Disastrous Climate Change and Capital's Failures: Restoring Nature/Society Equilibrium Through Alternative Frameworks

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Abstract: This dissertation examines the innerconnections of climate change and capital. I argue, the capitalist system causes, continues, and fails to address climate change and its attendant social and physical affects. To prove this argument, the paper examines the affects of anthropogenic induced sea level rise and the corporate and market based solutions capital provides. After showing the weaknesses of these solutions, I examine Marxist theory relating to capital and nature/society relations. While arguing that environmental and social degradation, appropriation, exploitation, and alienation are fundamental aspects to capital, I conclude that a capitalist system is will never be capable of confronting climate change in the best interests of all affected. Following this section, I analyze the ideological tensions between capital and sites of resistance. This analysis reveals that capital has infiltrated every aspect of our existence and we must make a concerted effort to seek and realize alternatives.

The first man who, having enclosed a piece of ground, bethought himself of saying This is mine, and found people simple enough to believe him, was the real founder of civil society. From how many crimes, wars and murders, from how many horrors and misfortunes might not any one have saved mankind, by pulling up the stakes, or filling up the ditch, and crying to his fellows, "Beware of listening to this impostor; you are undone if you once forget that the fruits of the earth belong to us all, and the earth itself to nobody." Jean-Jacques Rousseau

Introduction

Market rationalities and corporate environmental management strategies are the vanguard of emergent transformational methodologies curbing disastrous climate change and unchecked environmental degradation. The concepts seem at odds with each other since the corporation and market caprices are often the culprits instigating environmental crisis. But that aside, global climate change carries the potential to challenge or destroy the three pillars of sustainable development – environmental protection, economic development, and social development. The environment forms the foundation of our lived experiences and climate change threatens our foundation in new ways necessitating new approaches. Carbon dioxide (CO2) is the central point of discussion in climate change discourses. This molecule, its properties and affects unknown until the 19th century, forms the basis of climate change policy throughout the world. Whether our concern lies with power plants, car emissions, or the disappearance of islands and cultures, CO2 reaches and affects each of us in disparate ways. The question that guides this dissertation is whether the capitalist system is capable of confronting climate change in the most beneficial way to all life forms. In answering this question, I argue that capitalist production and social relations cause and propel climate change and will continue to do so. Our activities and imbalances within our nature/society relationship reflect itself in the climate crisis. This distorted relationship is based in a historical trajectory of social relations that led us to this position. The advent of environmentally conscious market and corporate management strategies will not mitigate climate change. To relieve the variety of ailments afflicting humanity, including climate change, requires a basic reworking of our society wholly separate and distinct from capital. Thus, any policies dependent on capital, whether they are focused on corporations or market systems, will fail because the basis for such policies requires the logic of exploitation and limitless growth - two requirements at odds with mitigating and adapting to disastrous climate change.

The importance of my research and dissertation lies in its interrogation of the dominant global policies concerning the environment. The widely acceptable answers to climate change are based in capitalism. For example, corporations must make a stronger commitment to decreasing CO2 emissions, new and stronger global carbon markets, technological innovation undergirded by capital competitiveness, aid tied to economic benchmarks, cost-benefit analysis, and new ways of commodifying nature. The foundational logic of capitalism disallows the possibility of tweaking the system to fix the dilemma. If capital were ever to heal the environment and create world equality, it would have done so by now. We are acculturated to think and act within a capitalist system as it continually reproduces its ideologies throughout society. No one is free to choose the physical, social, and spiritual conditions in which we are born. We are products of society – the mass of historical ideas congealed into ideology, practices, and policies. The academy, government, and policy communities produce knowledge in accordance with the universal conditions of capital. These actors knowingly and unknowingly produce ideologies catering to the favored groups and the continuation of market rationalities and limitless growth. David Harvey notes, "[o]nly if we let ourselves be imprisoned within the system of knowledge handed down to us will we fail to innovate" (Harvey, 1974, 271). To change courses requires new forms of social and environmental relations.

Understanding the logic of capital and the science of climate change is essential to understand that we need alternatives to capitalism not solutions based in capitalism. As Paolucci notes, "[t]he mode of production in material life determines the general character of the social, political and spiritual processes of life" (Paolucci, 2011, 69). Global capital accumulation and the social relations demand control, subordination, and appropriation thereby degrading environmental and human existence. Showing how capital social relations affect nature/society along with the inadequacies of how capital manages the environment through corporate and economic policies illuminates the precariousness of the path we walk on and realizing the necessity of a different path. This is the essence of my dissertation. I begin my argument with an explanation of the research design and methodologies that guided and provided my work with the theoretical positionalities and structures used in the substantive sections. Following this section is an examination of climate change science and the disastrous affects sea level rise. Of the many affects of climate change, sea level rise provides a grounded geophysical phenomenon whereby social and physical scientists can project its affects on populations, climates, and economy with precision. After an analysis of one of the many disastrous affects of climate change I examine how economic and corporate

theory intends to confront the crisis. This section provides an overview of the more transformative and cutting-edge techniques utilized by the finance industry, economists, and corporations. The aim of this section is to show how capital based solutions will never work for the significant majority of people affected. To strengthen this argument, I will undertake an examination of Marxist theory concerning nature/society relations in a capitalist system. This section is essential to understand the logic of capital and trace the causes of our current societal and natural order. To conclude the dissertation, I analyze ideologies of capital and resistance seeking to uncover the fundamental processes enabling the continuation of capital. Taken altogether this dissertation provides a stern warning to those whose work and hopes lie in the capitalist system. Climate change solutions based in capital processes, no matter how framed, will only benefit the slimmest majorities of people. We can no longer give our power, respect and, hope to the very organizations that benefit from nature/society exploitation in a capitalist system. This dissertation is a call to arms to its readers to embrace alternative ways of social relations founded on equality and respect for each other and the environment. Only in this way will most people have any opportunity to realize their human potential in a warming world.

Research Design and Methodologies

The fundamental purpose of this dissertation is to lay the foundation for transformative theorization regarding capitalism and climate change. This notion of transformation inspires my search to understand what has gotten us to this point, but also, how we can orient ourselves to the common good so that our future path is one of compassion – not selfishness. In *Competing Paradigms in Qualitative Research* Professors, Guba and Lincoln provide a critical theoretical research framework to guide scholarship –

> The aim of inquiry is the critique and the transformation of the social, political, cultural, economic, ethnic and gender structures that constrain and exploit humankind, by engagement in confrontation, even conflict. The criterion for progress is that over time, restitution and emancipation should occur and persists. Advocacy and activism are key concepts. The inquirer is cast in the role of instigator and facilitator, implying that the inquirer understands a priori what transformations are needed (1994, 116).

The notion of understanding "a priori what transformations are needed" is presumptive and perhaps misguided. A researcher should be open to revelations and unexpected ways of

knowing and understanding. Yet, I approached this dissertation with the fundamental belief that capital, and its embedded social relations, is the significant contributor to climate change and inequality. We can separate the physical and social delineating climate change in purely physical processes, but human caused emissions is the out of balance activity in the carbon cycle. In this sense, climate change is a physical manifestation of the social. However, my perception of this relationship is more than drawing an arrow from X to Y. Instead, the causation is steeped in embedded relations that "are intrinsically connected to other phenomena by virtue of the internal relations they have with them" (Gomez & Jones, 2010, 14). This is the story, the representation of society that I would like "to tell about" (Ragin & Amoroso, 2010). While doing this I encompass a discourse that seeks to provide "a performative epistemology rather than a realist or reflective one; an ethical rather than a structural understanding of social determination; an experimental rather than critical orientation to research" (Gibson-Graham, 2008, 17). Gibson-Graham asks us to attempt a different form of research and writing that is experimental, fluid, and prefigurative. To ask for questions and provide answers in ways existing outside or perpendicular to the common discourse. In short, the research should guide us to transform the discourse, the world, and ourselves.

This dissertation is largely theoretical and relies heavily upon ways of thinking and existing that challenges and interrogates capital. My use of critical Marxist geographical and sociological theory shapes my view on the configuration of capital and the environment and their interconnectedness in space and place. The theoretical framework provided by geographers and sociologists guided this research forcing me to conceptualize society in new ways (Cooper, 2008, 5). Only by researching and mobilizing theoretical frameworks that came before could I develop an awareness of and arguments linking climate change and capital. Most essential to my research design is learning how to process and present "new concepts and categories to deal with the system under investigation and, through the operationalization of these new concepts and categories, change the system from within" (Harvey, 1974, 270). Through Critiquing and deconstructing capital and corporations "the constructed (contingent, tentative, and uncertain) character of these pillars of domination… can be exposed" (Gomez & Jones, 2010, 19). And only by deconstructing capital's response to climate change can I find an answer to my research question –is capital a capable system to deal with climate change? While my contra-capitalist theoretical framework is not new, the formations and understandings that emerge through prolonged research and writing is indeed new to me, and thus could not be limited by Guba and Lincoln's a priori understanding of

what transformations are needed. It is the questions that inspire, enliven, and guide us – not the pre-formulated answers.

My research and theoretical focus on climate change – clearly physical phenomena – and capitalism –a purely social phenomenon – examines the boundaries between the physical and social to uncover the relationships and hidden causations between the two. Bruno Latour criticizes how social scientists explain natural phenomena by presenting the phenomena as a "repository of something else…its true substance" and we "replace some object pertaining to nature by another one pertaining to society" (2000, 109). My hope in this dissertation is not to replace the objective construction of climate change with capital, but to link capital's processes with the intense emission of greenhouse gases. Placing climate change upon the mirror of society thereby revealing its connective tendrils to each other. In this way, I will do as Latour demands and "represent those things in all of their consequences and uncertainties" (2000, 119).

Placing meta-issues such as climate change or greenhouse gases in front of a mirror to reflect all its consequences and uncertainties require an ontological understanding of what Marx called "inner connexions" (hereafter innerconnections) and vantage point. Paul Paolucci, a sociologist specializing in Marx's methodological principles, delineates Marx's methodological use of "present as vantage point" as follows –

> The present as vantage point helps Marx locate and prioritize what presuppositions and preconditions indicate the interaction, both historical and structural, between systemic parts and how their interactions transform such parts and, because of their internal ties, collective transformations of parts produce entirely new systems (Paolucci, 2011, 60).

By examining capital and climate change through the vantage point of the present I can analyze the historical and social forms made manifest in the contemporary. In other words, I can trace the historical and structural connections between the two phenomena by utilizing the present as the vantage point. For example, the innerconnections of global capital and greenhouse gases emissions over the past century culminating in disastrous climate change. Paolucci notes that the notion of innerconnection incorporates interrelationships, but the idea is something qualitatively different that "assumes social practices, structures, and their historical development—rather than separate 'things'—entail each other in an ontological sense. That is, things do not exist prior to their innerconnections with each other and the wholes that contain them" (Paolucci, 2011, 56). Marx's theory of innerconnections and vantage point forms the foundation to my research design and theoretical approach for it provides an avenue for analyzing meta-issues like capital and climate change by researching

and uncovering their innerconnections.

Marx's methodological use of vantage point and innerconnection provides a frame through which theoretical and scientific work can happen. Paolucci marks the importance of innerconnection in establishing "whether we should think of the world as a collection of parts that, when added up, produce a whole that is larger than the sum of those parts, or, should we first think of the world as a whole that contains mutually defining innerconnections that we must abstract out as the whole's constitutive parts" (Paolucci, 2011, 56). The discrepancy seems slight, but their theoretical usage is entirely different. Paolucci goes on, "Marx mentally abstracts units of analysis out from wholes by breaking down wholes into constituent parts" (Paolucci, 2011, 58). Thus, we can take large phenomena and deconstruct portions and examine them as parts or as totalities themselves. This process of abstraction is essential to tackling large issues such as the subjects of this dissertation. Climate change as a totality has many different affects. By abstracting sea level rise from climate change, I will provide an example of a physical phenomenon and its social implications. This abstraction process allows us to view the whole and its constituent parts. Or in this case, view a few of the constituents – in my view the most important totalities of the whole – corporate management, sea level rise, and the logic of capital in nature/society innerconnections. These abstracted parts are wholes in and of themselves; thus, while climate change and capital are the over-arching issues, each abstraction I make can be its own whole and abstracted again. Therefore, my analysis will seem almost an overview, because to accord each abstraction the attention many other scholars have given it would be impossible in this dissertation.

The research design and approach looks to the emergence of climate change through a social science analysis by mobilizing historical, abstraction, and deconstruction of meta-issues attempting to reveal the "true substance" of the phenomena and the logic behind the incorrect pathways of solving or mitigating climate change through capital based solutions. Cognizance of frameworks geared towards transformation and alternative ways of theorizing pushes this research to generate and support discourses of equality and environmental sustainability while refusing the hegemonic discourses and practices.

The research methods in the present dissertation are confined to secondary sources. The reasons behind this are multiple —

> (1) The generation of climate change projections are based in mathematical modeling and beyond my knowledge to reproduce; (2) government agencies, peer-reviewed journals, and Inter governmental organizations provide the most up to date and quantitatively correct information used by most scholars and policy makers; (3) sea level rise has only visibly affected several locations and research in those areas are

> financially prohibitive; (4) secondary sources provide significant information on the affects of sea level rise and is widely used; and, (7) analysis of capital through a Marxist lens and capitals' affects on the environment must be mainly dealt with through a concerted interrogation of the literature, not through fieldwork.

The information needed for a successful dissertation on the affects of climate change and the ideological and social foundations of the crisis are available in the vast network of information in Oxford libraries and online peer-reviewed sources. The weakness of this approach, as Gordon Clark makes note, is that "[s]econdary data is a cultural artefact, produced for administrators with priorities and ways of seeing the world" (2005, 58). The secondary data I amassed on sea level rise are from a broad set of governmental and peer reviewed journals. The IPCC report, which will be released in late 2013, would be the perfect source of secondary data on climate change, but with its absence, I utilized a wider base of reports and studies ranging in type and year of publishing for this dissertation. I use data from scholars writing specifically about human rights, migration, and other social consequences of sea level rise; I balance this approach by using sources from physical scientists, World Bank reports, and policy documents. By using different sources, I provide a nuanced and layered viewpoint to sea level rise and its affects and steer away from any single approach of viewing climate science and sea level rise.

The absence of fieldwork — of going somewhere "out there" — reflects a conscious choice to focus on what effective resources I had access to. As Doreen Massey argues, fieldwork has expanded to include sites existing outside a geographic romanticized field located "out there." She states, "are not discourses and texts, books and tables and diagrams just as much of `the real world', and are not other stages of your research (your literature search perhaps) also engagements with that world" (Massey, 2003, 81)? Ten years later, Massey's statement is more logical and persuasive. The data revolution and unprecedented information access provide serious theoretical scholars with ever-expanding opportunities. Academic work should influence discourse, add to the literature, and discover new ways of being in the world. One's work should not be judged on the money or social capital one can mobilize in presenting research. Moreover, one's immediate geography should not limit an academic's research. Thus, the lack of fieldwork in this dissertation does not inhibit a thorough investigation of climate science, sea level rise, nature/society relationship, or capitalism.

The research design and methods of this dissertation contain the hallmarks of a theoretical expedition. The theoretical framework emerges out of a critical, transformative,

and prefigurative body of geographical and sociological discourses to interrogate and deconstruct the innerconnections between capital and climate change. The theoretical methodologies employed attempt to utilize techniques used by Marx in his own work. And while I do not mobilize the traditional tools of researchers such as ethnography, statistics, or fieldwork, the science of sea level rise is the most grounded climate change phenomenon. For the subject in question, the research design and methods ground themselves in long transdisciplinary traditions of theoretical scholarship.

Climate Change Science and Sea Level Rise

Climate science and our understanding of climate change are new phenomena, yet their importance on all levels of life is astounding. The discovery of the link between the atmosphere and temperature by Joseph Fourier, the discovery of the greenhouse affect by John Tyndall, and the discovery of anthropogenic CO2 release in the atmosphere by Svate August Arrhenius all occurred in the late 19th century. These basic discoveries help us to understand mankind's influence on atmospheric operations. Arrhenius' hypothesis has proven itself over the last century as studies have shown atmospheric CO2 levels have increased by 30% since 1850 (Young et al., 2013, 2083). This rise is mainly "due to fossil fuel burning, cement production, and changes in land use" (Trudinger et al., 2005, 329). Indeed, our production patterns significantly alter our atmosphere. On May 20th 2013, the National Oceanic and Atmospheric Administration and the Scripps Institution of Oceanography both reported CO2 readings over 400ppm for the first time atop the Mauna Loa volcano in Hawaii. The last time in earth's history such levels occurred was 3-5 million years ago during the Pliocene, millions of years before *Homo erectus* left Africa (Sun et al., 2013, 1450). The significance and causes of these atmospheric changes are hotly debated in the media and politics, but scientists remain adamant in their adherence in Tyndal's original hypothesis - the earth is getting warmer.

Climate science is complicated and confusing even to the most well researched social scientist. Translation issues, lack of understanding, lack of expertise, and other factors contribute to our reliance on scientists and others who spread their knowledge to scholars, activists, media, and policy makers. Predictions on how the climate will react are not a foolproof. The following three arguments are the most disconcerting aspects of climate change science. First, the increase in CO2 and its effects on our current climate cannot be significantly linked to our future climate. We see changes in the weather, temperature, and

atmospheric makeup, but can we causally connect increased CO2 in the atmosphere with catastrophic weather conditions occurring in New York or Tornado Valley, USA? With this lack of direct evidence we are dependent on "model predictions, the credibility of which must be largely judged on the ability of the models to simulate the present observed climate and its variability on seasonal, inter-annual, decadal and longer time scales" (Pfafflin & Ziegler, 2006, 428). Second, scientists have recognized that "climatic shifts are often non-linear on all scales and, hence, episodic and abrupt, with multiple equilibria" (Simmons, 2008, 240). For example, 12,800 to 11,500 years ago, we saw a rise of 8.3C in the average temperature within a period of 1-3 years – not centuries (Hughes, 2001, 254). Therefore, despite our knowledge of long-term historical climate changes, we cannot predict the future when factors of complexity, chaos, and imperfect understanding coalesce into possible future climate scenarios. Finally, with current CO2 levels that have not been experienced for 3-5 million years, the only climatic information we have considering our future is dependent on the climate millions of years before humanoids walked the earth. The possibility of chaotic climate change questions the efficacy of future predictability. Thus, Professor Neville Brown believes climate scientists predicting future scenario's must recognize and acknowledge to the public that they are "treating the historical past as a database from which to distill a set of precepts of putatively enduring worth" (2001, 6). We must acknowledge the future scenarios scientists append to global warming, but not ignore the inherent ideologies and weaknesses of the science.

Not being able to predict the future is not a surprise to anyone. The dilemma is when these predictions are treated as truth and create situations resulting in unfavorable consequences. The issue, as Latour sees it, is the "power scientists hold over politicians or the domination politicians exercise over poor scientists" (2009, 4). In that, climate scientists can present findings that provide opportunities for "business as usual" or distorted political policies. Additionally, politicians can direct science to fit their ideological or political strategies. Latour also criticizes the belief that science is an absolute domain holding the only truth available, which is only navigable by scientists who become heroes when they translate this understanding back into the social world (2009, 11). Only scientists reveal their understanding of climate change. This allows for significant gaps of truth and embedded interests, which those of us not learned in the ways of science have to take at face value. We should take climate predictions with a critical eye towards bias and focus on the ways and policies that improve our existence today.

In all forms of nonfiction writing, we are bombarded with words such as

desertification, extreme weather events, disasters, starvation, natural resource wars, but one catastrophe particularly troubling. Over the past 6000-7000 years the sea level has been stable, but this trend is now over – sea level is undoubtedly rising in the post-industrial period (Richardson, 2009, 50). The primary cited factors of sea level rise (SLR) are: (i) oceanic thermal expansion; (ii) glacial melt from Greenland and Antarctica; and, (iii) change in terrestrial storage (Pokhrel et al., 2012, 1). Thermal expansion occurs when seawater warms causing expansion, thereby increasing the volume of the global ocean and producing a thermometric SLR (Solomon, 2007, 812). Change in terrestrial storage occurs through unsustainable and wasteful use of groundwater supply (Pokhrel et al., 2012, 1). Beginning in 1870, until recently, the thermal expansion of seawater has been the most important component of sea-level rise (Richardson et al., 2011, 51). However, recent datum shows deglaciation in Greenland and Antarctica as an augmenting factor of SLR (Cazenave & Llovel, 2010, 163). Since both contain enough water to raise the SLR by 70m, small melts could significantly alter the SLR estimates (Dasgupta, 2007, 3). Measurements of present-day sea level changes rely on two different techniques: tide gauges and satellite altimetry (Solomon, 2007, 408). Tide gauges were the most utilized technique by sea level scientists until the early 1990's. Satellite altimetry far exceeds the accuracy of tide gauges and will be the primary data source for sea level science in the foreseeable future. The results from both tide gauges and satellite altimetry are striking –sea level has been rising at a rate around 3mm a year, since 1993, significantly higher than the previous half century (Solomon, 2007, 387). Using tidal gauges, one study concluded, with 90% certainty, that during the 20th century, sea level rose between 0.13 - 0.2m (Bittermann et al., 2013, 1). The estimates for sea level rise in the next 100 years vary widely. For example, Meehl has stated the SLR could be 0.18m, Vermeer and Rahmstorf 1.9m, Bamber estimated 3m (Richardson, 2009, 57). Another projection hypothesizes the sea level rise will be 0.5 - 1.5m (Cazenave & Llovel, 2010, 165). And yet another study found that 21st century SLR will only be 0.102m (Giesen & Oerlemans, 2013, 16). All estimates could be far from the mark if the West Atlantic Ice Sheet (WAIS) collapses and the Greenland ice sheet significantly melts. The issue with statistical models is the certainty of current links between temperature and SLR will continue to hold in the future, but all scientists agree that SLR will continue for centuries.

The WAIS and the Greenland ice sheet are the largest variables in sea level rise predictions. The WAIS, which currently rests on bedrock below sea level (as deep as 2km) holds 10% of the Antarctic ice volume and has become a major concern for SLR scientists (Rapley, 2006, 25). In 1978, a controversial paper speculated that climate change affects

could release the WAIS into the ocean thereby causing a rapid rise in sea level (Mercer, 1978, 217). The significance of this collapse is undergirded by the WAIS not needing to melt to increase SLR –the SLR would be triggered solely through displacement. This collapse could raise the SLR by 7m (Cazenave & Llovel, 2010, 152). While recognizing the instability of WAIS and arguing that many studies overestimate the collapse affects, another study found that the rapid collapse would increase sea level by 3.2m (Bamber et al., 2009, 903). Additionally, the rapid collapse of the Greenland ice sheet collapse would raise the global average of sea level by approximately 3m (Lowe et al., 2006, 29). Without any ice sheet collapses, one study noted the SLR from Greenland ice sheet melt alone would be 0.56m in 2100 (Rignot et al., 2011, 4). Multiple scientific models hypothesize partial or complete deglaciation of the Greenland ice sheet occurring at a local Greenland temperature increase of 2.7 degrees Celsius (Lowe et al., 2006, 31). Altogether, a recent study found that we should expect the ice sheets to add a uniform 0.8 mm a year with a yearly rise due to WAIS at 0.3mm-0.4mm (Hay et al., 2013, 3698). The Ice sheets will have a significant affect on SLR for decades.

The affects of SLR on society are worrying. One scientist suggests SLR will have "potentially catastrophic impact on agriculture, inhabitable land area, distribution of fresh and salt water, weather patterns, epidemic diseases, extinction of plant and animal species, and perhaps even human survival" (Chatterjee, 2011, 446). Moreover, despite a stabilization of GHG emissions, anthropogenic warming and sea level rise will continue for centuries resulting from climate processes and feedback (Pachauri, 2008, 12). Thus, current and future adaptation projects will focus on areas particularly susceptible to SLR. And while adaptation will reduce certain geographic areas vulnerability, there will never be a complete adaptation strategy to negate SLR affects worldwide because of technical, geopolitical, and economic constraints. The application of Geographic Information Systems (GIS) concerning possible SLR scenarios provide a clear picture of what can occur on land. By incorporating census data and geographic data, scientists can hypothesize SLR affects on whom, how, and where. The most susceptible areas are Low level coastal zones, situated under 10m altitude an accounting for only 2% of dry land, which is home to 10.5% of the world's population, with most in Asia and the world's poorest countries (McGranahan et al., 2007, 33). Migration and adaptability are key issues for susceptible populations. As one author notes, "many uncertainties surround the migration–environment nexus, due to an incomplete knowledge of how the climate system behaves, uncertainty about the future behaviour of society, and the chaotic and complex nature in which the physical system operates" (Kniveton, 2010, 79).

And while "'[t]he exact number who will actually be displaced or forced to migrate will depend on the level of investment, planning and resources" (Stern, 2007, 112), predictions of how many varies from 25 million to 1 billion (Byravan & Rajan, 2010, 239; Richardson et al., 2011, 66). Clearly, with the knowledge of continued SLR and GIS application, policymakers must begin crafting protections for the millions soon to be affected.

Resulting from historical relationships and unequal development, developing countries while contributing less GHG emissions will experience greater loss due to the lack of economic structure and support to adapt to climate change. Developing countries are the most sensitive and affected by SLR because of their infrastructure and financial inadequacies to deal with such an issue. Within developing countries themselves are spatial inequities regarding SLR adaptation, migration, and health issues (Dodson, 2010, 223). Developed countries; however, will be more adept at adapting to SLR because of their financial means and opportunity to implement geoengineering solutions on a grand scale. However, everyone will be dealing with issues of fresh water resources because of the salination along the coast (Resources & Baba, 2011, v) along with deleterious affects upon agriculture and fisheries – two of the dominant occupations along the coast (Saroar & Routray, 2010, 664). The UN Development Programme stated, "people living in the Ganges Delta and lower Manhattan share the flood risks associated with rising sea levels. They do not share the same vulnerabilities. The reason: the Ganges Delta is marked by high levels of poverty and low levels of infrastructural protection" (UNDP, 2007, 78). The estimated yearly damages because of SLR are anywhere between $220-400 billion (Gosling et al., 2011, 446). Clearly unequal development and global inequity will mark the impact level and the adaptation possibilities for each community.

SLR will affect the world for centuries in disastrous ways. The sea will rise slow or fast depending on the impact of the ice sheets. The knowledge of continued SLR for centuries coupled with the unequal affects between the global north and south makes climate change a substantial issue for all people. While scientific predictions are not without their critics, SLR is the one affect that can be precisely marked in both the physical, social, and economic realms. With this knowledge, how can we not consider looking at alternative ways to construct and organize our social relations based in compassion and justice?

Capital and Climate Change

Capitalist modes of production and social relations are the hegemonic modes of being. These modes of being direct our relationships with nature and with society. In this section of the dissertation, I examine capital based climate change solutions supported by most of the world and implemented in either market based solutions or corporate management techniques. The critiques and overview in this section allows us to examine how capital attempts to confront climate change and how it fails.

Most Global and local climate change strategies focus on decreasing CO2 emissions. Among President Barack Obama's climate change policy is the cap on corporate CO2 emissions. Market based mechanisms undergird every aspect of worldwide climate change policy whether it be technological innovation or carbon offset markets. Wendy Brown argues that this a gradual development of advanced capitalist societies and neoliberal governmentalities –

> The political sphere, along with every other dimension of con-temporary existence, is submitted to an economic rationality; or, put the other way around, not only is the human being configured exhaustively as homo œconomicus, but all dimensions of human life are cast in terms of a market rationality. While this entails submitting every action and policy to considerations of profitability, equally important is the production of all human and institutional action as rational entrepreneurial action, conducted according to a calculus of utility, benefit, or satisfaction against a microeconomic grid of scarcity, supply and demand, and moral value-neutrality (2009, 40).

The advent of green capitalism and sustainable development points to a fundamental theory that our endless journey of modernization and development will continue if we take steps to account for our environment. Brett Clark mentions that theorists following this line of thought believe –

> Nature presents obstacles that must be overcome, problems to be solved. And it is assumed that the solution to the 'nature problem' will be produced by the ongoing development of the market and an advance of 'green ethics.' Thus, any real attempt to fundamentally transform the social system to address the ecological crisis is not necessary (2006, 323).

The process of economic integration that Brown speaks of, and Clark's insight affirms the hegemonic positionality of capital within climate change and environmental policies. These theories percolate in the scientific, corporate, and political elite, and then spread throughout institutions and society envisioning a democratization of these policies (Carter, 2001, 214).

The underlying thrust is that the economy and its attendant actors must become green.

Essential to this task is business commitment to environmental protection through technological and management innovations that improve both economic development and environmental stewardship (Toke, 2011, 8). The economy has surmounted or circumnavigated crisis before. The economic forces of production and innovation should be the foundation to any policy to correct climate change and environmental degradation. Ideally, the economy will transcend the environment as accumulation and development dematerialize freeing the processes from nature's restrictions. Neil Smith argues that the significance of green capitalism is that it "has become nothing less than a major strategy for ecological commodification, marketization and financialization which radically intensifies and deepens the penetration of nature by capital" (2006, 17). Arturo Escobar echoes Smith's view, "by rationalizing the defense of nature in economic terms, advocates of sustainable development contribute to extending the economization of life and history" (1996, 53). Therefore, the greening of the economy calls for the nature's integration into the capitalist system.

The basis of capital accumulation is private property rights. Environmental protection based in this system requires the commodification of nature. If an environmental input is correctly monetized, then it will be protected more adamantly than an environmental input that is not. If the environment were properly priced, there would be no exploitation. Paul Burkett posits, "if all natural resources could somehow be marketised and monetised, the problem of 'unobservability and uncontrollability of the processes of the environment through the price system' could be resolved" (2009, 42). A free flowing market system matching precisely the cost of natural resources to society would result. A problem of this approach is that, "the 'cost'to society and the other creatures that inhabit the earth may be modest for the first several billion metric tons of carbon emitted by societies, but when a natural threshold is approached, the cost may escalate dramatically and in an effectively unpredictable manner" (Clark & York, 2006, 331-2). Marketizing the environment based on current and future projections of cost is inherently misleading, especially concerning climate change. We will never correctly calculate the economic worth of our ecosystem. The earth has existed for billions of years and our incomplete economic knowledge of the future can never fulfill lasting requirements of sustainability. The basis of capital's response to climate change is that further accumulation creates new technologies and ways of being that no longer require environmental degradation or CO2 emissions. The foundation to this theory is the environmental kuznets curve that theorizes as a society develops its environmental efficiency increases and pollution decreases (Dasgupta et al., 2002, 147). One author argues

that pollution is a waste product, implying that production is inefficient, and dealing with the externality will require resources focused on technological innovation in the production process (Porter & Van der Linde, 1995, 98). To spur such technological innovation requires strong pollution and CO2 emissions regulation, which requires technological innovation to meet the regulations (Nentjes et al., 2007). By restricting production externalities to a near draconian level, corporate responses to state regulation necessitates innovation to hold and increase their current production levels. Thus, by increasing efficiency, we will consume less and realize sustainability without sacrificing our way of life. However, this assumption is addressed by and proven incorrect by one of the world's greatest economists, William Jevons. Jevons stated –

> It is wholly a confusion of ideas to suppose that the economical use of fuel is equivalent to a diminished consumption. The very contrary is the truth…As a rule, new modes of economy will lead to an increase of consumption (Jevons 1866 quoted in Polimeni, 2008)

In other words, "as technological improvements increase the efficiency with which a resource is used, total consumption of that resource may increase rather than decrease" (Polimeni, 2008, x). This contradiction is known as the Jevons Paradox. Put simply, the entire economic and corporate driven policy to improve efficiency as a pathway to sustainability is flawed and should not be considered without critical examination. The myopic focus on technological optimism allows short-term gains to obscure the societal and ideological foundations of the capitalist economy thereby exacerbating the environmental crisis it sets out to cure (Geertz, 1963, 147).

Corporate environmental management and the economizing of environmental issues, like most things, have supporters and detractors. Often along ontological and epistemological lines, critics of sustainable development and other capital based theories concerning profit and the environment focus on the inadequacies of the ideas themselves. As often the case, capital strategies attempt to give the impression that only minor market changes are needed to launch environmentally sustainable reforms while hiding the fact that the market itself may be incapable of the substantial reform required (Escobar, 1996, 52). To be sure, the business sector is essential to transitioning to a cleaner society. However, the world's efforts to decrease CO2 emissions have failed dramatically.

Reflecting on the notions of neoliberal governmentalities and market systems that Wendy Brown spoke of earlier in the paper helps us view the nexus between environmental protection and corporate profitability. The State and the corporation support capital based

policies and strategies that hold and expand upon the rationalities of the hegemonic economic discourse. Over the last decade we see a shift from the bottom line to a triple bottom line – people, planet, and profit. The awareness of the interconnection and the necessity of people and planet to create a profit influences corporate management to implement long-term strategies. One scholar notes, "numerous studies have shown that the environmental initiatives of companies stem, for the most part, from regulatory, commercial, and institutional pressures that organizations ignore at the peril of undermining their legitimacy and even their survival" (Boiral, 2007, 129). In affect, various pressures shape the corporation into an environmental protector. Over the last several decades, scholars, executives, and policy makers argued for a more responsible ethos for corporate activity. Milton Friedman, whose Chicago school economics continues to play a dominant role in government, argues that corporations should have no social responsibility because the responsibility of the corporation is only to its shareholders (1970). But, being responsible is often good for business.

The advent of consumer demand for green sustainable products provides another avenue of capital accumulation. This multi-billion dollar economy is the business response catering to environmentally concerned citizens (Toke, 2011, 1). In essence, by consuming green products we consume our way to sustainability. For instance, a corporation may develop or use eco-products, change waste practices, invest in green community projects, or stop certain damaging behaviors. In other words, "[t]he customers' knowledge of the minimal or positive environmental impacts of the company's practices is often crucial to the brand" (Callicott & Frodeman, 2009, 268). This includes the reputational risks that some companies must consider. Nearly 50% to 70% of large public companies value is considered intangible and thus risk profit loss if their reputation is darkened by social or environmental issues (Richardson, 2009, 557). The greener the company the more competitive it is in the market. Competitiveness in corporate performance is a significant driver for social and environmental initiatives if it enhances the firm's performance (Bansal & Roth, 2000, 724). In search of profits, the corporation will become environmental stewards and social champions if consumer demand flows in that direction.

Other corporate techniques to influence social and environmental responsibilities are becoming more acceptable. For example, a committed focus on long term investments, fiduciary duty, and universal ownership are new concepts and practices taking hold in corporate management and investment practices (Hawley & Williams, 2007). Moreover, the financial investment sectors, including Sovereign wealth funds, are attempting to improve

corporate behavior through investment strategies rewarding social and environmental responsible corporations (Clark & Monk, 2009). These practices reinforce the wider corporate social responsibility paradigm, whose principles embrace "acting as a good corporate citizen, attuned to the evolving social concerns of stakeholders, and mitigating existing or anticipated adverse effects from business activities" (Porter & Kramer, 2006, 7). A socially responsible corporation attempts to soften the production affects on both the community and environment in which it operates. This type of behavior is rewarded in the market. For example, one study reports that a focus on environmental management is linked to long-term financial performance based on stock market prices (Klassen & McLaughlin, 1996,1213). Being a socially or environmentally responsible corporation also saves possible costs down the road. For instance, "poor external ratings of pollution performance had a significant negative impact on a firm's stock price, suggesting that the market's expectation of future profitability was altered" (Klassen & McLaughlin, 1996, 1201). Another study found that a corporation loses money through decreased efficiency and compliance costs if it does not quickly observe environmental regulation; thus, a company should comply as soon as possible by integrating environmental management with pollution control and production management processes (Singh, 2000). Environmental responsibility is a win-win situation – it makes business sense. Besides specific legislation regulating environmental standards, these theories and practices are self-imposed for business or social reasons. Thus, companies need only follow the low standards set by the host government and develop a higher standard if it makes business sense to do so.

Capitalist solutions to environmental issues require the integration of nature with market rationalities. Economic development, technological innovation, and promoting good business practices are the drivers of these policies. All revolve around profit and continued capital accumulation. Significant or draconian market reform that would dramatically change the capitalist system is not even considered. Instead, we see small tweaks and reforms that attempt to shift the façade of capital into something "compassionate" "green" or "sustainable." However, when confronted with disastrous climate change, capital has no solutions. At best, CO2 emissions will be capped, but after decades of political apprehension, CO2 levels are higher than ever before. The reason behind the inability of capital to confront climate change is due to its innerconnections with nature/society – the subject of the following section.

Capitalism & Nature

Many scholars and scientists characterize the current stage of history as the defining moment of humanity. Climate change ties into species extinction, poverty, environmental degradation, unchecked consumption, and production. As Joel Kovel argues, "[h]umanity is not just the perpetrator of the crisis; it is its victim as well. And among the signs of our victimization is the incapacity to contend with the crisis, or even to become conscious of it" (Kovel, 2007, 23). To be conscious of it, we have to know exactly how the crisis works and its relations to nature, which requires an examination of capital and the intricate workings of its logic. To do this, I first examine conceptions of nature and attempt to flesh out a nuanced and applicable understanding to our daily lives. I then explore Marx's own writings and Marxist scholarship concerning nature and labor. Following this, I examine how capital relates to nature/society and how this innerconnection creates distorted realities made manifest in climate change and poverty. Finally, I conclude by arguing that capital will destroy the environment and us if left unchallenged.

Understanding our relationship with nature is important to understanding society and ourselves. Marx declares that "[m]an lives on nature" –meaning –"nature is his body, with which he must remain in continuous interchange if he is not to die. That man's physical and spiritual life is linked to nature means simply that nature is linked to itself, for man is a part of nature" (1844b, 31). But, what is this nature that Marx speaks of? Is it the untouched nature deep in the Amazon? Perhaps it is the U.S. national parks or protected lands? Is it the local park that gives us respite in our urban areas, or perhaps our backyard garden where we toil and witness? Perhaps an economic rationality where nature is a piece of machinery waiting for us to unleash its utility? Generally, our conceptions of nature revolve around and are placed "out there" as something to be saved, protected, or at least considered. With this conception of nature; however, we remain unaware of the sociohistorical conditions that have produced, construed and changed the very nature we see (Lehtinen, 2001, 31).

Interrogating the common notion that nature exists outside of society, thereby creating a dualism, allows us to encompass our understanding of our relationship to nature as symbiotic and constant. Noel Castree makes an important point when he states, "[s]o long as we operate with this dualism we are forced to concede that (i) society and what we call nature are different and can be studied separately, and that (ii) the study of society–nature relations must resort to notions like 'construction', 'interaction' and 'interrelation'" (2005, 226). Humans build things upon nature, we connect to nature in our gardens or parks, or we are

interrelated through our long existence and spiritual conceptions of Gaia. Castree questions our object/subject relationship to nature asking us to examine nature differently. Scott Hess provides us with an idea of how to do just that. He asks for us to examine what he calls, "everyday nature" the attention to and "a way of defining our identities and values through local relationship rather than through imaginative escape" (Hess, 2010, 91). Nature is not out there – it is here now. Hess sees this "everyday nature" as grounded in production and consumption, for this, he argues, is how we are most physically grounded in every day relation with nature (2010, 91). Hess'conception of every day nature asks us not to romantacize other people's relationship to nature (such as the displaced indigenous tribes in Brazil), but look to our own relationship to nature and alter our own nature, both within and without, in ways that will see it transform (2010, 105). Nigel Clark takes note that, "[i]f the natural and the social have become so inextricably bound together that they now comprise a single 'hybrid environment', then the transformation of society and the transformation of nature are effectively one and the same process" (2010, 9). If we accept both Marx and Hess'proposals, what or how we produce and consume reflects our physical and spiritual being. By removing the dualism between nature and society, we can begin to see how our everyday lives affect our environments near and far. With the advent of anthropogenic climate change, a global issue, we must understand our relationship to nature in a capitalist society and seek to transform it. Doing so would transform nature as well.

Labor and The Production of Nature

George Henderson describes the basic components of capitalist production in any society as resting on three conditions – "viable, functioning natural/ecological systems, human mental and bodily being, and sociality itself" (2009, 276). The first can be viewed in the myriad complex systems of nature, while the second and third form the steering and driving factor of production. The capitalist society shapes and organizes our bodies and minds and in the process does the same with nature. Underlying the nexus of body/mind and society is labor. Marx describes labor in such a way as to reveal its essential character in nature —

> Labour is, first of all, a process between man and nature, a process by which man, through his own actions, mediates, regulates and controls the metabolism between himself and nature. He confronts the materials of nature as a force of nature. He sets in motion the natural forces which belong to his own body, his arms, legs, head and hands, in order to appropriate the materials of nature in a form adapted to his own needs. Through this movement he acts upon external nature and changes it, and in this

> way he simultaneously changes his own nature. He develops the potentialities slumbering within nature, and subjects the play of its forces to his own sovereign power (1982 [1867], 283).

Our bodies and nature are in a continual process of co-constituting one another. Through labor, we shape the world we inhabit. This is what Marx means by metabolism. John Bellamy Foster, in his book *Marx's Ecology: Materialism and Nature*, describes this metabolic exchange as how "an organism (or a given cell) draws upon materials and energy from its environment and converts these by way of various metabolic reactions into the building blocks of growth" (2000, 160). It marks the point of fusion between the creative capacity of humans and the physical properties of nature. This metabolic relationship with nature is now widely used by system ecologists to refer to all levels of biological interaction (Foster, 2000, 160). Simply put, through our labor we perform a metabolic exchange between two spheres – nature and body/mind – much like a Venn diagram. Foster further notes, "[a]n essential component of the concept of metabolism has always been the notion that it constitutes the basis on which the complex web of interactions necessary to life is sustained, and growth becomes possible" (2000, 161). The metabolic circulation combines the social and physical dynamics within the larger frame of the social relations of society and production (Swyngedouw, 2006, 24). This metabolic exchange does not mean we control or dominate nature or that humans are outside nature or a simply a necessary component of a larger natural process (Henderson, 2009, 279). The metabolic relation, for Marx, is the foundation and necessary condition of history, specifically a socio-environmental history through which both nature and humans are transformed (Heynan et al., 2006, 7). Labor is the engine of human development. As Marx puts it —"[n]ature builds no machines, no locomotives, railways, electric telegraphs, self-acting mules etc. These are products of human industry; natural material transformed into organs of the human will over nature, or of human participation in nature" (1973 [1861], 706). In a very real and physical sense, we produce the world we live in.

Paying particular attention to labor allows us to analyze that which is at the center of human existence. Moreover, examining labor in Marxist theory forms the foundation of value, exchange, commodification, and capital. As Marx noted –

> [t]he labour process…is human action with a view to the production of use-values, appropriation of natural substances to human requirements; it is the necessary condition for effecting exchange of matter between man and Nature; it is the everlasting Nature-imposed condition of human existence, and therefore is independent of every social phase of that existence, or rather, is common to every

such phase (2000[1867], 497).

The goal of labor is to create value and interact with the world. Indeed, Marx notes "[h]uman labour-power in its fluid state, or human labour, creates value, but is not itself value. It becomes value in its coagulated state, in objective form" (1982[1867], 142). Thus, it is not our labor itself that holds value, but the products of our labor, the item that is developed from the metabolism between nature and body/mind. In most cases, our labor should be directed to create something useful something of value. As Marx notes, "[t]he usefulness of a thing makes it a use-value…It is conditioned by the physical properties of the commodity, and has no existence apart from the latter. It is therefore the physical body of the commodity itself… which is the use-value or useful thing" (1982[1867], 126). We can imagine this taking the form of diamonds, gold, food, and furniture. The physical component of the thing, the physical property of the commodity is what is important. Marx continues and tell us, "[u]se values are only realized in use or in consumption. They constitute the material content of wealth, whatever its social form may be" (1982[1867], 126). Thus, a use-value forms the foundation of wealth in society.

The commodity embodies both labor and value. The key factor that makes a use-value a commodity is that "he must not only produce use-values, but use-values for others, social use-values…In order to become a commodity, the product must be transferred to the other person, for whom it serves as a use-value, through the medium of exchange" (Marx, 1982[1867], 131). In other words, the producer of the thing must focus her labor upon something useful for another person if they hope to trade. The use-value is thus a bearer of an exchange value (Marx, 1982[1867], 126). This production/exchange process is the foundation of society – exchanging useful things that shift and transform depending on the wants and needs of humanity. The production and trading of commodities does not imply a capitalist system. From the moment when a human chopped wood and carried water we have constantly interacted with nature through labor and exchanged the objective manifestations of our labor. Neil Smith elaborates on the process of exchange-value –

> The exchange-value of a commodity expresses the quantitative relation in which it can be exchanged for other commodities; with production for exchange, exchange-value not use-value is the immediate reason for production…Indeed, the commodity's direct use-value to its owner is that of being a depository of exchange-value. The production of material life is therefore not just a natural activity in which nature provides the subject, object, and instrument of labor. In an exchange economy, the appropriation of nature is increasingly regulated by social forms and institutions, and in this way, human beings begin to produce more than just the immediate nature of their existence (Smith, 2008, 60).

This exchange occurs through money or a bartering system. Money is central to the theory of value outlined above. Money is both a measure of value and a means of circulation. As Marx notes, "[i]n its function as measure of value, money therefore serves only in an imaginary or ideal capacity…although the money that performs the functions of a measure of value is only imaginary, the price depends entirely on the actual substance that is money" (1982[1867], 191). So, I build a chair and bring it to market, I put a price tag on it, on what I think its value is, and it may or may not sell in the market. Someone comes along with the social acceptance of money, say gold, and offers to pay for the value I placed upon my commodity. That's how this works and Marx created the famous formula C-M (where C is commodity and M is money) to simplify this logic. Thus, we see metabolism between man and nature focused on creating something useful for oneself or others and exchanging it for money – this is when the use value of the object is realized (Lansing, 2011, 745). Marx continues to posit this process happens simultaneously yet also circularly. For the person who bought my chair the formula would be M-C. To show the completion of logic, the money I earned from my chair I used to buy food. The cycle is complete – C-M-C. As Paul Sweezey explains, "[c]ommodities constitute the beginning and end of the transaction which finds its rationale in the fact that the commodities acquired are qualitatively different from those given up" (1949, 57). Through these processes we exchange commodities covering greater distances of space and time, which is called stretching, and we create more and more types of goods and services in commodity form, which is called deepening (Prudham, 2009, 125). The stretching and deepening processes of commodities reflect how C-M-C has infiltrated every relation the world over.

Capital and the Environment

Much like the big bang, capital social relations occurred in a grand historical moment altering the world forever. A revolutionary method of organizing society, capital provided new avenues of exploration and innovation whereby capitalists monopolized the means of production. Marx explains –

> The historical conditions of its existence are by no means given with the mere circulation of money and commodities. It arises only when the owner of the means of production and subsistence finds the free worker available, on the market, as the seller of his own labour-power. And this one historical pre-condition comprises a world's

> history. Capital, therefore, announces from the outset a new epoch in the process of social production (1982[1867], 274).

The owner and laborer relationship create a fundamental inequality. Smith notes that this social formation "produces on the one side a class who possess the means of production for the whole society yet who do no labor, and on the other side a class who possess only their own labor power which they must sell to survive" (2008, 69). What we see occurring is the capitalist goes to the market with money, purchases commodities (labor power and the means of production), and following the production process, returns to the market with a product that he converts into money (Sweezy, 1949, 57). The formula looks like this M-C-M (where M is money). This formula also includes money circulation based in debtor/creditor relationships. Here, money is the object of production, not commodities. And for this logic to make sense, the money I get back must be more than what I began with. David Harvey notes —

> There is a big difference between the circulation of money as a mediator of commodity exchange and money used as capital. Not all money is capital. A monetized society is not necessarily a capitalist society. If everything revolved around the C-M-C circulation process, then money would be merely a mediator, nothing more. Capital emerges when money is put into circulation in order to get more money (2010, 76).

In a capitalist society money is everything. Capitalism does not fulfill human needs in any sense of the world, but instead scours the world for one fulfillment –profit (Smith, 2008, 78). The source of profit is the resources the capitalist owns or has access to and the laborers.

In a capitalist society, appropriating labor is a necessity. Neil Smith wrote that "the formal subsumption of labour took place when workers entered a wage relationship with capital but still maintained some immediate, creative control over the daily labour process" and the real subsumption occurred when workers "became cogs in the machinery of modern industry" and integrated wholly within capitalist socio-technical relations (2006, 28, 266). Labor power is a commodity, not to say that labor itself is a commodity, labor is only partially subsumed as a commodity since labor power is not produced exclusively or even primarily for sale (Prudham, 2009, 128). Yet, a capitalist system treats labor as a commodity. A capitalist pays a wage for a person to come into work at a specific time, for a certain duration, for a specific task, and the minimum wage corresponds to the value of the workers subsistence level to keep him in bare existence. Thus, we have the material requirements for the machine of capitalism "exploitable labour-power, conditions in which this exploitation can take place, and the necessity to objectify workers' labour in vendible commodities"

(Burkett, 2009, 53) – all necessary dynamics for the capitalist exploitation of labor.

Exploiting labor is the primary function for capitalist profit creation. Marx stated simply, "the condition for capital is wage labor" (1844b, 221). For example, the capitalist creates a commodity and he can reap a profit by raising the price, but others would raise their price, and we know that the materials used in production cannot quantitatively increase in their value, nor do the machines and technology inherently increases the value of their materials (they increase productivity); in other words, "[f]rom the stand-point of value there is no reason to assume that either materials or machinery can ultimately transfer to the product more than they themselves contain" (Sweezy, 1949, 61). Technology and materials influence profit making, but surplus value is the source of profit. Simply put –

> In a day's work the laborer produces more than a day's means of subsistence. Consequently the working day can be divided into two parts, necessary labor and surplus labor. Under conditions of capitalist production the product of necessary labor accrues to the laborer in the form of wages, while the product of surplus labor is appropriated by the capitalist in the form of surplus value (Sweezy, 1949, 61-2).

The objective of capital is to continually generate surplus value, which means there will never be enough material wealth in a capitalist system. This logic is why capitalist strategies require that we develop and accumulate our way out of the climate change crisis. The never-ending search for surplus value exposes that capital calls for the exploitation of resources infinitely, which degrades man and nature. Marx takes strong notice of how capital affects workers –

> The worker becomes all the poorer the more wealth he produces, the more his production increases in power and range. The worker becomes an ever cheaper commodity the more commodities he creates. With the increasing value of the world of things proceeds in direct proportion the devaluation of the world of men. Labor produces not only commodities: it produces itself and the worker as a commodity — and does so in proportion in which it produces commodities generally (1844b, 71).

Globalization as a system of global economic integration proves Marx's point – workers and the unemployed are suffering while others make billions. The trick of capitalism is not paying individuals the worth of their work, and the lack of alternative social relations to make a living create a capitalist prison for the exploited. Marx notes –

> Capital, therefore, is not only the command over labour…It is essentially the command over unpaid labour. All surplus-value, whatever particular form (profit, interest or rent) it may subsequently crystallize into, is in substance the materialization of unpaid labour-time. The secret of the self-valorization of capital resolves itself into the fact that it has at its disposal a definite quantity of the unpaid labour of other people (1982[1867], 672).

Thus, with the addition of labor power we have M-C-M + xM (where x = labor value), this logic explains the dynamic and infinite expansion of capital. Money is not traded for money; it is traded for more money. Henderson notes that capital "is not interested in things as they are useful for provisioning life, nor in things by which the measure of a sufficient life might be made. It is interested in more-of-the-same money" (2009, 272). This cycle is intimately tied to nature/society and controls the output and inputs of both in the capitalist system. Marx notes that the capitalist system is revolutionary as a form of social relations, yet unnatural and distorted --

> Nature does not produce on the one hand owners of money or commodities, and on the other hand men possessing nothing but their own labour-power. This relation has no basis in natural history, nor does it have a social basis common to all periods of human history. It is clearly the result of a past historical development, the product of many economic revolutions, of the extinction of a whole series of older formations of social production (1982[1867], 213).

We are no longer in tune with nature. Our metabolic relationship with nature is not of our own making. Our relationship with nature and society is mediated by capitalists and revolves around money. We have a distorted relationship with nature, since our labor and creativity are funneled and exploited by capitalists. Neil Smith elaborates —

> The surplus labor of the laboring class is appropriated by the ruling class. But qualitatively too, the relation of the laboring class with nature is altered, for though they relate to nature directly through the use of their labor power, they are alienated from their own product. The product's owner, on the other hand, is alienated from any direct, practical relation with nature because he is deprived of his own labor. Now the worker's alienation is not simply alienation from the product but, due to the increased specialization of labor, it is also alienation from one's fellow workers and oneself (2008, 63).

A capitalist system calls for a separation between our labor, the very essence of our being, with the very objects we produce and the world that it builds. A capitalist system drives labor towards infinite accumulation in ways that distort nature and ourselves. We as a species have not naturally created climate change. Climate change is the natural phenomena of the separation between man and nature. Climate change is not the evolutionary process of human activity upon earth, but the evolutionary process of human activity upon earth in a capitalist system.

Nature is essential to life, but also to capitalist production. Capitalist treatment of nature as an input to production will lead to its further degradation and destabilize sensitive ecosystems. As mentioned in the earlier section, economists attempting to value nature will

never realize its true potential and worth, thereby continuing its destruction. In a capitalist system, nature is not something to be enjoyed and protected; it is a means to an end of profit making and more capital accumulation (Clark & York, 2005, 407). The alienation of labor, and the concomitant alienation from nature, produces a world that is out of balance. As Foster explains, "[t]he resulting extreme polarization between wealth that knows no bounds, at one pole, and an alienated, exploited, degraded existence which constitutes the denial of all that is most human, on the other, creates a contradiction that runs like a fault-line through the capitalist system" (2000, 174). Within this fault line lay the extinct and endangered species of plants and animals, along with the polluted waters and lands – all victims to capital's search for profit. Capital manifests a rift in our metabolic relationship with nature and destroys our relationship with others.

Under a capitalist system of social relations our metabolic relationship with nature operates through relations of control, ownership, and appropriation with a focus on the realization of the embedded exchange and surplus value (Heynan et al., 2006, 8). Capitalism "produces conditions that provoke an irreparable rift in the interdependent process of social metabolism, a metabolism prescribed by the natural laws of life itself" (Marx, 1982[1867], 949). The concept of a metabolic rift captures this estrangement between nature and our means of interaction within a capitalist society. This rift continually deepens through the dramatic degradation of people, nature, development projects, exports, deforestation, and climate change. Capital has only a productive cycle that does not include maintenance or sustainability requirements of natural resources and labor. Only with the advent of corporate strategies concerned with long-term profit creation have capitalists concerned themselves with environmental protection. Processes of globalization further alienate us from nature, since we are no longer isolated to our local ecosystems as goods and people move throughout the globe. The exploitation of people and nature now happens in faraway places outside the perceptions and responsibilities of most.

The capitalist modes of production and the metabolic rift are not geographically isolated phenomena. The following two landmark studies, one published in 1986 and the other published in 2007 provide an idea of the vastness of capital's affects on nature. The two studies look at the human appropriation of the earth's net primary production (HANPP), which they define as –"the amount of energy left after subtracting the respiration of primary producers (mostly plants) from the total amount of energy (mostly solar) that is fixed biologically" (Vitousek et al., 1986, 368). The Vitousek study found that 40% of the earth's net primary production (NPP) is be appropriated by humans each year (1986, 373), while the

most recent study by Haberl found that a little under 30% is appropriated a year (2007, 12943). They both show that only one species is appropriating a large swath of NPP all by itself. This is considerable and, I argue, a production consequence of capitalism. Vitousek concludes –

> The co-option, diversion, and destruction of these terrestrial resources clearly contributes to human-caused extinctions of species and genetically distinct populations-extinctions that could cause a greater reduction in organic diversity than occurred at the Cretaceous-Tertiary boundary 65 million years ago. This decimation of biotic resources will foreclose numerous options for humanity because of the loss of potentially useful species and the genetic impoverishment of others that may survive (Vitousek et al., 1986, 372).

These studies reveal our metabolic relationship in a capitalist system. Labor is directed to profit maximization. Through this process material and energy is transformed into new forms like CO2 and other forms of pollution. The increases of production, consumption and waste patterns compound this negative metabolism. In this sense, capitalism itself destroys the foundation to its very existence (as it does with labor) by creating scarcity. This scarcity will have a contradictory affect upon profit creation. Labor will no longer have the money to buy the goods and services created by capital and capitalists will eventually re-internalize the costs that were once expelled into the environment (Kovel, 2007, 41). The importance of bridging and healing the metabolic rift before we go beyond the tipping point cannot be underestimated.

As mentioned in an earlier section, the capitalist approach to climate change, and to healing the metabolic rift, is to focus on technological innovation and market rationalities. However, technological innovation could never reverse the centuries of unbridled and unchecked CO2 emission. Jevon's paradox, also mentioned earlier, is echoed in Marxist theory. David Harvey argues "Marx saw the capitalist law of accumulation always pushing society to the limits of its potential social relations and to the limits of its natural resource base…Resource limitations could be rolled back by technological change, but the tide of capitalist accumulation quickly spreads up to these new limits" (1974, 266). Notions of sustainable capitalism or the incessant need for technological innovation or not solutions to climate change. They are methods of further capital accumulation. Thus, reconfiguring the present and future beyond and at a distance from capitalism is the only factor that will shift the tide of climate change. Each individual must take a stand to transform capitalist social relations and production if we hope to address climate change's impact on nature/society relations.

The nature/society relationship produced under capitalism takes on its qualities thereby shaping our world into maligned forms in its own image. Our metabolic relationship with nature and society now carry the weights of appropriation, exploitation, alienation, and degradation. Since the Industrial Revolution the global north has amassed incredible wealth and unbelievable feats of science and society, yet this production process has also created myriad social and environmental harms. The innerconnections between climate change and capital shows how limitless growth in a finite world interacts. Joel Kovel honors capital, yet understands its destructive quality –

> Our all-conquering capitalist system of production, the greatest and proudest of all the modalities of transforming nature which the human species has yet devised, the defining influence in modern culture and the organizer of the modern state, is at heart the enemy of nature and therefore humanity's executioner as well (2007, vii).

Climate change and the possible extinction of our species are the greatest social and natural rifts, and we can only heal it through non-capitalist means. The first step in this process is letting-go and releasing our attachment to a system that does not work in our best interest. To heal the rift requires society to regain control over the social conditions of our existence and to regulate our labor in a healthy and sustainable way that denies the competitive and selfish control of money and profit (Burkett, 2009, 54-5). Only through these processes can society discover and adapt to climate change in ways that honor the environment and all life forms.

This section of the dissertation has examined and questioned the essence of our nature/society relationship. Accepting the concept of an "everyday nature" consisting of our daily-lived experience allows us to see nature in every aspect of our lives and not as some romanticized form "out there." Through a Marxist analysis of labor and metabolism, we can understand the essence of our interactivity with nature through our production and consumption patterns. Moreover, by examining the logic of capital, I argue that capital cannot confront issues of extreme poverty and climate change. Healing the metabolic rift by seizing ownership of our labor and regulating our production in sustainable and healthy ways is the only option available if we hope to handle these issues. The further imposition of capital will only worsen the situation while enriching only a small minority. The problem that faces us now is deconstructing and breaking the capitalist ideologies.

Ideological Conditioning

This section of the dissertation focuses on the ideologies of capital and resistance. It explores how capital infiltrates and controls how we view the world and our future. The section also explains how ideology imprisons us in forms handed down to us disallowing and negating any possibilities for realizing justice, equality, and environmental sustainability. Yet, this part of the paper has an air of hope, which calls out to individuals to resist ideological colonization and regain control of our minds and of our future.

Capitalism as an ideology has spread, much like disease, throughout the world. Using the stick as much as the carrot, the Western world refined and developed the capitalist system into the hybrid systems we see today. Gordon Clark notes that "societies may be capitalist but they are capitalist in different ways and those differences persist over time by virtue of their reinforcing complementarities. Institutional evolution is crafted out of that which is inherited and that which is possible given current commitments and future (albeit contingent) expectations" (Clark & Wojcik, 2007, 6-7). Therefore, each society may have its own distinct form of capitalism, yet the underlying social relationships remain the same. Capitalism is the hegemonic system of global governance, with power impositions from above – national and multi-national organizations and actors imposing order through myriad legal and militaristic powers – and below through integrated ideologies and ways of being. For the capitalist system to remain as a hegemonic project it needs a continuous accumulation strategy that serves the elite and their allies while also controlling the political power to mobilize democratic power and sustain a measure of passive consent of the people (Van Apeldoorn & Overbeek, 2012, 5-6). The ideological state apparatus composed of social structures such as the media, church, and culture attempts to convince us to support and take on ideas not in our best interest (Althusser, 2006). David Harvey noted the power of ideology when he states –

> For any system of thought to become dominant, it requires the articulation of fundamental concepts that become so deeply embedded in commonsense understandings that they are taken for granted and beyond question. For this to occur, not any old concepts will do. A conceptual apparatus has to be constructed that appeals almost naturally to our intuitions and instincts, to our values and our desires, as well as to the possibilities that seem to inhere in the social world we inhabit (Harvey, 2007, 24).

Capitalism, much like democracy, is exported, imposed, and expressed as the way to become a whole human being, a whole society, and a whole world. Advanced capitalist states justify their ideology over individuals and "depict the current configuration of their host society as

somehow part of God's Will, normal, or otherwise necessary" (Paolucci, 2011, 202). Capitalist ideology has achieved what Mark Suchman calls "cognitive legitimacy" –the impossibility to think otherwise, the impossibility to think of alternatives (1995, 583). This is not to say that ideological hegemony is not faced with multiple sites of resistance; however, we must consider the inability of the powerful actors to "think outside the box" to think without capitalism. My generation has come to a point of capitalist realism where we can imagine no future without capitalism (Fisher, 2009). We are normalized to inequality, numbed to the violence of exploitation, and cannot imagine a future without capital. Our society shapes us, yet this capitalist realism "is ideologically mediated; one could even claim that it constitutes the highest form of ideology, the ideology that presents itself as empirical fact (or biological, economic...) necessity (and that we tend to perceive as non-ideological). It is precisely here that we should be most alert to the functioning of ideology" (Zupančič, 2003, 77). Should we not constantly question reality? Are we to accept this world as handed down to us? Capitalism is the universal mode of organizing labor, nature, and money. It infiltrates every sector of society, and the problems contained within this society are products of human fallibility – not the logic of the system itself (Paolucci, 2011, 42). Thus, the logic of capital rules nature and human behavior and those that challenge the rules are either infantile or sidelined. Wendy Brown notes the elaborate hybrid forms capital takes to tighten its grasp on ideologies and ways of being –

> neoliberalism entails the erosion of oppositional political, moral, or subjective claims located outside capitalist rationality yet inside liberal democratic society, that is, the erosion of institutions, venues, and values organized by nonmarket rationalities in democracies. When democratic principles of governance, civil codes, and even religious morality are submitted to economic calculation, when no value or good stands outside of this calculus, then sources of opposition to, and mere modulation of, capitalist rationality disappear (2009, 45-6)

We live in a world where the significant pathways to environmental and social protection are encoded within capitalist means.

Most of the critiques directed to Marxist scholars are their lack of creating capitalist substitutes. Yet, in a world where everyone is looking one way and someone is screaming, "look the other way" is that not an alternative? In this era of capital the process of arguing for an alternative social structure marks one as a radical, but was not the chained man who saw the world outside in Aristotle's *Allegory of the Cave* just sharing his insight that the world of shadows was not the true world? Those who watched the shadows in chains claimed the one who traveled outside as a radical and tried to kill him. Our reality is not too

different. Those who speak out against capitalism, whether individuals or nation states, will face repercussions in some form or another. Thus, manufacturing consent to the system, before dissent mobilizes, is essential to the continuation of capital. As the founder of propaganda notes, "[t]he conscious and intelligent manipulation of the organized habits and opinions of the masses is an important element in democratic society. Those who manipulate this unseen mechanism of society constitute an invisible government which is the true ruling power of our country" (Bernays & Miller, 1928, 1). Thus, our being-ness has been integrated within capitalism, objects of rational choice, competitive market behavior, and other social constructs mark themselves as human nature, and thus we cannot act outside these socially created constructs because they imprison us. But, these ideas are notions of historical behavior and modern at that. Marking them as universal ignores the historical and transformative possibilities of human nature, action, motivation, and performance.

The academy and education system, surely in advanced capitalist societies, enforce capitalism and ways of being within which we all fall in line. As Paolucci argues –

> Privileges await those who defend, cover over, apologize for, or otherwise support elites and their interests. It would be exceptional if it were any other way. As a result, sciences that prove themselves serviceable to institutions of power enjoy greater prestige, resources, and public and governmental support (2011, 5-6).

Political and corporate entities corrupt knowledge through either censoring scientists or courting research that aligns with their interests. These actors do not wait for research and scientific discoveries and then benefit from them; they take an active approach and fund research. This is especially visible in academia and big business. Government and corporate disbursed research monies require certain qualities, and researchers must fit within certain perimeters to receive funds. The radical is disciplined through lack of funds who then changes her research to fit funding criteria. Of course, we all operate within institutional frameworks that shape and guide our behavior. However, we cannot blame the changed researcher or the wall street financier for operating in a system that is inherently imbalanced, to do so would place the blame on the agent as opposed to the institutional structures normalizing and shaping these agents. We often complain of these actors, or maybe we are the actors themselves, but as long as we maintain the understanding that the system is not working or imbalanced, then at least we acknowledge the injustice – but is that enough? We can disavow the system as bad/broken, yet we still work within and with it. Our complicity in its reproduction and our insistence on certain fundamentals of our lifeworld ensures that many of us will not exceed complaining. In other words "I see know that X was not true, but

all the same, it is true in a way" and so we continue the consolidation of ideology in home and at work (Rothenberg et al., 2003, 10). Fisher provides a simple example of how this consolidation works "[w]e believe that money is only a meaningless token of no intrinsic worth, yet we act as if it has a holy value" (2009, 13). Thus, many of us recognize that a capitalist system is unjust, but we continue despite this knowledge. We learn or teach never venturing far from the habitus —"the ideological unconscious of practice creat[ing] a 'commonsense' world endowed with the objectivity secured by a consensus on the meaning of practices and the world" (Resch, 1992, 217). Each one of us has the responsibility to transform this exact behavior and to break the chains that bind us to negative manifestations.

Breaking the illusion

Climate change is the defining issue of our species. It has the power to bring us together or tear us apart. If we continue under a capitalist system, then surely, our social relationships will be founded upon inequality, appropriation, and exploitation. The unique capacity of our minds and sociability is that we are conscious of the coming change and can transform our behavior and evolve into more peaceful and sustainable existence. Marx stated, "material force must be overthrown by material force; but theory also becomes a material force as soon as it has gripped the masses" (1844a). The logic of capitalism, the never ending processes of accumulation, will never collapse because of the material conditions no longer support it. Control of resources and labor will just become concentrated in tighter networks of power. Unfortunately, we don't have the luxury of watching from the sidelines waiting for capital to collapse. We have an ethical and social responsibility to create and sustain change. Antonio Gramsci reveals how processes of change occurs –

> In every country the process is different, although the content is the same. And the content is the crisis of the ruling class's hegemony, which occurs either because the ruling class has failed in some major political undertaking for which it has requested, or forcibly extracted, the consent of the broad masses (war, for example), or because huge masses (especially of peasants and petit-bourgeois intellectuals) have passed suddenly from a state of political passivity to a certain activity, and put forward demands which taken together, albeit not organically formulated, add up to a revolution. A 'crisis of authority' is spoken of: this is precisely the crisis of hegemony, or general crisis of the State (Gramsci, Nowell-Smith, & Hoare, 1971, 178, 210).

The urgency of change shifts depending on one's personal circumstances. If one is benefiting from capital, obtains their material needs, has a bright future, then people such as this are

usually happy with how the world works. For the rest who exists day to day, no savings, no food or clean water, surrounded by violence, dying from preventative disease, are constantly exploited by capitalists, they are the ones looking for change. One individual can make billions of dollars a year, while billions live off less than a dollar day…and the world keeps turning. We are all implicated in capital in some form or another. The laws of capital force capitalists to continue the logic or face extinction. Condemning capitalists through moral or liberal arguments is useless because it assumes that capitalists can behave in other ways outside the logic of capitalism (Paolucci, 2011, 189). Yet, if anyone thinks this trajectory will continue unchallenged, then they are living in ignorance. Those supporting the system actively or passively are complicit in the destruction of life and human's possible extinction. We must draw a line in the sand and begin to consider the global community and the world that exists outside of our distorted perception of reality.

The contradictions and failings of capital hold within them the very seeds of societal transformation. Henderson notes, "[i]n Marx's view capitalist social relations set in motion the possibility for their own erasure" (2009, 272). The exploitation of humans and nature has come to a point where survival for both is threatened. Inequality and climate change will only worsen under capital. Those with the means to adapt will, but the rest will be left to scour the earth feeding of the scraps of the capitalists and their allies. Breaking the illusions capital ideologies has set for us is more difficult than ever. Wendy Brown provides a roadmap for a new ideological resistance –

> What remains for the Left, then, is to challenge emerging neoliberal governmentality in Euro-Atlantic states with an alternative vision of the good, one that rejects homo œconomicus as the norm of the human and rejects this norm's correlative formations of economy, society, state, and (non)morality. In its barest form, this would be a vision in which justice would center not on maximizing individual wealth or rights but on developing and enhancing the capacity of citizens to share power and hence to collaboratively govern themselves…a left vision of justice would focus on practices and institutions of popular power; a modestly egalitarian distribution of wealth and access to institutions; an incessant reckoning with all forms of power – social, economic, political, and even psychic; a long view of the fragility and finitude of nonhuman nature; and the importance of both meaningful activity and hospitable dwellings to human flourishing (2009, 59)

What practical forms these take and the mobilizations needed to realize them should be the basis of everyone's life work. Each person has this responsibility or is otherwise complicit in capital's unprecedented destruction of earth and its inhabitants. There can no longer be excuses to inaction or to ignorance.

Conclusion

The purpose of the thesis is to prove that we cannot rely on corporate actors or capitalist solutions to save us from the climate change crisis. Sea level rise, one of the many manifestations of climate change, has the capacity to destroy ecosystems that took millions of years to create and human societies that have survived for centuries. The threats of sea level rise bring into focus that millions of people's lives depend on transforming our ways of being. My focus on capital and corporations revealed that we are looking for solutions within the very rubric that manifested the problems in the first place. The logic of capitalism and its affects on our metabolic relationship with nature and society will only continue to deepen the rift and degrade nature/society. We must do the work through alternative manifestations of nature/society innerconnections and experiment with new social relations based in equality and justice. The foundation of this work is not only overturning labor's exploitation, but also of recovering, controlling, and healing our metabolism with nature and extinguishing our alienation from earth's processes. Yet, capital in its hybrid forms, such a neoliberalism, have fabricated a world of ideologies and practices that increase the difficulty of voicing and performing opposition. Thus, the first and most important step is to change the ideological frequency to one that orients itself to the common good of all living beings. The transformation of society will see the transformation of nature. David Harvey so eloquently stated –

> The conflict and contradiction between the system of nature and the social system could be resolved only by the creation of an appropriate and entirely new form of human practice. Through such a practice, human beings will 'not only feel, but also know their unity with nature' and thereby render obsolete 'the senseless and anti-natural idea of a contradiction between mind and matter, man and nature, soul and body' (Harvey, 1974, 267).

Armed with the right ideas, and aware of the wrong ones, can make this world a better place and ensure the most compassionate future for all living beings in a warming world.

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