce throughout the centuries” (1996, p. 15). Moreover, Simon, rather than thinking that environmental problems have been getting worse, predicts that all environmental problems humans face have and will continue to get better throughout human history, including “the rate of species extinctions; whether the Earth’s forested area is increasing or decreasing; possible ill effects of any ozone-layer depletion and greenhouse warming and infant mortality and lots, lots more” (Simon 1996, p. 36). Thus, Simon denies the existence of long-term ecological problems.⁶⁶

Using price as a proxy for scarcity, Simon conducts an analysis of many individual natural and renewable resources to show that because the real prices per unit of natural and renewable resources have decreased over time the scarcity of these resources have also diminished. “The fall in the costs of natural resources, decade after decade and century after century, should shake us free from the idea that scarcity must increase

⁶⁶ The bulk of Simon’s text is a refutation of the Malthusian population problem; as population increases people will become increasingly impoverished as a result of population outstripping food and natural resource production. Thus, this text is primarily geared towards natural and renewable resources and their scarcity and depletion relative to population growth. However, the problems of climate change and biodiversity are addressed by Simon and fall clearly within his general theoretical propositions concerning the deterioration of the natural environment.

sometime...current price is our best measure of both current *and* future scarcity” (Simon 1996, pp. 30-31; emphasis in original). More importantly, the cost and price of nearly all raw materials have decreased relative to wages thus making resources far more available to people and thus relatively less scarce. For example, the price of copper relative to wages “has declined very sharply. This means that an hour’s work in the United States has purchased increasingly more copper; from 1800 to the present its purchasing power has increased about 50-fold! The same trend has almost surely held throughout history for copper and other raw materials” (Simon 1996, p. 31).⁶⁷

The logic of Simon’s argument that humans have not, nor will they ever, face long-run environmental problems, whether caused by population increases or anything else, is simple.

Greater consumption due to an increase in population and growth of income heightens scarcity and induces price run-ups. A higher price represents an opportunity that leads inventors and businesspeople to seek new ways to satisfy the shortages. Some fail, at cost to themselves. A few succeed, and the final result is that we end up better off than if the original shortage problems had never arisen. That is, we need our problems (Simon 1996, p. 12).

Simon believes that embedded in the free market mechanism is the inherent technological advance that will save society from any environmental degradation that occurs in the short-run. “In a free society, solutions are eventually found. And in the long-run *the new developments leave us better off than if the problems had not arisen*. That is, prices

⁶⁷ Echoing Simon’s position, “in a strict economic logic, the world will *never* run out of any mineral. Resource scares are merely errors of analysis.” (Houthaker, quoted in Smith and Krutilla 1983, p. 3).

eventually become lower than before the increased scarcity occurred” (Simon 1996, p. 59; emphasis in original).⁶⁸

An ardent proponent of the free-market, according to Simon government has no role to play in the in the market other than preservation of private property and enforcement of contracts. Regarding the production of food, Simon argues:

Government intervention, however, is a very old story. In every era officials have sought to cleverly manipulate agriculture for one purpose or another, always under the guise of helping the public, but these intellectually arrogant schemes—illustrations of which Hayek calls the “fatal conceit” that rulers can increase production by central planning—always harm the public, and usually most harm the poor (Simon 1996, p. 110).

In his prior work, Simon took on faith that the absence of government intervention into the market would produce the most beneficial social outcomes for any social problem, including food production. However, what was previously a faith-based belief is now a statement of fact. “*We now can be perfectly certain* that the earlier assessment is entirely correct. Any country that gives to farmers a free market in food and labor, secure property rights in the land, and a political system that ensures these freedoms in the future

⁶⁸ While one might argue that Simon’s position is extreme, this is not the case concerning much of the technological optimist school of thought, particularly the neoclassical economics community. According to Wilfred Beckerman, in a Review of Simon’s book, he states “almost all [economists] will accept that the price mechanism will continue to ensure that the world does not suddenly (or ever) run out of supplies of any key minerals” (1998, p. 229). Or William Ophuls’ statement, “that exponential technological growth will allow us to expand resources ahead of exponentially increasing demands” (1977). Similarly, Robert Solow assumes “that it is always possible to substitute greater inputs of labor, reproducible capital, and renewable resources for smaller direct inputs of the fixed resource” (1993, p. 164). This means that technology will always allow us to use fewer and fewer of the fixed resource.

will soon be flush with food, with an ever-diminishing proportion of its work force required to produce the food (Simon 1996, p.109, emphasis in original). Not only is this the case with food production but also pertains to global climate change and biodiversity loss, as well as all natural and renewable resource scarcity. Any intervention by the government on the environments behalf can only harm the economy and prevent solutions to short-run environmental problems.

Specifically addressing climate change, Simon admits to know little concerning the science behind the issue. However, he is highly critical of any movement to intervene in an effort to curtail what he calls global warming. Simon begins by showing that in the 1960's and 1970's the concern was over "global cooling" and then the "hooaha" over global warming began in the 1980's (Simon 1996, p. 266). "Indeed, many of the same persons who were then warning about global *cooling* are the same climatologists who are now warning of global *warming*" (Simon 1996, p. 267).⁶⁹ These "global warming doomsters" have been wrong about global cooling thus, "is it reasonable now to trust the forecasts of those very scientists who have been systematically wrong in every doomsaying prediction that they have made?" (Simon 1996, p. 268). The proposed solution, according to Simon, is to do nothing and let the market solve the problem. "If

⁶⁹ This statement is true. However, it is a negligent attempt to discredit the science behind climate change. Historically, natural scientists were attempting to explain the natural cycles of the earths climate, that is devoid of anthropogenic causes. Thus, the natural tendency, as climatologists explained, was for the earth to enter a cooling phase of global climate. However, once they began to recognize the tremendous effect of anthropogenic climate change they quickly realized that the anthropogenic effects would dramatically overwhelm the natural tendencies (see Chapter 2 above).

there is warming, it will occur over many decades, during which period there will be much time for economic and technical adjustment” (Simon 1996, p. 269).

Consistent with Simon’s position concerning climate change and resource scarcity, he does not believe biodiversity loss to be a problem that humans need to address. Simon begins by criticizing the methods that biodiversity scientists use to extrapolate the potential extinction rates of species on the planet calling any attempt to quantify biodiversity loss a “mere speculation” (Simon 1996, p. 444). Not only are the numbers wrong according to Simon, he questions whether or not species extinction is even a problem.

One window on the risks we run from species loss is to look backwards and wonder: What kinds of species may have been when the settlers clear-cut the Middle West of the United States? Could we be much the poorer now for their loss? Obviously we do not know the answers. But it seems hard to even *imagine* that we would be enormously better off with the persistence of *any hypothetical* species. This casts some doubt on the economic value of species that might be lost elsewhere (Simon 1996, pp. 447-448, emphasis in original).⁷⁰

Simon further states,

the argument that even though we do not know how many species are being extinguished, we should take steps to protect them, is logically indistinguishable from the argument that although we do not know at what rate the angels dancing on the head of a pin are dying off, we should undertake vast programs to preserve them. And it smacks of the condemnation to death of witches in Salem on the basis of “spectral evidence” by “afflicted” young girls, charges that the accused could not rebut with any conceivable material evidence (Simon 1996, p. 449).

⁷⁰ The same argument is made by Robert Solow concerning sustainability. “Sustainability doesn’t require that any *particular* species of owl or any *particular* species of fish or any *particular* tract of forest be preserved” (1993, p. 181, emphasis in original).

Concluding his argument about the preservation of biodiversity, Simon adheres to his anti-interventionist policy.

There is no *prima facie* case for any expensive species-safeguard policy without more extensive analysis than has been done heretofore. The existing data on the observed rates of species extinction are almost ludicrously out of whack with the doomsters' claims of rapid disappearance, and they do not support the various extensive and expensive programs they call for. Furthermore, recent scientific and technical advances—especially seed banks and genetic engineering—have diminished the economic importance of maintaining species in their natural habitat (Simon 1996, pp. 454-455).

Ultimately, Simon believes that neither climate change nor biodiversity reduction is a problem in the long-run and neither should be addressed through government intervention. According to Simon, the science is very inconclusive and as a result any intervention by the government to solve this problem will only interfere with the workings of the market which internally maintains the mechanisms for solving the problem of climate change should it arise. The title of his book reveals Simon's belief. The "ultimate resource" that society has is knowledge and ingenuity.⁷¹ These together will solve any long-run problem that humans face concerning the environment or scarcity of resources. Yet, according to Simon, knowledge and ingenuity can only advance under libertarian conditions. Ultimately, what is important for technological advance is assurance that the,

⁷¹ Similarly, Jason Scorse, in his book *What Environmentalists Need to Know about Economics*, states "there is nothing intrinsic in the capitalist system that necessitates using more land, water, energy, copper or steel every year. Growth can be in solar panels, or new nanomachines, or in living architecture that recycles materials and produces food. Capitalism is in effect only limited by the limits of human creativity and ingenuity" (2010, p. 155).

political-legal economic system provides personal freedom from government coercion. Skilled persons require an appropriate framework that provides incentives for working hard and taking risks, enabling their talents to flower and come to fruition. The key elements of such a framework are economic liberty, respect for property, and fair and sensible rules of the market that are enforced equally for all (Simon 1996, p. 408).

Thomas Friedman’s Hot, Flat, and Crowded

Thomas Friedman’s popular book *Hot, Flat, and Crowded*, appears to be a work diametrically opposed to the position of Simon articulate above. In the book Friedman argues that population growth is a serious problem that puts a great deal of strain on increasingly scarce resources and the natural environment. In addition, Friedman highlights climate change and the biodiversity crisis as extraordinary problems that must be solved. Thus, Friedman calls for massive intervention into the economy by the government in order to stimulate technological growth, developing alternative “clean” energy sources to curtail the effects of climate change. Because of Friedman’s position on these issues Simon would most certainly call Friedman a “doomster” for trying to frighten people in order to force governments to act on what are essentially non-problems. There are, however, striking similarities between the positions taken by Simon and Friedman concerning the environment. This section will outline Friedman’s position in his book.⁷² The section that follows will highlight their similarities.

⁷² Friedman is extremely inconsistent and contradicts himself throughout the book. For example, the thesis of his book is the need for a technological fix to the environmental problems, stating “we can only innovate our way out” of the problem (Friedman 2008, p. 243). Friedman then affirmatively quotes Michael J. Sandel: “unless you think there is a purely technological fix, meeting the energy challenge will require shared sacrifice, and political will” (quoted in Friedman 2008, p. 215). Friedman also claims that “the only

The general problem as Friedman sees it is that the world

is getting *hot, flat, and crowded*. That is, global warming, the stunning rise of middle classes all over the world, and rapid population growth have converged in a way that could make our planet dangerously unstable. In particular, the convergence of hot, flat, and crowded is tightening energy supplies, intensifying the extinction of plants and animals, deepening energy poverty, strengthening petro-dictatorship and accelerating climate change (2008, p. 5; emphasis in original).

These problems have progressed substantially over the years and must be addressed by society.

Friedman articulates the dire need for technological advancement so that humans can manage climate change, biodiversity loss, scarcity of natural resources, etc. (Friedman 2008, pp. 26-27). Because, according to Friedman, “they are no ordinary problems, any one of them, if not managed properly, could cause sweeping, nonlinear, irreversible disruptions that might affect multiple generations” (Friedman 2008, p. 27). Taking a national-paternalistic tone that permeates the entire book, Friedman calls on the United States to stimulate technological advance, stating, “either we [the U.S.] are going to rise to the level of leadership, innovation, and collaboration that is required, or everybody is going to lose—big. Just coasting along and doing the same old things is not an option any longer” (Friedman 2008, p. 6).

thing that can stimulate this much innovation in new technologies and the radical improvement of existing ones is the free market” (Friedman 2008, p. 244). Yet, his book calls for massive government intervention into the free market in order to stimulate technology. We will attempt to clarify summarize what we feel are the key ideas in Friedman’s book and provide a consistent summary of these ideas.

Friedman proposes what he calls a “Code Green” method for solving environmental problems, adding, “*we need a whole new system for powering our economy*. This is a systems problem, and the only answer is a new solution” (Friedman 2008, p. 181; emphasis in original). The new system Friedman advocates is a massive advance in clean technology. “No single solution would defuse more of the Energy-Climate Era’s problems at once than the invention of a source of abundant, clean, reliable, and cheap electrons” (Friedman 2008, p. 186).⁷³ Development of these “abundant, clean, reliable, and cheap electrons” will require, “enormous amounts of experimentation—the kind you find in our great research universities and national laboratories; it requires lots of start-up companies that are not afraid to try, risk, fail, and try again, and plenty of venture capitalists ready to make big bets for big returns; it requires lots of teamwork and collaboration between business, government, and academe” (Friedman 2008, p. 174).

In order to assure that advances in technology occur, Friedman recommends that the federal government of the United States guarantee the stability and profitability of the market for green technology. The government should do this through “generous tax incentives, regulatory incentives, renewable energy mandates, and other market shaping mechanisms that create durable demand for these existing clean power technologies” (Friedman 2008, p. 188). This will cause innovation in existing technology so that we

⁷³ Friedman acknowledges that “no one has yet come up with a source of electrons that meets all four criteria: abundant, clean, reliable, and cheap” (2008, p. 187). However, he fundamentally believes that, through his recommendations society can and will develop electrons that meet all four criteria.

can reduce the amount of natural resource inputs in today's production "so we get the same comfort, mobility, and illumination from fewer resource" (Friedman 2008, p. 191). In addition, through government stimulus we are likely to have "eureka breakthroughs" that completely alter the available technologies in the market (Friedman 2008, p. 191).⁷⁴ Ultimately, Friedman advocates, "putting in place *a system* of government policies, regulations, research funding, and tax incentives that would stimulate *a system* for innovating, generating, and deploying clean electronics, energy efficiency, and resource productivity, along with an ethic of conservation" (Friedman 2008, p. 199).

While absolutely requiring government initiative and intervention, Friedman ultimately puts the fate of our ecological problems and solutions in the market.

The only thing that can stimulate this much innovation in new technologies and the radical improvement of existing ones is the free market. Only the market can generate and allocate enough capital fast enough and efficiently enough to get 10,000 inventors working in 10,000 companies and 10,000 garages and 10,000 laboratories to drive transformational breakthroughs; only the market can then commercialize the best of them and improve on the existing ones at the scope, speed, and scale we need (Friedman 2008, p. 244).⁷⁵

⁷⁴ Friedman also recommends that we must change the way humans view the natural world. Humans must obtain "an ethic of conservation" that, quoting Michael J. Sandel, reins in "our tendency to regard the earth and its natural resources as wholly at our disposal for present needs, wants, and desires. We have to develop new habits and attitudes toward consumption" (quoted in Friedman 2008, p. 192). Yet Friedman proceeds to believe that it is only through the profit motive and the desire to accumulate, an anti-ethic of conservation, that we will escape our ecological problems.

⁷⁵ Another point of contradiction: quoting Ray Anderson, "How can the invisible hand [of markets] be a rational allocator of resources if it is blind to externalities" (quoted in Friedman 2008, p. 260).

By making clean energy profitable, the market will assure that clean energy will develop. Profit is the most important tool that anyone can utilize for innovation. “There is only one thing bigger than Mother Nature and that is Father Profit, and we have not even begun to enlist him in this struggle” (Friedman 2008, p. 244). Moreover, as these products develop, a learning curve simultaneously develops that will dramatically bring down costs and increase profits, which will enable prices to drop to “Chindia” prices, a portmanteau meaning extremely cheap manufacturing prices (Friedman 2008, p. 250).

Addressing the biodiversity crisis Friedman espouses a program of “a million Noahs and a million arks” (Friedman 2008, p. 301). In this local “program” environmentalists will locate specific regions that are threatened, the arks. Federal governments will protect certain areas while designating and developing other areas for economic growth. This will provide local communities economic opportunities “that enable them to thrive without harming the area’s biodiversity” (Friedman 2008, p. 302).

Private enterprise,

be they hoteliers, energy or mining companies, agribusiness, tourism developers, or others who have interest in keeping the area’s biodiversity intact and can attract global investment projects that can make a profit, respect the natural world, and help raise local living standards all at once...A local government that is able and willing to preserve protected areas and not sell them off to the highest bidders or allow itself to be corrupted by logging or mining interests (Friedman 2008, pp. 302-303).

Lastly, formal education of the population is necessary “so young people develop knowledge skills that make it less necessary for them to plunder the natural world around

them” (Friedman 2008, p. 303). The Noahs will coordinate all of these disparate groups to preserve biodiversity, profit, and local labor forces.

In addition, Friedman recommends that a global initiative be launched to provide financing for the preservation of biodiversity. In this initiative, rich countries would pay poor countries to preserve their biodiversity,

because with the power of the global economy today, the amounts of money being put up for oil palm plantations and soy plantations and raw timber are so high that in too many places the forests are obviously worth more (in the short term) cut down than standing. If you just look at the price a villager or a logging company can get today for chopping down a tree, as opposed to what they might earn protecting it, it’s easy to see why the forest loses. And when you think what a big logging company can get from clear-cutting a vast area, it’s even more frightening (Friedman 2008, p. 312).

Thus, Friedman wants to transfer profitability from destruction of the planet to preservation of the planet. Properly designed governmental policies at a local, national, and international level that utilize profits and monetary rewards geared toward ecological preservation and technological advance, are the only ways in which society will prevent ecological collapse.

Critique

With a cursory investigation Friedman and Simon would seem to be diametrically opposed to each other for many different reasons. Friedman, consistent with the natural science consensus, sees climate change and the reduction in biodiversity as a serious problem that needs to be addressed immediately. Simon, on the other hand, does not view either of these ecological crises as a problem in the long-run. Friedman sees the growing global population as a serious problem, while Simon sees population growth as

the solution to the problem. Friedman advocates for massive government intervention into the market in order to solve both of these problems, while Simon believes that only an unfettered free market will solve all of the problems that humans face.⁷⁶ For Simon, government is only a fetter on finding solutions. To make a political analogy, Friedman represents the “progressive”, left-wing faction of environmental policies while Simon represents the libertarian, right-wing faction concerning the environment. However, they have some important similarities in their theoretical perspectives.

Each fundamentally adheres to market-based solutions to all ecological and resource-based problems. Both believe that profit motivation will stimulate the necessary development of productivity and technological advance that will ultimately culminate in salvation. In addition, neither view growth as problematic, equating growth with increasing prosperity of the *whole* of society. Ultimately, though differing with respect to implementation, each thinker sees technological advance as the great savior of the human race.⁷⁷ As a result this technological optimist stance must be critiqued in order to analyze

⁷⁶ Many other economists fall in the middle of these two thinker’s perspectives on government intervention seeing a minor role for government intervention in correcting for externalities and providing incentives for technological advancement. “Getting the prices right’ alone is unlikely to provide sufficient incentives for the type of major environmental innovations...Therefore, further government action is warranted” (Scorese 2010, p. 157). However, government fail miserably if they pick winners and losers. Thus, “what governments can and should do is create an economic climate where an entire host of technologies can vie and compete for dominance on an even playing field” (Scorese 2010, p. 158).

⁷⁷ Similarly, Davidson shows that that weak version of EMT and the strong version of EMT both ultimately rely on technological advance to curtail ecological destruction (2012, pp. 41-44).

its relevance and applicability to solving our two ecological crises. The rest of this section will critique both Friedman and Simon according to their technological optimism and show that each is a Panglossian.⁷⁸

Both thinkers can and have been critiqued in many ways. Friedman, with his reliance on government to solve ecological problems, is susceptible to the criticisms put forth in our chapter on externalities and the neutrality of the state. Friedman has also been criticized for relying on mythical “abundant, clean, reliable, and cheap electrons” that even he admits do not exist (see Foster 2009, pp. 14-28). There is no historical analysis of inequality or imperialism, nor an understanding that capitalism requires firms to view nature as a commodity in their pursuit of exchange value, undermining the required ecological perspective that Friedman says must occur in society. For example, the “Chindia” prices, the “cheap” electrons that Friedman requires, neglects the fact that “Chindia” prices have come about through cheap and atrocious labor practices and through massively polluting areas around manufacturing facilities. In other words, China and India have relied on creating more externalities in order to keep their products cheap.

⁷⁸ One caveat must be articulated in order to preemptively ward off criticism of our position. We take the position articulated by Clark and York: “our contention is neither that economic growth has not produced new technologies that are more efficient nor that improvements in technology that reduce some types of pollution have not taken place. Rather, we contend that the belief that these changes lead to benign ecological relationships needs further consideration, especially considering that capitalist expansion of commodity production—which includes energy sources as throughputs—has outstripped improvements in the efficiency of energy use” (2005, p. 411). Nor do we adhere to the idea that technological advance, especially advances in cleaner energy, must cease. Advances in cleaner technologies certainly hold the *potential* for greater ecological preservation and human social advancement. However, technological advancement in-and-of-itself cannot solve these problems.

Simon can be criticized for disregarding the scientific evidence for climate change and the biodiversity crisis. Moreover, Simon does not address the difference between ease of extraction of resources, leading to a reduction in price, and the harmful effects of that extraction. While a resource like copper might become cheaper through advances in methods for extraction, the impact of these advances on the surrounding environment have been catastrophic. In addition, there is no analysis of differing time-frames between scarcity and environmental impacts. For example, while the known oil or coal reserves could increase over time through discovery of new stocks, thus making oil less scarce, CO₂ emissions causing climate change must be curtailed immediately. Thus, the relation between scarcity of a resource and its effects on the environment are not necessarily directly related.

We, however, will undertake a criticism that is relevant to both Friedman and Simon, and their reliance on technological advance to solve environmental problems. This critique will show that both thinkers misrepresent the potential for technology to solve the ecological problems, while completely disregarding growth coupled with technological advance as a major *cause* of ecological problems. Moreover, each thinker adheres to the idea that through technological advance we can somehow dematerialize the economy while providing economic growth and increasing profits. Ultimately, as Stewart Davidson states, technological optimists maintain a “naïve reliance upon the idea that the ‘silver bullet’ of technological innovation is capable of resolving the tension between economic growth and ecological sustainability” (2012, p. 37). According to

Brett Clark and Richard York, “capital and neoclassical economists attempt to assuage fears of environmental deterioration as an inherent part of capitalist economic operations. They typically assert that capitalist development will lead to improved technologies and efficient raw material usage, and that this will decrease emissions and environmental degradation” (2005, p. 409).

The Jevons Paradox

Both Simon and Friedman believe that increased productivity through technological advance will reduce the amount of energy and natural resources per unit of production.⁷⁹ The argument is, “through innovative technological development and [for Friedman] appropriate reformist government policy, the economy can be dematerialized, reducing the throughput of raw materials and energy that the system requires” (Friedman 2008, p. 410). There is empirical support for advances in technologies reducing *per unit* material and energy inputs. However, even with the reduction of material and energy inputs per unit, the *aggregate* level of inputs continues to increase. And it is the aggregate level that is important for curtailing global climate change and the reduction of biodiversity loss.

The theory that articulates this phenomenon is the “Jevons Paradox”(see York 2006; Foster 2009, pp. 121-128). William Stanley Jevons first articulated this idea in

⁷⁹ A similar claim is that of the Environmental Kuznets Curve (EKC). “The EKC suggests that environmental impacts, such as pollution, increase in early stages of development within nations as an industrial economy is established, but level off and eventually decline as economies ‘mature, because environmental quality is a luxury good, affordable only the affluent” (Clark and York 2005, pp. 409-410).

1865 in his book *The Coal Question*. In this book Jevons inquired into the stock and rate of use of coal in Great Britain. This was of great importance as coal was the primary energy source in Great Britain at the time. “Jevons observed that as the efficiency of coal use by industry improved, thereby allowing for the production of more goods per unit of coal, total coal consumption increased” (York 2006, p. 143). The economic reason for the aggregate increase in coal use is simple. Increases in productivity through technological advance reduces the price per unit of coal contained in each product. This reduction in price per unit reduces the price of the product and thus increases the quantity demanded for the product. In the aggregate, the increase in the quantity demanded overwhelms the per unit reduction in natural resources and aggregate consumption of coal increases.

Capitalist production is motivated by profit. According to Marx, the mantra of capitalist production is “accumulate, accumulate! That is Moses and the prophets!” (Marx 1906, p. 652). Echoing Marx, Friedman states, “there is only one thing bigger than Mother Nature and that is Father Profit” (2008, p. 244). However, Friedman is unwilling to acknowledge that the profit motivation is the driver of ecological destruction. This drive for the continued expansion of profits and accumulation “leads producers to try to both reduce costs by reducing resource inputs per unit of production (i.e., improving efficiency) and increasing revenues by expanding the quantity of goods and services produced and sold, thus necessitating the expansion of resource consumption” (York 2006, p. 143; see Foster 2002, pp. 92-103; Schnaiberg and Gould 1994, pp. 45-67).

The reason why growth in aggregate consumption of resources overwhelms per-unit reduction in resources is specifically related to the nature of capitalist production which must continually grow in order to survive. Thus, as Richard York states, “the political-economic explanation of the Jevons Paradox suggests that the association between efficiency and total consumption is primarily due to a third factor that drives both...it recognizes a potentially direct link in that profits stemming from improvements in efficiency can be invested in expanding production” (2006, p. 143). Thus, the internal workings of the capitalist system based on the accumulation of profits, rather than being the solution to environmental problems, as Friedman and Simon both believe, according to the Jevons Paradox actually contribute to further environmental destruction.

Empirical evidence supports the theoretical claims made by the Jevons Paradox. Generally speaking, throughout the history of capitalism we have consistently seen advances in technology that reduce per unit use of natural resources, while simultaneously seeing increases in aggregate resource use (Bunker 1996). Specifically, we see that the most technologically advanced countries increase their aggregate use of resources and aggregate emissions relating to carbon consumption. For example, more technologically advanced countries, with higher affluence, also have a greater “ecological footprint” than countries with lower technological development and affluence (York et al. 2004). “In fact, this type of pattern appears to be quite common” (York 2006, p. 144).

Other empirical examples support the conclusions of the Jevons Paradox. For example, Brett Clark and Richard York show,

calculations based on aggregate data for selection of “advanced” capitalist nations illustrate the paradoxical relationship between efficiency and resource consumption. Over the period 1975 to 1996, the carbon efficiency of the economy—economic output, measured in terms of gross domestic product (GDP), per metric ton of CO₂ emissions—increased dramatically in the United States, the Netherlands, Japan, and Austria...However, over this same period, total CO₂ emissions, and even per capita emissions, *increased* in all four of these nations despite the improvements in efficiency (2005, p. 412).

For the United States alone, “since 1975 the amount of energy expended per dollar of GDP...has decreased by half, marking an increase in energy efficiency by that amount. But at the same time the overall consumption of energy by U.S. society has risen by some 40 percent” (Foster et al. 2010, p. 44). Further, they conclude, “gains in the efficiency of the use of fossil fuel have typically resulted in the expansion of their use in industrialized capitalist nations. As a result, carbon emissions generally increase with modernization and its concomitant ‘improvements’ in technology and gains in efficiency” (Clark and York 2005, p. 412). Thus, empirical observation shows that “incremental increases in ecological efficiency are...easily wiped out by subsequent growth processes...Ecological modernization [technological optimism] is, despite its impressive potential, not sufficient to ensure long-term environmental stabilization” (Jänicke quoted in Davidson 2012, p. 38).

As was well understood by classical economists, the continuous drive for accumulation ensures that capitalism, as an economic system, will continuously grow. However, continuous growth ensures that the Jevons paradox will continue to prevent the curtailment of global climate change and the biodiversity crisis. By failing to address the Jevons paradox technological optimists also fail to reconcile growth, technological

advance and ecological preservation. As a result, technological optimism, while at times paying homage to the need for structural changes and reducing growth, ultimately “legitimize and sustain the very structures and systems that have been responsible for environmental decline” (Gouldson and Murphy quoted in Davidson 2012, p. 45). Thus, the fundamental inability to question economic growth coupled with increases in aggregate resource use hinders the ability for technological optimists’ solutions to have any chance of succeeding in practice.

Relations of Production and Advances in Technology

There is another social aspect of production that technological optimists do not address resulting from their inability to question growth and the social relation of private ownership of the means of production. This is an aspect that is of vital importance to social analysis and to the relationship between increases in productivity and ecological sustainability. What will be articulated in this section is the relationship between increases in productivity, economic growth, accumulation and the length of the workday, as they exist under capitalism and could exist under other relations of production.

Technological advance provides society with interesting choices concerning work and the standard of living of its members. With every advance in technology, given a constant population size, society is presented with two choices. Society could chose to work the same amount of hours and increase the level of aggregate economic output, or it could chose to work less hours and maintain the same level of economic output. Assuming that the distribution of income did not change if society chose to work less,

members in society would maintain the same standard of living as they did prior to the increase in productivity, while having more leisure time. Clearly articulating this point, Jeffrey Kaplan states,

Machines *can* save labor, but only if they go idle when we possess enough of what they can produce. In other words, the machinery offers us an opportunity to work less, an opportunity that as a society we have chosen not to take. Instead, we have allowed the owners of those machines to define their purpose: not reduction of labor, but “higher productivity”—and with it the imperative to consume virtually everything that the machinery can possibly produce (2008, p 2).

Kaplan goes on to show what could have been the case if in the United States society chose to work less based on advances in technology.

By 1991 the amount of goods and services produced for each hour of labor was double what it had been in 1948. By 2006 that figure had risen another 30 percent. In other words, if as a society we made a collective decision to get by on the amount we produced and consumed seventeen years ago, we could cut back from the standard forty-hour week to 5.3 hours per day—or 2.7 hours if we were willing to return to the 1948 level. We were already the richest country on the planet in 1948 and most of the world has not yet caught up to where we were then (Kaplan 2008, p. 4; see Schor 2010).⁸⁰

In fact, even though productivity has increased dramatically since the 1970’s in the United States, workers have been working longer hours. This despite the fact that they could have used these productivity increases in the form of more leisure time (Schor 1992). However, under capitalism, society is not afforded the choice of working less and

⁸⁰ Kaplan could have further acknowledged that since 1973 real wages in the United States have been stagnant. Thus, workers have increasingly producing more per hour of work, working long hours, without the benefit of a higher standard of living.

consuming the same amount.⁸¹ Increases in productivity are always utilized to further capitalist goals. In other words, as “Marx explained...capitalism prevents the truly rational application of new science and technologies because they are simply used to expand operations of capital” (Clark and York 2005, p. 412).⁸²

Capitalism concentrates the means of production in the hands of a few members of society, which means the majority of society does not have control of the production process. As Marx articulated in *Capital*, there are two necessary conditions for capitalism to exist. Labor must be free, “in the double sense that neither they themselves form part and parcel of the means of production, as in the case of slaves, bondsmen, &c., nor do the means of production belong to them as in the case of peasant-proprietors; they are, therefore, free from, unencumbered by, any means of production of their own” (Marx 1906, p. 785). Workers, thus, must sell their labor-power in order to acquire their means

⁸¹ There are a few examples of businesses that implemented a shorter workday. The Kellogg Company voluntarily implemented the six-hour day, much to the delight of its workers (Kaplan 2008, p. 2; see Hunnicutt 1996). However, reducing the working day was vehemently opposed by the majority of businesses in the U.S. In addition, Kellogg did not attempt to curtail growth as growth and profitability were necessities for the companies survival.

⁸² Advances in technologies, rather than being neutral, in capitalist economies are developed and deployed to further the dominant position of capital and the accumulation process. At the beginning of the Industrial Revolution, factories were set up primarily to control the work process. “It seems possible to identify four main reasons for the setting up of factories. The merchants wanted to control and market the total production of the weavers so as to minimize embezzlement, to maximize the input of work by forcing the weavers to work longer hours at greater speeds, to take control of all technical innovation so that it could be applied solely for capital accumulation, and generally to organize production so that the role of the capitalist became indispensable” (Dickson 1975, p. 73; see Huesemann and Huesemann 2011; Marglin 1974).

of subsistence. Because the worker is separated from the means of production they do not maintain a position of authority over the work process. The capitalist chooses the level of production and the length of the working day. Total production, hours of labor and advances in labor saving technologies are all geared towards the capitalists' goals, i.e. increasing profits, growth of revenue or increasing their power over labor.⁸³ "Only those technologies will be selected that can make money in the marketplace. In the case of process technologies, the selection mechanism is dominated by the ability of the technology to increase productivity, improve the competitive position, and increase profits for its owners" (Braun 1995, p. 21). No matter the potential social benefit, if a technology is not profitable it will not be implemented.

Firms are reluctant to install technologies whose gains they cannot capture. A decentralized system of solar and wind, for example, may have technical superiorities such as avoiding the power loss that accompanies long-distance power generation in centralized facilities. But if the technologies are small-scale and easy to replicate, large firms have difficulty capturing the profits that make investment desirable (Schor 2010, p. 87).

As David Dickson articulates,

technology plays a political role in society, a role intimately related to the distribution of power and the exercise of social control. It does this...in both a material and an ideological fashion, implying that in both senses technological development is essentially a political process. At a material level, technology sustains and promotes the interests of the dominant social group of the society within which it is developed...The implication of this thesis is that one can only understand the nature of technology developed in any society by relating it to the

⁸³ In addition to the adoption of new technologies, the development of new technologies is determined by the profit motive. Investment in research and development of new technologies will not be conducted unless it furthers the accumulation process (Huesemann and Huesemann 2011).

patterns of production, consumption and general social activity that maintain the interests of the politically dominant section of that society (1975, p. 11).

However, should workers own the means of production they would be afforded the choice of whether or not to reduce output and hours of work, or invest in labor saving technologies in order to maintain the level of production while working shorter hours.

The separation of labor from the means of production highlights a unique social paradox that is only possible under a system of private accumulation and private property. Capitalism continuously suffers from crises of overproduction. Simply, this means that capitalist society has the productive capability in both machinery and labor available to supply far more products than the level of aggregate demand will allow. Because capitalists will only produce the amount of products that they think they can sell at socially determined level of profit, if there is not sufficient demand in the system unemployment ensues and society is left with the paradoxical circumstance of “poverty amidst plenty” (see Keynes 2007). As King Camp Gillette, the inventor of the disposable razor understood in the early half of the nineteenth century,

We have the paradox of idle men, only too anxious for work, and idle plants in perfect conditions for production, at the same time that people are starving and frozen. The reason is overproduction. It seems a bit absurd that when we have overproduced we should go without. One would think that overproduction would warrant a furious holiday and a riot of feasting and display of all the superfluous goods lying around. On the contrary, overproduction produces want (quoted in Slade 2006, pp. 9-10).

The crisis of overproduction has been well known for a long time by capitalists and Marxists alike. Kaplan notes that business was very concerned with what they called “need saturation” (2008, p. 2). Quoting the Secretary of Labor, James J. Davis, “the

textile mills of this country can produce all the cloth needed in six months' operation each year" (quoted in Kaplan 2008, p. 2). Without the demand for these products capitalist accumulation is stymied. Thus, capital must find ways to ensure that wants are never satiated. "By the late 1920s, America's business and political elite had found a way to defuse the dual threat of stagnating economic growth and radicalized working class in what one industrial consult called 'the gospel of consumption'—the notion that people could be convinced that however much they have, it isn't enough" (Kaplan 2008, p. 2; see Slade 2006; Packard 1960).

Over the years, business developed many institutions in order to combat the crisis of overproduction. The use of marketing and public relations has served business in their drive to increase demand and accumulation. Planned obsolescence has intentionally designed products to fail over a certain period of time so that consumers would be forced to buy new products (Slade 2006; Packard 1960). Advertising has created the need to continuously buy new products and fashions because the old ones, while functional, were perceived to be obsolete—"perceived obsolescence". As Victor Lebow understood "Our enormously productive economy...demands that we make consumption our way of life, that we convert the buying and selling of goods into rituals, that we seek our spiritual satisfaction, our ego satisfaction in commodities...We need things consumed, burned up, worn out, replaced, and discarded at an ever increasing rate" (Quoted in Durning 1992, pp. 21-22).

Other ways in which the surplus has been absorbed is through consumer credit and increased government spending. For example, over the last thirty years the easy access to consumer credit has allowed consumers to satisfy their manufactured insatiable demand for goods and services. As Juliet Schor shows in her book *The Overspent American*, “through the 1990s, households have been taking on debt at record levels. And the largest increases have been not among low-income households, but among those earning \$50,000 to \$100,000 a year. (Sixty-three percent of these households are now in credit card debt.)” (1998, p. 19). Much of this increasing indebtedness resulted from stagnating wages and increasing pressure to maintain a certain social standard of living required by rapidly changing consumer goods. “Overspending is how ordinary Americans cope with the everyday pressures of new consumerism” (Schor 1998, p. 21). In addition to the use of marketing and the public relations industry, capital has drawn upon government to drain surplus production and capacity in order to ensure profitability (Baran and Sweezy 1966). All of these measures have dampened the effects of the tendency for overproduction crises to occur.

However, the cost of continuously increasing consumption and demand means continued economic growth, the continuation of the Jevons paradox, and the resulting ecological destruction that comes with it. While some technological optimists, including at times even Friedman, “have paid...attention to issues of consumption, there is little sense in which the specific manner in which this issue has been problematized rectifies—or at times even acknowledges—EM’s over-reliance on technological innovation and its

failure to adequately address the Jevons paradox” (Davidson 2012, p. 45). An apt description of the tendency of the capitalist system regarding the environment is given by Meadows et al.:

If a society’s implicit goals are to exploit nature, enrich the elites, and ignore the long term, then that society will develop technologies and markets that destroy the environment, widen the gap between the rich and the poor, and optimize for short-term gains. In short, that society develops technologies and markets that hasten a collapse instead of preventing it (2004, pp. 223-224).

Conclusion

Friedman, Simon and all technological optimists ultimately believe that technological advancement will solve the environmental problems that society face. They believe that the economy can be dematerialized and justify their position by the historical reduction in per-unit energy and raw materials as society advances technologically. Thus, technological optimists do not see a fundamental contradiction between capitalism, the necessary growth that accompanies it and global climate change and the biodiversity crisis.

While technological optimist are correct that advances in technology tend to reduce the material and energy inputs per unit of production, they do not account for the fact that aggregate levels of resource use increases with advances in technology. This is precisely what the Jevons paradox articulates. Moreover, it is aggregate resource use that is important for solving ecological problems, especially regarding global climate change and the biodiversity crisis. Technological optimists have no answer to the Jevons paradox and thus no solution to global climate change and the biodiversity crisis. The

crisis of production within capitalism highlights the continued need for expanding growth and profit in a capitalist economy.

From a social and ecological perspective the crisis of overproduction is insane. The crisis of overproduction, by definition, means that we have the productive capacity to supply more goods and services than people need and want in order to satisfy their lives. Thus, we need to continuously manufacture demand by creating new wants, either through planned or perceived obsolescence or the continuous expansion of government consumption. These all serve to absorb the excess surplus product society produces. Some of the profit is reinvested in advanced technology that increases productive capability, furthering the potential crisis of overproduction, furthering the need for more obsolescence, *ad infinitum*. All the while we have two ecological crises that threaten life on the planet, that are exacerbated by the continuous *and necessary* growth of the capitalist system. It is as though “modern bourgeois society with its relations of production, of exchange and of property, a society that has conjured up such gigantic means of production and of exchange, is like the sorcerer, who is no longer able to control the powers of the nether world whom he has called up by his spells” (Marx and Engels 2008, p. 8).

Because capitalist firms are privately owned and hierarchical in nature the implementation of new technologies still serves the interests of capital (Feenberg 1991). And because capitalism is driven by continuous growth and accumulation, every advance in technology is geared towards the satisfaction of these two goals. Thus, under an

economic system based on private property relations the majority of society is not afforded the possibility of choosing the level of production or the amount of hours worked. Advances in technology, thus, are not allowed to serve ecological or humanist goals. However, understanding that society, given the current means of production, has the *potential* to satisfy both human comfort and subsistence, in addition to ecological sustainability is extraordinarily important. Through an alteration of the relations of production, society can in practice achieve the satisfaction of human subsistence, comfort and ecological sustainability. Once this is done, humans can rationally apply advances in technology and science to further society in general.

This brings us to the final and most important step in this dissertation. Drawing from the insights gained from the criticisms waged in the previous three chapters we can begin to develop alternatives that can solve our ecological problems in practice.

CHAPTER 6

TRANSITIONING TO A SUSTAINABLE SOCIETY

Introduction

Given the arguments of the previous three chapters it should now be evident that the three proposed market-based solutions to the problems of climate change and destruction of biodiversity, externality theory, privatization theory and technological optimism, have little chance of solving these problems in reality. Because some combination of all three of these proposed solutions are required for capitalist society to exist, the possibility of solving these two environmental problems cannot reside in capitalist society; i.e. the capitalist state cannot be entirely neutral because it requires the continuous accumulation of capital for its legitimacy, private property is necessary for capitalist society and aggregate growth of material inputs will overcome all per-unit reductions in inputs.⁸⁴

Thus,

at some point—it has to happen if capital is the efficient cause—the realization will dawn that all of the sound ideas for, say, regulating the chemical industries, or preserving the forest ecosystems, or doing something serious about species-extinctions, or global warming, or whatever point of ecosystemic disintegration is of concern, are not going to be realized by appealing to local changes in themselves, or the Democratic Party, or the Environmental Protection Agency, or the courts, or the foundations, or ecophilosophies, or changes in consciousness—

⁸⁴ Robin Hahnel criticizes the Marxist position that growth, or accumulation as the capitalist imperative, *necessarily* means increases in material inputs (2011, pp. 79-80). While he is correct that the accumulation process and economic expansion does not *necessarily* mean an increase in the material throughputs in the production process, this leads one to the unrealistic assumption, criticized in the previous chapter, that somehow economic production of goods and services can somehow decouple itself from material things. Marxists such as John Bellamy Foster, Brett Clark and Richard York (2010) are quick to point out the fallacy of dematerialization.

for the overriding reason that we are living under a regime that controls the state and the economy, and will have to be overcome at its root if we are to save the future (Kovel 2002, p. 224).

As a result, if society as we know it is to survive we must begin to look for alternative ways of producing and consuming—alternative ways of living—that are non-capitalist. In other words, we must begin to transition out of a capitalist society and into an alternative form of society.

In this chapter we will address one issue that is a necessary requirement for an ecologically sustainable society and two alternative relations of production that can begin to transform the ways in which human beings interact with the natural environment. The first issue that must be addressed is economic planning geared towards ecological preservation and reduction in fossil fuel consumption. The dramatic decline in carbon emissions required to solve climate change and the need for regulatory mechanisms for the preservation of biodiversity cannot be accomplished through the “anarchy of capitalist production.” Thus, some form of coordinated planning is required. While neoclassical economics focuses on efficiency in the decision making process, “the scale of the changes required by sustainability makes the criterion of efficiency rather less important than that of *effectiveness*: actually achieving the objective in the first place” (Jacobs 1999, p. 92). Because of the collective nature of these two problems, “decisions about how much of the environment should be protected, or to what level, must be made collectively and politically, by the community or society as a whole; in practice, by the state” (Jacobs 1999, p. 80).

Immediately one will recognize the problem of relying on the state for solutions to ecological problems based on earlier arguments concerning the non-neutral nature of the capitalist state. Because of this potential contradiction we will analyze mechanisms with which the state can be transformed to serve the requirements of the population and the natural environment. While the state currently is not a neutral body, history has shown that the state can be *forced* to succumb to the will of the populace through massive social pressure, generally in the form of social movements. Thus a brief section will highlight some important social movements and the need for a sustained social movement that transforms the state into a truly democratic body.

While the planning mechanisms articulated above concern macro-environmental coordination, there are two micro-environmental alterations in the relations of production that will be analyzed. These are common property relations and worker-owned cooperatives. While neither of these mechanisms are solutions to the problems of climate change or biodiversity loss at present, they are important non-capitalist, cooperative forms of production. Each maintains important potential for developing micro-level institutions that can blossom and become dominant forms of production after the transition from capitalism to a sustainable, democratically-planned economy. Important insights concerning the transition out of capitalism can be gained from understanding the debate between Marx and the Classical Anarchists, especially each thinker's positions concerning social movements, worker-owned cooperatives and the need for the political alteration or abolition of the state.

Marxism, Anarchism and Transition

The fight between Marxism and Anarchism has a long and tense history amongst members of the left. Those on the left often return to thinkers like Proudhon, Bakunin, Kropotkin, Marx, Engels and Lenin seeking insight concerning the transition from capitalism to a post capitalist society. Unfortunately, the arguments between the two groups—Anarchists on the one side and Marxists on the other—often devolve into bastardized form, pitting anarchism as a philosophy concerned with building “communism” from the ground up, against Marxism, a philosophy of centralization and state-run, hegemonic socialism as a necessary step in the transition to a communist society. These debates tend to disregard one of the most important elements of Marx’s disdain for anarchism—that the transition must take the form of a political transition—often neglecting the importance Marx too placed on building socialism from the ground up. In this section we will highlight important elements of Marx’s denunciation of anarchism and show that Marx placed a great deal of emphasis on altering the relations of production from the “ground up” in the transition from capitalism to communism. This transition, however, could not be accomplished without authority and politics, but a certain type of authority and politics, one that was truly democratic, i.e. unalienated.

Pierre-Joseph Proudhon was a French anarchist whose “central idea was that society should be organized not for politics and war but for work; for only work, considered as a kind of *esprit general*, could and would make possible a moral order in society that would sustain itself without coercion and without the kind of parasitism on

the effort of others” (Thomas 1980, p. 178). The organization of cooperative labor, for Proudhon, devoid of any political manipulation would allow for the “fair” exchange of equivalent values of labor in the exchange process. “If the worker actually *receives* his value, his cost in terms of socially necessary labour-time, under the capitalist wage-contract, if in other words everything does exchange at its value...then the system is not unjust according to its own lights” (Thomas 1980, p. 230; see McNally 1993, Chapter 5).

The transition out of a “capitalist” system and into a cooperative system, where labor was free to exchange according to equal values, was to come about by building a society comprised of worker-owned cooperatives.⁸⁵ According to Proudhon,

⁸⁵ Capitalism here requires the quotation marks because, in essence, Proudhon was advocating for a petty-bourgeois capitalist society, where wage labor was not abolished. This was a primary point of criticism from Marx. “The foolishness of those socialists (namely the French, who want to depict socialism as the realization of the ideals of *bourgeois* society articulated by the French revolution) who demonstrate that exchange and exchange value etc. are *originally* (in time) or *essentially* (in their adequate form) a system of universal freedom and equality, but that they have been perverted by money, capital, etc. Or, also, that history has so far failed in every attempt to implement them in their true manner, but that they have now, like Proudhon, discovered e.g. the real Jacob, and intend now to supply the genuine history of these relations in place of the fake. The proper reply to them is: that exchange value or, more precisely, the money system is in fact the system of equality and freedom, and that the disturbances which they encounter in the further development of the system are disturbances inherent in it, are merely the realization of *equality* and *freedom*, which prove to be inequality and unfreedom. It is just as pious as it is stupid to wish that exchange value would not develop into capital, nor labour which produces exchange value into wage labour. What divides these gentlemen from the bourgeois apologists is, on one side, their sensitivity to the contradictions included in the system; on the other, the utopian inability to grasp the necessary difference between the real and the ideal form of bourgeois society, which is the cause of their desire to undertake the superfluous business of realizing the ideal expression again, which is in fact only the inverted projection [*Lichtbild*] of this reality (Marx 1973, pp. 248-249).

mutuality, reciprocity exists, when all the workers in an industry, instead of working for an *entrepreneur* who pays them and keeps their products, work for one another and thus collaborate in the making of a common product whose profits they share amongst themselves. Extend the principle of reciprocity as uniting the work of every group, to the Worker's Societies as units, and you have created a form of civilization which from all points of view—political, economic and aesthetic—is radically different from all earlier civilizations (quoted in Buber 1949, pp. 29-30).

None of this was to come about by decree. All cooperatives were to be free associations of free individuals and no authority would be allowed to dictate how cooperatives would function, nor force workers to cooperate.

This points to the most important element of Proudhon's thinking for our study. Proudhon was vehemently opposed to any political involvement, seeing politics as the cause of the unfairness of the economic system. However, it was not just capitalist politics that was coercive and authoritarian, *all* politics were deemed authoritarian.⁸⁶ Any political involvement by labor, for Proudhon, even in attempting to organize for emancipating itself from the ills of capitalism was to be condemned. Proudhon believed that "to indulge in politics is to wash one's hand in dung" (quoted in Thomas 1980, p. 239).

⁸⁶ It was this completely antiauthoritarian perspective that led Proudhon to side with the slave owners of the southern United States during the American Civil War, seeing that the South was anti-centralization (Thomas 1980, p. 264). Also, "in 1848, as a member of the National Assembly—the 'Parliamentary Sinai', as he called it in his subsequent *Confession*—Proudhon, who was expected to be on the socialist left with Ledru-Rollin and Louis Blanc, not least by those who elected him, astonished his associates by voting with the right against the constitution of the Second Republic, on the grounds that he did not believe in constitutions!" (Thomas 1980, p. 239).

The failure of Proudhon and his followers to recognize the importance of political action received unrelenting criticism from Marx.

The Parisian gentlemen had their heads filled with the emptiest Proudhonian phraseology. They babble about science and know nothing of it. They scorn all revolutionary action, that is to say, action arising out of the class struggle itself, all concentrated social movements, every social movement that is centralized and therefore [they oppose] all action that can be carried through by legal, political means (as, for example, the legal shortening of the working day). Under the pretext of freedom, and of anti-governmentalism or anti-authoritarianism, these gentlemen—who for sixteen years have so calmly endured the most miserable despotism, and still endure it—actually preach ordinary bourgeois science, only Proudhonistically idealized! Proudhon has done enormous mischief. His sham criticism and sham opposition to the utopians (he himself is a philistine utopian, whereas in the utopias of a Fourier, an Owen, etc. there is the presentment and imaginative expression of a new world) (quoted in Thomas 1980, p. 272).

Proudhon's regressive vision, according to Marx, was similar to that of bourgeois economists who saw only individualism and believed that the primary problem of contemporary society was that the state simply manipulated the fair workings of an otherwise free society. Removing all authority would, in Proudhon's eyes, return society to its natural harmonious state. Thus, Proudhon, from Marx's perspective, acted as a reactionary theoretician, deluding the working class of France and preventing the progressive movement towards a new society.

Mikhail Bakunin was another anarchist leader who bore the brunt of Marx's vitriolic criticism. At first glance Bakunin appears to be a strange bedfellow to Proudhon. As Paul Thomas explains:

In the first place, Proudhon's followers, like Proudhon himself, were 'social individualists'...who perceived not individualism but collectivism as the enemy. They were opposed not so much to individualism, which they merely considered to have been perverted by capitalism, but to collectivist regimentation which, they

reasoned, always accompanied authority. Bakunin and his followers, by contrast, were resolute collectivists, opposed in the first instance not only to political authority but also to individualism, the bourgeois principle they considered a mainstay of illegitimate authority relations (1980, p. 268).

In addition to embracing collectivism, Bakunin differed from Proudhon in that Bakunin was fundamentally forward looking seeing progress not in some retreat to an idealized petty-bourgeois capitalism as Proudhon did, but abolishing capitalism and creating a collective form of production. Moreover, Proudhon was fundamentally opposed to violence seeing in it authoritarianism, whereas Bakunin supported violence totally, seeing violent destruction of the old as necessary for creating the new anarchist society.

Yet Bakunin and Proudhon had a number of things in common. Both shared a disdain for authority and anything political. According to Bakunin, “it is necessary to abolish completely, in principle and in practice, everything that might be called political power, for so long as political power exists, there will always be rulers and ruled, masters and slaves, exploiters and exploited” (quoted in Thomas 1980, p. 295). Bakunin saw any attempt to use theory as a guide for revolutionary action as fundamentally authoritarian. According to Bakunin, the revolution could not be guided by any group or idea. A successful revolution that would not result in the cooptation by an authority must be spontaneous.

Contrary to the belief of authoritarian communists – which I deem completely wrong – that a social revolution must be decreed and organized either by a dictatorship or by a constituent assembly emerging from a political revolution, our friends, the Paris socialists, believed that revolution could neither be made nor brought to its full development except by the spontaneous and continued action of the masses, the groups and the associations of the people.

Our Paris friends were right a thousand times over. In fact, where is the mind, brilliant as it may be, or – if we speak of a collective dictatorship, even if it were formed of several hundred individuals endowed with superior mentalities – where are the intellects powerful enough to embrace the infinite multiplicity and diversity of real interests, aspirations, wishes, and needs which sum up the collective will of the people? And to invent a social organization that will not be a Procrustean bed upon which the violence of the State will more or less overtly force unhappy society to stretch out? It has always been thus, and it is exactly this old system of organization by force that the Social Revolution should end by granting full liberty to the masses, the groups, the communes, the associations and to the individuals as well; by destroying once and for all the historic cause of all violence, which is the power and indeed the mere existence of the State. Its fall will bring down with it all the inequities of the law and all the lies of the various religions, since both law and religion have never been anything but the compulsory consecration, ideal and real, of all violence represented, guaranteed, and protected by the State (Bakunin 1980a, pp. 268-269).

Complimentary of Proudhon, Bakunin states:

His own socialism was based upon liberty, both individual and collective, and on the spontaneous action of free associations obeying no laws other than the general laws of social economy, already known and yet to be discovered by social science, free from all governmental regulation and state protection. This socialism subordinated politics to the economic, intellectual, and moral interests of society (Bakunin 1980b, p. 117).

Both Proudhon and Bakunin could only view authority from a negative position, i.e. any authority prevented individuals from obtaining freedom. For Bakunin, the notion of democracy based on majoritarian rule was illegitimate, a point fundamentally opposed by Marx. Contrary to Marx, Bakunin did not see the state that existed under capitalism as problematic *because* it was an alienated state, one outside the control of the majority, Bakunin saw the state *as such* as the representation of unfreedom. “I do not believe in constitutions and laws; the best constitution in the world would not be able to satisfy me. We need something different: inspiration, life, a new, lawless and therefore free world”

(Bakunin quoted in Thomas 1980, p. 295). Bakunin's position on authority was thus, fundamentally different than Marx's position and ultimately made these two thinkers differences irreconcilable.

As noted earlier, the hostility between Marx and Proudhon and Bakunin is often categorized according to differences between "top-down" versus "bottom-up" socialism. This, however, dramatically misrepresents Marx's position concerning the importance of progressive and real, though not necessarily revolutionary, changes that can and should be made from within capitalist society. The main difference between the anarchists and Marx revolved around their position on the role of political struggle and politics more generally as it related to the transition out of capitalism.

Both Proudhon and Bakunin viewed any revolutionary political action as resulting in the necessary subordination of certain groups of people in society. "Political action, Bakunin insists...reeks of dictatorship; and political action on the part of revolutionaries reeks of revolutionary dictatorship, which, being a contradiction in terms, amounts in effect to no revolution at all" (Thomas 1980, p. 337). However, Marx saw political action, both revolutionary and progressive, as absolutely vital in the revolutionary struggle towards emancipation of the proletariat. Politics could not be separated from revolutionary social movements, nor from anything else in society.⁸⁷ Summarizing Marx's position on political action, Thomas states,

⁸⁷ "While he [Marx] employed economic categories in the analysis of the existing social forms of productive activity, Marx, whenever he discussed the supersession of these forms used specifically *political* terms—liberation, emancipation, *Gemeinschaft*—all of

Abstention from any revolutionary activity that could be called political was bitterly opposed by Marx, who remained untroubled by what seemed to his anarchist rivals to be an unbearable paradox: that of using political means in order to transcend what now passes for politics. Marx saw no reason why the proletariat should not ‘use means for its liberation which become superfluous after its liberation’; the important point was not to abjure political action across the board, lest it contaminate the actor, but to be able to distinguish among different kinds of political action, the better to be able to use those that were appropriate to furthering the revolutionary cause. Politics, after all, does not stop just because some people think it unimportant or distasteful (1980, p. 343).

For Marx, one of the most fundamental errors in anarchist thought concerning politics and the state was that the anarchists viewed the state a-historically. For Marx, there is no such thing as the state “as such” only particular states at certain historical junctures. Moreover, it is not enough to assume, as Bakunin did that, “*former workers...as soon as they have become rulers and representatives, cease to be workers...and look down on the whole common workers’ world from the height of the state. They will no longer represent the common people but only their own claims to rule them*” (quoted in Thomas 1980, p. 337). Whereas Bakunin and Proudhon saw freedom as only the negation of the state—saw the state as only curtailing freedom—Marx saw that the state could in fact enhance the freedom of the working class.

Marx’s understanding of the term ‘political’ is very different from, and indeed ultimately incompatible with what the anarchists understood by the word. Politics is understood...as being expansive, not restrictive; politics does not amount to the threat the anarchists always saw in it, but actually embodies promise and potential...It is here that anarchists’ links with the liberal tradition and its negative conception of liberty—as freedom *from* something external and exterior—are at their clearest (Thomas 1980, pp. 347-348).

which have a non-cooperative, non-nostalgic, forward-looking application” (Thomas 1980, p. 242).

This brings us to the most important element for this study concerning the debate between the anarchists and Marx. Marx's willingness to embrace political elements of the revolutionary movement allowed him to be a champion of important working class movements. For example, Marx was supportive of labor union struggles and the fight for the ten-hour day and was supportive of the cooperative movement. However, Marx never lost sight of the ultimate objective, the emancipation of the working class through the revolutionary overthrow of the capitalist system. "Apart from their [the unions] original purposes, they must now learn to act deliberately as organizing centers of the working class in the broad interest of its complete emancipation. They must aid every social and political movement tending in that direction" (Marx quoted in North 1998, p. 18). Summarizing his position on political movements, Marx writes,

[as to] POLITICAL MOVEMENT: The political movement of the working class naturally has as its final object the conquest of POLITICAL POWER for this class, and this requires, of course, a PREVIOUS ORGANISATION of the WORKING CLASS developed up to a certain point, which arises from the economic struggles themselves.

But on the other hand, every movement in which the working class comes out as a *class* against the ruling classes and tries to coerce them by PRESSURE FROM WITHOUT is a POLITICAL MOVEMENT. For instance, the attempt in a particular factory, or even in a particular trade, to force a shorter working day out of the individual capitalists by STRIKES, etc., is a purely economic movement. The movement to force through an eight-hour *law*, etc., however, is a *political* movement. And in this way, out of the separate economic movement of the workers there grows up everywhere a *political* movement, that is to say a movement of the *class*, with the object of achieving its interests in a general form, in a form possessing general, socially binding force. Though these movements presuppose a certain degree of PREVIOUS organization, they are in turn equally a means of developing this organization (Marx 1975, p. 258).

The political elements of social movements, for Marx, are important for both alleviating real hardships for the working class and in building class-consciousness, showing that another form of production is possible. It is in this vein that we should view Marx's comments supporting the cooperative movements and his approval of the Paris Commune.

For example, "on several occasions Marx declared himself strongly in favour of cooperative firms, maintaining that their generalized introduction would result in a new production mode" (Josa 2005, p. 3). In Volume III of *Capital*, Marx writes,

the co-operative factories of the labourers themselves represent within the old form the first sprouts of the new, although they naturally reproduce, and must reproduce, everywhere in their actual organization all the shortcomings of the prevailing system. But the antithesis between capital and labour is overcome within them, if at first only by way of making the associated labourers into their own capitalist, i.e., by enabling them to use the means of production for the employment of one's own labour. They show how a new mode of production naturally grows out of an old one, when the development of the material forces of production and of the corresponding forms of social production have reached a particular state (1967, p. 440).

Relative to the victory for the ten hour day, Marx thought that worker-owned cooperatives were, "a greater victory of the political economy of labour over the political economy of property...The value of these great social experiments cannot be over-rated...they have shown that production on a large scale, and in accord with the behests of modern science, may be carried on without the existence of a class of masters employing a class of hands" (quoted in Kovel 2002, p. 163). Writing about the producer's cooperatives that emerged during the Paris Commune, "if co-operative production is not to remain a sham and a snare; if it is to supersede the Capitalist system; if united co-

operative societies are to regulate national production upon common plan, thus taking it under their own control, and putting an end to the constant anarchy and periodical convulsions which are the fatality of Capitalist production—what else, gentlemen, would it be but communism, “possible” communism?” (Marx 1972, pp. 557-558).

However, Marx never lost sight of the fact that, while these movements were important, unions and cooperatives in-and-of-themselves would not be enough to transform society. For this, an alteration of the *both* the relations of production and the overthrow of the capitalist state were necessary.

(a) We acknowledge the co-operative movement as one of the transforming forces of the present society based upon class antagonism. Its great merit is to practically show, that the present pauperising, and despotic system of the *subordination of labour* to capital can be superseded by the republican and beneficent system of *the association of free and equal producers*.

(b) Restricted, however, to the dwarfish forms into which individual wages slaves can elaborate it by their private efforts, the co-operative system will never transform capitalist society. to convert social production into one large and harmonious system of free and co-operative labour, *general social changes* are wanted, *changes of the general conditions of society*, never to be realised save by the transfer of the organised forces of society, viz., the state power, from capitalists and landlords to the producers themselves (Marx 1985, p. 190).

Thus, rather than being a proponent of top-down socialism, Marx supported many ground-up initiatives. He also supported political movements that altered the political relationship between capital and labor. Ultimately for to Marx, if society is to move out of capitalism one must transform the state *and* promote the growth of *all* institutions that

have the potential to develop into non-capitalist, communal, non-hierarchical, democratic and cooperative institutions in post-capitalist society.⁸⁸

If the way feudalism was replaced by capitalism is any guide, capitalism will be undermined by those people who are able to develop new socio-economic forms within the environment it has created, forms which once established can be developed and strengthened to provide the foundation from which the capitalist mode of production and its corresponding social forms can be overwhelmed (Gare 2000, pp. 30-31).

Economic Planning

Discussions surrounding economic planning invariably conjure up visions of totalitarianism, suppression of civil-liberties and other hindrances on individual freedoms. This, however, tends to be more ideologically driven than based in a thorough analysis of the history of economic planning and the social context within which certain “planned economies” have existed in previous societies.⁸⁹ For example, regarding the Soviet Union, “many commentators have hurried to tell us that we have learned from the

⁸⁸ It should also be remembered that in the transition from feudalism to capitalism that the bourgeois revolutions that overthrew feudal governments occurred after capitalist institutions existed in society. Thus after the reorganization of the State, these institutions were allowed to grow.

⁸⁹ “Planned economies” requires the quotation marks because *all* economies are planned. As Karl Polanyi stated, “There was nothing natural about *laissez-faire*; free markets could never have come into being merely by allowing things to take their course. Just as cotton manufactures—the leading free trade industry—were created by help of protective tariffs, export bounties and indirect wage subsidies, *laissez-faire* itself was enforced by the state” (1944, p. 139). Concluding, “*laissez-faire* was planned; planning was not” (Polanyi 1944, p. 141). According to Charles E. Lindblom, “Older forms of market system have for the most part been converted into more sophisticated market systems—prodded, steered, shaped and regulated by government. The consequences have been so large and pervasive that we have come to neglect giving them the attention they deserve” (1999, p. 43). For a history of state intervention in capitalist economies see (Martinez 2009).

collapse that broad and large-scale economic planning is impossible” (Lindblom 1999, p. 41). However, it is often forgotten that Soviet planning was highly successful in achieving certain goals and that many so-called unplanned economies have also failed. In addition, “The Soviet experience did not in any consequential way test the potential of democratic non-market planning, about which we all remain in considerable ignorance” (Lindblom 1999, p. 41). Nor did the Soviet experience tell us anything about the “possible efficacy of broad and large-scale economic planning using the market system” (Lindblom 1999, p. 41).

In the ecological realm, the Soviet Union has also been castigated for its decimation of the natural environment. While correct, certainly relating to the late Soviet Union, it is often forgotten that “Lenin stressed the importance of recycling soil nutrients and supported both conservation and pioneering experiments in community ecology...This led to the development in the Soviet Union in the 1920s and early 1930s of probably the most advanced conception of ecological energetics or trophic dynamics” (Foster 2009, p. 267). In addition, Arran Gare (1996) shows that there was a strong ecological movement within the early Bolshevik party. This was all subverted with the drive to industrialize occurring throughout the world economies and the development of the Soviet war economy later in the century (Foster 2009).⁹⁰ In the race to keep up with

⁹⁰ It should also be noted that simply because there is evidence that certain “planned economies” have exhibited ecological destructive practices does not lend support to capitalist production. In other words, simply because one theory fails, this does not lend support for another theory. Moreover, one can point to a litany of examples in which capitalist markets have failed both ecologically and economically.

the West “the idea of a qualitatively different type of progress, one measured by the quality of life rather than the quantity of technology or consumer goods, has been systematically suppressed” (O’Connor 1989, p. 97).

The point here is not to criticize planners in the Soviet Union, nor to give them unwarranted support. It is a useless activity to condemn them in absentia. The point is to attempt to release our ideological predilections so as to learn from the successes and failures of planned economies in order to provide the greatest possible chances for successfully planning our economy and curtailing climate change and the biodiversity crisis. For both of these will necessarily require substantial levels of planning at the local, national and international level if they are to be solved.

Economic Planning for Ecological Sustainability

To highlight the need for planning to curtail our two crises, one need only look at the necessary requirements called for by natural scientists in order to curtail these two crises. For example, the Wuppertal Institute (Friends of the Earth Europe 1995) conducted a study of the requirements for European sustainability based on “scientific evidence and judgement, of total global environmental capacities: that is, those levels of air and water quality, land use, material consumption, energy consumption and so on which can sustain the ecosystem and human health over time” (Jacobs 1999, p. 81). Their conclusions showed that to be sustainable would require,

reductions in current European carbon dioxide emissions of 77 per cent, which translates into a halving of fossil fuel use. Key raw materials such as cement, pig iron, aluminium, copper and lead, along with nitrogen, phosphorous and potassium fertilisers, need to be reduced by 85-90 per cent, with chlorine use

being stopped altogether. To conserve biodiversity the area of protected land needs to be increased more than ten-fold, with arable and pasture lands cut by around half (Jacobs 1999, p. 81).

These numbers are quite dramatic but not out of the ordinary (Jacobs 1999, p. 81; see Brown *et al.* 1992).

Michael Jacobs proposes a hypothetical, though not unrealistic, prediction of the future based on a popular sustainability model (Ehrlich 1977) that measures the environmental impact based on population, consumption per capita, and environmental impact per unit of consumption.

Given a moderate rate of world economic growth of 2-3 per cent, output will quadruple over the next fifty years. Population is expected to double. Let us say conservatively, that current environmental impacts must be reduced by 50 per cent in that period. Then T (environmental impact per unit of consumption) in the year 2045 must be one-sixteenth of its current level; or put another way, the environmental efficiency of production must improve by 91 per cent. And of course, so long as growth continues, it must carry on improving after 2045 too (Jacobs 1999, p. 83).

Many others have articulated particular mechanism with which we can attempt to achieve these lofty requirements (Brown *et al.* 1992; Sarkar 1999; Gare 2000; Kovel 2002).

What appears to be beyond repute, notwithstanding of those blinded by capitalist ideology,⁹¹ is that an extraordinary level of planning will be required to curtail climate change and preserve biodiversity.

⁹¹ In his brief study of previously planned economies, Lindblom (1999) argues that there has never been an attempt to plan a non-market economy. Whether this would work or not Lindblom says we do not know but argues that the reason for the “absence of not even one temporary majority for a non-market system in more than a hundred years, we have to conclude that in market societies our minds are systematically shaped...Non-

A socialist society, however, is not structurally constrained in the same way that capitalist society is. For example, a socialist society is not encumbered by the growth imperative that is a necessary requirement of a capitalist system. In addition, “State ownership and central planning in principle permit the state to minimize resource depletion, ‘negative externalities’ such as pollution and the destruction of environmental amenities” (O’Connor 1989, p. 98). Furthermore, because socialist economies are not demand constrained like capitalist economies, there is no fundamental need to “waste resources through advertising, packaging, style changes, model changes, product differentiation, product obsolescence, and credit buying which are needed to keep the [capitalist] system afloat” (O’Connor 1989, p. 103).⁹²

There are, however, important problems that arise in planning, both as it relates to social production and as it relates to ecological protection, if the governing institution, the state, is not democratically organized. This pertains to both socialist societies and, as already articulated, capitalist society. However, only a socialist society can become truly democratic, that is can democratically decide to undermine the accumulation process—a characteristic not possible in capitalist societies.

market systems are excluded from the thinking of most people and depreciated in the minds of those who think about them” (1999, p. 52).

⁹² In capitalist economies there is a constant struggle to sell all that is produced at a level of full employment and full capacity utilization. This happens for many reasons associated with the anarchy of capitalist production, production for profit and the institution of money (Keynes 2007). However, in socialist economies, because production is planned, the planning authority can coordinate production so as to utilize resources at full capacity and full employment to coincide with the public demand for these goods. For an analysis of tendencies in differing social systems (see Kalecki 1971).

Democratic Planning for Ecological Sustainability

Planning has a long and storied history of being conducted by a ruling elite. In fact, many have argued, from the Plato to James Madison to Samuel Huntington, that only an elite group of privileged individuals were competent enough to make decisions concerning the governing of society (see Lindblom 1999; Crozier *et al.* 1975). “In the history of thought, the great minds have, with few exceptions, cast the study of social order—how people can live with each other—as a problem of curbing the potential subversion of the mass against the elite” (Lindblom 1999, p. 59). This has been the case in many capitalist as well as many socialist societies; i.e. the Vanguard Party in Bolshevik philosophy (Chomsky 2002, p. 226).⁹³

The inability for capitalist economies to economically plan in a direction counter to the capitalist interests resides in the non-neutral nature of the state and the external pressures of capitalist power that influence the state. Often, as Lindblom notes, the failure of,

planning is not the mobilisation of intelligence for the alteration of a passive social structure but is instead the mobilisation of intelligence to overcome people who are mobilising intelligence to obstruct. It has been difficult to plan to improve low-income housing because many people in the political system plan and fight against it. Old-age pensions were slow to come to the USA because of opposition rather than system inertness...The potential for the kind of planning that will extend the mass benefits of the last hundred years of market-oriented planning lies less in better design than in more effective development of majorities to overcome the resistance of highly advantaged minorities (1999, p. 49).

⁹³ As Noam Chomsky points out, “Institutions of domination have a nice way of reproducing themselves” (2002, p. 226).

However, non-democratic, socialist societies also have problems in their ability to plan. Historically, “in the light of the failures of governed markets...of twentieth-century planning, that it was never or rarely democratic” (Linblom 1999, p. 49). One problem with relying on an elite group for governing rather than a truly participatory democratic system, is that the populace must rely on the benevolence of the ruling elite to enact legislation for the general will, at least where the interests of the two groups do not coincide—e.g. democratic reform in Germany under Bismark. “Central planning has encouraged large, ecologically unsound mining, construction, and other projects, and centralized energy production and distribution. The horror example [in the Soviet Union] is nuclear power production which everywhere is associated with centralized political power, military ambition, secrecy, and rule by technocrats” (O’Connor 1989, p. 100). This has resulted from the lack of popular oversight and control by the population. In addition, according to James O’Connor,

no matter how enlightened those at the top of the socialist hierarchy may be, workers, farmers, scientists, and technicians trained to recognize ecological problems and deal with them do not exercise political power. The combination of the state ownership/planning and Party/bureaucratic rule, or the absence of popular power with an “ecological consciousness,” means that managers, technicians and workers in particular enterprises are politically divided from those in other enterprises...Insofar as ecologically conscious cadre have no common organization, the root of this problem is clearly political (1989, pp. 98-99).

Because of the nature of undemocratic socialism with the, “absence of freedom to organize and agitate independently around specific environmental issues; lack of public information about pollution levels; bureaucratic secrecy and disinformation about environmental effects of new investments; and last but not least, political indifference”

(O'Connor 1989, p. 99) we cannot help but suffer from ecological destruction. Thus, we must not only alter the control of the state, we must also develop democratic institutions that ensure no elite group can dominate the state.

Michael Albert (2003), in his book *Parecon*, outlines the need for an alternative form of social production based on democratic participatory economic arrangements, primarily focusing on the benefits “Parecon” would have on social justice issues that other economic arrangements would not have. Albert provides, in meticulous detail, the institutional arrangements that his “utopian” participatory-economic-democracy might look like and provides support for why his utopia addresses social issues better than capitalism, centrally planned socialism, market socialism and green Bioregionalism. One of the most important elements of *Parecon* that directly coincides with the arguments made in this chapter, is the need to develop institutions, such as worker-owned cooperatives and participatory councils for decision making at the society level (Albert 2003, Chapter 5). The importance of this being “that unlike in other systems where outcomes are determined by elites with no attention to either most of the relevant information or most of the impact, or to the wills of most people affected, or to the merits of the methods utilized, in parecon all these considerations are central” (Albert 2003, p. 142).

While the “utopian” vision outlined by Albert certainly enhances the democratic potential in society to deal with many issues that class-based societies do not, including capitalist societies and nondemocratic socialist societies, we feel it is lacking in two

fundamental areas. First, where Albert directly deals with environmental issues, such as clean air, he deals with them as externalities that are directly felt by those affected. While Albert highlights how his utopia deals with direct externalities in a much better fashion than non-participatory democratic economies, this becomes problematic when addressing issues that are not directly felt by members of society today. For example, in Albert's utopia, "if no one seeks clean air, there is no issue to be addressed" (Albert 2003, p. 145). However, the effects of climate-change and the loss of biodiversity are difficult to "see" and often do not effect people in their daily lives. Thus, climate change and loss of biodiversity might not be a concern to people in *Parecon*. Thus, even in a post-capitalist participatory democracy, there will be a need for something like a central planning body that can set limits to what certain communities or councils can produce, specifically dealing with issues like carbon emission and biodiversity loss, that do not directly impact individuals in their daily lives.⁹⁴ This type of planning will be far easier to implement in a utopia, like the one outlined by Albert, as Parecon deals specifically

⁹⁴ Robin Hahnel, another individual who has spent a great deal of his career developing post-capitalist utopias (see Hahnel 2005), articulates the need to let scientists "set the cap" on carbon emissions (2011, p. 195). Interestingly, Hahnel recognizes the need for a planning body to "set the cap" and the need for socialized investment and collective consumption, all of which would require transcending the capitalist state, but then ends his book without articulating the need to transcend the capitalist state. "A big part of a successful response to climate change will take the form of investment planning administered through a publicly controlled financial sector. Unfortunately, at the moment the financial sector controls the government rather than the other way around" (Hahnel 2011, p. 241). Hahnel speaks as if we simply need to convince the state to work in the interest of the population and not in the interest of the capitalist class.

with the abolition of all ruling classes, but must be implemented if we are to try to solve climate change and the biodiversity crisis.

The second area that Albert does not deal with is the transition from capitalism to parecon. While the development of utopias is extremely important for providing a vision of what society can look like and setting a goal for society to achieve, the transition cannot be neglected. In addition, as articulated earlier, in order to achieve a successful transition to a truly democratic classless society not only must we develop non-capitalist institutions, like the ones developed by Albert (2003) and Robin Hahnel (2005), but we must also transform the state. Historically, the transformation of the state has occurred through massive social movements.

Social Movements and the State

As has been shown earlier the tendency of the state in capitalist economies is to serve the interests of capital and the corresponding pursuit of accumulation and control. This is demonstrated by Frances Fox Piven (2006, Chapter 6) who shows that progressive reforms brought about by social movements become systematically dismantled after the social movements disperse and the natural tendencies of the state and the ruling class are allowed to operate without pressures from these movements. Once the movements “recede, so do the democratic currents they have unleashed. American politics returns to its default position where special influences, especially business influences, matter most, and the public arenas created by democratic institutions become arenas for popular

manipulation” (Piven 2006, p. 6; Fones-Wolf 1994). In other words, without social movements there is no power to confront the natural tendencies of the capitalist state.

While the state in capitalist societies is not neutral, there have been many times in history that social movements have forced the state to enact progressive legislation that is against the ruling interest and in the interest of the majority of the population (see Gamson 1975; Piven and Cloward 1977; Tarrow 1994; Tilly 2004; Piven 2006). “The great moments of equalizing reform in American political history have been responses to the threatened or actual exercise of this disruptive power” (Piven 2006, p. 21). The abolition of slavery, New Deal legislation and desegregation embodied in the Civil Rights Movements were all examples of dramatic progressive reforms that were brought about through social upheaval. In addition, the revolutionary movements of the French Revolution, the Revolution in Russia in the early 1900’s and the fall of the Berlin wall in 1989, the recent revolutions in the Middle East and Africa, were the result of social movements. One can say that social movements are a necessary, but not sufficient, condition for progressive social change.

Social movements also have the power of altering culture and discourse in society whether or not they succeed in changing political and social institutions. For example, social movements can build a sense of solidarity amongst persons who believe in social causes or who share the plight of those resisting oppression. This can have a cumulative effect in the building and furthering of social movements. In addition, social movements often alter the discourse in society, forcing the ruling class to address burdensome issues

that they would prefer to remain silent on. This could be seen immediately in the Occupy Wall Street movement that emerged in 2011. Prior to the movement the federal government was debating deficit reduction and austerity measures. Yet, once the Occupy Wall Street movement received press coverage, the ruling class was forced to begin debating the massive disparity in income inequality. In addition, this provided a great deal of education to the population not participating in the Occupy Wall Street movement on the problems society faces resulting from income inequality.⁹⁵ These cultural and discursive contributions will be vital in building movements towards altering the state and building an ecologically sustainable society.⁹⁶

If society is to transition out of a capitalist economy into a socialist ecologically sustainable democracy, which we argue is the only way to have a chance of solving climate change and the biodiversity crisis, we must begin to build social movements that are robust and sustainable that maintain the goal of transitioning out of capitalism, and promote democracy and ecological sustainability.⁹⁷ Without social movements the goal

⁹⁵ For a good study of social movements (see Tarrow 1994; Giugni, McAdam and Tilly 1999).

⁹⁶ One should also note, social movements need not transform society in a progressive fashion. They can similarly move society in a conservative or regressive manner, as has happened with the rise of fascism historically.

⁹⁷ Hahnel, in his book *Green Economics*, acknowledges the importance of social movements in attempting to force the implementation of environmental legislation (2011, pp. 210-211). Yet, he then states, “however, dogged determination, heroic protest, and civil disobedience can be only one part of an effective strategy to reduce carbon emissions sufficiently to avert climate change. Unless an effective cap-and-trade international treaty is approved and enforced, unless governments are forced to

of altering the non-neutral nature of the state will not be possible and ecological planning will not be attained. However, while transformation of the state and some form of coordinated planning are necessary conditions in thwarting climate change and the biodiversity crisis, they are not sufficient conditions. As we articulated above, there is also a need to try to ensure that the state after the transition is not class-based and serving will of a particular group in society, i.e. a state that it is truly democratic. Thus, we will explore two cooperative production institutions that have the potential to enhance the possibility of a successful transition to a democratic post-capitalist society.

Worker-Owned Cooperatives in Capitalist Society

In addition to altering the state, it is important to alter the relations of production at the micro-level in an effort to prevent the emergence of a new or different ruling elite should society transition out of capitalism. The two primary methods of production that we will analyze that maintain the *potential* for democratizing the production process are worker-owned cooperatives and common-property relations. Each of these face problems as they exist in the capitalist economies of today but, equally, each holds tremendous potential for balancing power relations and giving a utopian vision about what society might look like in the future (Albert 2003). First, we will address how each functions in a capitalist

implement effective domestic policies, demonstrators engaging in civil disobedience will be rounded up and arrested by armed police and military personnel to no avail” (Hahnel 2011, p. 211). Hahnel fails to recognize these are the very actions that will force government to implement the types of proposals that Hahnel deems vital to thwarting climate change. Given Hahnel’s prior writings, which are overtly anti-capitalisms, one might assume that Hahnel believes that ecological issues cannot be solved under a capitalist system. However, *Green Economics* contains much that could be seen as reformist, not promoting the need to move past a capitalist system.

society and then we will provide a utopian section on what society might look like if the state is altered and worker-owned cooperatives and common property relations become the dominant economic form in a post-capitalist society.

Worker-owned cooperatives are firms that are primarily owned and managed by those working in the firms themselves.⁹⁸ For simplicity, we use the term worker-owned cooperative because it is familiar and because ownership generally implies control of the firm.⁹⁹ With the emergence and expansion of the capitalist system worker-owned cooperatives simultaneously emerged in order to counter the vicissitudes of the capitalist system. Efforts were made to maintain control over the production process and ensure that those who labored also made decisions concerning the production allocation and distribution of their product. “Robert Owen was one of these pioneers and his own efforts to create a functioning co-operative community became the model for others that followed in the United Kingdom, France and other parts of Europe and the United States” (Restakis 2010, pp. 51-52). While these early communal societies and worker-owned cooperative movements did not survive long enough to transform the entire society, there has been continuous effort since the time of Owen to establish worker-owned

⁹⁸ There are many different definitions and terms that refer to variants of worker-owned cooperatives. Some use the term producer-cooperatives, labor managed firms, worker self-management, etc. (see Dow 2003, p. 102).

⁹⁹ This is not necessarily the case (Berle and Means 1932). However, generally speaking those that own firms ultimately have the right to control the decisions of the firm at least in the last instance.

cooperatives in many regions of the world. Many of these efforts have been highly successful.

In northern Italy, for example, there are a large number of worker-owned cooperatives operating in a number of industries. “Co-operatives in Emilia Romagna are no longer marginal alternatives to the mainstream economy. They have become a determining force in the mainstream. In every key industry, co-operatives play a central role” (Restakis 2010, p. 65). In addition, the often-cited Mondragón Corporación Cooperativa, is a conglomeration of roughly 150 worker-owned cooperatives that have been successfully operating in the Basque region of Spain since 1956. In Cleveland Ohio, a “new model of large-scale worker-and community-benefiting enterprises is beginning to build serious momentum” (Alperovitz et al. 2010, p. 1). Argentina saw a number of cooperatives arise after their economic crisis of 2001. These cooperatives were established by direct takeover from factory workers and exhibit extraordinary equality in the workforce.

Worker-owned cooperatives break down the traditional organization of the firm. According to Christopher Eaton Gunn, “workers’ self-management refers to the collective process of self governance and democratic management within an organization that produces goods or services. It eliminates employee-employer relationships and provides an extension and reinforcement of democratic principles fundamental to modern Western thought” (1984, p. 15). Because the worker-owned cooperative’s “essence is ownership by producers, the very notion of cooperation cuts into the core of capitalist

social relations, replacing hierarchy and control from above with freely associated labour” (Kovel 2002, p. 163).

There are tremendous advantages to worker-owned cooperatives over the traditional capitalist-owned firms. For example, most worker-owned cooperatives maintain much more egalitarian wage structures (Miller 1989). “Existing LMF’s [Labor Managed Firms] do adopt flatter wage scales than similar KMF’s [Capital Managed Firms]” (Dow 2003, p. 25). Some, like the Mondragón Corporación Cooperativa, have predetermined differentials in which the highest paid workers cannot exceed 5-1 ratio over the lowest wage workers within the cooperative. Others are completely egalitarian. In addition, most worker-owned cooperatives operate according to democratic principles in which all members of the cooperative have one vote in company decisions.¹⁰⁰ Many worker-owned cooperatives mandate a certain level of money to be invested in community projects and social safety nets. As Gunn states, many worker-owned cooperatives attempt to achieve “a satisfactory mix of income, long-term economic security, satisfaction from work, sense of community at work, and contribution to the

¹⁰⁰ For the ethical justification of democratically operated worker-owned cooperatives see (Pateman 1970; Walzer 1983; Dahl 1985; Bowles and Gintis 1990; Archer 1996). Some have argued that participating in democracy at the micro-level will foster democratic participation at higher levels (Mason 1982; Bowles and Gintis 1990). This would mean that worker-owned cooperatives would enhance political democracy at the community, regional and national levels. However, in his study of worker-owned cooperatives in the plywood industry in the Northwestern United States, Greenberg disputes this claim showing that workers in these cooperative enterprises do not participate in democratic processes outside of the firm in greater number than their counterparts in conventional firms (1986, p. 151). There was some evidence of increasing political participation at the community level in his earlier article (1981, p. 973) and Smith (1985) found greater participation from workers in worker-owned cooperatives.

broader community” (1984, p. 18; see Dow 2003, p. 60; Restakis 2010, p. 208). Moreover, worker-owned cooperatives do not tend to lay off workers who are members as a cost cutting mechanism, but rather all workers reduce their level of work so that no individual bears the brunt of low economic performance (Craig and Pencavel 1993, pp. 299-301; Weisskopf 1993).

From the community level, the workers working in the cooperatives live in the communities in which the firm is located and thus have a shared sense of community that many capitalist firms do not maintain (Dow 2003, p. 39).

Worker’s control of production can lead to greater community control over it. Workers constitute a community in their productive work, which in turn is part of the community they live in. The two communities are likely to have many common interests. The same cannot be said for the relationship between a community where a firm is located and capital owners, who may have no living connection with that community (Gunn 1984, p. 36).

Thus, worker-owned cooperatives do not have the same tendency to outsource jobs to other countries to save labor costs, while firing workers in the firm. Also, the pressure to move the entire firm is virtually non-existent. Some have articulated that worker-owned cooperatives would be less environmentally destructive, especially to their immediate community, because these workers would be living with the effects of the pollution they created (Dow 2003, p. 39; Wolff 2010; Vanek 2011).¹⁰¹

¹⁰¹ Vanek (2011) argues that because capitalist enterprises are owned by people who often do not live in close proximity to the polluting firm, often not even in the same city, the incentive for capitalist firms to pollute are high. This, according to Vanek, means that worker-owned cooperatives would require less regulation for pollution because they maintain internal incentives to not pollute.

While the social benefits of worker-owned cooperatives are numerous, especially from a social justice perspective, cooperatives are faced with tremendous constraints because they must function from within capitalist economies. First, because worker owned cooperatives must operate according to the rules of a capitalist economy, they must maintain a certain level of profitability in order to survive as a firm. This means that business decisions are often dictated by the necessity for profit and have lead many worker-owned cooperatives to act similarly to their capitalist counterparts. For example, a number of worker-owned cooperatives hire wage laborers who are not allowed to become members of the cooperative (Dow 2003, p. 56). In addition, we see in the Mondragón Cooperatives, resulting from international competitiveness and the need to maintain profitability, that the cooperative has acquired firms overseas that are not cooperative enterprises (Cheney 1999; Dow 2003, pp. 62-64).

Similarly, worker-owned cooperatives have a motivation to make profits resulting from their membership requirements. In most worker-owned cooperatives members must pay into the firm, either in the form of an up-front payment or a fee that is deducted from their wages. Because workers are required to invest in the firm they have an incentive to see a return on their investment in the form of profit. Moreover, investment in existing worker-owned cooperatives would be unlikely if there were to be no increase in the profitability of the firm. This makes the possibility for worker-owned cooperatives to overtake capitalist firms as the dominant form of production relations in society highly unlikely.

Finally, for worker-owned cooperatives to have *potential* to help in curtailing global climate change and the biodiversity crisis they would have to become the dominant form of production in society. So long as worker-owned cooperative remain in a minority position relative to capitalist production, their ability to bring about social justice and ecological sustainability will be marginal.¹⁰² As Kovel states, “no doubt, were the entire economy in cooperative hands, matters would be different—but for that to happen, capital itself would have to be shoved aside and replaced, and that is quite another, and revolutionary matter, which will not come from the existing cooperative movement” (2002, p. 164). As they exist presently worker owned cooperatives are an extraordinarily small portion of the total economic output of society. Thus, they would not only need to grow substantially in number, but in fact grow at a much faster rate than capitalist enterprises.¹⁰³

Marx was correct in his assessment that, while breaking down important characteristics of capitalist firms, worker-owned cooperatives function much the way

¹⁰² For example, “modern-day workers’ cooperatives exist, but have failed to transform the economic system as their early advocates hoped. Instead, they are a peripheral form of organization that prospers only in narrow niches. Even in countries with thriving cooperative sectors, a very small fraction of the total workforce is employed in such firms (about 2-3 percent in Italy, whose sector is by far the largest in the West)” (Dow 2003, p. 47).

¹⁰³ The system will allow for many small encumbrances on it from within society so long as the accumulation process is not dramatically altered or abolished. As Joel Kovel notes, “capitalism will tolerate any number of improvements and rationalizations so long as its basic expansion is secured—and indeed, many of the reforms succeed in doing just that... Thus some cooperatives and green capitalism are allowed or even encouraged to join the club so long as they add modestly to accumulation, or at least keep out of its way” (Kovel 2002, p. 164).

capitalists firms operate. This is primarily due to the fact that they are operating in capitalist economies and are forced to compete with capitalist firms and each other. Thus, the possibility that worker-owned cooperatives will be the primary mechanism for transcending capitalism is highly unlikely. In addition, Marx was correct that an alteration of the state within capitalism is a necessary requirement for transcending capitalism. However, it is important to develop worker-owned cooperatives as possible institutions that can blossom and become dominant should the political system be transformed.¹⁰⁴ They also provide glimpses into the future of what a socialist society could become.

Common Property in Capitalist Society

Since the publication of Elinor Ostrom's pioneering book *Governing the Commons* in 1990, common property relations and the corresponding common pool resources have received much greater attention from academics. Most of this literature revolves around local, small-scale property relations but recently the literature has grown to incorporate larger areas including commons on a global scale (Klein 2002; Buck 1998; see McCarthy 2005, pp. 12-16). "The knowledge base is strongest with small-scale ecologies and institutions, where time series exist on many successes and failures. It is now developing for larger-scale systems" (Dietz et al. 2003, p. 1907). In addition to the diversity of the

¹⁰⁴ There is also evidence that altering the political climate in which cooperatives operate can foster the growth and success rate of cooperatives. For example, Dow articulates that one of the reasons for the success of cooperatives in Northern Italy (2003, p. 75) and in the Basque region of Spain (2003, pp. 64-45) was due to the favorable political climate in these regions. Thus, by altering the political climate through social movements the success of cooperatives can be a cumulative process.

scale of certain types of properties, the literature also covers a very diverse set of property that can or should be under the umbrella of common property. These can span from the usually cited common property of fisheries or water rights, to copyrights, pharmaceuticals, the global climate, and space.

The particular characteristics that make common property most successful has been extensively covered.

Effective commons governance is easier to achieve when (i) the resources and use of resources by humans can be monitored, and the information can be verified and understood at relatively low cost (e.g., trees are easier to monitor than fish, and lakes are easier to monitor than rivers; (ii) rates of change in resources, resource-user populations, technology, and economic and social conditions are moderate; (iii) communities maintain frequent face-to-face communication and dense social networks—sometimes called social capital—that increase the potential for trust, allow people to express and see emotional reactions to distrust, and lower the cost of monitoring behavior and inducing rule compliance; (iv) outsiders can be excluded at relatively low costs from using the resource (new entrants add to the harvesting pressure and typically lack understanding of the rules; and (v) users support effective monitoring and rule enforcement (Dietz et al. 2003, p. 1908).

In the particular successful case studies that Ostrom (1990) analyzes these arrangements stood out as unifying institutions enhancing the success of common property in preserving the resources under their rule. However, “few settings in the world are characterized by all of these conditions. The challenge is to devise institutional arrangements that help to establish such conditions or...meet the main challenges of governance in the absence of ideal conditions” (Dietz et al. 2003, p. 1908).¹⁰⁵

¹⁰⁵ “While the social systems for managing finite natural resources vary immensely from culture to culture, making broad generalizations risky,” notes David Bollier, “scholarship on the commons has shown that social institutions can be created to manage common property successfully and sustainably” (2002, p. 202).

Property held in common, by definition, means that multiple “stakeholders” maintain the right to access and/or have a say in the way in which a piece of property is utilized. Thus, just as worker-owned cooperatives have a democratizing effect on the production process, common property relations have a democratizing effect on the way in which certain pieces of property are utilized. “As scholars of common-pool resources have shown, people can come together to manage a scarce resource and pursue their shared interests as a group” (Bollier 2002, p. 179), despite the fact that not all commons incorporate all stakeholders in the decision making process.

Countless historical examples of successful commons and community-based production abound. In one study, Ostrom shows how different groups were able to successfully manage “fragile groundwater basins beneath the Los Angeles metropolitan area” (Bollier 2002, p. 202; see Ostrom 1990, pp. 103-142). As Bollier notes, “contemporary case studies have looked at commons governed by lobster fishermen in Maine, cattle ranchers in northern California, users of the Edwards Aquifer in south central Texas, and Alaska halibut fishermen, among many others” (Bollier 2002, p. 202). Contrary to the market-based models based on private property so prevalent today, “in the commons, the goal is to maximize the long-term value of the asset and social stability” (Bollier 2002, p. 180).

Due to the nature of common property relations—bringing together diverse members of the community who have a stake in the way resources are used—institutions within common property relations are often diverse. This can produce a robust set of

institutional arrangements because these arrangements surrounding the commons are developed by the community directly impacted by the use of the commons. As Bollier notes, “a commons is flexible yet hardy precisely because it draws information from everyone in a ‘bottom-up’ flow. This means that rules are ‘smarter’ because they reflect knowledge about highly specific, local realities” (Bollier 2002, p. 183). This is not to say that rules in the commons will never be broken but often the incentive to break the rules is outweighed by the incentive to adhere to the rules. As James A. Swaney writes, “the argument is not that the incentive to cheat is eliminated, but that net consequences may favor following the rules. And when the rules are legitimate, individual commoners who have been successfully socialized do not waste their conscious energies continuously weighing the benefits and costs of cheating” (1990, p. 455). In addition, “the commons member who degrades the commons for immediate benefit will share in the eventual loss in productivity, but the primary constraint on such behavior is the threat of lost status and reputation in the community” (Swaney 1990, p. 457). Moreover, individuals have less incentive to cheat because they were the ones that made the rules and they have the opportunity to change the rules if they feel the rules are not working.

The structural relations of common property differ substantially from those of private property. “Competitive private markets systematically *undermine* community by rewarding narrowly self-interested behavior and eroding community standards” (Swaney 1990, p. 457). Conversely, common property relations have as their foundation community and put cooperative social relations at the forefront of the production process.

“Community is characterized by common attitudes and objectives that develop out of shared experiences and common social beliefs” (Swaney 1990, p. 456). Because no one group that is allowed to participate in the commons is granted a dominant position in the decisions that govern the commons, a collective spirit can be developed regarding common property decision making. In essence, common property relations, similar to worker-owned cooperatives rewrite the rules with which society abides by in the social production process. “Interdependence in providing an important good or in managing a key resource is usually the principal thread holding common property together” (Swaney 1990, p. 455). Moreover, “in the environment, interdependencies are growing rapidly, thereby providing an impetus to common property” (Swaney 1990, p. 455).

Like worker-owned cooperatives, common property relations face pressures given the nature of capitalist society. First, because private property is the dominant form of property in capitalist societies it can often be difficult to establish common property relations. At times resources such as fisheries that are difficult to arrange into private property can become commons but resources such as land that are easily privatized are granted private property rights. In addition, areas that are owned by the federal government, such as natural forests and mineral rights, that are held in the public trust are leased for exploitation by corporations who exploit them as if they were privately owned. Thus, it is difficult for common property to become the dominant property form in society.

In addition, because common property relations are susceptible to the profit motivations of those utilizing the commons, if there is not proper enforcement of the commons and if those participating do not follow the rules, the commons can be over-exploited (Ostrom 1990, Ch. 5). Thus, in a number of the commons, the capitalist mentality articulated by Hardin (1968) can prevail if common property is treated as open-access. In addition, the competition between those producing goods on the commons and those producing goods for sale on private property can force those on the commons to over-exploit their commons. This results from the fact that those producing on private property can cut their costs without worrying about sustainability, thus undercutting the price of those producing on the commons.

Finally, though not specific to capitalism, it is often difficult to strictly demarcate who should be included in the decisions concerning production on common property. For example, in fisheries should it only be the fishermen who decide who gets to fish where and how many fish are each able to harvest? Should marine biologists that are concerned with marine ecosystems be allowed to participate? Should the fishermen and the marine biologists have a say in common property relations of agriculture up-stream and the level of fertilizers that drain into the water supply? Questions like these can make establishment and enforcement of common property extraordinarily difficult.

Utopia, Cooperatives, Commons and Planning

Utopias are important because they can provide insight into what a society might look like in the future. Moreover, utopias can be a mobilizing force for popular social

movements and provide goals that society can begin working toward today.¹⁰⁶ The loss of utopias means that we have given up on the project that society can be converted into anything else, that what exists is what shall exist (Gare 2000). Yet, what should be clear to any student of history, and a central tenant in Marx's philosophy, is that no historical social system is unchangeable. Thus, if we want to build a society that is socially just and ecologically sustainable we must develop utopias and begin to work towards them in practice.

What we have attempted to show in this chapter so far is that the transition to a post-capitalist ecologically sustainable society will require an alteration of the state from a non-neutral body to one that will allow for democracy and some level of planning for sustainability. This must be conducted through massive social movements if there is any possibility to change the nature of the state and the capitalist class that governs the state's decisions. We have also highlighted two alternative relations of production that hold extraordinary potential should the state be transformed and should they be allowed to function in a non-capitalist economy. In this final section we will articulate the potential benefits a society maintains if the state is popularly controlled, i.e. allowed to democratically plan, and where common property relations and worker-owned cooperatives are the dominant form of production relations in the economy.

By transforming the state from a tool for furthering the capitalist accumulation process to a truly democratic set of institutions, the state will be able to generate policies

¹⁰⁶ Many utopias have been developed by contemporary authors (see Morrison 1995; Schweickart 1996; Sarkar 1999; Milani 2000; Hahnel 2005; Schor 2010).

according to the general will of the population. This will allow the state to implement policies that are counter to the accumulation process and will ultimately allow for the transition out of a capitalist economy. Concerning global climate change and the biodiversity crisis, this means that the state will actually be able to put limits on the total output of society, limit carbon emissions and protect important biodiversity areas. The growth imperative will be broken. The state will also be able to redistribute income and provide important social welfare programs thus, creating a more equitable, just and sustainable society. In essence, the state will be relieved of its subservience to a particular group and will in fact be allowed to function according to the will of the populace.

There is no guarantee that a truly democratic society will not democratically decide to further ecological destruction. However, there is evidence that the population believes that government should engage in curtailing ecological destruction. For example, Jon A. Krosnick and Bo Mac Innis (2013) found the majority of Americans believe that climate change is happening and the United States should do something to curtail emissions.¹⁰⁷ In addition, with the transition out of capitalism and into a truly democratic society where common property relations and worker-owned cooperatives become the dominant relation of production there is good reason to believe that the tendencies to curtail climate change and the biodiversity crisis will be strengthened.

¹⁰⁷ It is difficult to find studies concerning popular support for biodiversity preservation because it is not an issue that gets much media attention.

In a society dominated by worker-owned cooperatives and common property relations the power that has traditionally been in the hands of the property-owning minority of the population will be in the hands of the majority. By creating a society dominated by worker-owned cooperatives and common property relations we can “create a network of mutually supporting partially autonomous alternative local economic systems which can function as stepping stones for transforming the whole of society and eventually for participating in the creation of an ecologically sustainable world civilization” (Gare 2000, p. 36; Douthwaite 1996). This will help foster democracy in the political process and will address many of the concerns that thinkers like Proudhon and Kropotkin articulated concerning the centralizing authority of the state. Because each of these institutions will be run according to democratic principles and will be working outside of the capitalist desire to accumulate (because the state will set limits on growth, accumulation and provide a certain level of social subsistence) worker-owned cooperatives and common property will be allowed to make decisions for the betterment of their lives and society as a whole.¹⁰⁸

¹⁰⁸ In Albert’s *Parecon*, he states, “Participatory workers must weigh the gains from working less or using less productive though more fulfilling techniques, against the consequent loss of consumer well being” (2003, p. 123). However, to ensure that society address requirements of averting climate change and biodiversity loss, the central authority of the state would need to set certain limits on even what a democratically planned local cooperative could produce. This does not mean that they need to dictate exactly what is produced, how much and according to what method. That could, and should be done according to producer and consumer councils for the social reasons Albert outlines. The central authority would simply address macro-environmental issues by requiring preservation of biodiversity and capping emission levels according to what climatologists have deemed safe levels.

As articulated in the last chapter, every advance in technology provides human society with two distinct choices. Humans can either decide to work the same amount of hours as they did prior to the technological advance and produce more, or they can decide to work fewer hours and produce the same amount. Thus, the problem of ecological destruction is not increases in productivity, per se. “Instead, the problem is...what we do with increases in our productivity” (Hahnel 2011, p. 81). In other words, with increases in productivity, humans could maintain the same standard of living while enjoying more leisure time.¹⁰⁹ Hahnel provides a vivid example,

In 1950 the United States was not a poor, underdeveloped economy where critical economic needs went unmet for an overwhelming portion of the population. It was the wealthiest country on the planet in 1950...Had Americans...taken all their increased productivity as leisure, their material standard of living would have been exactly the same in 2000 as it was in 1950, and the standard workweek, not workday, would have been eight hours instead of forty. In other words, working only one day a week instead of five (Hahnel 2011, p. 81).

The impact of such a decision toward solving climate change and the biodiversity crisis would have been tremendous. The problem being that in capitalist societies decisions are not made democratically. In other words, society is not afforded with the choice of working less. People in charge of privately held firms are the ones in society that decide on the number of hours individuals work and because they operate according to the profit motive, always opt for increasing production while maintaining the number of hours worked by employees (Maume and Bellas 2001).

¹⁰⁹ This becomes even more striking when one realizes that most workers have not seen an increase in their standard of living since 1973.

Worker-owned cooperatives, on the other hand, can make the decision to invest in labor saving technologies that in fact save labor. Because worker-owned cooperatives do not *necessarily* make production decisions based on the profit motive they can utilize advances in technology and make the decision to produce the same amount while working less.¹¹⁰ Thus, “productive efficiency would be translated into leisure time rather than an increase in profits and consumer goods” (Rocheleau 1999, p. 48). Should worker-owned cooperatives become the most pervasive form of production in society a no growth economy would finally become possible.

A no growth economy is extraordinarily important for curtailing global climate change. Not only does the level of carbon emissions released in the atmosphere immediately halt in a society that ceases to grow but, of equal importance, the Jevon’s paradox is eliminated. In other words, every advance in “green technology” would reduce the total environmental impact human societies have on the planet. There would no longer be the need to exploit resources at an increasing rate. Thus, instead of the position held by Marx, “that capitalism prevents the truly rational application of new science and technologies because they are simply used to expand operations of capital” (Clark and York 2005, p. 412), technology could be utilized for truly human and environmental purposes.

Again, one cannot say that a democratic society would necessarily invest in measures such as public transportation and reforestation, for, by definition, such

¹¹⁰ Once the distributional effects and egalitarian tendencies of worker-owned cooperatives are incorporated into society, in fact most individuals would see an increase in their standard of living while reducing their hours worked.

decisions are left to democratic procedures. But with economic democracy's social planning of investment and lack of capitalism's built-in ecologically destructive incentives, such measures are substantially more likely (Rocheleau 1999, p. 49).

Regarding common property relations, there are a number of reasons to believe that human beings will not only interact with each other in a more cooperative fashion, but will interact with the environment in a fashion that will enhance the preservation of biodiversity. First, in a well functioning commons, those who have a social stake in a commons all have a say in the way the commons are utilized. For example, in well functioning common fisheries cooperation between fishermen is geared towards ensuring that there is a sustainable population of fish (Leal 1998). Moreover, if the drive towards accumulation is severed, there will be far less pressure to overly exploit common properties. However, in a truly successful commons that is geared towards biodiversity preservation, not only the fisherman but also the groups that are affected by the biodiversity of the ocean, marine biologists, tourists, etc., all would have a say in the way a particular common was managed. This means that no one group has the power to dictate over the concerns of others. The community decides the management of the commons with specific biodiversity limits placed on the commons by a central coordinating body.

Second, similar to worker-owned cooperatives, those that rely on the productivity of the natural environment generally live in the communities that preservation or destruction directly affects. Thus, there is an incentive to not "foul one's own nest". As Bollier explains,

A commons is far more likely to take into account the long-term repercussions of its choices on the environment, social equity, and values. A commons *optimizes* rather than *maximizes*. It is more adept at internalizing the long-term external costs of its activities than markets are. In practice, markets tend to maximize private gain for short-term ends, while commons tend to optimize collective gain for long-term ends. There is a structural incentive for this phenomenon. As long as members of a commons cannot liquidate their interests and invest them elsewhere, their lives and long-term futures are bound up with the fate of the commons. Stewardship of resources, rather than development for private gain in the market, is structurally favored by a commons regime (2002, pp. 186-187).

Third, because common property relations allow for all who have a “stake” in the commons to democratically decide how to utilize these commons for the community’s sake production is no longer strictly according to one’s own interest without producing according to the needs of society. By definition, common property relations must incorporate production for society. “When people spoke about commons...they designated an aspect of the environment that was limited, that was necessary for the community’s survival, that was necessary for different groups in different ways” (Illich 1983, p. 7). By designating property in common people begin to recognize that production occurs not for the individual, but for society as a whole.

Finally, as with worker-owned cooperatives, certain institutional arrangements can be developed to enhance the probability that common property relations are able to help solve the biodiversity crisis. For example, assuring that biodiversity preservation has representative stakeholders in all common property discussions and decisions. This could be a biologist from a local university or a community member that understands the local biodiversity and its requirements for sustainability. Or, regarding the development of a certain plot of land, an ecological architect could be brought in to develop the land in

an ecologically sustainable manner. The important thing is that there be a representative in common property production decisions that advocates for producing in accordance with biodiversity preservation. In addition, the state can and should set standards for biodiversity preservation that must be adhered to by local groups who then decide how to produce so as to meet these standards.

While this is certainly a utopia at present it is not utopian in the sense of being impossible. What is important in judging a utopia is to see if the utopia is feasible. In other words, does the utopia maintain fundamental contradictions within it that do not allow the utopia to solve the problems it has set out to solve? In addition, we must recognize the tendencies within a utopia that run counter to its stated objectives. We believe that this utopia satisfies all of the requirements of a possible utopia. We also believe that without moving towards a post-capitalist democratic utopia, where society controls the production process, the possibility of solving climate change and the biodiversity crisis will forever elude us. Everyone should be reminded that all that is, was utopian.

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