NATURE AND THE MYTH OF A SUSTAINABLE CAPITALISM

A MASTER THESIS

On the environmentalist transformation of capitalism and its potential in overcoming the environmental crisis.

Wim Carton **Aalborg University**
stud.nr. 20070707 spring 2009
Development and International Relations (DIR) supervisor: Li Xing

ABSTRACT

THIS THESIS criticises the predominant conviction in contemporary environmentalism that ecological sustainability can be achieved within the framework of the capitalist order. Our argument is that the fundamental causes of the contemporary environmental crisis, of which climate change is the most serious, but certainly not the only manifestation, lie not in an ineffective management of the earth's resources, but in the logic of capitalism itself. Any successful attempt at overcoming this crisis must therefore depart from a critical reading of the contemporary socio-economic order and the way its basic functioning affects the natural *and* the human environment. This thesis is meant to contribute to this debate by historicising the issue, and by demonstrating that the environmental crisis is, essentially, a cultural and political problem, and not a technical one. Our argument adopts a social-science oriented, mainly Marxist approach to illustrate the fundamental dilemma between production-for-profit (and the concomitant drive for economic growth) and the popular objective of sustainability. The main conclusion arrived at is that an environmentalist reconfiguration of the socio-economic system is incapable of resulting in an ecologically sustainable society as long as the basic contradiction between nature and capital is not addressed. Common environmental practices of governments and businesses, it is maintained, are therefore flawed as long as they fail to connect the manifestations of the environmental crisis to the unsustainable dynamics driving the growth of the global economy itself.

Concretely, the first part of this thesis outlines the fundamental contradiction between capital and nature from a historical and theoretical, mostly Marxist perspective. The argumentation of this part holds that capitalism is essentially a crisis-ridden system dependent on the exploitation of nature for its functioning. The second part of departs from the system's crisis-tendency and argues that capitalism continuously has to transform itself in order to overcome its own crises. Environmentalism, it is argued, is one of these transformations. Based on an interpretation of concepts of both Polanyi and Gramsci, the phenomenon of environmentalism is analysed and its limitations defined by the examining the dynamics of the adaptation process. In particular, this part connects the concept of the ‚double movement' to the Gramscian notions of hegemony and ‚passive revolution' to argue that environmentalism is first and foremost concerned with the continued accumulation of capital, and not with the protection of nature. In the last part of our thesis, the findings of the first part are connected to those of the second and the question of sustainability is addressed explicitly. In this way, the limits of the continuous capitalist reform process are fully exposed as being defined by the fundamental contradiction between capital and nature as well as by the dynamics of the transformation process itself. Sustainability, it is argued, is not achievable through environmentalist transformation, because the latter is unable to address the core problem of exploitation through capital accumulation within a finite world. These findings are subsequently illustrated by briefly examining some practical solutions proposed by governments, particularly pertaining to cost internalisation. It is concluded that these environmentalist suggestions amount to 'false solutions' because of their focus on symptoms rather than socio-economic causes. In the conclusion, the argument is summarised and it is concluded that environmentalism is unable to provide an adequate response to the inherently environmentally-degrading tendencies of the global economic system.

Freedom's utter frustration in fascism is, indeed, the inevitable result of the liberal philosophy, which claims that power and compulsion are evil, that freedom demands their absence from a human community. No such thing is possible.
Karl Polanyi

Freiheit ist immer Freiheit des Andersdenkenden
Rosa Luxemburg

And did those feet in ancient time,
Walk upon Englands mountains green:
And was the holy Lamb of God,
On Englands pleasant pastures seen!

And did the Countenance Divine,
Shine forth upon our clouded hills?
And was Jerusalem builded here,
Among these dark Satanic Mills?

Bring me my Bow of burning gold;
Bring me my Arrows of desire:
Bring me my Spear: O clouds unfold:
Bring me my Chariot of fire!

I will not cease from Mental Fight,
Nor shall my Sword sleep in my hand:
Till we have built Jerusalem,
In Englands green & pleasant Land.
by William Blake

CONTENTS

ACKNOWLEDGMENTS

I would like to thank a number of people without whom this thesis could not have taken its current form. First of all, I would like to extend my gratitude to my supervisor, Li Xing, for putting me on the right track, for making suggestions regarding the theoretical framework I used, and for commenting on earlier drafts of this thesis. His remarks have been valuable from the very beginning until the very end, and I am sure I don't exaggerate when I say that his supervision has not only greatly benefitted me for this particular work, but also stirred my interest for Marxism in general.

Secondly I would like to thank my parents for continuing to support me in every possible way, and for giving me the opportunities that I have been given. Though I'm quite sure they do not share my enthusiasm for either international relations or environmentalism, they have never failed to give up patience or understanding in hearing me out. Particularly the discussions with my father have been enriching, and though I do not share his optimism about the technological innovations awaiting us, I continue to enjoy discussing the matter with him.

Last but, as it goes, absolutely not least, I would like to thank Ruth Streicher for all that she has done in supporting me during the months I was writing this thesis. She stands out from the herd for so many reasons that it is impossible to name them all; for sharing my enthusiasm and for never growing tired of discussing my work, or for forgiving me overlooking the social constructions behind the concepts I was using. She has tirelessly gone through numerous drafts of this thesis, made comments, suggested changes, added new perspectives and corrected mistakes, all with the greatest pleasure and eagerness. Without her help, this thesis would have been a lot more one-sided, a lot less gender-conscious and probably also a bit more dramatic. A lot of what is here is thanks to her.

All the mistakes that remain, of course, are my responsibility alone. There are certainly more considerations that could have been made, different angles that could have been explored, and certain points that could have been worked out better. These decisions were entirely mine.

On a final note, I have chosen to use the plural 'we' during the rest of this thesis, even though I am the only author. I have done this in an attempt to circumvent the sometimes odd constructions resulting from the use of the passive form, and the in my eyes equally odd tone given to an academic article when using the first person. My use of 'we' should thus be seen as an indefinite form, so as to mean, depending on the context, 'we, the author and the reader' or 'we, the general subject', or even 'we, the author alone'. I believe the advantages hereof are a matter of personal opinion and I apologise for the possible confusion or the potential awkwardness during reading.

INTRODUCTION

In March 2009, hundreds of scientists representing 80 countries convened in Copenhagen in an effort to discuss the most recent research on climate change[1] ahead of the United Nations (UN) summit that is to be held later this year, and at which world leaders are expected to agree on a follow-up to the 1997 Kyoto Protocol[2]. The outcome was nothing if not sobering. A report summarising the meeting shows that scientists are growing increasingly pessimistic about the potentially debilitating effects of a continued rise in greenhouse gas (GHG)[3] emissions on the planet's atmosphere (Guardian, 2009a). In a poll conducted by the British newspaper the 'Guardian' (2009b), among over 250 experts who attended the conference 90% answered that they believed the planet would eventually warm by more than 2°C (par. 9), a figure that according to the EU is "the threshold beyond which irreversible and possibly catastrophic changes become far more likely" (EC, 2009, par. 3). This assertion is itself a reflection of the conclusions reached by the Intergovernmental Panel on Climate Change (IPCC) in its most recent assessment report, which explores the possible effects of global warming in different parts of the world. An average temperature rise in excess of 1.5 – 2.5°C, the IPCC (2007a) argues, would put up to 30% of all species at increased risk of extinction and generally bring about "major changes in ecosystem structure and function, species' ecological interactions and shifts in species' geographical ranges, with predominantly negative consequences for biodiversity and ecosystem goods and services, e.g. water and food supply" (p. 48). The panel

[1] Climate change is meant here, and throughout this paper, as exclusively referring to observed patterns of climatic transformation due to human influences. It is here used interchangeably with the term 'global warming', which though not exactly the same, is in the dominant scientific discourse believed to be the most likely outcome of climate change.

[2] The Kyoto Protocol commits governments of 37 industrialised countries to cut their greenhouse gas emissions by 5% compared to 1990 levels. It was established through the United Nations Framework Convention on Climate Change (UNFCCC) and is one of the more tangible achievements of the United Nations Conference on Environment and Development (UNCED), also known as the 'Earth' or 'Rio' summit', organised in Rio de Janeiro (June 1992). Because UNCED was widely seen as the first important global summit on environmental issues (even though it had been preceded by the Stockholm Conference in 1972), its importance, including that of the Kyoto Protocol, should perhaps be situated on a symbolical rather than on a political level. As of January 2009, 183 countries had ratified the Protocol. The most notable absentee on the ratification list is the US, also the world's largest emitor of greenhouse gasses. The US has refused to cut emissions as long as there are no similar commitments from the major developing countries as well, because it believes this would be detrimental to the American economy (UN, 1997, par. "UN Conference on Environment and Development"; UNFCCC, 2009a; 1998, p. 3).

[3] The greenhouse effect is a natural process that regulates the earth's temperature by absorbing heat reflected off the earth's surface. A number of gasses contribute to this process, most of which are naturally present in the atmosphere. Some, however, are exclusively emitted as a result of human activity. An increase in the emission of greenhouse gasses, as is currently observed, strenghtens the greenhouse effect and thereby heightens the overall temperature on earth. The principal anthropogenic greenhouse gas is carbon dioxide (CO_2), but others, such as nitrous oxide (N_2O), methane (CH_4) and sulphur hexafluoride (SF_6) contribute to the regulation of the global climate as well (IPCC, 2007b, p. 82).

furthermore concludes that this is likely to expose millions of people to, *inter alia*, rising sea levels, coastal flooding and droughts as global precipitation and water runoff patterns change, thereby increasing the likelihood of crop failure and food insecurity (pp. 49-51). In short, even though the exact dynamics of climate change remain disputed, it seems increasingly obvious that the world of the 21st century is facing an environmental challenge of unprecedented proportions.[4] Global warming, the vast majority of scientists now agree, poses a very real threat to the survival of human communities around the globe; communities, indeed, which already now depend on ecosystems that after centuries of pervasive pollution, deforestation and overexploitation have been stretched to the limits of their capacity.

The response of the international community thus far has been slow and superficial, and is yet to make a difference. The Kyoto Protocol, currently the most tangible international agreement on climate change, only calls for a reduction in greenhouse gasses of 5% by 2012, while the IPCC (2007a) has pointed out that, to stabilize the CO_2 concentration at the 2005 level and limit global warming to 2°C, the world would have to bring about a cut in CO_2 emissions of between 50 and 85% by 2050 (p. 67). Even then, the humble objectives of the Kyoto agreement are proving to be a struggle for most Annex I parties[5]. The latest data show that overall emissions including land use, land-use change and forestry (LULUCF) have already decreased by 5.5% between 1990 and 2006, but that all of that reduction was brought about by the disintegration of the Soviet Union. The so-called economies in transition (EIT)[6] of the Annex I list are together responsible for a 35% decrease in GHG emissions, while the combined emissions of all other Annex I parties have actually risen by 9.1% (UNFCCC, 2008, pp. 5-6). Admittedly, the Kyoto commitment period only runs from 2008 to 2012, and some governments have in more recent years in fact stepped up their efforts to bring down GHG levels, at times already going far beyond Kyoto. The EU, for instance, in 2008 pledged to decrease its emissions by 20%, to establish a 20% overall share of sustainable energy and a 20% increase in energy efficiency, all by 2020 (EC, 2008b, par. 1). The result of these promises remains to be seen. Meanwhile however, measurements of global GHG levels, the only real indicator of how well mitigation is working, show that atmospheric concentrations of CO_2 are actually increasing faster than ever before. Already now, they are at a higher level than any previous period in the history of mankind (NOAA, 2009, par. “Trends in Atmospheric Carbon Dioxide – Global”).

[4] The terms ‚environmental challenge‘, ‚environmental problem‘, ‚environmental crisis‘ etc are here used for reasons of convenience and clarity, even though one of the main arguments this paper wishes to make is that climate change/global warming is in essence a social and a poilitical problem. To name it ‚environmental crisis‘, we recognise, is in fact somewhat misleading, as it takes the political aspect out of the debate.

[5] Signees of the Kyoto Protocol are divided in an Annex I and a non-Annex I group, which is roughly a division between the industrialised and the developing world. Only the Annex I parties are expected to contribute to the 5% emission reduction during the period 2008-2012 (UNFCCC, 2009b).

[6] The EIT’s are the former Soviet countries of Eastern Europe plus the Russian Federation (UNFCCC, 1998, p. 20).

Interestingly, the issue of climate change has resonated fairly well also with the broader population of the industrialised world. Persistent NGO campaigns, recurring media attention and popularised undertakings such as Al Gore's documentary, 'An Inconvenient Truth', have all contributed to an irrefutable increase in overall public awareness of climate change and environmentalism in general. Even businesses and corporations have recently joined the bandwagon of global warming in what would appear to be a newfound dedication to everything 'green', 'ecological' and 'sustainable'. Large multinationals, carmakers and even airlines are all working hard to present an image that is in line with the trend that sustainability has become. The Coca-Cola Company for example, symbol of globalisation, now has a number of 'sustainability strategy guides', one of which is a 'climate protection strategy' that aims at reducing the company's 'carbon footprint', a popular measurement of CO_2 emissions (The Coca-Cola Company, 2009). It is common to find similar 'green business' models on the websites of virtually every larger corporation, including those of oil companies such as Shell, BP, Chevron and ExxonMobil. Some of the claims these companies make are highly questionable, and can easily be exposed as greenwash[7]. In a lot of cases, 'green' terminology is very freely adopted to describe a company's overall philosophy, or to give its products a sustainable appearance even though the foundations for these claims are weak or non-existent. Occasionally, products are labelled 'green' despite the fact that their production simply substitutes one environmental problem for another, as indeed is the case for biofuels, which are partly to blame for the recent rise in food prices (IMF, 2007, par. "Dilemma of Biofuels").[8] All this notwithstanding, it is undeniable that sincere attempts are underway to 'green the economy' and promote a less destructive way of life at the core of the capitalist system. The recent increase in the use of renewable energy bears witness of this, and proves that various actors are at least trying to come up with answers to the problem, however slow, limited and imperfect these efforts might be.

In drafting their solutions to climate change, governments and businesses have adopted widely diverging approaches that at the heart of it nevertheless turn out to be extremely similar in that they all focus on reducing GHG (mostly CO_2) emissions by steering economic activity away from the use of fossil fuels towards 'carbon-neutral' alternatives such as wind and solar energy, biomass and nuclear

[7] Greenwash is a term commonly used to define the practices of companies attempting to present an environmental-friendly image of themselves, despite the fact that their main activities remain largely environmentally damaging. See for example the weekly column by Fred Pearce in the Guardian (2009c) at http://www.guardian.co.uk/environment/series/greenwash.

[8] The IMF research showed that a higher demand for biofuels in the US and Europe led to higher prices for especially soybeans and corn. This in turn led to a higher demand for cheaper substitutes, such as rice and wheat, which in turn increased their price, etc. The effect was mostly felt by the poorer countries, where the share of per capita income spent on food is far higher than in the industrialised world (IMF, 2007). In some places, people took to the streets to vent their anger about the surge in food prices, as seen in the 2007 and 2008 food riots in Egypt, Haiti, Mauretania, Cameroon et al. that left many people dead (Guardian, 2008c).

power.[9] These environmentalist initiatives are aimed at creating a more energy-efficient economy that uses clean power to sustain and expand on current levels of wealth and prosperity, and for the most part do not touch on the issue of energy usage or mass consumption *in se*. They are meant to alter the nature of our energy production but do not question the sustainability of current energy consumption levels in itself; they scrutinise the way products are manufactured and used, but not the fact that they are made at all. Seen from this perspective, the climate is changing because we are using the 'wrong' kind of energy, and are not using it very efficiently, rather than because, as might indeed be argued, our consumption habits as a market society are simply too energy-demanding. Global warming is therefore first and foremost perceived as an ahistorical, technical problem pertaining to the *management*, and not the *logic* of the socio-economic system (Foster, 1994, p. 12; Xing & Hersch, 2002, p. 208).

Albeit quite likely the most serious, climate change is clearly not the only problem. Forests are disappearing, fish stocks depleted, species dying *en masse*, deserts encroaching on what used to be fertile land, not to speak of the numerous localised pollution problems, of plastics, heavy chemicals, e-waste and smog. Just as with global warming, these issues are commonly seen as 'market imperfections' rather than for what they really are, that is, part of a general, cultural and social crisis deriving from the inherent features of the present socio-economic order. Overcoming them hence becomes a matter of 'greening' existing economic institutions instead of fundamentally altering them; of correcting the 'imperfections' of the market mechanism rather than questioning its *modus operandi*. The suggested solutions to this general environmental crisis remain mostly apolitical in nature because the prevailing conviction holds that the challenges posed by a warming and degraded planet can and should be addressed within the existing socio-economic framework. Sustainability, it is believed, is accomplishable without putting into question the all-powerful doctrine of economic growth through capital accumulation. Anno 2009, this growth principle remains as strong as ever, as is readily derived from the reaction of governments around to world to the 2008/2009 economic crisis, which has sparked tremendous financial efforts to keep the global economy expanding.[10] In fact, many of the economic rescue packages drawn up to combat the recent financial crisis have included attempts to stimulate the growth of green industries from the belief that such measures will

[9] Clearly, environmentalists are not a homogenous group when it comes to their beliefs, and it is indeed hard, as with terms like sustainability, to find a straightforward definition. The interpretation used here rests on the finding that, by far, the dominant form of environmentalism practiced by policymakers is that of free market environmentalism, which reconciles environmental considerations with free market economics (Xing & Hersch, 2002, pp. 207-208).

[10] US President Barack Obama, for example, has made numerous remarks on the need to stimulate economic growth, and his willingness to do whatever it takes to achieve this. Boosting the American economy has easily been Obama's key focus point so far. It was the central theme in the last months of his presidential campaign, as well as in his inauguration speech, in which he proclaimed: „The state of our economy calls for action: bold and swift. And we will act not only to create new jobs but to lay a new foundation for growth" (The New York Times, 2009).

be advantageous to the economy in the long run.[11] In this way, economic growth and sustainability have become wholly compatible concepts. What is more, even, the environmentalist reconfiguration of capitalism is now championed as *the* means for the economy to continue growing. Rather than a departure from business-as-usual practices, therefore, the current rise of environmentalism has grown to be a *conditio sine qua non* for continuing to do exactly the same as before, namely ensure that capital accumulation can continue, that corporations remain profitable and that the global economy does not cease growing (Barry & Doran, 2006, p. 257). Environmentalism is now defined primarily in function of these narrow economic considerations. The words of US President Obama are typifying in this context: "We will build the roads and bridges, the electric grids and digital lines that feed our commerce and bind us together. [...] We will harness the sun and the winds and the soil to fuel our cars and run our factories" (The New York Times, 2009).

This unlikely marriage of environmental sensitivity and economic liberalism forms the departing-point for this thesis. The subsequent argument is based on the two premises described above, namely that (1) the countries of the world are at least in theory attempting to mitigate the environmental crisis and minimise the often disastrous effects of their businesses' economic activities on the natural world; that governments have recognised the importance and urgency of overcoming the environmental challenge we are facing. On the other hand, (2) they continue to swear by the dogma of economic growth through capital accumulation as the single most important tool for assuring the welfare of their citizens, and consistently subordinate all human aspirations to the logic of 'free' market capitalism. These two objectives, sustainability and economic growth, are here taken together and set against each other. The observed surge in environmentalist policies which is meant to bring sustainability about, is in what follows conceived as an attempt at reforming the system in order to overcome the crisis. It is, we maintain, an adaptive process of capitalism itself. Our overall aim is to scrutinise whether sustainability is achievable given the dynamics of this process. Simply put, our thesis examines whether the capitalist reform process is likely to result in ecological sustainability, as is the aspiration; if, in other words, an environmentalist reconfiguration of the economic system can be successful in overcoming the general environmental crisis without at the same time eroding the basis of capitalism itself; if, in other words still, a dynamic and adaptive market society is resilient enough to overcome one of its most fundamental contradictions, that between capital and nature. Our assumption is that it cannot. We will argue that the basic capitalist principle of production-for-profit is irreconcilable with the objective of ecological sustainability, making the system's transformation into a 'sustainable capitalism' impossible.

[11] For example, the European Economic Recovery Plan, which is to prevent the European economy from shrinking, has as one of its two main pillars 'smart investment', meaning „investing in the right skills for tomorrow's needs; investing in energy efficiency to create jobs and save energy; investing in clean technologies to boost sectors like construction and automobiles in the low-carbon markets of the future; and investing in infrastructure and inter-connection to promote efficiency and innovation" (EC, 2008c, p. 2).

In outlying our argument, this thesis builds around the contemporary issue of climate change. Importantly though, it does not present an analysis of it as a phenomenon *sui generis*, nor do we intend to answer whether it is possible for capitalism to overcome the specific crisis that is global warming. Indeed, such a question would come down to a denial of the wider, historical context within which the climate problem actually needs to be situated. Instead, anthropogenic climate change is in what follows conceived as *a symptom* of a continuous problem within the logic of capitalism itself. Rather than treating it as an independent, absolute crisis, it is here thought of as an indication of a much more profound, socio-economic dilemma; as essentially a historically-specific manifestation of the contradictory relationship between a profit-oriented society and nature. In this respect, the degradation of nature can be described as a constant throughout the history of capitalism, and global warming as its presently most serious, most systemic form. While the objective of our thesis is a substantiation of the resilience of capitalism with regard to this general, structural crisis, the specific issue of climate change is important to our understanding in that it functions as the relevant historical context, as well as constitutes a useful framework for a systematic analysis of this permanent, underlying crisis. Our argument therefore departs from a historicisation of global warming in order to exemplify the nature of the fundamental contradiction between capitalism and the environment. Throughout, the climate context is also used to give a more practical, empirical foundation to our theoretical argument on the impracticability of bringing about a sustainable form of capitalism.

But ultimately, the importance of connecting climate change to the contrariety of capitalism and ecological sustainability lies in the graveness of our current predicament. Never before have humans had a more invasive and adverse impact on the biosphere; never before, also, did they more relish the illusion of standing above nature, and of being disconnected from it. The prospects presented to us by scientists are all but hopeless. Despite numerous promises, initiatives and commitments, the international community has thus far failed to adequately address what is quite easily the most profound challenge it has ever been confronted with. Yet there is a much more important question to be asked than the one pertaining to the success of global governance. As Sweezy (2004) notes, "everyone who shares the belief in the fatal implications of current trends has a moral obligation on the one hand to try to understand the processes that underlie these trends, and on the other hand to draw appropriate conclusions about what has to be done to reverse them before it is too late (p. 88). To adequately address the present problem, in other words, it is crucial to comprehend its fundamental causes. We maintain that these lie primarily in the very nature of our socio-economic system and not merely, as is supported by the international community, in the managerial characteristics of our energy consumption. Indeed it is our opinion that, even if the form of mankind's dependence on energy would change, and even if the world would step away from fossil

fuels completely, capitalism would soon run into a new and perhaps even graver environmental problem. Already now, the challenges facing society are far larger than climate change alone. Deforestation, soil erosion and water scarcity are just a few of the contemporary issues that cannot be overcome by switching to renewable energy alone. At the source of all these problems lies the same cause, a society constructed almost entirely on the principle of production-for-profit. The denial of this, the depoliticisation of the environmental crisis and its disconnection from the socio-economic conditions that have made it possible in the first place, is leading to the implementation of false solutions, of strategies that alleviate the symptoms but do not address the underlying condition. With this essay, we aim to demonstrate the importance of repoliticising the issue, by reconnecting the concrete problem that is climate change to the inherent features of global capitalism and the permanent environmental crisis resulting from it. In this respect, the relevance of our thesis lies in the social and historical specification of a debate that has so far mostly been conducted on a purely technical level.

METHODOLOGY

The question we are posing in this thesis essentially relates to a structural condition of society, i.e. the nature of the capitalist system and the determining features that derive from it. It is fundamentally a theoretical question, and the approach adopted to answer it will necessarily reflect this. Although our analysis departs from a critical reading of the historical environmental crisis, this thesis predominantly relies on an interpretation of selected academic literature on the nature of capitalism, environmentalism and historical change. In the process, we have attempted to arrive at a perspective that is as holistic as possible within the current framework, without falling into meaningless generalisations. At the same time, it was felt that the suggestion of a profound contradiction in the logic of capitalism itself calls for a systems-based method that affirms the interconnectedness of the different societal spheres that intersect with the ecological dilemma we are outlining. It was therefore deemed necessary not to employ one single theory in putting forward our argument, but rather to use relevant concepts with different theoretical focuses in the belief that this would lead to greater understanding, as well as help to avoid a reductionist interpretation of our problem. The choice of the theories eventually applied was motivated primarily by their ability to explain the dynamics of capitalism as a resilient and adaptive system, with particular relation to the system's long-term ecological impact as well as society's environmentalist tendencies.

This, and the fact that our thesis at its outset questions the competence of economic liberalism in addressing the environmental crisis, means that a lot of weight has been given to theorists situated within the Marxist and post-Marxist traditions, not in the least Marx himself. The strengths as well as weaknesses of Marxism in describing the capitalist mode of production are well-attested, but the ecological implications of Marx's work, argues Burkett (1996), have frequently been misunderstood. Rather than a downgrading of the role of nature, he notes, Marx's analysis actually constitutes "the basis for a coherent historical specification of capitalism's natural conditions and limits – one that organically relates ecological and class struggles while highlighting the need for alternatives to the market in order to achieve ecologically sustainable production" (p. 332). We subscribe to this view and have subsequently treated Marx's texts as imperative to our analysis of the basic dynamics of capitalism and the system's relation to its natural conditions of production. At the same time, of course, it remains true that Marx was first and foremost occupied with the exploitation of labour, and even though he himself already saw this as intimately connected to the degradation of nature, much of the ecological relevance of his conclusions are actually post-Marxist interpretations rather than ideas developed by Marx himself (see e.g. Foster, 2000). Nevertheless, these 'eco-Marxist'

writings are valuable and even necessary additions, seeing that Marx's work is evidently outdated when it comes to describing the logic behind the present form of capitalism as a much more global and integrated system. We have therefore supplemented a personal and interpretative reading of Marx with the theorisations and critique of more contemporary thinkers.

In addition to Marx and the post-/eco-Marxist school, two scholars in particular stand out in this thesis because of their key relevance to our analysis of market capitalism as an adaptive but crisis-ridden system. Although they are not explicitly related to ecology, we have treated the works of both Polanyi and Gramsci as crucial components of our argument, and have drawn heavily on our own interpretation of the theoretical concepts they developed. We belief that this has greatly contributed to understanding the socio-economic circumstances that brought about the present environmental crisis, and all the more so regarding the environmentalist potential to overcome it. While Gramscian concepts allow for the description of a hegemonic, political structure that changes over time, by reacting to recurring crises and incorporating the demands of an evolving society in order to safeguard the existing social order (Gramsci, 1978), the work of Polanyi (2001) stresses the continuous struggle between a self-regulating and expanding market, and a society intent on fighting the adverse outcomes of these processes. Both scholars, therefore, have defined and conceptualised capitalism as a dynamic system that is continuously creating crises, which it is then compelled to solve in order to maintain its legitimacy in the eyes of the subordinate classes. In this thesis, we explore this feature of capitalism in specific relation to the question of the environmental crisis, environmentalism and the objective of ecological sustainability.

Importantly, our application of the theories of Polanyi and Gramsci does not provide an alternative to the critique given by Marx. Both scholars were heavily influenced by Marxist theory, and their writings in fact represent two distinct and logical continuations of the classical Marxist debate on the inherent inclination of capitalism towards crises. In employing the work of Polanyi and Gramsci, this thesis actually builds on a foundation laid by Marxist crisis theory and in so doing complements a classical conceptualisation of capitalism with a more modern one. Similarly, the concepts developed by Polanyi and Gramsci respectively are here perceived not as alternative interpretations of the adaptive character of capitalism, but as fundamentally complementary ones. The connections between the theories of both are crucial to our argumentation when describing the environmentalist transformation of capitalism, and will be developed in more detail in the second part of this thesis. For the moment, however, we recognise that there are also limits to their explanatory power. While we maintain that the basic characteristics of capitalism as described by classical Marxism still hold, neither Marx, Polanyi or Gramsci developed their argument in the context of the present form of capitalism, that is, a fully globalised mode of production that has "deprived contemporary states of sovereignty" (Scholte, 1997, p. 441), though not making the

nation-state less relevant. Yet while the transnational capitalism of the 21st century is of an indisputably different order and magnitude than its predecessor in the 19th century, this change should also not be overstated. As Wallerstein (2002) repeatedly stresses, "capitalism was from the beginning an affair of the world-economy and not of nation-states. It is a misreading of the situation to claim that it is only in the twentieth century that capitalism has become 'world-wide'" (p. 19). The capitalism described by Marx, Polanyi and Gramsci was therefore different only in that it was much *less* integrated, *less* transnational and *less* universal than it currently is, not in that it was a 'national capitalism' - indeed we concur with Wallerstein that such a thing has never existed. This is not to deny the undeniable differences between 19th century capitalism and the fully globalised system of the 21st century, but merely to reiterate the belief that the gradual transformation of capitalism was one of form, intensity and magnitude, and not of nature. Consequently, an application of the theories used here, we maintain, remains relevant also in the current context, because both Gramsci and Polanyi were occupied with the nature of the system. It is clear, however, that some reservations need to be made regarding the implications of the 21st century, fully globalised manifestation of capitalism for our analysis of environmentalism. This too will be elaborated on later in this thesis.

Our argumentation occasionally also draws on contributions from outside the field of political economy. Most controversially perhaps, it uses elements from the 'Limits to Growth'[12]-thesis (LTG), which holds that unlimited population growth combined with an equally unlimited expansion of the global economy will eventually lead to an 'overshoot and collapse' scenario brought about by the physical inability of the planet to sustain material appropriation beyond a certain limit (Meadows et al., 1972, p. 143), and thereby constitutes an affirmation of the belief that current economic and demographic trends cannot continue due to the finite carrying capacities of the natural environment. While we ignore LTG's arguments on population, its economic growth-pillar actually largely corresponds to our own hypothesis, though there are important differences. Most significantly, LTG does not define growth in function of the present socio-economic system, hence fails to move beyond a narrow mathematical, abstracted explanation of the mechanisms that have lead to current levels of growth in the first place. In this way, the LTG argument actually conforms to the technical and managerial approach propagated by the international community, and refuses to see the real problem. These considerations notwithstanding, the LTG thesis also encompasses some genuinely useful ideas, not in the least that of a physical (though not absolute) limit to the carrying capacity of the planet. We have therefore attempted to critically reconcile its interesting aspects with a more profound, socio-economic interpretation of growth based on a reading of the theories described earlier.

[12] It represents a concept developed in a 1972 publication by the Club of Rome. The full title of the report is 'The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind'.

The focus of this essay is necessarily an ecological one. Our argumentation therefore revolves around a definition of sustainability that seemingly excludes the concepts of inequality and social justice usually associated with it.[13] This omission, however, is merely functional, and we recognise that a definite separation between social inequality and the ecological constituent of sustainability cannot be made; that questions of social justice are *always* implicitly present even in a 'purely ecological' approach. Indeed, if one recognises that the biosphere is a closed system and that natural resources are essentially finite, then the question of wealth, of distribution, equality and social justice becomes inevitable. These issues are however not our explicit concern, and it is therefore necessary to stress that certain aspects of what is commonly understood under sustainability will not be dealt with here. Hence, while we frequently refer to 'ecological sustainability' in order to underline the particular focus of this essay, the application of this term should not be seen as an expression of the belief that the concept of sustainability is divisible. Concretely, by 'ecological sustainability' we mean a mode of consumption and production that does not erode the natural basis of social reproduction; a deliberate balance between man's material demands and the physical capacity of the planet to provide. Applied to the question posed in this essay, it could also be interpreted as a form of social existence in which the contradiction between market society and nature has been overcome. This inescapably involves a time-dimension that is somewhat hard to grasp, or what the Brundtland report (WCED, 1987) refers to by mentioning 'future generations'. Herein, too, the interconnectedness of social inequality and ecological sustainability becomes evident, since the preservation of nature for 'future generations' is not much more than a form of social justice *vis-à-vis* our descendants.

The concept 'ecology', furthermore, itself only becomes meaningful in relation to a certain social order, seeing that nature does not have any 'meaning' or 'value' outside of its relationship with (the needs of) man, since both 'meaning' and 'value' are social concepts. "Social labor," O'Connor (1998) writes, "mediates between human and natural history; labor is the material interface between society and nature" (p. 5). Finally, the difficulty in separating ecology from questions of social inequality also lies in the normative character of the sustainability concept. It is, fundamentally, a

[13] The most commonly used definition of sustainability is that of the Brundtland Commission, as it was proposed in the 1987 report, ‚Our Common Future'. This was itself the result of the World Commission on Environment and Development (WCED), the first UN commission to address the issue of sustainable development (UN, 1997, par. "UN Conference on Environment and Development"). The report describes sustainability as "[meeting] the needs of the present without compromising the ability to meet those of the future" (WCED, 1987, p. 40). Interestingly, this is immediately followed by an explicit expression of the conviction that sustainability and development (or growth) are compatible concepts: "Far from requiring the cessation of growth, [sustainable development] recognises that the problems of poverty and underdevelopment cannot be solved unless we have a new era of growth in which developing countries play a large role and reap large benefits" (p. 40). Growth is here seen as a precondition for sustainability, which is a logical consequence of the report's development orientation as well as of the commission's faith in economic (though environmental-friendly) growth as a welfare creator. Clearly, this is not an interpretation of sustainability that is supported in this thesis.

Western construction embedded in specific social and cultural values.[14] In this sense, the question *who* the system should be sustainable for is not easily answered in ecological terms, and neither is the question 'how much' nature a sustainable society should have exactly.[15] In fact, even a social justice-oriented approach to sustainability would be ambiguous, since 'needs' and 'future generations' are terms that are in their vagueness open to very broad interpretations (Sachs, 1997, p. 74). For the sake of our thesis, then, 'sustainable' is subsequently used in the meaning of the ecological conditions necessary for the current social order to preserve itself. While we acknowledge that this naturally assumes a subjective interpretation of nature as well as an overarching social dimension, we stress that these issues do not figure *explicitly* in this paper.

Equally important, it should be pointed out that our thesis is not concerned with the specific environmentalist policies of companies, countries or civil society organisations. It does not elaborate on the potential success of individual attempts at becoming 'sustainable'. In fact, we belief that such an approach would be essentially meaningless since the notion of sustainability does not have any value when applied to individual commodities, services or policies. Sustainability is a social condition, not some characteristic of consumer products. It is not a concept that can be measured or divided, hence the only meaningful unit of analysis is the social system, that is, the world economy. Instead, the focus of this thesis is on contemporary society's faith in the reconcilability of environmental conservation (sustainability) and economic growth, which is reproduced in the presently most dominant form of environmentalism. Put differently, our concern is with the observed rise of mainstream environmentalism as a general, but mostly Western phenomenon, and while we do draw on specific manifestations of this phenomenon, we do so only with the purpose of illustrating and strengthening the fundamental theoretical argument of this thesis. Especially in the third part, where the question of sustainability is explicitly dealt with, a number of examples will be explored to exemplify the structural limits of environmentalism in bringing about an ecologically sustainable society.

The remainder of this essay is divided into three major parts. The first provides a critical reading of the permanent environmental crisis from a historical, essentially Marxist perspective. In doing so, particular attention is given to the case of anthropogenic climate change, so as to demonstrate its significance as fundamentally a symptom of a profound and continuous problem within the logic of capitalism, rather than a stand-alone crisis. The first part of this essay thus connects global warming to the larger trend of environmental degradation in the recent history of mankind, and relates it to a historically-specific form of social organisation. Our general objective in this part is not to give an

[14] For an analysis of sustainability and sustainable development as a social construction, see Redclift & Woodgate (1997, pp. 55-70).

[15] This means that a society could be sustainable with a minimum of nature, where everything in some way serves human needs, or it could have a lot of nature that is quite independent of the needs of humans.

exhaustive account of the history of capitalism and environmental degradation, but rather to provide an illustrative narrative of some key tendencies that can then form the departure point for subsequent chapters. We furthermore employ a number of ecological concepts to explore wherein exactly the logic of capitalism contradicts the processes of nature. In this way, part one provides the historical grounds for the claim that there is, in fact, a fundamental contradiction in the relationship between the capitalist mode of production and nature. At the end of this part, this contradiction is then briefly approached from a theoretical, mostly classical Marxist angle, in order to exemplify the link between Marxist crisis theory and historical environmental degradation. More than just an elaborate introduction, therefore, we insist that this first part of our thesis is crucial in that it provides the historical as well as theoretical foundation for understanding the environmentalist transformation of capitalism and the system's inherent unsustainability. In this respect, the first part of our thesis should be considered as a historical elaboration on the classical Marxist argument of capitalism as a system inherently generating social, economic and ecological crisis.

The second part departs from this crisis-tendency to demonstrate how society is attempting to deal with the destruction of the environment, and how this relates to the continued functioning of capitalism itself. It provides a theoretical interpretation of how governments and businesses are using environmentalist practices in an attempt to overcome the capitalist contradiction we outlined in part one. To this purpose, we give an interpretation of the concepts of Polanyi and Gramsci and connect them to the classical Marxist debate. In this way it is demonstrated both why and how capitalism continuously (and necessarily) transforms itself, and what the structural limits of this transformation are. Finally, then, armed with these theoretical weapons, we undertake an attempt to describe the phenomenon of environmentalism as essentially a transformation of capitalism. Our purpose is to show how the mainstream environmental movement has become subordinated to the logic of the capitalist system, how the goal of environmental conservation, or ecological sustainability, has been linked to economic growth, why this is so, and what the practical manifestations thereof are.

In the third and final part, we use all of the above to analyse the main problem put forward at the beginning of this thesis, namely whether it is possible for capitalism to become an ecologically sustainable system through environmentalist transformation. In other words, the third part of this essay examines whether the capitalist adaptation process as described in part two is capable of overcoming the fundamental contradiction with nature as outlined in part one. Our argumentation holds that it cannot, and to prove this on theoretical grounds, we draw on both the nature of the system (part one) and its transformative dynamics (part two). Along the way, we offer some empirical implications of this for a number of the most common 'solutions' that environmentalist groups, governments and businesses suggest will be able to bring about a state of sustainability,

namely recycling, efficiency increases and technological developments. Here as well, the aim is to be illustrative rather than exhaustive. Throughout, the focus remains mostly on our theoretical argumentation. Finally, we briefly scrutinise the attempts of the international community and the European Union in internalising the external costs of environmental degradation for the cases of carbon trading and the EU transportation sector, as yet another environmentalist attempt at overcoming the destruction of nature. All of these efforts, we conclude, are unable to achieve sustainability within a market society, and therefore constitute a false solution that distracts from the real, underlying problem, i.e. the fundamental, social contradiction between capital and nature.

ONE:

THE HISTORICAL UNSUSTAINABILITY OF CAPITALISM

THE INVENTION OF NATURE

This thesis focuses on the process of universal, environmental degradation brought about under capitalism, but this is of course not meant to imply a downplaying of the transformative (as to nature) character of *all* historical types of social organisation. As O'Connor (1998) rightly points out, "no species, including our own, can use its environment without modifying it" (p. 24), which is simply another way of saying that the physical world is a dynamic system that is continuously changing through the interaction of the various elements of which it is comprised. Humans take up a special place in this only because their environmental impact is of a different quantitative and qualitative dimension compared to that of other organisms, and because their encroachment on nature has been steadily increasing throughout history.[16] The first hunters and gatherers altered their environment in no more drastic ways than most animals because their partaking of nature was primarily defined in terms of their physical presence and concomitant food-acquisition activities. But as new and more complex societies evolved and human numbers rose, the appropriation of nature gradually became more invasive. With the emergence of agriculture, the domestication of wild plants and animals began; farmers started clearing land for cultivation and cutting wood for the construction of settlements. Later still, hunting intensified, the first mines were constructed, villages turned into cities and intensive agriculture and irrigation transformed the surrounding landscape; roads, canals and dykes were built, forests cut and land laid dry. In short, the evolution of societies was, already in pre-capitalist times, accompanied by an increasing destruction, or 'humanisation', of the natural environment.

With the rise of capitalism, though, mankind's relation to nature changed dramatically, and this is the background against which the current crisis must be viewed. Whereas before, the human impact on the environment had been mostly limited to the local or regional level, the European-compelled integration of the world induced a form of environmental transformation that has come to affect the entire planet. From the 15th century onwards, Western explorers and colonisers carried seeds, plants, animals, minerals, bacteria and people between the Eurasian and the American, Australasian and

[16] Both the quantitative (the scale of exploitation) and the qualitative (the form and motivation of a particular human interaction with nature) can be said to be entirely dependent on the historical type of social organisation that is examined, and thereby, again, illustrates the interconnectedness of ecology and social science, as well as the impossibility of disconnecting human history from natural history (O'Connor, 1998, pp. 48-70).

African continents, often with disastrous effects for indigenous ecosystems and peoples.[17] In this way, the geographical unification of the world made possible a quantitative increase in the destruction of nature. This again was directly related to the economisation of nature, or the fact that "nature's elements, along with the social conditions of human existence, [were] increasingly brought within the sphere of the economy and subjected to the same measure, that of profitability" (Foster, 1994, p. 35). This development was important particularly in the case of land itself, whose commodification constituted a key factor in the subsequent evolution of capitalism and the system's relationship to its natural conditions.

In pre-capitalist times, land had been an instrument of political and military power, and its use and ownership had been determined by legal and customary rules rather than by a market mechanism based on profit. The economic exploitation of land was therefore entirely subordinated to social motivations, to the needs of the feudal lord, the family or the wider community. Even though land played an essential role in the acquisition of social status and political power, no significant exchange of it took place outside of these traditional social institutions (Polanyi, 2001, pp. 72-73). The gradual marketisation and privatisation of land represented such a significant departure from these century-old practices that it ultimately came to connote the end of feudalism. The social upheavals accompanying this 'great transformation' took the form of what Marx (1977) has called the "expropriation of the agricultural population from the land" (p. 877), whereby he refers to how, by way of seizing communal grounds, dividing them and where necessary evicting the original inhabitants, a large group of landless workers was created. These workers subsequently came to be dependent on capitalist farmers for their income, and later, at the end of the 18th century (in England), flocked to the industrial centres in a historical movement away from the countryside towards the cities. Marx saw this development, the commodification of agricultural land, as a typical example of 'primitive accumulation', meaning the process by which something is first made into capital, and from which all subsequent capital accumulation originates.[18] Primitive accumulation, he decided, constitutes the origins of capitalism, and is a crucial factor in the human alienation from nature.

[17] The introduction of European diseases in the ‚New World' is but one of the more wellknown examples of the (unintential) devestation that this early form of globalisation brought upon the native inhabitants of what were up to then strictly isolated worlds (Diamond, 2005).

[18] Marx viewed primitive accumulation primarily in terms of the exploitation of people, but he recognised that its scope was much broader than the agricultural issue: "The discovery of gold and silver in America, the extirpation, enslavement and entombment in mines of the indigenous population of that continent, the beginnings of the conquest and plunder of India, and the conversion of Africa into a preserve for the commercial hunting of blackskins, are all things which characterize the dawn of the era of capitalist production. These idyllic proceedings are the chief moments of primitive accumulation" (Marx, 1977, p. 915). David Harvey (1982) has termed this 'accumulation by dispossession' and has stressed the fact that it is, in fact, a continuous process, still visible everywhere in the world.

The commodification of land and the subsequent creation of a working class dependent on wage labour is directly relevant to our understanding of environmental degradation, since it essentially helped to bring about what Marx termed the 'metabolic rift', that is, the physical and intellectual separation of humans from their natural environment. Though this estrangement, like environmental degradation itself, should be viewed as a gradual, historical process that far predates the existence of capitalism, the rise to dominance of the latter has given a completely new dimension to it:

"Prior to capitalism, productive labor was expended by producers not socially as fully separated from the conditions of production. Production was mostly for use; and even when some products became commodities, a general regulation of production by socially necessary labor time (in the form of exchange value) did not take place. Social-labor allocation occurred through relations of direct personal interdependence and/or hierarchical dependence mutually constituted with the producers' social (including spiritual) ties to natural and other conditions of production" (Burkett, 1996, p. 341).

In other words, farmers in pre-capitalist systems were more or less directly dependent for their survival on the produce of the land they cultivated themselves.[19] This entailed an immediate connection between humans and the earth, and therefore directly limited the impact that they had, and could have on their environment.[20] Needless to say, these pre-capitalist workers still transformed the environment, but they only did so in direct relation to their immediate needs, because production itself was based on the motivation of personal and/or social use. More-over, since these systems were self-sufficient, people were highly dependent on seasonal fluctuations and very vulnerable to natural disasters, which in turn kept population numbers down.

With the decline of subsistence farming, the commodification of land, the rise of capitalist farming and the concomitant abstraction from nature, this self-constraining, socio-cultural relationship with the natural basis of society was largely lost. Capitalist farming, where the objective of producing food is subordinated to the goal of making profit, resulted in a drive to increase crop yields and heighten productivity levels. At the same time, large groups of dispossessed farmers were created, and transformed from a class immediately dependent on land to one dependent on wages (or 'exchange value'), which made workers complicit in the capitalist production process by them having to buy food on the market rather than being able to grow it themselves. Though wage labour does not make one independent of nature, it does abstract from it significantly and therefore

[19] This was the case for farmers, but, through a hierarchical form of social organisation and resource distribution, this relationship extended to the rest of society.

[20] Environmental degradation, of course, still took place, sometimes on such a scale as to bring about the downfall of whole civilisations, as indeed was at least partly the case for the Mayans, the Easter Islanders, the Romans, Sumerians, etc. (Diamond, 2006). Imperfect knowledge of soil fertility and erosion processes, amongst many other factors, all contributed to this. These earlier forms of environmental destruction, however, should be understood differently than the processes observed under capitalism, as they are the outcome of different, historical forms of social organisation. Indeed it could be argued that the ecological problems encountered by these civilisations derived exactly from the fact that they were immediately dependent on agriculture productivity; any local harvest failures therefore frequently meant food insecurity and famine.

removes the socio-ecological constraints inherent to subsistence farming. In this way, primitive accumulation "created the potential for ecologically destructive production methods" (O'Connor, 1998, p. 23). Moreover, the change to a society motivated by production-for-profit is important because it implies the institutionalisation of an interaction with nature whereby, in order to generate profit, considerably more value is produced than socially needed. Under capitalism, a labourer works for the production of use *and* for the production of profit, whereas production under pre-capitalist labour was for use only. Considering that labour is essentially the interaction between man and nature,[21] more labour translates into more interaction with nature, thus significantly expanding the demands placed on the environment.[22]

The ecological significance of human alienation can perhaps best be demonstrated by an example that Marx himself was concerned with, and that caused him to develop the notion of the 'metabolic rift'. Before capitalist farming became common practice, Marx (1977) noted, the fertilisation of agricultural land had traditionally happened through the application of human and animal manure as well as other household waste. Together with low-intensive farming and the practice of crop circulation, this had long ensured relatively stable productivity levels. But because of the physical separation of people from their land, as witnessed in the flight of dispossessed peasants away from the countryside towards growing towns and cities, first in England and then everywhere in Europe, and because of more intensive, capitalist agriculture, the fertility of agricultural soils rapidly decreased. In this way, the urbanisation movement and the digression from traditional agricultural methods, in the absence of artificial fertilisers, produced a real problem. Marx (1977) thus concluded that "capitalist production [...] causes the urban population to achieve an ever-growing preponderance [and] disturbs the metabolic interaction between man and the earth, i.e. it prevents the return to the soil of its constituent elements consumed by man in the form of food and clothing" (p. 637). By taking people away from the countryside and concentrating them in cities, he argued, capitalism caused a decrease in soil fertility which amounted to "a robbery", meaning an exploitation of land equal to that of labour (p. 638). At the other end of the line, the metabolic disruption of society resulted in large-scale pollution in the cities, both by the new and highly defiling industries dependent on the newly-created working class, and by large amounts of human and animal excrement and garbage that piled up in streets and rivers everywhere. In Manchester in 1840, the

[21] „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. Though this movement he acts upon external nature and changes it, and in this way he simultaneously changes his own nature" (Marx, 1977, p. 283).

[22] This is what Marx calls ‚surplus labour', which, he recognises, existed before capitalism as well, but because production was motivated by need (use value) rather than by profit (exhange value), the amount of surplus labour demanded of workers was usually confined (Marx, 1977, pp. 344-345).

situation was so bad that Friedrich Engels noted of some courtyard in a working class area that "the inhabitants can only enter or leave the court by wading through puddles of stale urine and excrement" (Engels, quoted in Ponting, 1992, p. 354).

The increasing alienation of humans from the natural world is not only evidenced in the physical separation from the land, but also in the changing way that the concept of nature has been defined and thought of historically.[23] Indeed the idea of man as superior to, and distinct from all other creatures can be found throughout history, e.g. in the Judaist and Christian traditions, and is as such nothing new. With the success of the positivist, scientific method in the 17th century, though, which stressed the importance of reductionist analysis to study and understand reality, this conception of nature was complemented with essentially a "fragmented view of the world – a focus on the individual parts [...] rather than on the organic whole of the physical world, on studying the way in which the constituent elements operated separately rather than the ways in which they interacted" (Ponting, 1992, p. 147). Nature became "'the aggregate of things', [...] a mechanistic structure that could be disaggregated or taken apart and then rebuilt in various ways" (O'Connor, 1998, p. 22), or, differently still, it became perceived as not much more than the sum of those parts that were in some way useful to humans, instead of the constantly evolving, highly interdependent system that it really is, and that people, up to then, had been a more or less integral part of. This drastic change in the perception of the world amounted to nothing less than the gradual demystification and mechanisation of nature, and therefore helped to create a fictional dualism between the natural and the human world, and between the physical body and the alienated mind (Doyle, 1998, p. 776). In this context Commoner (1973) writes:

"Among primitive people, a person is seen as a dependent part of nature, a frail reed in a harsh world governed by natural laws that must be obeyed if he is to survive [...] The Bushman must squeeze water from a searched-out tuber; we get ours by the turn of a tap [...] All this leads us to believe that we have made our own environment and no longer depend on the one provided by nature. In the eager search for the benefits of modern science and technology, we have become enticed into a nearly fatal illusion: that through our machines we have at last escaped from dependence on the natural environment" (p. 15).

While this altered perception of nature is directly related to the physical alienation described above, it is equally connected, in dialectic fashion, to the more general optimism and anthropocentrism of the Enlightenment and the idea of history as progress, that is, a one-directional movement towards ever greater wealth, greater technological achievement and higher forms of civilisation through the conquering of nature. Any physical limit to the inevitable force of progress, it

[23] The discussion here is limited to the development of European ideas about nature because these are closely related to the evolution of capitalism and have, as a result of the expansion of capitalism, come to be dominant everywhere in the world.

was (and is) generally believed, would be overcome by means of the development and distribution of science and technology (Ponting, 1992, p. 149).

THE ECONOMICS OF EXPLOITATION

Capitalism clearly did not develop suddenly or intentionally. Instead, its emergence out of the European feudal structure was a long and open-ended, evolutionary process of dialectical relations in which social, political, cultural, technological, scientific, economic etc. factors all contributed, though unevenly so (Wallerstein, 2002, p. 19). Once it matured into an all-encompassing socio-economic system, the different aspects of society together worked to reinforce capitalism's inherent drive towards ever more capital creation and accumulation, and, as a result, an ever greater alienation from nature and a larger impact on the environment. This expansive movement, both qualitatively and quantitatively, was certainly not an even or a peaceful process. Indeed, society inevitably needed to protect itself against the commodification of both human labour and the natural world (Polanyi, 2001), but through coercion, adaptation and war, the system gradually managed to suck into its orbit people and nature everywhere. The exact means by which this happened, by which traditional societies around the world were absorbed by a global but western-oriented market system need no elaboration here, but the history of the slave trade, of colonialism and imperialism, of the Cold War as well as more recent neoliberalist policies would all serve as useful examples. In this way, the "singled-minded pursuit of profit, in which none can refuse to join on pain of elimination" came to function as the "motor force" (Sweezy, 2004, p. 91-92) of the core as well as the periphery of the globalised economy.

Since every type of economic activity requires energy, either in the form of human labour or for the operation and production of machinery, the profit-driven growth of capitalism's economic output necessarily translated into ever higher energy demands (Li, 2008, p. 53).[24] To meet these demands, humans have consistently been looking for new sources of energy. This in turn has led to the increased exploitation and use, especially since the industrial revolution, of oil, gas and coal, which are directly responsible for the historical and current increase in GHG emissions. To conflate the problem of global warming with the technology of oil and coal extraction *per se*, however, is to tragically miss the point that these technologies only came to be used on a large scale *in relation to capitalist production* in the first place, since under capitalism, technology itself has to be profitable in order to become widespread, that is, there has to be a market for it.[25] As Huber (2008) puts it, "it is

[24] Increasing energy-efficiency is only possible to a certain extent, because of physical limits and the inevitable loss of energy in the form of heat. In nature, for example, energy efficiency per step in the food chain is only about 10% (Li, 2008, p. 53; Ponting, 1992, p. 13) This will be elaborated on later in this thesis.

[25] As Redclift & Woodgate (1997), for example, have argued, „the role of technology [in human history] was principally that of raising output from scarce resources" (p. 57).

important to retain a perspective of dialectical complexity that emphasises the mutually constitutive relations between energy and society" (p. 106). This is true of technology and energy, but also of any of the other resources for which a market is created. 19th century industrial mining for soil nutrients, for example, could only have taken place in the context of production-for-profit. It was the immediate result of the more intensive, industrial methods of capitalist agriculture, which, we noted earlier, together with the process of urbanisation caused the rapid depletion of soil fertility, forcing farmers to rely increasingly on the application of external fertilisers to keep up productivity (Foster & Clark, 2003, p. 192). The subsequent increase in fertiliser demand led to the large-scale importation of soil nutrients, in particular guano from Latin-America and phosphates from a number of small islands in the Pacific. In the latter case, nutrient mining took place on such a scale as to render some of the islands completely uninhabitable, compelling the British government to relocate the natives to a (not so) nearby island. It was only the invention of synthetic fertilisers (itself a consequence of demand) which significantly lessened the degree of large-scale nutrient mining in the global periphery (Ponting, 1992, p. 220).

In the same momentum towards more productivity and hence more profit, human labour was, where possible, gradually replaced with more powerful, cheaper and faster machinery. The result of this global (and uneven) industrialisation process was an explosive growth in the iron and especially the coal mining industry, where the output rose from 5.2 million tons in 1750 to 123.3 million tons in 1874 in the UK alone, followed by an equally dramatic rise in the use of oil in the 20th century (Huber, 2008, p. 109).[26] Industrial development thereby worked in a cumulative way: A flourishing production in one economic sector created a demand for commodities and technology in another and thus further stimulated the demand for natural resources and energy, hence also increasing the environmental impact. The spread of car ownership is illustrative here, since the car industry is responsible for roughly 30% of the world's oil intake, as well as consuming 20% of all steel produced, 10 percent of aluminium, 50% of lead and 60% of rubber (Ponting, 1992, p. 330). Car-usage therefore has an effect far beyond the actual emission of greenhouse gases, because the industry directly stimulates the growth of the mining sector, of rubber plantations, of synthetic production, etc. In short, it is clear that all these developments, technological improvements and concomitant environmental destruction are linked to each other, and that they are in turn a function of growing economic activity. None of these circumstances can be described or understood outside of the framework of the capitalist mode of production. They are a direct consequence of the commodification of land and labour and of the human alienation from nature, as well as a direct cause of continued economic growth and of still further estrangement from the natural basis of

[26] The authors of LTG note that the world economy's annual energy consumption increased by about 3.5% per year between 1950 and 2000, and that the production of fossil fuels in 2000 reached 28 billion barrels of oil, 88 trillion cubic feet of gas and 5 billion tons of coal per year (Meadows et al., 2004, p. 89-90).

society. The current environmental crisis should be described accordingly, that is, as the result of the system's demand for ever more energy and resources, rather than, as is frequently the case, as a direct consequence of the usage of a certain type of resource or technology.

Similarly, history has shown that in a market society, the exploitation of a given resource will in the absence of regulation continue as long as this practice is profitable, even when it should be obvious to capitalist producers that this will in the end lead to depletion and/or large-scale environmental degradation, thereby eventually undermining profits. In the case of climate change, this is illustrated by the continued and ever more rapid increase in GHG emissions (NOAA, 2009, par. "Trends in Atmospheric Carbon Dioxide – Global"), and by the fact that, despite all scientific evidence on the possibly catastrophic effects of global warming, the World Bank, for example, continues to subsidise and support fossil fuel extraction on a scale 17 times larger than it supports clean energy initiatives (Shamsuddoha & Chowdhury, 2008, p. 400). The same trend can, *mutatis mutandis,* be discerned in the management of all resources. Ponting (1992) gives an interesting description of this in relation to industrial whaling. Before the use of petroleum became widely spread, he writes, whale oil was commonly used for the maintenance of machinery and the production of candles and oil lamps. By the middle of the 18th century, rising demand for oil had caused dramatic growth in the whaling industry, employing more than 10.000 men in Europe alone. The hunting soon took place on such a scale as to deplete stocks faster than they could naturally regenerate, forcing whalers to start hunting smaller (and less profitable) animals, and to relocate their business to more remote waters where whales were still abundant. Although it would have been clear to all that this highly intensive form of exploitation was unsustainable in the long run, the industry continued to grow until whales everywhere had become so scarce as to make commercial whaling unprofitable, particularly given the emergence of petroleum derivatives as a much cheaper alternative. The immediate result was the near-extinction of most larger species as well as the complete collapse of the whaling industry even before the International Whaling Commission (IWC) decided on a moratorium on commercial hunting in 1982 (pp. 187-191). "The history of whaling", Ponting (1992) continues, "demonstrates the inability of those involved to conserve the whales. Instead all the economic pressure worked to maximise short-term gains with little or no concern for the future [...] The same sorry sage happened in sealing, the fur industry and also in many of the world's fisheries" (pp. 191-192).

CAPITALIST LINES AND ECOLOGICAL CIRCLES

In order to understand the trend of environmental degradation, it is necessary not only to comprehend how capitalist production is organised, but also how natural processes function and how they are affected by the interactions with humans as organised through capital. These interactions are characterised first and foremost by the incessant attempts of society to overcome

existing natural boundaries, to achieve 'growth' and 'progress', and to develop new technologies and products that allow mankind to shape, control and use nature as it desires. Since this ongoing conquest of nature is fundamentally a social process, its main instrument is the historically-specific form of social organisation which has with capitalism taken its most extreme form yet. Instead of overcoming nature, however, a capitalist society masks the dependence on nature while its economic rationale fundamentally contradicts the way that natural processes are organised and regulated. To demonstrate this, we here make use of Commoner's concept of the 'laws of ecology' (p. 33), a number of considerations regarding nature which, because of Commoner's systems approach to nature, make possible a comparison with the logic of capitalism. Though his four laws to some degree necessarily generalise about the processes he describes, they in many ways represent an explicit reiteration of what should arguably be a common-sense perspective on the natural environment.

Commoner's first law holds that *everything in nature is connected to everything else*. A bird, for example, is dependent on the fruits and seeds of trees for its survival, while trees are contingent on birds for the dissemination of their seeds and thus for their reproduction. Birds are eaten by carnivores, which in turn are eaten by other carnivores. When birds and carnivores die, their cadavers decompose and, with the help of fungi and bacteria, eventually turn into soil nutrients that are necessary for trees and other plants to grow. In this way, everything in nature is always part of a larger interdependent system. These natural cycles are also present in purely chemical processes: CO_2 is emitted by plants during the photosynthesis process, but it is at the same time also absorbed by it and constitutes, in the form of carbon, a major building block of life on earth. The CO_2 gas present in the atmosphere causes the greenhouse effect, which is an important force in regulating the temperature on earth, and thereby creates the right conditions in which trees and plants can grow (Commoner, 1973, p. 30). Under capitalism, now, these cycles are disturbed and nature, as argued above, is approached from a mechanistic perspective; it is reduced to nothing more than the sum of those parts that are in some way useful to humans. The adverse effects of a certain transformation on the wider ecosystem are rarely considered by those instigating the change. An example used by Ponting (1992) is that of flood control along the Nile. For most of human history, he writes, the Nile valley has benefitted from a natural process of fertilisation through annual floods, which carry silt from the highlands of Ethiopia and Uganda down to the lowland plains of Egypt. This allowed extensive agriculture to develop, which in turn sustained the ancient Egyptian civilisations. In the 20th century, now, a number of dams were constructed along the river in order to control flood levels, which has made it impossible for the silt to be carried down into the valley. Consequently, agriculture along the Nile is now almost entirely dependent on expensive, artificial fertilisation to keep the soil fertile. In constructing the dam, therefore, the river was reduced to just one of its

functions, which was sought to be controlled and regulated. The role of the Nile in the broader ecosystem, meanwhile, was neglected (pp. 86-87).

In the case of climate change, the failure of society to grasp that everything in nature is interconnected is best described in relation to Commoner's second ecological law, which holds that *everything must go somewhere*. In nature, he argues, there is "no such thing as waste [...] What is excreted by one organism as waste is taken up by another as food" (1973, p. 39). Everything is degraded, recycled and re-used. This supposition is similar to the one underlying the conclusions of the 'Limits to Growth'- thesis, namely that the earth is a closed and finite system in which any form of alteration necessarily effects the whole system (Meadows et al., 2004). This seems ridiculously obvious, yet capitalist production has proven largely ignorant of these endless environmental cycles, and of the finiteness of the planet in general. In its drive for profit maximisation, capital reduces nature to a source of raw materials and a sink for the disposal of consumer garbage, without taking into account that this waste will eventually show up somewhere else in the system. Resources are extracted, transformed, consumed and then discarded, and that, in many cases, is where the economic process ends. Because most of the materials produced by humans are not originally present in that form in nature (plastics, chemicals, etc.), a lot of the eventual waste cannot be recycled by natural processes, and therefore stays in affected ecosystems for very long periods, meanwhile poisoning air, water, soil and living organisms alike (Ibid., p. 91). For this reason, Foster (1994) notes, while nature is an unending circular system, capitalist production should be considered "a linear one, running from sources to sink – sinks that are now overflowing" (p. 122). In the economic system, he continues, "it doesn't matter where something goes unless it re-enters the circuit of capital" (p. 121). This trend indeed is exemplified by climate change, where fossil fuels are the raw material and the emission of CO_2 gas is the waste. To the individual capitalist, coal and oil serve to make a profit; they are being used because, historically, their consumption provided more and cheaper energy than human labour. The emission of CO_2, meanwhile, is of no concern to the individual capitalist whatsoever. The outcome is the rapid filling of the sink that is the planet's atmosphere. In nature, however, fossil fuels are the result of millions of years of organic fossilisation. In the early evolution of the planet, Commoner (1973) writes, CO_2 levels in the atmosphere were so high that the "average temperature of the earth approached the tropical" (p. 30). With the development of extensive vegetation, CO_2 was gradually taken up and stored in plants, part of which eventually became fossilised in the form of oil and coal. Because vast quantities of CO_2 were taken out of the atmosphere, the earth cooled down to the level at which the whole of human history has taken place. This immeasurably (to humans) long process is now, in a matter of decades, being reversed by the extraction and consumption of fossil fuels, and by large-scale deforestation, or rather, by production-for-profit as a linear system unable to put a real value on nature.

This again is related to the third ecological law, which states that *nature always knows best.* According to Commoner (1973), *"*any major man-made change in a natural system is likely to be *detrimental* to that system" (p. 41, emphasis in original). A bit more accurate, perhaps, would be to describe *nature knows best* as the fact that any *deliberate* change has a detrimental effect on the environment, that is, any *conscious* attempt by society at engineering the environment to fit human needs.[27] What Commoner is essentially referring to here is nothing less than evolution, the perpetual process of natural change which derives its momentum from the constant creation of variations of life itself. The relative success of each of these varieties is dependent on environmental factors (the presence or absence of other organisms as well as climatic and geographical factors); any animal with a genetic variation that gives it a certain advantage in a particular environment will have more chances of survival, hence is more likely to pass on the genetic variation to its offspring, whereby new variations are created, etc. In this way, species slowly adapt to a continuously changing environment (Darwin, 2006)**.** This extremely crude summary of evolution theory is, for our purpose, sufficient to illustrate that this process is tremendously slow (again measured in human time), and that it necessarily results in a sort of natural equilibrium, exactly because species evolve *together*, because everything in nature is interconnected and organisms continuously adapt to each other (Commoner, 1973, p. 35). All the intersecting ecological cycles of nature are the result of this eternal process, and themselves enforce the 'regulation' of the natural balance because, when one factor in the circle swings out of control, all the other organisms dependent on it will be affected, thereby creating a new balance. 'Nature knows best', therefore, is another way of saying that in the natural order of things, everything is adapted to everything else through the mutually dependent process of evolution.

Humans, though obviously entirely part of nature, interfere in this by way of the transformative activities of society. They make deliberate adjustments to the ecological order with the purpose of making nature more usable for themselves. In this way, the existing 'balance of nature' is adversely disturbed in favour of mankind, forcing other organisms to adjust to sudden and drastic changes in their environment. Given the incomparably fast pace of social change compared to the speed of change in nature, this is a highly problematic given. All the more so with climate change, since temperature and water runoff patterns are two of the most fundamental factors determining the functioning of any ecosystem. Since global warming is likely to take place over just a few centuries, a lot of species will be unable to adapt, meaning that those most sensitive to temperature rises will

[27] As described earlier, this is something characteristic of all human societies. Yet with the change to a system based on production for profit rather than for use, the quantity and quality of humankind's engineering of the environment transformed dramatically.

likely go extinct.[28] The capitalist transformation of the environment could therefore be described as an intervention in the ecological system's self-balancing processes. Humans introduce new materials into nature's ecological cycles which have not evolved together with other organisms hence cannot be controlled through nature's self-limiting force of mutual dependence. As a consequence, they stay in the environment as polluters, are not degraded and recycled (or only very slowly) and do not contribute to the creation of new life.

Commoner's fourth law, finally, holds that *there is no such thing as a free lunch*, a concept he borrowed from economics to indicate that "every gain is won at some cost" (1973, p. 46). It is to mean that the world is essentially a closed system, in which the total amount of matter is always the same. Since it is impossible to create material wealth without natural resources (Daly, 1999, p. 77), any kind of products or materials socially manufactured somewhere will necessarily go at the cost of something else. All of the energy and resources used during production will inevitably have to be 'subtracted' somewhere else in nature. So even though the human transformation of the environment may create benefits for mankind, it does so only at a certain cost. Everything that goes into the planetary sink, meanwhile, is effectively taken out of natural circulation (though it continues to circulate as pollution) and thus made environmentally useless. Because, however, humanity is in everything still dependent on, and part of nature, it is only possible to pollute and degrade it to some extent without taking away human sustenance itself. In this respect, society is much like the lynxes Commoner (1973, p. 35) talks of when describing the inclination of nature to achieve an equilibrium. When the lynxes prosper, he notes, their increased numbers raise the pressure on the population of rabbits because of more extensive hunting. As a consequence, the rabbits become so scarce that many lynxes after a while find it difficult to find food, hence starve to death. This then again favours the growth of the rabbit population. In the same way, society is currently feasting on the earth, depleting all the resources it is dependent on for its survival, meanwhile cherishing the illusion that it will be able to do so eternally. Economic growth, as the main indicator of this practice, should always be seen as having a certain ecological cost. As Kovel (2007) nicely points out, growth is essentially a "euphemism [...] for capital accumulation" (p. 4), and thus the driving force behind the capitalist transformation of nature. To say that it has limits is merely to reiterate the belief that nature cannot be transformed endlessly without damaging that part of nature which we are intending to preserve, that is, mankind.

"We have broken out of the circle of life, converting its endless cycles into man-made, linear events," Commoner (1973, p. 12) writes in his introduction. The means by which this was achieved in the past few centuries took the form of the gradual commodification of nature, which alienated

[28] This is why the IPCC (2007a) has warned that with a temperature rise of over 1.5-2.5°C, up to 30% of all species might go extinct, while with a temperature rise of 5°C, at least 40% of species might proof unable to adapt (pp. 48, 51).

mankind from its natural surroundings and gave rise to capitalism as we know it today, a system of inherent, exploitative production unable to extend its logic of financial remuneration to the life-sustaining processes of nature, or, as Sweezy (2004) has eloquently put it, "a juggernaut driven by the concentrated energy of individuals and small groups single-mindedly pursuing their own interests, checked only by their mutual competition, and controlled in the short run by the impersonal forces of the market and in the longer run, when the market fails, by devastating crises" (p. 91).

THE SOCIALISATION OF COSTS

At the heart of this incapability of capitalism to preserve natural resources is what Garrett Hardin has termed 'the tragedy of the commons', or the inevitable depletion of common goods in a system that places the maximisation of personal gain above everything else. In a metaphor depicting a number of herdsmen all using the same pasture, Hardin (1968) writes:

"As a [capitalist] being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, "What is the utility *to me* of adding one more animal to my herd?" This utility has one negative and one positive component. (1) The positive component is a function of the increment of one animal. Since the herdsman receives all the proceeds from the sale of the additional animal, the positive utility is nearly +1. (2) The negative component is a function of the additional overgrazing created by one more animal. Since, however, the effects of overgrazing are shared by all the herdsmen, the negative utility for any particular decision-making herdsman is only a fraction of −1. Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another; and another. . . . But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. *Each man is locked into a system that compels him to increase his herd without limit--in a world that is limited*" (p. 1245, emphasis added).

The history of environmental degradation under capitalism, and of climate change in particular, should be appreciated in a similar manner. While only capital benefits from profits, the potentially adverse effects of environmental transformation are socialised (or 'externalised')[29], which means that for capital, there are almost no immediate, financial risks involved in the degradation of nature. Pollution or unsustainable resource extraction do not in any significant way weigh on the gains that are to be made, hence, in the absence of social motivations, there are no personal restrictions on the usage of the commons. The problem eventually arises, in Hardin's analogy, from the fact that the herdsmen pursue production-for-profit, i.e. they have been socially abstracted from the land, and from the fact that the pasture is a limited resource while all herdsmen pursue unlimited growth. This last aspect, in a way, corresponds to the argument made by the authors of 'Limits to Growth' when

[29] Economists frequently refer to 'externalities', meaning both costs and benefits, to indicate the (unintended) effects of economic activity for which people do not pay, or are not compensated for. Environmental costs are one of the most notable and important form of externality (Brook, 2001).

they claim that unlimited economic growth in a finite space is inherently unsustainable (Meadows et al., 1972). The difference resides in Hardin's example relating this condition to the capitalist motive of gain maximisation (rather than needs satisfaction), which indeed is essential to his metaphor, while in LTG, this is only dealt with on the side and the problem of growth is otherwise outlined in a social and political vacuum.[30]

To fully appreciate Hardin's example in the context of capitalism's historical tendency to bring about environmental degradation, it is useful to employ O'Connor's theory of the 'second contradiction'. It essentially holds that the relationship between the economic system and its conditions of production (here in the sense of nature)[31] is contradictory because capitalism tends towards the destruction of these conditions, thereby undermining its own sustenance basis. In the words of O'Connor (1998), the system "impair[s] its own social and environmental conditions, hence increasing the costs and expenses of capital, and thereby threaten[s] capital's ability to produce profits, that is, by threatening to bring on economic crisis" (p. 159). Considering global warming, for example, significant climate alterations, the IPCC (2007a) report shows, will very likely produce floods, droughts and the destruction of infrastructure, which will inevitably result in profit losses for capitalists. In Hardin's analogy, the 'rational' herdsman unintentionally contributes to a situation in which his pasture becomes overgrazed and incapable of supporting his cattle, and this in turn has a negative effect on his profits. O'Connor (1998) argues that the reasons for this happening lie in capital's "lack of ownership of laborpower, external nature and space" (p. 165). Real ownership, he continues, is for these factors impossible to achieve because labour, nature and space, in accordance with Polanyi's terminology, are fictitious commodities. Though they are sold and bought as if they were produced and reproduced by capital, they are clearly not produced by it and can therefore not really be owned (pp. 164-165).

Indeed, the reproduction of these fictitious commodities is dependent on the common services of nature, such as the water cycle and soil-producing biochemical processes, all of which cannot be regulated capitalistically. These natural services instead enter the production process as a "free gift of Nature to capital, that is, as a free gift of Nature's productive power to labour, which, however,

[30] It is necessary to point out that the interpretation given here was not the way Hardin intented the ‚tragedy of the commons' concept to be used. He developed the model of the tragedy of the commons in order to illustrate that unlimited *population growth* inevitably leads to a stress on the commons, and to overexploitation (see also Burger & Gochfeld, 1998) . Hardin does not himself make the link between maximisation of profit and the depletion of resources under capitalism, although he does stress the case of pollution in understanding the way in which the commons could be abused. In this sense, Hardin himself did not go any further than the authors of the LTG in outlining the mechanism behind growth, but because he explicitly presupposes the motive of profit maximisation, it is possible to interpret his metaphor in the way proposed here (p. 1246).

[31] Marx (1977) defines this as „all those things which labour merely separates from immediate connection with their environment [and which] are objects spontaneously provided by nature, such as fish caught and separated from their natural element, namely water, timber felled in virgin forests, ores extracted from their vains" (p. 284)

appears as the productiveness of capital, as all other productivity under the capitalist mode of production" (Marx, quoted in Burkett, 1998, p. 92). "Only through such free appropriation", Burkett continues, is capital "able to augment the elements of its accumulation beyond the limits apparently fixed by its own magnitude" (Burkett, 1998, p. 98).[32] In other words, the services of nature are necessarily used by capital to generate profits, but the social costs of this are not calculated into the production process. Nature in this way "helps to create use-value without contributing to the formation of exchange value" (Marx, quoted in Burkett, 1998, p. 91).[33] Exactly for this reason, i.e. that the value of nature is not represented in the final price of the commodity, capitalism tends to degrade its own conditions of production.

It is useful once more to return to Hardin to exemplify this. In the metaphor depicting the capitalist herdsmen, every individual uses the pasture in order to feed his own cattle and then sells his animals on the market at a certain price. He thereby makes a profit that is equal to the selling price minus the costs for breeding the cattle. These costs could be anything that is produced or bought by the herdsman, but the service that nature provided when producing the grass, the air etc. will not be included as a cost, simply because it wasn't produced by human labour hence the herdsman didn't have to pay for it.[34] His profit, therefore, is larger than if he would indeed have had to compensate the production of nature. But because he doesn't, his private gains, when considering an increase in the number of cattle on the field, will always outweigh his potential losses. The herdsman therefore essentially *undervalues* his product by not taking into account all the factors of production (Marx, quoted in Burkett, 1998, p. 98). Instead, these costs are socialised; they are offloaded on the community as a whole, which eventually causes the pasture to be overgrazed, and all herdsmen suffer the consequences. In the real world, this translates into climate change, deforestation, soil erosion, water and air pollution, mass extinction of species, etc. The solution to the dilemma appears obvious; it would seem sufficient to 'internalise' the costs of the appropriation of nature, and have the use value of nature be represented in the price of the final product. This, indeed, is what is frequently proposed as a solution to the environmental crisis. As will be discussed later, however, the assumption that it is even *possible* to put a financial value on nature is itself extremely problematic.

[32] Burkett is here paraphrasing Marx.

[33] This is what Wallerstein (1999) has called the „tendency of capitalists not the pay their bills" (p. 4).

[34] Marx gives a similar example when describing a manufacturer who uses a waterfall to produce energy, and who thereby has a certain advantage over those manufacturers that use coal to produce steam. The manufacturer with the waterfall, Marx writes, owes his surplus profit partly „to a natural force, the motive force of water-power which is provided by nature itself and is not itself the product of labour, unlike the coal that transforms water into steam, which has value and must be paid an equivalent, i.e. costs something. It is a natural agent of production, and no labour goes into creating it". (Marx, 1991, p. 782)

A SYSTEM OF CRISES

It is useful to conclude this first part with a theoretical elaboration on the idea of capitalism as a system *necessarily* resulting in environmental, social and economic crises, given that this assumption forms the departure point for our subsequent analysis. Marx's theory of recurring capitalist crises as put forward in 'Capital' provides an opportunity to do this. One of the central concepts Marx used to explicate this theory is the so-called 'law of the tendential fall in the rate of profit'[35], which he saw as the "'law of motion' of the capitalist mode of production" (Mandel, 1981, p. 29).[36] Though it revolves largely around the economic problem of *accumulation crises*, it is actually only "one of many symptoms of capitalism's fundamental contradiction" (Burkett, 1999, p. 182), which means that the declining rate of profit cannot be separated from the human and natural devastation that these economic crises, as well as the attempts to overcome them bring about. It is, in other words, immediately relevant to our thesis because, in a market society, ecological crises predominantly manifest themselves as economic ones. "Capitalist accumulation and crisis," O'Connor (1998) explains, "cause ecological problems, which in turn (including the response of environmental and social movements to these problems) may cause economic problems. There is a mutually determining relationship - at the levels of production, market relations, social movements, and politics – between economic and ecological crisis trends and tendencies" (pp. 183-184). The socio-economic crisis-tendency of capitalism is therefore in all respects directly related to the question of environmental degradation, and here serves as an indication of the self-limiting, contradictory logic of capitalism as a system necessarily eroding its social and ecological foundations.

Summarised briefly, Marx's argument holds that the general (meaning: society-wide) rate of profit will decline over time as a consequence of the accumulation of capital itself, or put differently, as a consequence "of the progressive development of the social productivity of labour" (Marx, 1991, p. 319). He bases this assumption on a distinction between two forms of capital: variable capital (wages, used to employ 'living labour'[37]) and constant capital (capital spent on the means of

[35] The terms used in subsequent pages should be interpreted as follows; *variable capital (v)* is the capital used to buy living labour; *constant capital (c)* is the capital used to procure the means of production, i.e. infrastructure, machinery, tool, raw materials, etc.; *total capital (C)* is the sum of variable and constant capital; the *rate of surplus value* represents the percentage of labour not used for the reproduction of wages, that is, every employee works a number of hours in which he reproduces the amount of capital necessary for his wage, and a number of hours for the creation of surplus value, e.g. if he works 10 hours per day, and it takes 5 hours to reproduce his wage (say 100 euros = (v)), then the *surplus value (s)* created in the remaining 5 hours is 100 euros as well, and the rate of surplus value is 100 percent, or (s/v); the *rate of profit* is that percentage of produced value that is profit, meaning (s/C) (Marx, 1991, p. 317).

[36] We here depart from the concept of Marx himself, even though its is recognised that it has been questioned time and again, and is in fact a contestated, though not a disproven one. For our thesis, however, we assume the validity of Marx's law on the falling profit rate.

[37] 'Living labour' is seen by Marx as the labour of the working force, while ‚dead' or ‚objectified labour' is the result of a former stage in the production process. Any machine, therefore, is ‚objectified labour', since it re-enters the production process but is itself the product of human labour.

production) (Mandel, 1981, p. 13). In his search for profit, now, the capitalist seeks (or rather, is forced by competition) to heighten the productivity of his labour force by employing more machines, tools, raw materials, etc. so that the same amount of workers can produce more commodities faster. Consequently the share of constant capital employed in the production process, *ceteris paribus*, gradually rises and the percentage of variable capital declines (Marx, 1991, pp. 317-318). Accordingly, "each individual product, taken by itself, contains a smaller sum of labour" (Ibid., p. 318), while the amount of constant capital expands both absolutely and as a relative share in the total composition of the capital consumed during production. Herein already lies an important consequence for the ecological impact of capitalist production, since the accumulation of ever more *constant capital*, which is in some way extracted from nature, inevitably increases the stress placed on the environment. For Marx (1977), however, the relative rise in constant capital first and foremost implies the decline of the rate of profit. The reason is that *only variable capital* contributes to the generation of profit, since profit is a function of surplus value, which can only be produced by surplus labour, i.e. exploitation, or the labour produced on top of what is necessary for the reproduction of wages (pp. 307-319). In a sense, this is merely a theoretical restatement of the fact that the economy is based on the productive and consumptive activity of humans. The lower the relative share of variable capital in the production process, therefore, the lower the share of profit in the value of the individual commodity (Marx, 1991, p. 318).[38]

However, the same competition-driven, profit-inspired movement towards higher productivity hence lower rates of variable capital also results in an ever greater *mass of profit*, meaning the total amount of profit generated during the production process. This is one of the basic Marxist laws of capitalist production, and derives, in short, from the fact that with higher productivity comes the creation of more products in a shorter timeframe, that is, the production of more surplus value and therefore more capital (hence accumulation). The result is a decrease in commodity prices as well as the productive consumption of ever more capital and the creation of greater amounts of products (Marx, 1967, p. 773). Taken together, now, this means that capitalism, through the increase of labour productivity, brings about the production of larger masses of commodities, therefore larger absolute profits, yet that the rate of profit per commodity will fall as the means of production take up an ever larger share in the total value of the product. To remain profitable, therefore, companies need to ensure that the increase in the *mass of profit* sufficiently compensates for the continuous decline in the *rate of profit*.[39] Additionally, a number of 'counteracting factors' can be introduced in order to

[38] Because productivity and the share of variable capital in the labour process decreases, Marx notes, a surplus working population is created which can only be employed by raising the amount of constant capital accordingly. To be able to employ a greater labour force at ever larger productivity levels, therefore, will require ever greater amounts of capital (1991, p. 330).

[39] In the words of Marx (1991): "In order to apply an absolutely greater variable capital at a higher composition, or with a relatively steeper increase in the constant capital, the total capital must grow not only in

raise the rate of profit, such as the intensification of the exploitation of labour, i.e. the growth of surplus value by lengthening labour time and keeping wages down (Marx, 1991, p. 339). In contemporary capitalism, this strategy is most evidently used in the outsourcing of production to the periphery of the world economy, where wages are just a fraction of those in the core, and the rate of surplus value therefore much higher. Other, less deliberate factors also contribute to raising the rate of profit. The expansion of production itself, for one, tends to lower the average costs of raw materials (so-called increasing returns to scale), which means that the share of constant capital will fall and that production will become cheaper (O'Connor, 1998, p. 181). This in turn again increases the demand for raw materials, and thereby, of course, also the exploitation of nature.

Since both the *increase in the mass of profit* and the *decline in the rate of profit* derive from the features of capitalism as a system of competitive production, Marx's 'law of motion' can be interpreted as an explanation of the inherent tendency of capitalism to expand continuously *at ever greater speed,* that is, every company, in order to remain competitive, needs to enlarge its production faster than the relative fall in the variable component of capital (Marx, 1991, p. 330). Any company that fails to do so becomes uncompetitive and is thus forced to reduce costs and/or increase productivity and/or cut labour expenses. When this happens throughout the economy (the reasons for which can be many), unemployment levels rise, purchasing power and consumer demand fall, companies overproduce, etc. In short, if overall economic output ceases to grow fast enough to compensate for the fall in the rate of profit, the system generates an economic crisis.[40] The economy as a whole, therefore, continuously has to grow in size as well; it has to put out ever more commodities and create ever more capital. Herein, then, lies the crisis-induced need for continued economic growth.

To make this constant expansion feasible, existing markets need to be enlarged and new ones created, and, we maintain, 'primitive accumulation' needs to continue, whereby 'primitive accumulation' is interpreted not in the "pre-history of capital" (Marx, 1977, pp. 875) form that Marx himself envisaged, but rather as "accumulation by dispossession" (Harvey, 2004, p. 548), or the ongoing process by which different spheres of society and nature that were formerly regulated by social conventions (particularly in the periphery of the world economy) are commodified and subordinated to the laws of the market. The relevance to self-expanding production and economic crisis-management is evident, since accumulation by dispossession creates new capital by inventing

---

the same proportion as this higher composition, but still faster than it" (p. 330). With the term composition, Marx here refers to his concept of the ‚organic composition of capital', which is to indicate the rising trend in the share of constant capital relative to that of variable capital.

[40] This, of course, is not considering the various counteracting factors that can also raise the rate of profit; however, the fact that, according to Marx, the declining rate of profit and the increasing mass of profit are both inherent to capitalist production allows us to conclude that this law always goes, while so-called counter-acting factors merely work to slow the decline in the rate of profit.

new commodities (e.g. intellectual properties, genetic materials), by creating a new (cheap) labour force to exploit (e.g. by making subsistence farmers into wage labourers), and by finding new ways to capitalise nature (e.g. the deforestation of the Amazon forest). Applied to environmental exploitation, it seems clear that an expanding economy fundamentally based on consumptive production demands that ever greater quantities of materials, meaning extractions from nature, circulate in the economy. We can therefore conclude that the increased exploitation of nature is, for capital, in many ways a (temporary) way out of the permanently looming economic crisis, i.e. by lowering production costs, by raising the rate of profit and by the continued process of accumulation by dispossession. The consequences for the environment are evident in ever newer, more elaborate and more disastrous forms of degradation.

TWO:

TRANSFORMING THE SYSTEM: ENVIRONMENTALISM

CONTEMPORARY RELEVANCE OF GRAMSCI AND POLANYI

While a classical Marxist analysis allows for a description of the fundamental, historical contradiction between nature and capitalism, it cannot fully explain the attempts of the system in overcoming the social crises resulting from this contradiction, nor indeed the observed resilience of capitalism in maintaining its "legitimacy as a viable and sustainable socio-economic system" (Xing & Hersch, 2006, p. 49) despite these crises. What is missing from the structural analysis of Marx, in other words, is an approach that considers more directly the dialectics of historical change within the capitalist system, and in so doing conceptualises market society as a complex and dynamic rather than a static structure. In this part, these issues are explored on the basis of Polanyi's notion of the 'double movement' and the Gramscian concepts of 'passive revolution' and hegemony. Since both scholars were heavily influenced by their reading of Marx, their contributions should be interpreted as an addition to classical Marxism rather than an alternative to it. Polanyi as well as Gramsci essentially elaborated on the capitalist crisis-tendency that Marx identified, and thereby developed a concept of capitalism in which 'civil society' came to fulfil a crucial role. In both their theories, the result is a theoretical model that stresses the mutual dependency between the spheres of the state, the market, and society itself. In both cases, the historical resilience of capitalism depends on the functioning of the countless interactions between these three spheres, which ultimately come together, as Polanyi (2001) put it, in "One Big Market" (p. 75).

The level on which these interactions happen is important here. As Wallerstein (2002) notes, capitalism has since its conception *always* been a world-system, even though it has become increasingly more integrated and all-present in the 20th century (p. 19). At the same time, there is no such thing as a global state or a global civil society, but at most only the weak foundations thereof (Germain & Kenny, 1998). This means that the impact of global capitalism manifests itself on the level of the nation-state, but that one nation-state by itself has but little influence over the global economic system. Birchfield (1999) points out that Polanyi and Gramsci recognised the problem of this power discrepancy between the national and the international:

"Both Polanyi and Gramsci, despite their narrow concerns for specific national situations, [...] embrac[ed] a holistic view of the expansionary logic of capitalism in order to clarify the root source of domination. Whereas Polanyi demonstrated the repercussions of such domination in the economic lives of people, Gramsci was concerned to show the political domination that necessarily precipitated

it, and neither author ignored the extent to which international-national connections could be manoeuvred by powerful private forces to undermine popular sovereignty" (p. 47).

Polanyi (2001) directly refers to this in 'The Great Transformation'. "Sovereignty," he notes of the 19th century liberal state, "was a purely political term, for under unregulated foreign trade and the gold standard governments possessed no powers *in respect to international economics*" (p. 261, emphasis added). His preoccupation with the global expansion of capitalism is furthermore explicit when he describes the concept of the 'double movement'. "While the organization of world commodity markets, world capital markets, and world currency markets under the aegis of the gold standard gave an unparalleled momentum to the mechanism of markets," he writes, "a deep-seated movement sprang into being to resist the pernicious effects of a market-controlled economy" (pp. 79-80). We thus have to disagree with Birchfield (1999) when she says that Polanyi's analysis "perhaps foreshadowed a necessary double movement that transcended national boundaries" (p. 46), because despite Polanyi's predominant focus on the history of England,[41] his analysis ultimately derives its relevance from the connection he himself makes to the *global market economy* and the system's eventual disruption in the international rise of fascism. His analysis therefore does not *foreshadow* a transnational double movement, Polanyi's double movement *is* transnational in that it represents, in all respects, a process between the expanding mechanism of a global market and the implications of this for the nation-state (society). The further globalisation and integration of capitalism in the 20th century does not fundamentally change this. The limits to Polanyi's argument when applied to the present age therefore do not lie in his exclusive focus on English society, but rather, we maintain, in his conviction that the countermovement could ultimately be successful in bringing liberalism to a halt; that "our age will be credited with having seen the end of the self-regulating market" (Polanyi 2001, p. 148). The limits lie in Polanyi perceiving the interests of society as opposed to those of the capitalist class, which, we maintain, is currently not the case anymore, if indeed it ever was entirely. Our own interpretation of the 'double movement' introduced below therefore deviates from what Polanyi intended it to be, in that it conceives of the countermovement as necessarily subordinated to the expansion of capital. Our argumentation for this is based on the connection we make between the 'double movement' and Gramsci's 'passive revolution', and on how, in a fully globalised world, the interests of the ruled have become almost entirely linked to the interests of the rulers.

Gramsci's views on international relations, meanwhile, remain contested, mostly because he was, in the end, a nation-state theorist. "[T]he international situation should be considered in its national aspect," he wrote in his prison notebooks; "[t]o be sure, [the] line of development is toward

[41] Which, we should note, is logical given the pioneering role of England in the industrial revolution and the rise of capitalism.

internationalism, but the point of departure is 'national' – and it is from this point of departure that one must begin. But the perspective is international and cannot be otherwise" (Quoted in Birchfield, 1999, pp. 46-47). In other words, though the mode of production might be organised globally, it can only manifest itself though the nation-state, that, is through political and civil society. Indeed, this has changed little also with the globalisation of capitalism in the 20th century, and even though some scholars like to see signs of an emerging global civil society and a truly potent form of global governance, these institutions (the UN system, for example) remain embryonic and ultimately depend on the varying willingness of nation-states handling in their own interest (Germain & Kenny, 1998, p. 16). Even the European Union, the most supranational structure in the world, is still a union of self-centred nation-states. There is no global state to match the power of global capital, and this was no different when Gramsci developed his theory, even though global capitalism was much less integrated. Essentially, however, Gramsci's hegemony and 'passive revolution' are national concepts, and to speak of some sort of international hegemony (as we will do) is an interpretation of his thesis that deviates from the original. We will thus need to stretch Gramsci's theory to explain the contemporary hegemonic order. Yet as with Polanyi, we maintain that this does not preclude a valid analysis of that order because ultimately, capitalism can only be seen as a global system. National capitalist classes and 'national markets' should be interpreted as the particular national manifestation of One Big Market, meaning a global capitalist structure that is the only valid unit of analysis.

The relevance of both Gramsci and Polanyi to our understanding of environmentalism lies exactly herein. 'Double movement' and 'passive revolution' allow us to conceive the rise of environmentalism as the product of the interaction between a global market system prone to environmental crisis (as shown in part one) and a mostly nation-state-centred political and civil society attempting to mitigate this crisis. The importance of this national/international divide with respect to environmentalism can best be exemplified by the international negotiations on climate change, which in the absence of a 'world government' can only take place between nation-states, hence are complicated by particular national interests. In this respect, the Kyoto Protocol is not a global environmentalist project, but a nation-oriented one; it is implemented with different measures and objectives varying from state to state; it is negotiated globally, but its implementation ultimately depends on the nation-state. Needless to say, the discrepancy between global warming as a universal problem and these nationalised environmentalist reactions to it greatly effects the latter's effectiveness. Similarly, while some NGO's and civil society organisations have undoubtedly become transnational (Greenpeace, WWF, etc), it would be overly optimistic to interpret this as evidence of a global civil society. We could say that, while capitalist structures are organised globally and reproduced on the national level, environmentalism is mostly organised nationally and only

reproduced on a global level, which creates an imbalance of power between the economic and the political sphere that, certainly in the periphery of the world economy, has indeed always been part of capitalism. One of the arguments put forward in this part of our thesis is that environmentalism can only become truly global when it has been completely assimilated by the 'international hegemonic order'. The theories of Polanyi and Gramsci allow for an interpretation of environmentalism within this contemporary context. Even though our own interpretations of the 'double movement' and 'passive revolution' deviate from what both scholars originally intended, we maintain that the relevance of their concepts remains unchanged also when applied to 21st century capitalism.

POLANYI AND THE 'DOUBLE MOVEMENT'

In 'The Great Transformation', Polanyi departs from the premise that "never before our own time were markets more than accessories of economic life, [...] absorbed in the social system" (Ibid, p. 71). This changed fundamentally during the evolution of capitalism,[42] which gave rise to the increasing separation of the economic from the political sphere, that is, the subordination of social institutions to the self-regulating laws of the market. However, and this is a key component of Polanyi's work, this separation is necessarily incomplete because the market *cannot* regulate itself entirely; the idea of a self-regulating market is false, and actually constitutes a (dangerous) fiction that amounts to a denial of the natural embeddedness of economic life within the fundamental social structures (Block, 2001, p. xxiii). The fallacy, writes Polanyi, lies herein: for a market society to function, all aspects of the production process need to be commodified, i.e. they have to be bought and sold on the market. This includes land (nature), labour and money, since these are crucial elements of industrial production.[43] Yet nature, labour and money are not commodities at all, since they are not produced for the market, that is, their value to the capitalist production process cannot be separated from their vital function in society (as humans (labour), as the subsistence of humans (nature) and as a mechanism for economic interaction between humans (money)). Polanyi (2001) therefore calls land, labour and money 'fictitious commodities', because even though they need to be treated as tradable goods in order for the market system to function, they cannot be commodified in any meaningful way (p. 79).[44] More even, "to allow the market mechanism to be the sole director of the fate of

[42] Polanyi rarely uses the word capitalism, nor does he refer to any other Marxist terminology in his book. Instead he talks about a ‚market society', which, if not capitalism itself, should at least be seen as the specific, post-industrial-revolution incarnation of capitalism. Polanyi's relation to Marxist theory, also, is disputed (and perhaps not immediately relevant), but it is interesting to note that he was critical of mainstream Marxist theory (Block, 2001, p. Xxiii), especially, it would appear, of the role class played in Marx's critique.

[43] Money, in Polanyi's words, is „merely a token of purchasing power which, as a rule, is not produced at all, but comes into being through the mechanism of banking or state finance" (2001, pp. 75-76).

[44] Polanyi goes to great lenghts to demonstrate the need for land, labour and money to be treated as commodities in order for a market society to function, for example in his account of the Speenhamland Law (Polanyi, 2001, p. 81)

human beings and their natural environment indeed, even of the amount and use of purchasing power, would result in the demolition of society" (Ibid, p. 76). In a way, this is a rewording of the 'tragedy of the commons' idea we described earlier, namely that a system that has individual gain maximisation rather than social needs as its main motivation tends to neglect, degrade and destroy that which cannot be financially valuated or capitalistically produced.

A market society, then, is trapped in a fatal dilemma. On the one hand, it needs to ensure the continuation of production, indeed even, has to continue expanding perpetually in order to avoid a socio-economic crisis.[45] On the other hand, it has to protect itself sufficiently from that same, self-expanding market in order to safeguard society itself. These two, contradicting poles to the same process are what Polanyi calls the 'double movement', namely:

"[t]he extension of the market organization in respect to genuine commodities [...] accompanied by its restriction in respect to fictitious ones. While on the one hand markets spread all over the face of the globe and the amount of goods involved grew to unbelievable dimensions, on the other hand a network of measures and policies was integrated into powerful institutions designed to check the action of the market relative to labor, land, and money. [...] Society protect[s] itself against the perils inherent in a self-regulating market system" (Polanyi, 2001, pp. 79-80).

It is significant that Polanyi conceives this as a process *within market society*, which means that it should not be understood as a dualism between, for example, state and market. Such an interpretation would indeed completely miss Polanyi's point that the economy is *not*, and *cannot* be completely disembedded from the political realm, because this would be disastrous for market society itself. Rather, Polanyi's 'double movement' is a dialectical, evolutionary process between economic motivations on the one hand, and social ones on the other, yet within the overall (hegemonic) framework of global capitalism. It is a movement involving all layers of society, mediated through the interests of different classes and political actors (Ibid, pp. 159-160).[46] And even though the 'double movement' necessarily presents itself on the national level, it remains fundamentally a movement between global economic liberalisation and the nation-based protection against it.

[45] See the discussion on the declining rate of profit in part one.

[46] Polanyi's view on the class struggle derives from his conception of the double movement; unlike Marxists, he sees the class struggle as changing over time, depending on the challenges that society as a whole is facing. „The fate of classes is more frequently determined by the needs of society than the fate of society is determined by the needs of classes [...] [A]ny widespread form of change must affect the various parts of the community in different fashions, if for no other reason than that of differences of geographical location, and of economic and cultural equipment. Sectional interests are thus the natural vehicle of social and political change" (Polanyi, 2001, p, 159). In this sense, it is unjustified to claim, as some critics do, that Polanyi's theorisation of society is incomplete because he does not sufficiently problematise the role of classes (Stroshane, 1997, p. 94). Polanyi's insistence on the need for the *whole of society* to protect itself against liberalisation justifies the relative role he ascribes to classes, and makes it possible to see his analysis as quite separate from Marxist theory.

The fact that both elements of this process take place within society also implies that actors take part in both liberalisation and protection, that the state can be both an obstacle to the expansion of the market, and function as the main actor in advancing liberalism; that capitalists can promote the liberalisation of society, while also cooperating on protective measures when society demands it. This explains Polanyi's insistence on how the protection of society against increased liberalisation is a spontaneous movement. Actors across the political spectrum, he argues, work independently to strengthen society when the need arises. The advance of liberalism, on the contrary, is dependent on "an enormous increase in continuous, centrally organized and controlled interventionism" (Ibid, p. 146). "There was nothing natural about laissez-faire", Polanyi (2001) writes; "free markets could never have come into being merely by allowing things to take their course" (p. 145). The nation-state, in other words, is a necessary component in the deliberate liberalisation of society and the creation and expansion of global markets, just as much as it is a tool in the spontaneous protection of society against that liberalisation. Historically, this ambiguity translates into periods of relatively more protection (embeddedness) and periods of increased liberalisation, where the protectionism of society is weaker (disembeddedness). While the post-World War II 'Pax Americana' could for example be seen as a period of more embeddedness (Lacher, 1999, p. 344), the era of neoliberalist capitalism can be described as a period of more disembeddedness. Again, however, this disembeddedness of the economy can never be complete, since the economy is *de facto* dependent on social conditions. The denial of this reality, that is, the utopian attempts to disembed the economy further, are what creates social dislocation and the concomitant protectionist reflexes of society.

The adaptive characteristics of market society can be explained by the 'double movement' in relation to the Marxist conceptualisation of socio-economic crisis. We interpret it as follows. The 'first'[47] half of the 'double movement' exists in the expansion of the global market, which on a national level results in the liberalisation of society. In a sense, this corresponds closely to the notion of 'accumulation by dispossession' in that new capital is created by privatising nature, enlarging the labour force (hence more exploitation) and inventing new commodities. As already described above, this expansion (growth) is the result of capital accumulation by individual companies driven by the motive of profit. In this way, markets are expanded and the mass of profit is enlarged. However, the privatisation of land, labour and money is "bought at the price of social dislocation. If the rate of dislocation is too great, the community must succumb in the process" (Ibid, p. 79). Therefore, society inevitably, and spontaneously protects itself, which happens on many levels, and in many different ways and forms. The commodification of labour, for example, is accompanied by the gradual

[47] Clearly, recognising the double movement as a dialectic process, we do not mean to use the terms ‚first' or ‚second' part of the double movement as a time-delineation; rather, it is a deliberate choice for the departure point of our argument. The reverse order would of course also be valid.

emergence of unions, of social laws dictating minimum wages, forbidding child labour, shortening the working day and setting health standards, while the capitalisation of nature will result in, *inter alia*, environmental laws, the establishment of natural parks, of recycle centres and efforts to control pollution levels. For companies, this means that barriers are constructed against the free accumulation of capital, i.e. that immediate profits will in some way suffer from the protectionist tendencies of society. Indeed, it is obvious that a company suddenly obliged to install pollution filters, or to ensure health services for its employees, will have to endure extra costs, making the production process itself more expensive. In terms of the 'law of the declining rate of profit' described earlier, this will make the constant capital rise, lowering the share of variable capital, hence decreasing the rate of profit and lowering competitiveness. In order to maintain profit rates in the face of protectionist measures, therefore, capitalists need to innovate. They are compelled to cut costs elsewhere, to introduce new technologies, expand their market, find cheaper labour, relocate their production to the global periphery, merge with other companies, etc. In short, capital will need to compensate for the costs of social protection by making more profit elsewhere, hence by evading the obstacles created by the nation-state (O'Connor, 1998, p. 163). This, in time, leads to new problems, since, fundamentally, capital accumulation depends on the commodification of nature, labour and money for its success. The result is a new threat to society, new protective measures, more attempts by capital to circumvent the erected (national) barriers, and more social problems. In this way, global capitalism continuously reinvents itself in an attempt to overcome the obstacles of social protection. It undergoes a permanent, evolutionary process of transformation in dialectic relation to the social crises its expansion *inherently* causes - a transformation, moreover, that is absolutely necessary for the global economic system to continue functioning, i.e. for companies to remain competitive. Crisis, O'Connor (1998) writes on this subject, "is the occasion that capital seizes to restructure and rationalize itself in order to restore its capacity to exploit labor and accumulate" (p. 163).

GRAMSCI, HEGEMONY AND 'PASSIVE REVOLUTION'

The transformation of the system in relation to its crisis-tendency is also intimately connected to the question of political legitimacy. Indeed it is clear that the continued capacity of capitalism to exploit and accumulate is dependent on the public perception of it as a legitimate form of social organisation, and that, at the same time, the legitimacy of the system is itself also contingent on its capability to ensure the wealth and welfare of those groups that could bring about its demise. The continuous transformation of capitalism, in other words, is not only requisite for the system's economic functioning, but also for the continuation of the "political rule of capital" (Morton, 2007, p. 602). The two, clearly, are very closely intertwined. Hence, if we conceive the ecological and

economic crises of capitalism as mutually determined events (as we argued earlier), then it is necessary to do the same for political and economic crises as well. In this respect, Gramsci's concepts of legitimacy and political power in capitalist society are a necessary addition to the considerations of Marx and Polanyi.[48] Particularly relevant to our purpose are his notions of 'hegemony' and 'passive revolution', which offer an explanation for the resilience of capitalism in the face of socio-economic crises and structural contradictions.

A social group is hegemonic, according to Gramsci (1978), when it exercises "domination" as well as "intellectual and moral leadership", and thereby "dominates antagonistic groups, which it tends to "liquidate", or to subjugate perhaps even by armed force [while] lead[ing] kindred and allied groups" (p. 57). In the words of Cox (1983), hegemony is a "combination of consent and coercion", a concept that "bridge[s] the conventional categories of state and civil society" (p. 164). Indeed, for Gramsci, civil society fulfils a crucial political function in that it is essentially an *extension of the state* (Burawoy, 2003, p. 215). It is the civil superstructure of society, the aggregate of institutions that lie in between the state and the economy, and the sphere in which the class struggle is played out. While the state ensures the hegemony of the ruling class largely by its use of force and ideology, civil society does so mostly by the creation of consent, through religion, media, education, art and family institutions (Birchfield, 1999, pp. 42-43).[49] To overthrow the existing hegemonic structures, therefore, it is necessary to overcome the 'political buffer of the state' that is civil society, meaning, it is necessary to break the societal consensus on the legitimacy of the hegemonic order, and create a majority consensus in favour of the counterhegemonic bloc. "Civil society," writes Burawoy (2003), "smothers any attempt to seize state power directly, so that revolutionary activity involves the slow, patient work of reorganizing associations, trade unions, parties, schools, legal system, and so forth" (p. 215). This is what Gramsci (1978) calls a 'War of Position' (p. 108).

This conceptualisation of civil society as the extension of the nation-state is significant because it implies that the hegemonic group can retain its dominant position even when it is not in direct political control. In other words, it does not need to run the state itself as long as the actual "rulers recognis[e] the hegemonic structures of civil society as the basic limits of their political action" (Cox, 1983, p. 163). Such an argument, indeed, could be made for the consensual basis upon which liberal democracies have been established, namely that any group can effectively be elected to parliament

[48] The prison notebooks particularly focus on the rise to power of the Italian bourgeoisie and the fascists in the 1930s. Since his notebooks are so fragmentary, and since Gramsci developed his theory in particular relation to the historical period in which he lived, the academic debate on Gramsci has given birth to a variety of interpretations and applications of his ideas to the fields of political and international relations studies. It is therefore necessary to point out that, as perhaps with all theory, but especially with Gramsci, the interpretation of the Gramsci's concepts proposed here is individual, that is, they are used in a way that seems relevant to our argument, even though this may not have been the original focus of Gramsci himself.

[49] This also explains why Gramsci devoted much attention to the role of intellectuals, and to the 'Americanisation' of society through cultural exchange as an indication of hegemony.

as long as its representatives recognise the need to conform to the logic of the market. Rather than a restriction, even, this conformation to capitalism inherent to liberalised societies is perceived as absolutely natural, and is itself the result of the positive association that the vast majority of voters make between personal interests, and the interests of the capitalist class. As long as the majority believes to gain by the rule of capital, i.e. as long as the consensus holds that the system is legitimate, the hegemonic position of the capitalist class is safeguarded. In this context, hegemony is exercised through rule by consent, or rule by intellectual and moral authority. It is furthermore connected to what Gramsci referred to as the evolution of 'historical blocs',[50] or the capability of a social group to forge a society-wide consensus on the desirability of issues that (continue to) further its own interest. Though Gramsci (1978) himself related the creation of a historical bloc mostly to the context of the *creation* of hegemony (p. 168), it can also be interpreted as the way by which hegemony is maintained. For this reason, Xing & Hersch (2006) note, the global capitalist class can be described as a hegemonic group in the Gramscian sense, since it has succeeded in creating a "transnational capitalist historical bloc" (p. 47) that carries the project of globalisation, which seemingly transcends the interests of the ruling group and thus finds approval in virtually all layers of society, particularly in the core of the global economy, where wealth has to a large degree been redistributed and almost all social classes now share in the material excesses made possible by globalisation.

Such a restructuring of the system without touching at the fundamental social relations is, in Gramscian terms, called a 'passive revolution', or a "revolution without a revolution" (Gramsci, 1978, p. 59). Here as well, Gramsci devised this concept mainly in the context of how a hegemonic group is created (Ibid., pp. 59-61), but it is possible and useful to stretch this to include the way hegemony is retained as well. This entails a recognition of how the historical hegemony of capital "necessarily involved concessions to subordinate classes in return for acquiescence in bourgeois leadership, concessions which could lead ultimately to forms of social democracy which preserve capitalism while making it more acceptable to workers and the petty bourgeoisie" (Cox, 1983, p. 163). 'Passive revolution', in this case, is the process by which the ruling elite maintains its power by absorbing antagonistic elements and giving way to the demands of society as long as these do not threaten the hegemonic structures themselves. Applied to contemporary capitalism, it is "the tendency as well as the process in which capitalism responds to an organic crisis by implementing political reforms [and] economic restructuring [...] in order to sustain the dominant mode of production and to reduce the potentials for radical revolutionary changes" (Xing & Hersch, 2002, p. 194). The continuous transformation of capitalism, in other words, is not only necessary from a socio-economic

[50] A historical bloc, according to Gramsci (1978), is the „unity between nature and spirit, structure and superstructure, unity of opposites and of distincts" (p. 137).

perspective, but also from a political one, because a non-adaptive capitalist order would gradually become irrelevant to the evolving demands of society, hence lose its political legitimacy and facilitate the potential counterhegemonic success in the 'War of Position'.

COMMON GROUNDS

It is obvious, then, that the concepts of Gramsci and Polanyi overlap and complement each other to a large extent, though each clearly focuses on very different aspects of capitalist continuity and change. When we connect their concepts to the theory of Marx and the notion of the ongoing 'accumulation by dispossession', we can conclude that the adaptive character of capitalism is an inevitable consequence of the system's crisis-tendency, as well as a *sine qua non* for the alleviation of those crises in order to avoid a complete breakdown of society, a disruption of the market mechanism, a legitimacy crisis, etc. Put differently, the hegemonic group will have to keep making concessions and continue transforming the character of its political rule, because the hegemonic structure, i.e. capitalist organisation, incessantly brings about social devastation as a consequence of the system's inclination towards both crisis and perpetual expansion. In this sense, the continued legitimacy of the system rests on its capability to incorporate the demands of all major groups in society, to absorb or isolate dissent, to alleviate the social problems that liberalism creates, while all the time maintaining the hegemonic structures that enable the sustained production of profit.

Herein, the role of the state is finally exposed, and the theories of Polanyi and Gramsci convincingly meet. Since the function of the state in Polanyi's work is to mediate between society and market, i.e. to find the balance between too much protection (hence disruption of the economy) and too little protection (hence destruction of society), it emerges that the intervention of the state in the double movement is, in fact, the 'passive revolution'. Put differently, 'passive revolution', applied to our interpretation of Polanyi, is the active expression of capitalism's structural need to ensure the expansion of capital while protecting society to the degree necessary in order to keep expanding capital still further. This process can only be assured in a society that is, as Gramsci argues, the extension of the state, where the interests of the ruled are closely linked to the interests of the rulers, namely through the creation of material wealth and the adequate functioning of the economy. As long as society is fundamentally a market society, indeed, it is better to be exploited than not to be exploited at all, meaning that the only thing worse than working for a capitalist is to be unemployed. 'Passive revolution', therefore, is not, as some would have it, a conscious or 'top-down' process, but the natural tendency of all classes (ruled and ruling) to act in what seems to be their best interest, which, from the simple fact that it provides in the livelihood of everyone, for the vast majority lies in the continued functioning of the economy. This is all the more so in the globalised capitalism of the 21st century, where seemingly everyone in the core countries benefits

from the porosity of borders. Clearly, however, this benefit has not extended to the rest of the world. The result of this condition is the creation of hegemonic consent through the weakening of society's protective tendencies, the absorption of those elements most dangerous to its legitimacy, and the (superficial) transformation of the system to alleviate the immediate concerns of the (relevant) majority. It is on this fundamental basis of consent that the legitimacy of a market society depends, and it is here, we maintain, that the underlying connection between the revolutionary character of capitalism as witnessed in the 'passive revolution' and the 'double movement' should be seen.

Ultimately, then, what underlies these similarities between Gramsci and Polanyi is a common concern for what Burawoy (2003) calls an 'active society':

> "Whereas Polanyi was unclear about the institutional makeup of active society, Gramsci filled it out with political parties, print media, mass education, and all sorts of voluntary associations. For both Polanyi and Gramsci, liberal capitalism with its weak society gave way to an organized capitalism marked by a dense and complex "civil society" or "active society," aided and abetted by a more elaborated and more interventionist state" (p. 206).

Yet while Polanyi sees society as a force countering the rule of capital, Gramsci defines civil society as a component of the state, and as a force absorbing the potential threats to the legitimacy of the hegemonic rule of capital (Ibid., p. 220). This, then, forms the departure point for our analysis. In the case of environmentalism, we maintain, both conceptions of society are valid and relevant. Environmentalism is the product of an 'active society' in the sense that Gramsci as well as Polanyi envisaged; it is at the same time a 'passive revolution' and the spontaneous protection of society in reaction to the social dislocation of liberalisation. In connecting these two concepts, we devise of a society that is, by means of the nation-state, attempting to protect itself against the ecological destruction caused by the global market. Simultaneously however, it is also entirely dependent on that global market for everything it does. The continued legitimacy of the hegemonic order serves its own direct interest, which means that global capital has in society its strongest ally. In the following chapter we further develop this connection between Gramsci in Polanyi in relation to environmentalism.

THE ENVIRONMENTALIST TRANSFORMATION

Already in the introduction of this essay we have briefly outlined what should be understood under environmentalism, namely the movement that has as its self-declared goal the preservation of the natural environment and the alleviation of the different environmental problems arising in and from modern society, from a common belief that these issues constitute a serious challenge to society as a whole (or even to 'nature' itself). This is certainly not a new phenomenon. Indeed even Plato, writing around 400 BC, already showed himself concerned with the human-induced

degradation of nature when he wrote that "[w]hat now remains compared with what then existed is like the skeleton of a sick man, all the fat and soft earth having wasted away, and only the bare framework of the land being left... there are some mountains which now have nothing but food for bees, but they had trees not very long ago..." (Quoted in Ponting, 1992, p. 76). Yet until the second half of the 20th century, the deterioration of the environment remained of relatively marginal concern to the majority of mankind.[51] One of the main reasons hereof, according to Dunlap (1997), is that environmental problems had up to then been mostly restricted to the local level, and that scientific knowledge about the causes and human consequences of these issues had been rather limited. Since the end of the 1960s however, the increasing frequency (and awareness) of localised problems and the emergence (and awareness) of regional and global problems affecting everyone alike, has instigated the gradual ascendance of environmentalism as a wider social phenomenon. Additionally, the movement has in most recent years benefited from (and helped to create) a "widespread societal recognition of the fact that human activities are causing a deterioration in the quality of the environment, *and* that environmental deterioration in turn has negative impacts on people" (Ibid., p. 27, emphasis in original), which constitutes a development that has lead academics to converge on the conclusion that environmentalism "is becoming one of the principal axes of the [...] politics and institutions of the advanced societies" (Buttel, 1997, p. 50).[52]

Evidently, contemporary environmentalism encompasses the efforts of a wide range of organisations, individuals and institutions that operate with different ideological backgrounds, and with widely diverging objectives and motivations. From the environmentalism of NGO's to the recent UN summits on climate change, desertification and biodiversity, from governments committed to cutting CO_2 emissions to the booming popularity of small-scale eco-communities, from Greenpeace and the World Wildlife Fund (WWF) to the conservation of local ecosystems, from households becoming more environmentally conscious to the advent of 'green business' models, from vegetarianism to wind farms, the concern for the environment, these days, appears to be everywhere, that is, at least in the industrialised world. There is hardly a common motive here, something more than a vague and ambiguous 'concern for nature', which makes it hard to lump together all of the above under the same denomination. Yet it is possible to discern a certain logic and a common history in this conglomerate of environmental goals and institutions. Crucially, we maintain that all forms of environmentalism ultimately derive from an 'active society', even those

[51] Relatively because, of course, the environment has figured as a major concern to those directly affected by local environmental degradation, by soil erosion, by the water and river pollution of early industrial activity, etc.

[52] Buttel stresses the fact that this happened in „discontinuous surges and declines". Environmentalism was very popular in the 1960s and early 1970s, but it lost a lot of its power in the late 1970s and 1980s, only to regain momentum in the 1990s (1997, p. 51).

forms that have now been institutionalised through laws, in government practice and in business models.

In Polanyi's version of society, environmentalism is the spontaneous, protectionist countermovement of society.[53] As described earlier, this is a necessary reaction to the increased liberalisation of land, labour and money, which, if left by itself, would cause nature to be "reduced to its elements, neighbourhoods and landscapes defiled, rivers polluted, military safety jeopardized, the power to produce food and raw materials destroyed" (Polanyi, 2001, pp. 76-77). Society consequently protects itself by, *inter alia*, placing restrictions on industrial emissions, establishing natural reserves and limiting hunting. In this way, the commodification of nature is restricted, and, inadvertently, an obstacle to capital accumulation is formed. Examples of these very natural, societal reactions to environmental degradation are everywhere. When, in 1952, 4000 inhabitants of London died because of sulphur dioxide pollution, the city quickly imposed restrictions on the type of fuel that could be used in the industrial process (Commoner, 1973, p. 67). Similarly, the ongoing deforestation in the Amazon region has given rise to social movements and local organisations fighting for the preservation of the forest, the pollution of rivers has led to a regulation on the discharge of sewage water, and the extensive poaching of elephants, tigers, and whales has resulted in a moratorium on the sale of ivory, skins and whale oil. These examples, indeed, merely acknowledge society as a force of itself; they illustrate that the damage of, and concern for the environment manifests itself in society, i.e. through the scientific community, through civil organisations, media and the personal experience of individuals. It is, in other words, in the sphere of society that the adverse effects of liberalisation become evident, and it is there as well that the need and demand for protection is expressed.

The state plays a double role therein. Though Polanyi does not distinguish between state and society - indeed he did not theorise on the exact role of the state in the double movement - it seems clear that in his conception of society, the state is a crucial factor in institutionalising these protectionist reflexes. More even, it "plays a key role in mediating relations between productive forces and production relations" (Xing & Hersch, 2006, p. 47), thus inevitably contributing to the liberalisation *as well as* the protection of society. In this sense the state actually bridges the double movement. Hence, while environmentalism manifests itself firstly in society (through environmental problems), the eventual implementation of society's demands, or the degree to which the environmental protection of society will intervene with the liberalisation process, is to a large degree dependent on mediation through the state, particularly when environmental problems manifest themselves on a regional or global scale. With climate change for example, the protectionism of

[53] We here focus on the countermovement because we have already at great length discussed the environmental effects of liberalist expansion (the other part of the 'double movement') in the first part of this thesis.

societies can only become successful when nation-states manage to agree on international restrictions about the emissions of GHG. Since the scale of the problem is global, the nation-state, and by extension the international state system, is a prerequisite for the institutionalisation of the protection of society.

Following Gramsci's conceptualisation of hegemony and civil society, Polanyi's protectionist environmentalism is also a potential threat to the hegemonic order. Since the environmental movement demands the defence of society against the commodification of nature, it directly challenges the continued creation of profits (and wealth) hence also the political legitimacy of the hegemonic structures. In this respect, the protectionism of society through environmentalism is perceived as a counterhegemonic force embarking on a 'War of Position', which means that it has the potential of undermining the societal consensus on the legitimacy of the hegemonic order. Indeed, the original discourse of the environmental movement in the 1960s and 1970s placed the conservation of nature directly opposite to economic growth, and in many instances propagated that the protection of the environment required the "containment of rampant economic development" (Sachs, 1997, p. 72).[54] Such radical positioning naturally conflicts with the interests of the hegemonic group, and therefore causes a 'struggle' between hegemony and counterhegemony (or thesis and antithesis) in the sphere of civil society. Since civil society is the extension of the state, that is, the defender of hegemony through consent, this in turn gradually gives form to a 'passive revolution', i.e. the assimilation of the most crucial elements of the counterhegemony into the hegemonic structures. Put differently, civil society adopts the concerns of the environmentalist antithesis yet subordinates them to the hegemonic structures, and thereby creates a more acceptable alternative around which it then creates hegemonic consent. In this way, a legitimacy crisis is averted and the revolutionary character of the counterhegemony rendered impotent.

Concretely, this 'passive revolution' manifests itself in the adoption of environmental discourse by governments and businesses, and indeed by virtually all civil society organisations at the core of the global economy. Hence companies now possess environmental strategies, sustainability policies, climate mitigation plans and CO_2 reduction schemes. Correspondingly, a lot of consumer products have suddenly become 'bio', 'green', 'sustainable' and 'eco-friendly', fostering the illusion that we can now consume our way out of the environmental crisis. Governments, meanwhile, are making attempts to promote 'sustainable development' and frequently convene to discuss international agreements pertaining to the protection of biodiversity, the adaptation to, and mitigation of climate change, the prevention of desertification, deforestation, etc. In this way, the process of 'passive revolution' continues on an international level. The Kyoto Protocol and its prospective 2009

[54] The original success of the ‚Limits to Growth' publication in the beginning of the 1970s serves to illustrate this point.

successor to be agreed upon in Copenhagen are the most obvious examples of this. In short, it is very obvious that environmentalist demands for the protection of the environment have been integrated into mainstream political and economic discourse and policy, thereby transforming capitalism into a seemingly 'green(er)' system.

However, it is equally obvious that the fundamental structures of the system have remained unchanged despite this transformation of appearances. Otherwise, indeed, the environmentalist transformation of capitalism would not be a 'passive revolution' at all. Thus, while environmental considerations have been adopted by the mainstream, they have also been adjusted to fit the hegemonic institutions. This adjustment, in fact, is a structural necessity of the system, since capitalism would cease to function if the obstacles to the creation of profit were too high. Environmentalism can only be absorbed by the capitalist system to the extent that it does not limit accumulation. Indeed, it is evident that even those corporations sincerely occupied with the environment will need to ensure the profitability of their business if they want to continue functioning (Xing & Hersch, 2002, p. 209). Though the environment might prove to be a significant factor, it simply cannot outweigh the basic systemic need for companies to remain competitive. This means that the assimilation of environmentalism into mainstream institutions (or hegemonic structures) necessarily involves a marriage to the principle of growth in order to make it 'harmless', since an environmentalism that proclaims the existence of physical 'limits to growth' is not compatible with the dynamics of the capitalist system, which dictates that growth is endless (Sachs, 1997, p. 72). A necessary component of the environmentalist 'passive revolution', therefore, was the removal of the 'limits' argument and its replacement with the complete opposite, namely the notion that there is such a thing as the *right kind of growth*. The result of this is demonstrated quite beautifully in the ambiguous concept of 'sustainable development', which combines the notions of environmental sustainability and economic growth. It thereby legitimises the existing capitalist structures, allows the system to continue functioning, and appears to address the most pertinent concerns voiced by the counterhegemonic movement, while in fact retaining liberalisation's most problematic aspects:

> "'sustainable development' is not about giving priority to environmental concerns, it is about incorporating environmental assets into the economic system to ensure the sustainability of the economic system. 'sustainable development' encompasses the idea that the loss of environmental amenity can be substituted for by wealth creation; that putting a price on the environment will help us protect it unless degrading it is more profitable; that the `free' market is the best way of allocating environmental resources; that businesses should base their decisions about polluting behaviour on economic considerations and the quest for profit; that economic growth is necessary for environmental protection and therefore should take priority over it" (Beder, quoted in Doyle, 1998, p. 774).

The concept of 'sustainable development' therefore shows how capitalism has transformed environmentalism and made it fit to the system's core principles of capital accumulation and production-for-profit. This transformed, or weakened form of environmentalism, of which 'sustainable development' is a central aspect,[55] is the (reformative) reaction of capitalism to the counterhegemonic movement of 'original environmentalism'; it is the hegemonic answer, through 'passive revolution', to the environmental crisis, at least to the extent that the protectionist reaction of society to this crisis threatens the hegemonic order. Logically then, this transformed environmentalism is currently the dominant form of environmentalism, and we will accordingly call it 'hegemonic environmentalism'. It manifests itself inherently in the environmental policies of all corporations, as well as in the policies of the international state system (e.g. carbon trading), in the programs of the UN (try finding a UN department that does not mention 'sustainable development' as its objective somewhere), in most of the NGO sector, and so forth. Judging by the sheer amount of contemporary communication on the degradation of nature, hegemonic environmentalism does, in fact, "*appear* to be greener than the green" (Doyle, 1998, p. 772, emphasis in original), thereby beating the environmentalist movement at its own game. Yet it is not all bad. Hegemonic environmentalism in many ways still represents a restriction to the accumulation of capital, that is, a protection of nature. It still results, in the case of climate change, in a (very slow) switch to more renewable energy sources, in more recycling, in higher energy efficiency, in less immediate pollution.

Here we again arrive at the argument made in an earlier context, namely that the protection of nature *needs to be limited* in order not to disrupt economic activity and thereby also society itself, but it also needs to be *sufficient* in order not to damage society to the extent that this would result in profit loss. This 'zone of legitimacy' or 'zone of economic rationality' between too much protectionism and too little is where environmentalism can be implemented. An example is the reaction of governments to the hole in the ozone layer caused by industrial emissions, mostly chlorofluorocarbons (CFC's). By the end of the 1970's, Oosthoek (2008) writes,

[55] Sachs traces its evolution back to the discourse of the Brundtland report in 1987. The ambigious language of the report, he argues, has allowed „the locus of sustainability [to shift] from nature to development; while ‚sustainable' previously referred to natural yields, it now refers to development [...] Since ‚development' is conceptually an empty shell which may cover anything from the rate of capital accumulation to the number of latrines, it becomes eternally unclear and contestable just what exactly should be kept sustainable. This is the reason why all sorts of political actors, even fervent protagonists of economic growth, are today able to couch their intentions in terms of ‚sustainable development'"(p. 73). The ambiguity of the term sustainability is also mirrored in the discourse of the EU, when, under the heading *"Promoting Sustainable Use of Resources",* the European Commission (EC, 2008a), in a communiqué to the European Parliament recently stated that *"arctic resources could contribute to enhancing the EU's security of supply concerning energy and raw materials in general"* (par. 3.1). The text failed to explain how exactly the exploitation of 'hydrocarbons', meaning oil and gas, would contribute to the EU's long-term objective of sustainability, but it would appear that the definition of sustainability employed here by the Commission can only be a very creative one.

"it was almost certain that these gases, which were used on a large scale in spray cans and refrigerator systems, was [sic] almost certainly damaging the ozone layer [...]. However, governments, under pressure of the chemical industry, refused to act since the mechanisms involved in ozone destruction were by then not fully understood. It was argued that more data and research was needed to warrant action" (p. 64).

The problem worsened during the 1980s and "by 1987 the world's media were reporting on a 'Hole in the Ozone Layer'" (Ibid.), after which the Montreal Protocol was signed and the usage of CFC's was banned. The fact that governments did not take action until the media, the scientific community and hence the public had picked up on the issue and perceived it as a real threat, illustrates that their motivation to take action was not necessarily the severity of the ozone problem, but rather the severity of the potential legitimacy crisis. Indeed as soon as society became aware of the problem, governments became compelled to act. On the other hand, the fact that they did not act before and, as Oosthoek (2008) mentions, were successfully kept from doing so by the chemical industry demonstrates their role in the other part of the 'double movement'. In the former case, states acted as the protector of society, in the latter they functioned as the promoter of continued capital accumulation. In both instances the reason for the behaviour of the state was the legitimacy of the hegemonic order; in both instances, also, the position of the state was ultimately beneficial to the economy since the continued destruction of the ozone layer would for example have caused increased health problems hence rising healthcare costs.

The problem of hegemonic environmentalism is not that it does not protect nature, indeed it still managed to halt the growth of the hole in the ozone layer. The problem is that it does not protect nature *in the long run*. As we have described in an earlier chapter, a company that is faced with obstacles to the creation of profit will tend towards innovation, production adjustment and cost reduction in order to expand its production and restore profits. In fact, it will tend towards innovation and productivity increase by itself, even without the hindrance of societal protection. As Wallerstein (2002) puts it, "[capitalist] production is constantly expanded as long as further production is profitable, and men constantly innovate new ways of producing things that will expand the profit margin" (p. 15). Yet the protectionism of society increases the production costs and therefore adds a new incentive to innovation/adaptation, on top of all the other ways by which capitalism is forced to adapt in order to avoid the ever-looming economic crisis. In terms of hegemonic environmentalism, obstacles to profit are created in the form of governmental restrictions on the packaging of products or on the use of CFC's and other chemicals, guidelines on water usage and filtration, carbon taxation, etc. At a first glance, these examples might appear to imply that the societal tendency towards protectionism has succeeded in coercing capitalism to transform itself into a more environmentally-considerate system. This, however, would be completely missing the point that companies need to compensate for rising costs (or declining rate of

profit) by making cost reductions elsewhere, or by increasing their mass of profit, hence expanding their production. Since environmentalist protection is organised at the national level, an important way for capital to adapt is by relocating to countries where environmental law is not so stringent, i.e. where the double movement is less successful in implementing environmental measures through the nation-state. Kolstad & Xing (1998) for example argue that "to the extent that the environmental policy gap between developing and developed countries widens, more capital investment associated with polluting industries can be expected to flow to countries with lax environmental regulation. This could result in a significant migration of polluting industry to "pollution havens""(p. 21).

Against this inherent need for continuous adaptation and innovation, the social ascendance of hegemonic environmentalism actually constitutes a golden opportunity for capitalism, because the fact that more people become sensitive to environmental issues also means that this will be reflected in their behaviour as consumers, which in turn implies that it is possible to exploit society's new environmental awareness by creating a market for 'sustainable' and 'eco-friendly' products. Though this might go at the cost of more traditional products, it does not necessarily have be so. Indeed, the alternative energy hype is yet to threaten the traditional oil industry, which continues expanding its production into the most remote areas of the world. The emergence of 'sustainable products' in this respect actually serves as a justification for the continued use of the traditional products. Hegemonic environmentalism, it thus emerges, not only contributes to rising costs, but also creates a direct opportunity to increase profits by taking advantage of the environmental trend and expanding production in yet another way. With respect to climate change, for example, environmental policy creates obstacles to profit creation in the form of restrictions on CO_2 emissions, yet this goes hand in hand with new economic opportunities, be it markets for windmills and solar panels, biofuels or hybrid cars. In this way, capital accumulation simply continues under a new name.

In the process, environmentalism has transformed into a hegemonic environmentalism that is in many respects truly global, not because it is the product of a global civil society, but because it has been assimilated by global capitalism and now functions as a tool in the continued production of profit. There is very little that is specifically national anymore about the 'sustainability policies' of the world's largest multinationals and international organisations. 'Sustainable development' has grown to be a truly global concept, and is to be found literally everywhere, from The Coca Cola Company (*"Sustainability: Our business is only as strong and sustainable as the communities in which we operate"* (2009b, par. 'Sustainability')) to The World Bank (*"[...] to advance the vision of an inclusive and sustainable globalization"* (2009, par. 'About Us') to UNESCO (*"[...] to help countries implement a national strategy for sustainable development"* (2009, par. 'About UNESCO')). In this way, environmentalism has transcended the societal protectionism of nation-states and become a global phenomenon, even though it ultimately remains dependent on the nation-state for its successful

implementation. Indeed only where it is truly and completely a component of capital has environmentalism become truly globalised, for the very reason that it needs to be reconcilable with the fundamental logic of the market economy in order to do so. The global concept of 'sustainable development' hence is a vehicle for nearly everything, but not for the long-term protection of society against the continued expansion of capital. It is as Sachs (1997) has appropriately called it, "the late twentieth-century expression for 'progress'" (p. 71), whereby he already hints at its erroneous and discredited logic. Indeed when the world embraces 'sustainable development' while the degradation of nature can continue in every conceivable way, something must be seriously wrong with the concept's underlying logic.

We therefore conclude that environmentalism is both the countermovement of Polanyi, and, in its currently most dominant form, hegemonic environmentalism, also a 'passive revolution' in the Gramscian sense. It is in every way the product of an 'active society' in which the interests of the different social groups have largely converged around those of the hegemonic group, meaning the capitalist class. This is where our interpretation of the 'double movement' differs from the one Polanyi envisaged. While Polanyi saw the countermovement as a force equal to that driving the expansion of capital, we maintain that it should in its current form be seen as a force *subordinated* to that expansion, because, as Doyle (1998) points out, "the distinctions between the interests of the business community, environmentalists, other sectors - including the state itself - are now increasingly blurred in this era of corporatism" (p. 773). This makes it hard, if not impossible, for a counterhegemonic force - like environmentalism - to firmly establish itself and question the legitimacy of the established order, since society will spontaneously protect its own interest and come together in a historical bloc to create a 'passive revolution', which consequently takes the momentum out of the counterhegemony. This indeed is what happened with the environmental movement. While the resulting hegemonic form of environmentalism, manifested mostly in so-called 'sustainable development', to a certain degree continues to address and solve environmental problems, it does so only at the cost of renewed capital accumulation. In terms of Polanyi's double movement, hegemonic environmentalism is therefore not only an attempt of society to protect itself, but also, and more importantly so, a component of the expansion of capital itself. It first and foremost ensures the further growth of the economy, meanwhile subordinating the protection of the environment to the economic principles of the system. This, now, is highly problematic because, as we have shown in the first part of this essay, it is exactly these principles that are at the heart of the current environmental crisis to begin with. It then seems obvious that in the long run, this contradiction cannot be sustained. Here we arrive at the central question put forward in this essay, the question of sustainability within an adaptive capitalism.

THREE:

NO EXIT: THE LIMITS TO ENVIRONMENTALISM

SUSTAINABILITY IN A COMPLEX SOCIETY

The one question that remains to be answered is whether the environmentalist transformation of capitalism is capable of overcoming the current environmental crisis and achieving a state of sustainability. The short answer is that it is not. The long answer takes up the rest of this essay, and is illustrated by a number of contemporary efforts at moving the system closer to sustainability in the specific context of the climate crisis. Even then, our argument has to a large degree already been hinted at in the preceding pages, since the impossibility for capitalism to achieve sustainability essentially derives from the basic characteristics of the system as described by Marx himself. Indeed, this has to be so since the key feature of the environmentalist 'passive revolution' is exactly that it preserves the existing hegemonic structures. In other words, even the 'environmentalist capitalism' of the 21st century needs to obey to the logic of surplus value and capital accumulation, and to the principle of unchecked competition as the organising principle of society. Even a capitalism sensitive to the plight of the planet is fundamentally still a capitalist system, that is, a system based on the exploitation of nature as well as labour (Marx, 1977, p. 638). And as we have illustrated in part one, it is exactly the narrow economic motives upon which capitalism entirely depends, i.e. production-for-profit and capital accumulation/growth/wealth creation, which are the cause of the current and historical extent of environmental degradation. In the terminology of Polanyi, it is the market system's structural need for the capitalisation of land, labour and money that is directly responsible for social dislocation and the deterioration of the natural environment.

Before we go any deeper into arguments on the systemic unsustainability of the current mode of production, it is useful to specify what capitalism would hypothetically need to look like for it to be a sustainable system. What kind of environmentalist transformation would be necessary to arrive at a truly green economy? Taking the concept of sustainability as meaning "the ecological conditions necessary for the current social order to preserve itself",[56] the answer is rather self-evident: A 'sustainable capitalism' would have to be a system that does not degrade its own (physical) conditions of production, or in reference to the concept of O'Connor (1998), a system that has

[56] Taken from the discussion on the common use and inherent ambiguity of the term sustainability in the methodology of this paper. Here as well, sustainability has an overarching social dimension, and an inherent time-dimension that is impossible to conceptualise without going into vague arguments on the needs of future generations. Something can only be sustainable, it is clear, when it is capable of continuing itself perpetually, into the near and distant future.

overcome the so-called 'second contradiction of capitalism', leaving aside for now the very obvious fact that it being a contradiction of capitalism naturally presupposes that such a thing is impossible. Put differently, for hegemonic environmentalism to bring about the sustainability of capitalism would require it to assure the protection of nature (as a fictitious commodity) to the extent necessary to reproduce market society *ad infinitum.* Since the existence of capitalist production is ultimately dependent on capital accumulation (or growth/expansion), it follows that hegemonic environmentalism would in fact have to ensure the *expansive* reproduction of market society. As is indeed evident already in the term 'sustainable development' itself, this is exactly the mission upon which the protagonists of hegemonic environmentalism are currently embarking. Yet these objectives, we maintain, are fundamentally flawed.

In the first place, the assumption that an expansive capitalism is able to preserve its natural conditions of production disregards the essentially exploitative relationship between capital and the natural environment. While capital is entirely dependent on the exploitation of human labour for the production of surplus value hence profit,[57] it is equally contingent on the exploitation, or 'free appropriation', of the productive forces of nature. Indeed, nature already enters the production process in the form of humans, who, for their wellbeing rely on a minimum of 'free' natural services. More significantly even, labour itself is nothing more than the productive interaction between humans and their physical environment; human labour turns the productive forces of nature into something useful to mankind (or use value), be it through fishing, hunting and breathing, or in the capitalist production process. Thus, while labour is in fact the only force *producing* use value, the different services of nature (air, water, raw materials) are crucial to capitalism in that they "*always* contribut[e] to use value" (Burkett, 1998, p. 100, emphasis added), meaning that labour has to appropriate the physical world to be able to produce use value. Considering that use value is needed for the creation of exchange value, this means that both "nature and use value are necessary conditions of value and of capital accumulation" (Ibid., p. 101).[58] At the same time, however, the 'free' services of nature do not contribute to the nominal size of exchange value, but even reduce the value of commodities by introducing 'free' elements into the production process, making labour more productive (Marx, quoted in Burkett, 1998, p. 98). And as we have demonstrated in the first part of this essay with the herdsmen analogy of Hardin (1968), it is exactly because the productive force of nature is not represented in the commodity's exchange value that nature in itself seems fundamentally worthless to capitalism; that even though capitalist production is concerned with (and

[57] See for example Marx (1977), Altvater (1990) and Burkett (1998).

[58] In relation to Polanyi's theory of the double movement, this also implies that nature as a fictituous commodity cannot be separated from nature as the source for all real commodities, which strenghtens the point made earlier that hegemonic environmentalism is in fact both the protection of society (in terms of nature as a fictituous commodity), and the expansion of the market (in terms of nature as the necessary source for the production of real commodities).

entirely dependent on) the use value it needs to appropriate from different natural resources in order to produce a profit, nature as a living ecosystem is completely meaningless to it. Quite clearly, also, the preservation of the system's physical conditions of production cannot be guaranteed solely by capital's mechanistic (and economic) consideration for the environment's component parts, seeing that in nature, as we have also shown in the first part of this paper, everything is connected to everything else, meaning that every environmental component is dependent for its survival and self-limitation on the ecosystem in which it grows (Commoner, 1973, p. 30). Since this interdependence is disregarded by all types of capitalism, necessarily including the kind transformed by hegemonic environmentalism, nature is inevitably degenerated.

From this follows a second structural reason for hegemonic environmentalism's theoretical impossibility to reach a state of sustainability. Since it needs to assure the *expansive* reproduction of market society, and since capital accumulation is ultimately dependent on the exploitation of nature, the environmentalist transformation cannot prevent the gradual increase in capital's free appropriation of the environment, simply because more production requires greater amounts of natural resources in order to create use value. This itself would perhaps not be a significant problem were it not for that other ecological law of Commoner (1973), which holds that in nature, "there is no such thing as a free lunch" (p. 46), meaning that every gain is won at a certain cost, or more precisely still, that the planet is fundamentally a *finite and closed system.*[59] The straightforward recognition of this is arguably the one significant contribution of the 'Limits to Growth' thesis (Meadows et al., 2004). In other words, as long as growth is based on the appropriation of a finite nature (as it has to be), it will sooner or later run into the physical limits of the planet's life-sustaining processes, be it tomorrow or in another millennium. As indeed the authors of LTG themselves imply when working out their different models, however, this 'limit to growth' is a relative and not an absolute one, which is to mean that the 'carrying capacity' of the planet is dependent on the specific form of social organisation, on population levels, on technological development, etc., each of which, of course, are also dialectically connected to one another.

The degradation of nature can therefore be *slowed down* by introducing a number of environmentalist measures. Higher rates of recycling, for example, decrease the 'source to sink' tendency of capitalism and therefore take pressure away from the environment. Yet recycling is itself a capital-intensive process requiring in all cases the input of additional energy and matter (hence

[59] Burkett (1998) quotes Marx as saying that the scarcity of nature is itself also a prerequisite for the existence of capitalism, because „if the land were so easily available, at everyone's free disposal, then a principal element for the formation of capital would be missing. A most important condition of production and - apart from man himself and his labour - the only original condition of production could not be disposed of, could not be appropriated" (p. 95). Burkett concludes that „if land were infinite it could not be appropriated by capital in such a fashion as to exclude labour from this necessary condition of production", and that „limited quantity of such useful natural conditions is a prerequisite of their monopolization" (pp. 95-96).

additional exploitation). Its practicability is complicated by the thermodynamical impossibility of achieving the complete recycling of inorganic materials. In physics, energy and matter are always transformed but never created or destroyed. Since any kind of transformation itself demands energy, it follows that more energy is *always* put into producing something than what can possibly be gotten out of it without adding even more energy (Daly, 1999, pp. 77-84; Craig, 2001, p. 374; Georgescu-Roegen, 1981).[60] Furthermore, Georgescu-Roegen (1979b) argues, matter always increases in entropy, i.e. the increase in the geographical diffusion of matter, which for recycling means that ever more energy will be needed to achieve the near-complete recovery of materials. This is further complicated by the capitalist division of labour and the general transnational character of production and trade, which significantly contributes to the degree of material entropy.

Additionally, the eventual result of the recycling process (a resource for renewed production) needs to be cheap enough so as to encourage companies to use recycled materials instead of newly exploited ones. Since the exchange value of commodities do not depend on the use value of the 'freely' appropriated natural elements used to produce it, but rather on supply and demand, it appears that raw materials (for example) will only be relatively expensive when they have become scarce (Marx, quoted in Burkett, 1998, p. 96), hence that recycling will in many cases only become profitable as the 'free' appropriation of nature becomes more difficult. This is less of a factor with straightforward products like glass and plastic bottles or paper, which can relatively easily be recycled, but all the more so with electronics, cars, and so on. "[E]xisting methods," Kang & Schoenung (2005) write, "are limited in their ability to handle complex products such as CRTs and PCs, which contain a large variety of materials" (p. 399). They also note that in these cases recycling depends largely on manual labour, which makes it rather capital intensive to fully recycle a computer for instance. The result is that so-called 'e-waste' is very frequently shipped to the periphery of the world economy to be 'recycled', where it often ends up being burned by workers not protected against the toxics released in the process (Widmer et al., 2005). It needs no elaboration that this neither is a sustainable solution. In sum, even though recycling can slow down the degradation of nature to some extent, it simply cannot stop it completely since the feasibility of recycling processes are restricted by thermodynamical as well as economic factors.

Other environmentalist interventions in the production process too can serve as cases here. Already above we have referred to the EU's policy regarding ecological sustainability with a particular focus on climate change. Europe's approach to the environmental crisis as put forward in its 'Sustainable Development Strategy' here serves as a good example of hegemonic environmentalism,

[60] Because of this, Georgescu-Roegen (1979a) has argued, in accordance with his fourth law of thermodynamics, that as matter becomes more spread out, its ‚reassembly' will demand more amounts of energy, and that „the increase of capital implies an additional depletion of resources[;] that any material process consists in the transformation of some materials into others by some agents, and that natural resources are the sap of the economic process" (p. 98).

which is clearly shown in the EU's self-declared, continuing dedication to economic growth as the means to provide a "long-term improvement of quality of life" (EC, 2009b, par. 'Outline'):

"The European Union is firmly committed to 'sustainable development'. It is a key principle of all its policies and actions. The European Union aims to create a society which is based on freedom, democracy and respect for fundamental rights, fostering equality of opportunity and solidarity within and between generations. It will work for the *'sustainable development' of Europe based on balanced economic growth* and price stability, a *highly competitive social market economy*, aiming at full employment, a high level of education and social progress, and a high level of protection and improvement of the quality of the environment" (EC, 2005, p. 2, emphasis added).

A bit further in the same document it is specified that the EU objective is to "prevent and reduce environmental pollution and promote sustainable production and consumption to break the link between economic growth and environmental degradation" (Ibid., p. 4). In specific relation to climate change, Europe's aim is to decrease its GHG emissions by 20%, establish a 20% overall share of sustainable energy and bring about a 20% increase in energy efficiency by 2020 (EC, 2008b, par. 1), whereby the latter two goals clearly serve as means towards the first. This approach is typical of hegemonic environmentalism in general, where the focus is more than often on increasing the efficiency of existing technologies and on the implementation of new ones, particularly when it comes to renewable energy (Xing & Hersch, 2002, p. 206; Doyle, 1998, p. 775).

In itself, of course, there appears to be very little wrong with either of these objectives; indeed one would think they can only be encouraged. Yet the EU's focus on efficiency and technology is not coincidental. As O'Connor (1998) has noted, both these strategies are fundamental ways for capitalism to avoid an *economic crisis*. An increase in efficiency, he notes, "is arguably the most important way that capital has prevented a general crisis arising from a profits crisis caused by high-cost materials" (p. 181), because it reduces expenditure and thus increases the rate of profit. Similarly, new technologies tend to increase the productivity of labour, hence enable the expansion of production and increase the mass of profit (though the rate of profit will actually decline, necessitating even more expansion).[61] In both cases therefore, the more or less immediate result for the economy is the increased accumulation of capital and the further expansion of production (since capitalist production and profit are means towards another). Taking into account that production is ultimately based on the appropriation of nature, both the increase in efficiency and the adoption of technological improvements will eventually increase the demand for natural resources, that is,

[61] There are, of course, additional benefits to the development of new technologies. In the case of windmills and solar power, for example, costs will also be reduced relative to the (inevitable) increase in the costs of fossil fuel extraction. On a general note, it is necessary to remember that the examples used here are mere illustrations to our theoretical argument, and that numerous other factors will evidently also contribute to the specific outcome of a given process. It is, however, indisputable that both increased efficiency and technological improvements are 'good' for the economy; indeed, they would not be introduced on a wide scale to begin with, if they weren't.

heighten the stress placed on the environment. Put differently, because rising efficiency and the introduction of new technologies are generally good for economic growth, and because growth is *always* in some way based on extractions from nature, so-called 'sustainable development' strategies will actually tend to contribute to the degradation of nature. This may seem somewhat surprising, but it is the logical result of an 'environmental strategy' that has economic growth as its main motive. Turning back to the example given above, it appears that the objectives of the EU have failed already before they have been implemented. Breaking the "link between economic growth and environmental degradation" (EC, 2005, p. 4) is a theoretical impossibility because there is only one way in which growth can come about, and that is through the 'free' appropriation of nature. There can be no material economic gain without a simultaneous reduction in the only original source of wealth, nature. Yet again, then, this example illustrates the fundamental contradiction between the linear functioning of the economy and the cyclic processes of nature; more economic growth will result in a greater demand for natural resources thus in larger amounts of environmental exploitation and more rapid degradation; a low degree of growth, on the contrary, implies a weak demand for raw materials, and therefore a minimal capitalist appropriation of nature (O'Connor, 1998, pp. 181-182). To belief that economic growth and the preservation of nature can coexist, or that growth can be achieved without using natural resources, i.e. that labour and capital are by themselves sufficient for production is, to quote Georgescu-Roegen (1975), "to ignore the difference between the actual world and the Garden of Eden" (p. 361).[62]

At the same time, however, this is not to mean that the *immediate objectives* of the EU's 'sustainable development' strategy (the 20% targets) cannot be achieved. On the contrary even, it is very probable that the rise in energy efficiency and the renewable energy revolution, if implemented in a satisfactory manner, will result in the reduction of *Europe's* GHG emissions. What the above discussion *does* imply is that this (once only) environmental gain will in the longer run be offset by the concomitant stimulus given to economic growth, which happens only through the appropriation of nature. Concretely, while the EU's climate change strategies (and, *mutatis mutandis*, also those of other 'sustainable development' supporters) might bring down CO_2 levels, the resulting economic opportunities will eventually degrade the environment in yet another way, be it by directly increasing the demand for silicon, plastics and metals to produce solar panels, or for lithium to make electric car batteries (Guardian, 2009e). Be it perhaps by stimulating the production of biofuels out of palm oil, sugar cane, corn, soy, jatropha, etc., which, besides turning food into fuel, also lead to soil erosion, increased water usage, biodiversity reduction and deforestation, thereby in the long run potentially

[62] The argument that growth is ultimately based on natural resources is a major debate between neoclassical economists on the one hand, and ecological economists and marxists on the other. Solow, for example, writes that „the world can, in effect, get along without natural resources" (Quoted in Burkett, 2006, p. 97), while ecological economists and marxists maintain that natural resources cannot be substituted by other production factors because nature is an element of *all* production (Ibid., p. 103).

raising GHG emissions rather than reducing them (UK Renewable Fuels Agency, 2008, p. 64). Or there is the large-scale destruction of ecosystems as a consequence of hydropower projects (International Rivers, 2008; Rosenberg et al., 1997), or indeed any of the innumerable other, more indirect ways by which a growing economy incessantly appropriates the services of nature. Economic growth, to name but one example, results in a larger demand for cars, which means that even when 'sustainable development' has turned them all into 'clean electric cars' and reduced emissions to zero, the already enormous quantities of raw materials used in car production will have to increase. While more efficient use of natural resources might make it possible to reduce the amount of material needed per car, the absolute, unrelenting expansion of production will eventually tend to raise mineral exploitation and energy use after all.[63] Of course this does not mean that cars are an inevitable part of capitalism, it only means that the *expansion of commodity production* is inevitable to it. Just as is the case with recycling, therefore, technological development and efficiency increases can temporarily reduce the stress placed on nature; they can probably help mitigate climate change as an individual problem, and reduce the impact of specific economic sectors on the environment, thereby 'postponing' the inevitable encounter between the market economy and the planet's physical 'limits to growth'. They can, however, in no meaningful way help to bring about the long-term sustainability of the system because, essentially, the companies implementing these innovations are bound with hands and feet to the logic of capitalism, which tells them to 'accumulate or die'.

These two, seemingly contradicting consequences of the EU's 'sustainable development' strategy, i.e. the short-term reduction in GHG emissions and the long-term degradation of the environment, actually constitute the practical implication of the theoretical argument we have made above, namely that hegemonic environmentalism, in terms of Polanyi's double movement, is at the same time both a protectionist movement of society and the continued capitalisation of nature; that while nature is protected in one way, it is increasingly degraded in many others. Consequently, it is also possible to make a theoretical argument on the environmentalist transformation's structural impossibility to overcome the contradiction with nature. Firstly, from the writings of Polanyi we derive that the protectionist countermovement is a reactionary process (it is spontaneous) while the expansion of capitalism is an active process ('laissez-faire was orchestrated') (2001, p. 147). This means that the countermovement is a reaction to social dislocation and environmental destruction brought about by liberalisation, or, put differently, that there can only be a countermovement when the problem is already apparent enough to cause alarm to society (hence the state). Further, that the countermovement will be concerned with the problem itself rather than with its cause, i.e. the

[63] That the efficiency increase can never completely level out the demand created by expansion is, needless to say, the logical consequence of the fact that there is an upper limit to how efficient something can be, but there is no economic limit to capitalism's impetus to keep expanding.

capitalisation of land, labour and money, which implies that any form of protectionism will be perceived as successful when the immediate problem is taken away, even though the cause remains. Thus, hegemonic environmentalism is seen as a sufficient and legitimate form of protection because its aim is to prevent, reverse or alleviate the consequences of climate change, of deforestation, soil erosion, etc. There is no need for society to question the causative factor (liberalisation) as long as the problem itself appears to be addressed. More even, for society to be concerned with the capitalisation of nature itself, the countermovement would have to be an *active* process, seeing that a market society's interests per definition lie in the continued functioning of the market mechanism.[64] Applied to the environmental crisis, it follows that there is no systemic need for hegemonic environmentalism to really address the question of structural unsustainability, since society is concerned only with the concrete manifestations of this condition (such as climate change). The legitimacy of the hegemonic order is not threatened by capitalism's ecological unsustainability, hence there is no reason for that order to either recognise its existence or attempt to resolve it. If anything, society is occupied with the system's *economic sustainability*, not realising that this condition is both dependent on its ecological counterpart, and inevitably contributing to its demise.

Which brings us to the second theoretical argument. Not only is there no political need for hegemonic environmentalism to address the issue of sustainability, it is also economically unable to do so. This of course has to do largely with the structural contradiction of capitalism discussed earlier. In respect to Polanyi and Gramsci, we have noted that the protectionist tendencies of society will in most cases only be successful (or become institutionalised) when they have been mediated through the state (or through society itself as the extension of that state)[65], meaning that the hegemonic order demands that any form of protection be made compatible to the inherent logic of capitalism, or differently, that a 'passive revolution' takes place so as to reconcile the spontaneous protection of society with the need of the system to keep expanding. Any form of protection that does not conform to the logic of that system is a threat to it because it would hinder the production of profit and therefore endanger society through an economic crisis (Polanyi, 2001, pp. 3-4). 'Passive revolution' in this sense is another way of expressing the capitalist system's tendency to find a balance between too much protection (the creation of an accumulation crisis) and too much social dislocation/environmental destruction, and thereby ensure the legitimacy of the system. However, arguably the most significant manner in which environmental destruction is expressed in a market society, is through economic crises itself, since social dislocation creates a demand crisis, while environmental destruction leads to more social dislocation, to supply crises, and so on (O'Connor,

[64] This is providing, of course, that the economy is capable of ensuring employment and wealth to sufficient amounts of people.

[65] Indeed, the state itself is not a necessary factor in all cases when we conceive of society in Gramsci's terms, namely as the extension of the state. In this case, society itself performs the ‚passive revolution' through the creation of consent.

1998, p. 182-184). This means that 'passive revolution' is a necessary reform of capitalism also because it creates a temporary balance between two inherent characteristics of market society that by their own would both result in an economic crisis, and eventually in the collapse of the system; too much environmentalism would destroy profits and e.g. create an accumulation crisis, too little environmentalism creates social dislocation and results in e.g. a demand crisis. The survival of the hegemony, politically and economically, is not only dependent on the protection of nature, but also on the limitation thereof.

Applied to our thesis, we need to conclude that there is very little about hegemonic environmentalism that is actually about the environment. Its policies and strategies are aimed at protecting nature only to a degree that does not interfere with the system's structural need to keep making profit (expansion), and to the degree necessary to prevent a scale of environmental destruction that would disrupt profits in yet another way. The main motive in either case is economic growth, and not ecological sustainability; the limits to environmentalism are defined by economic growth. Indeed a company that implements environmentalist measures, be it a carbon tax, an air/water filtration installation or solar panels, can do this only if it does not endanger its production. When environmentalism does prevent an obstacle to profit creation, companies are forced by the market to find new ways to expand their production or to cut costs, which anyway is the natural tendency of capitalism. Hence they will start producing electric cars, windmills and biofuels, they will substitute one natural resource for another and turn environmentalism itself into something profitable. The degradation of nature is thereby not halted but moved elsewhere, to other elements of nature, to other sectors of the economy, to other parts of the world, where limitations are absent. The overall trend, as we have illustrated in earlier chapters, remains one of increased destruction, deriving from the structural features of capitalism, its speed depending on temporary environmental benefits due to recycling and efficiency increases that, however, are eventually offset by the gain these innovations mean to the economy, and by their stimulus to the continued expansion of production. Hegemonic environmentalism cannot transform the inherently unsustainable characteristics of capitalism, because it ultimately derives its legitimacy from leaving them intact.

FALSE SOLUTIONS

On a final note, it is useful to comment on one more 'solution' commonly put forward to achieve a state of ecological sustainability within the capitalist system. Already above we have discussed the 'sustainable development' strategies of technological improvement, efficiency increase and recycling, and concluded that all of these are innovations unable to overcome the fundamental contradiction between capitalism and nature. To that list we can add another frequently suggested false solution, namely the internalisation of environmental costs, or as the EU describes it, the objective of

"ensur[ing] that prices reflect the real costs to society of production and consumption activities and that polluters pay for the damage they cause to human health and the environment" (EC, 2005, p. 6). Again, one would be tempted to congratulate the EU on its noble principles, but is the internalisation of costs really feasible? Let us once more rewind to Hardin and his metaphorical herdsmen (and -women of course). We concluded that the main reason for the tendency of the capitalist herdsmen to overgraze their common pasture is that they do not compensate for the productive activity of nature, that is, they freely appropriate the services of the soil in producing grass (or for that matter nature's production of livestock) in order to sell their cattle on the market and make a profit. The answer of the EU to this problem, it appears, is to charge the herdsmen for using the land, in the hope that this will limit their appropriation of nature. But how high should this charge then be? How expensive should it be to use nature? What *is* "the real cost to society of production and consumption" (Ibid.)? Clearly, the 'price of nature' cannot be dependent on market mechanisms, because supply and demand reflects the scarcity of commodities and not their use value, which would mean that nature is worthless as long as it is abundant, and valuable only when it is rare; indeed this is the logic that has caused the current crisis to begin with. Moreover, nature is not produced by man at all, hence there are no 'production costs' in the capitalist sense. Perhaps an answer might be that the 'price of nature' should be dependent on its use value. Yet then the same problem still remains: How do we decide how much nature is financially worth to society? How much should we pay for using the air, minerals, the soil and the rain, rivers and oceans, so that they will not be degraded? And who should we pay it to? How does one compensate nature for providing us with services and resources?

Evidently, these are extremely ridiculous questions. One might as well ask how much life itself is worth. We thus have to agree with Burkett (1998) when he says that

> "[t]he notion that exchange values can and should be 'corrected' to fully account for the use values of nature, domestic labour, etc., is tantamount to a denial of the basic, irreconcilable contradiction between exchange value and use value – between material and social requirements of capital accumulation and those of a truly human, social, and ecological development. It amounts to an assertion that ecological and other human-social values can be monetized, while fully maintaining their human-developmental qualities. It reduces, in short, to the claim that capitalism is not a class-contradictory, and historically limited, form of human production and development" (p. 106)

Of course this is where the problem is located. Hegemonic environmentalism and 'sustainable development' do not accept that capitalism is historically limited; their supporters do not believe that economic growth runs contrary to the conservation of nature. As a result, numerous efforts are being made to internalise costs and monetise nature, or the pollution of it, which creates the very same problems. Not surprisingly, these attempts encounter various methodological difficulties as well as create opportunities for the most outrageous abuses. One such case is the attempt to 'make

polluters pay' through carbon trading, a scheme that under closer scrutiny turns out to be perversely inadequate at bringing down GHG levels. In an effort to achieve the already tragically modest objectives of the Kyoto Protocol, the international community has set up an international mechanism that allows for the trade in 'carbon credits'.[66] These credits, Bachram (2004) explains, are allocated to Annex I countries on the basis of their 1990 GHG emissions minus their voluntary commitment. In this way, each country is given a carbon quota that it can then divide among its industries as it desires. Companies that emit less CO_2 than they are allowed to can choose to 'save' their credits for the next year, or they may choose to sell them to companies that need to buy extra credits because they exceeded their quota. Additionally, companies can 'earn' credits by investing, through the Clean Development Mechanism (CDM) and the Joint Initiative (JI), in carbon reduction projects in non-Annex I countries (the developing world). The way these credits are earned illustrates the sad absurdity of attempts to monetise nature:

"The amount of credits earned by each [CDM & JI] project is calculated as the difference between the level of emissions with the project and the level of emissions that would occur in an imagined alternative future without the project. With such an imagined alternative future in mind, a corporate polluter can conjure up huge estimates of the emissions that would be supposedly produced without the company's CDM or JI project. This stratagem allows for a high (almost limitless) number of pollution credits that can be earned for each project. It allows the company to pollute more at other sites, to sell its credits to other polluters, or to engage in a combination of these lucrative tactics. Its long-term consequences are (1) increased greenhouse gas emissions and (2) increased corporate profit obtained from their production" (Ibid., p. 9).

In combination with the ludicrous notion of an imaginary reduction *vis-à-vis* the future, carbon trading, writes Lohmann (2008), is abstracted from reality in many other ways. The Kyoto protocol states, for example, that credits earned by offset projects are *equal to* emission reductions, that is, investing in a CDM project is the same as reducing one's emissions, which of course neglects the numerous problems with controlling these projects as well as the theoretical impossibility of measuring how much carbon these projects are 'saving' (p. 362). Moreover, only emission 'reductions' are taken into account that are brought about by "those with official status" under Kyoto (Bachram, 2004, p. 13), which means that local and indigenous, century-old practices are not seen as carbon offsets, hence become replaced by large commercial projects, monoculture plantations and so on, in order to generate carbon credits:

"One example is the local low-carbon irrigation system of Sarona village along the fast-flowing Bhilangana river in mountainous Uttaranchal, India. The system uses porous rock dams to divert water gently into small canals while letting silt through. [...] This well-established, sustainable system,

[66] Lohmann (2008) notes that all GHG emissions are equated to CO_2 in order to make carbon trading feasible, which is a „gross oversimplification" because „the effects and lifetimes of different greenhouse gases in different parts of the atmosphere are so complex and multiple that any straightforward equation is impossible" (p. 361).

like many others in the region, is now under threat from a 22.5 megawatt run-of-the-river hydropower system being built by Swasti Power Engineering with prospective Kyoto Protocol carbon finance" (Lohmann, 2008, p. 363).

This project, the UNFCCC (2009c) estimates, will save "109,304 metric tonnes CO2 equivalent per annum" (par. 'Amount of Reductions') because it replaces conventional electricity generated from coal and oil, and the UNFCCC has therefore allowed it to produce carbon credits until 2017. The benefits, however, are ambiguous to say the least. Apart from destroying traditional irrigation methods and endangering local ecosystems, there is no real proof of any 'carbon saving' present here. Though the project might reduce the share of conventional power hence reduce carbon emissions on a local scale, the fact that the credits generated by it are sold to Western countries to allow them to continue polluting basically cancels out the project's proposed benefits. In this way, Lohmann (2009) argues, these offset schemes give "industries reasons for delaying structural change, [...] because it provides them with the get-out clause of buying pollution permits" (p. 6).

This case is more than just an anomaly, or the result of an imperfect application of the internalisation principle. The 'cap and trade' concept, Lohmann (2009) writes, "favours ingenuity in coming up with ever-new ways of producing cheap pollution rights, but not ingenuity in finding paths to a non-fossil economy" (p. 11). The irony of the logic behind carbon trading became evident, he continues, when, the UK in 2007 decided against subsidising renewable energy because carbon trading proved to be a cheaper way of 'solving' climate change (Ibid., p. 7). This shows how completely disconnected carbon trading is from the real world in which the emission of GHG is taking place; how 'putting a price on nature' flatly ignores anything that does not fit into the market logic. It is furthermore nothing short of tragic that numerous companies have actually made fortunes with carbon trading; that some EU countries, for example, distributed their carbon credits for free to the largest polluters, who consequently made millions by trading them and passing on the non-existent costs to the consumers (Lohmann, 2008, p. 362; Charman, 2008, p. 35). In this way, carbon trading has actually largely benefited the polluters, while, as many critics now acknowledge, the emission of CO_2 and other GHG has not decreased at all. Meanwhile, also, the market price of carbon credits has fluctuated significantly, which in market terms means that it has become cheaper or more expensive to pollute nature depending on international trade, or that the efforts needed to address global warming ultimately depend on the ups and downs of the stock market. One is left to wonder, indeed, what carbon trading has to do with environmental protection at all.

Nor is the problem limited to the imaginary financial costs of CO_2 emissions in the carbon market. Let us for example examine a seemingly more benign form of 'pricing nature', namely the EU's attempt at compensating for external costs in the transport sector. In a report stressing the need for more internalisation, the European Environment Agency (EEA) notes:

"Until recently, the main instrument used to abate the environmental impacts of transport has been environmental regulation, mainly through the setting of vehicle and fuel-quality standards. However, it has become clear that such 'end-of-pipe' approaches (mainly taken by environment ministries) are not sufficient to meet current and probable future international and national environmental targets. What is needed is a change in policy-making to a greater focus on preventative or controlling measures (e.g. road pricing) taken by the sectoral (transport) ministries" (EEA, 2000, p. 9)

Despite efforts to achieve this by internalising costs, the EEA (2000) notes, "progress has been slow: a recent report on the environment in the EU shows that the transport sector, which is continuing to grow rapidly, is jeopardising the EU's ability to achieve many of its environmental policy targets" (p. 9). The EEA stresses the need for "demand-management policies to reduce overall rates of [transport] growth" (Ibid.), and recognises that currently, "the environmental costs of water and soil pollution, vehicle production and disposal pollution, effects on ecosystems [...] are inadequately covered and methods of estimating them need to be improved" (EEA, 2009, p. 85). This is hardly a surprise, because, as we noted earlier, how does one estimate the economic value of something that you wish to preserve, if the framework you work in is built around exploitation and consumption. Thus the real problem becomes clear when the EEA (2000) by way of a side remark announces:

"It is widely accepted that transport prices do not recover external costs, but there is less agreement about the extent of the shortfall. [...] The recent ECMT [European Conference of Ministers of Transport] report on policies for internalisation concludes that the main response to internalisation is likely to be significant technological and operational efficiency improvements. The overall effect on demand for mobility and modal shares is likely to be relatively small. But the increase in transport costs will be offset by efficiency improvements and there will be opportunities for reducing non-transport-related taxes. So the impact on GDP growth or industrial competitiveness is likely to be small" (p. 83).

In other words, the EU here itself acknowledges that internalisation of costs cannot help to achieve its self-declared goal of 'demand-management' and a reduction of private transport growth. The reason appears rather obvious when we consider the argument made in previous chapters. How would demand be affected if "there will be opportunities for reducing non-transport-related taxes" (Ibid.)? Considering the crucial importance of transportation to the economic system, why would demand for transport fall if the rise in transport prices is offset by a reduction of taxes somewhere else, if GDP growth is not affected and purchasing power remains more or less the same? Where is the "preventive or controlling measure" (Ibid., p. 9) in all of this? More importantly, where does the environment come in exactly, when you tax people for polluting, but then re-enter the gains of this tax into an economy that is addicted to environmental exploitation? Indeed, even if demand for transport would fall, the environmental costs saved in the process would be negatively compensated for by the continued growth of the economy; car companies would need to find other ways to make profit and find new ways to 'freely' appropriate nature, otherwise the drop in transport demand

would bring about an economic crisis. Thus the only result the internalisation of costs might have, as the ECMT itself acknowledges, is the increase of efficiency and the implementation of cleaner technologies, which, we have already noted above, are equally false solutions. In this most likely scenario, the internalisation of pollution costs will make people switch to electric cars, or trains or even bikes for that matter, and thereby indeed help to decrease CO_2 emissions and perhaps even mitigate climate change. They will *not*, however, have contributed to the sustainability of the system, since capital accumulation needs to continue, hence also the exploitation of nature.

The internalisation of costs therefore does not reduce the stress on nature but, as with recycling, efficiency increase and technological improvements, just moves the onus elsewhere. This might create temporarily environmental gains in some aspects (emissions reduction being one), but will in the long run stimulate the economy hence increase the environmental stress somewhere else. The fallacy of internalising environmental costs becomes clear when we attempt to conceive of the internalisation of *all* environmental costs, so that there are no more opportunities for companies and individuals to relocate the appropriation of nature. Since there are very little things you can substitute nature as a whole with, and since accumulation needs to continue, the result, it would seem, is likely to be minimal even in this case. The reason is that the so-called 'environmental costs' are not 'compensating' nature at all. They are levied by governments or institutions and then made available as capital in some way or another, but they stay in the economy, continuing to contribute to growth. Clearly, nature itself cannot be 'paid', so 'internalised costs' are nothing more than ordinary taxes; they can alter people's behaviour but not change the way the economy functions. They can, in other words, dissuade people from exploiting nature in a particular way, but not from exploiting it altogether. It is clear, then, that there is no such thing as an 'economic cost of nature', and that the use and degradation of the environment cannot be measured financially in any meaningful way. The denial of this is nothing more than a failure to recognise the fundamental contradiction between capital and nature.

THE OTHER END OF HISTORY, A CONCLUSION

"Accumulate, accumulate! That is Moses and the prophets!" Marx wrote in one of his more poetic moments (1977, p. 742), and it continues to be a very apt description of the all-powerful logic of capitalism also at the beginning of the 21st century. In this thesis, we undertook to scrutinise the consequences of this logic in relation to the natural environment. We departed from the observation that recently, in the context of global warming, environmentalism has become a widespread phenomenon; that media, NGO's, governments and businesses now all propagate their dedication to the conservation of the environment, or what is most often referred to as 'sustainable development'. We also found that the overwhelming majority of these self-declared environmentalists believe that the objective of ecological sustainability is attainable within the framework of the capitalist system. From these two observations we derived the overall aim of this thesis, namely to examine whether it is *theoretically* possible for environmentalism to transform capitalism into an ecologically sustainable system. The stress on theoretically is important. Our purpose was not to analyse the different, concrete manifestations of environmentalism. Our concern was with the logic and dynamics of the environmental movement as a whole to the extent that it aspires the system's sustainability, and not with its manifold forms.

Similarly, we did not ask ourselves whether environmentalism can provide solutions to any of the numerous, individual environmental problems such as global warming, even though we frequently used the latter to demonstrate our point. We did not ask whether the international state system is capable of coming up with solutions to a global environmental problem despite the clashing interests of nation-states, or whether a weak global governance could overcome the problems posed by a strong global capitalism. These are very relevant questions, but they were not the focus of this thesis. Our focus was with the structural conditions of capitalism itself as the global, exploitative system that it has always been. We argued that isolating climate change as the focal point of this thesis would have failed to communicate our belief in the underlying socio-economic relation between *all* contemporary environmental problems. Hence, in the first part of our work, we outlined the historical as well as theoretical connection between the capitalist mode of production and the destruction of nature. This part explored how capitalism developed in dialectical relation to the human alienation from nature, which has enabled the system to generate environmental destruction on a quantitatively and qualitatively completely different dimension than during any other moment in human history. Making use of a classical Marxist argument and a number of ecological concepts, we furthermore placed technological development within the capitalist framework and contrasted

the economic logic of the system to the logic of nature. Finally, we elaborated on the structural reasons for this contradiction between capital and nature by making use of Marxist value theory and a Marxist analysis of capitalism as a system perpetually tending towards the creation of economic as well as ecological crises, which we argued are intimately connected.

All this served to illustrate, from a historical and classical Marxist perspective, the crucial point around which this thesis was constructed, namely that the appropriation of nature by capitalism was a *sine qua non* to the historical expansion of the system, that this appropriation inevitably lead to the degradation of the environment hence to ecological *and* economic crises, and that to overcome these crises, the system necessarily transforms itself by finding new ways to appropriate nature. These points we developed further in the second part of this thesis, by making use of our own interpretation of the works of Gramsci and Polanyi. Environmentalism, we argued, is exactly that, the result of the system's need to restructure itself in order to overcome crises. We used Polanyi's 'double movement' to explain this, but we needed to connect it to Gramsci's notions of hegemony and 'passive revolution' in order to understand the limits of that transformation. So while environmentalism is indeed a protectionist measure by society in the sense that Polanyi envisaged it, it is equally a measure by society to safeguard the accumulation of capital itself. The outcome of this marriage between environmentalism and growth we have called hegemonic environmentalism.

Hence we actually reinterpreted Polanyi's 'double movement' to mean that, in a world where the interests of the ruled have become almost indistinguishable from those of the rulers, society not only inevitably protects itself, it also inevitably limits that protection in order for the economy to continue growing. By connecting Gramsci to Polanyi and by redefining Polanyi's society as Gramsci's civil society, i.e. the extension of the state, we showed that the political legitimacy as well as the economic functioning of the system depend entirely on the ability of capitalism, through 'passive revolution', to ensure a balance between too much protection and too little, thereby considering that the real motivation in either case is the safeguarding of profit creation, and not the protection of society itself. We could thereby note that the fact that this is, in the case of environmentalism, an uneven process between global economic structures and nation-state-oriented forms of governance and civil society makes the creation of this balance undoubtedly even more difficult, but it does not change anything to the fact that the limits to environmentalism are ultimately defined by the system's structural need to ensure economic growth; that as long as capitalism is successful in ensuring its hegemony through the creation of consent, environmentalism can do nothing else than alleviate problems rather than solving them. For this reason, we maintain that even when truly global forms of governance and civil society would come to exist, environmentalism would still be unable to step out of the system's economic logic as long as capitalism's legitimacy is dependent on the creation of material wealth, i.e. the exploitation of nature. Indeed we argued that hegemonic

environmentalism has very little to do with the protection of the environment at all, and that it is first and foremost about overcoming the barriers to continued capital accumulation.

This is the condition that we examined in the third and last chapter of this thesis. The inherently unsustainable character of the capitalist mode of production, we argued, essentially derives from the nature of the system as defined by Marx, which is why we spent so much time and effort outlining it in the first part of this thesis. Capital accumulation is in one way or another always contingent on the appropriation of nature. Summarised crudely, more capital accumulation means more appropriation hence more exploitation of nature. Growth cannot happen without the use of natural resources, it can only hope to achieve higher rates of efficiency and recycling to lessen the amount of energy and materials needed per commodity. But there are physical and economic limits to both of these processes, and no limits to the desire of capitalism to continue expanding. The irony, moreover, lies in the fact that efficiency increases and recycling processes are generally good for the economy, that they contribute to the creation of more capital, thus to more demand for natural resources and energy. The same goes for technological innovations. The current eagerness of companies to invest in renewable energy, for example, clearly illustrates this. In this way the appropriation of nature is relocated, which perhaps solves the specific crisis of the moment, but simultaneously lays the foundation for the crisis of the future.

Environmentalism cannot change this because it derives its legitimacy from leaving intact the structures that enable the destruction of nature to begin with. The only way in which environmentalism managed to become as ever-present and seemingly important as it currently is, was by going through a 'passive revolution' that turned it into hegemonic environmentalism, meaning a form of environmentalism reconcilable with the logic of the hegemonic structures. The notion of 'sustainable development' is the most obvious manifestation thereof. It shows how the objective of ecological sustainability became subordinated to the continued production of profit; how environmentalism was made harmless to the hegemonic order by eliminating those aspects of it that could have threatened its legitimacy. Since growth is the cause of environmental degradation, environmentalism in the process also lost those aspects of it that could have guaranteed the real protection of nature, and perhaps even sustainability. Instead, the result is that the solutions put forward by businesses, governments and civil society organisations fail to address the real cause of the problem. Technological developments, efficiency increases and recycling are false solutions because they cannot provide a durable future for capitalism. They can alleviate existing problems by switching to a different kind of 'free' appropriation, but they cannot halt the exploitation of nature by production-for-profit altogether. On the contrary, they are likely to merely lay the foundations for a future and probably even more severe crisis by legitimising the continued accumulation of capital for the sole motive of material wealth. Attempts to internalise the costs of production, we have

argued, is one illustration of this trend. It shows how mankind fails to acknowledge the basic contradiction between nature and capital, and in so doing just exacerbates the problem. The impossibility of internalising environmental costs should teach us that nature simply cannot be monetised in any meaningful way, that the environment is a social form of wealth, which cannot be valuated financially without reducing it to its elements and thereby destroying it. The conclusion is inescapable. We have examined whether the environmentalist transformation of capitalism can bring about ecological sustainability. The answer, we maintain, is that it cannot.

Which brings us back to where we started in the introduction, to climate change. There is certainly no arguing about the graveness of the problem the world is facing. If the predictions of the IPCC turn out to be accurate, then there is quite simply nothing in the history of mankind that compares to the social and ecological implications of global warming. If ever a time there was to start addressing the real cause of the environmental crisis, it is most definitely now. Radical socio-economic changes are needed, changes that go much further than the current efforts to increase the efficiency of the economy and change the appearance of the world's energy dependence. As O'Connor (1998) rightly argues, "environmental policy that does not address the way that capitalism works (when it works) and the way that capitalism doesn't work (when it doesn't work), and economic policy that does not address the problem of the conditions of production in general and ecology in particular, are likely to fail, or even to contribute to the deterioration of environmental conditions" (p. 184). It is quite clear what needs to happen. The market system needs to be subordinated to social and ecological values, it has to become entirely embedded again in structures that give priority to the use of nature not to profit, but to a human society. This is why Polanyi (2001) concludes his argument with a chapter on "freedom in a complex society" (p. 257). "The discarding of the market utopia," Polanyi (2001) writes, "brings us face to face with the reality of society" (p. 268). Unfortunately we don't seem to be quite there yet.

The question, however, is not what needs to happen, but whether the needed change is possible. Since radical change demands the discarding of the market utopia, it also dictates the end of capitalism as the hegemonic order. A discussion on the feasibility of this counterhegemonic revolution would require another thesis, though would undoubtedly be a very interesting topic. For now it is useful to refer to what Gramsci (1978) called the "two fundamental principles of political science: (1) that no social formation disappears as long as the productive forces which have developed within it still find room for further forward movement; (2) that a society does not set itself tasks for whose solution the necessary conditions have not already been incubated" (p. 106). Whatever importance we may attach to this, there are really only two possible outcomes to the environmental crisis. In the first scenario, capitalism will continue the exploitation of nature until it eventually destroys the very foundations upon which it is built, hence also itself and society with it.

One could argue that climate change is a serious step in this direction. The second scenario involves the end of capitalism as the hegemonic order before it is too late. How this would have to be achieved is beyond the scope of our present argument. It seems clear, however, that the latter case is the more desirable one, and the former the more likely.

The beginning of this thesis has a poem by William Blake entitled 'And did those feet in ancient time', which he wrote at the beginning of the 19th century while living in London. In it, Blake talks of the 'dark Satanic Mills' of early industrial England, which many have interpreted as a reference to the Albion flour mill, one of the first true examples of industrialisation. The factory burnt down in 1791, allegedly with the help of some Londoners who saw it as 'satanic' because of its steam-powered engines and because it produced so much flour that it drove traditional millers out of business (p. 47). Polanyi (2001) used Blake's reference to the 'Satanic Mills' to criticise the social dislocation caused by the liberalisation of society (p. 35). Very little has changed since the times of Polanyi and Blake. More resources have been extracted from nature to create ever more material wealth for an increasingly small percentage of the world population. There is nothing free about this 'free' appropriation of nature; it has gone at the cost of environmental destruction and social dislocation particularly in the periphery of the world economy. In nature, we have seen, everything goes at a certain cost. So too in society, since human beings cannot escape the fact that they are entirely part of that nature. To realise this is the real challenge. The road to Polanyi's "discovery of society" (2001, p. 268), perhaps, goes through mankind's rediscovery of nature. Until then, Blake's 'dark Satanic Mills' will continue to function a little longer.

REFERENCES

Adam, B. (1997). Time and the Environment. In: Michael Redclift and Graham Woodgate (Eds.), *The International Handbook of Environmental Sociology*. Cheltenham, Edward Elgar Publishing, pp. 169-178.

Altvater, E. (1990). The Foundations of Life (Nature) and the Maintenance of Life (Work). *International Journal of Political Economy*, 20(1), pp. 10-34.

Ayres, R. (1999). The Second Law, the Fourth Law, Recycling and Limits to Growth. *Ecological Economics*, 29(3), pp. 473-483.

Bachram, H. (2004). Climate Fraud and Carbon Colonialism: The New Trade in Greenhouse Gases. *Capitalism Nature Socialism*, 15(4), pp. 5-20.

Barry, J. & Doran, P. (2006). Refining Green Political Economy: From Ecological Modernisation to Economic Security and Sufficiency. *Analyse & Kritik*, 28(1), pp. 250-275.

Birchfield, V. (1999). Contesting the Hegemony of Market Ideology: Gramsci's 'Good Sense' and Polanyi's 'Double Movement'. *Review of International Political Economy*, 6(1), pp. 27-54.

Block, F. (2001). Introduction. In: Karl Polanyi, *The Great Transformation: The Political and Economic Origins of Our Time*. Boston, Beacon Press, pp. xviii-xxxviii.

Brook, D. (2001). The Ongoing Tragedy of the Commons. *The Social Science Journal*, 38(4), pp. 611-616.

Burawoy, M. (2003). For A Sociological Marxism: The Complementary Convergence of Antonio Gramsci and Karl Polanyi. *Politics & Society*, 31(2), pp. 193-261.

Burger, J. & Gochfeld, M. (1998). The Tragedy of the Commons: 30 Years Later. *Environment*, 40(10), pp. 4-27.

Burkett, P. (1996). Value, Capital and Nature: Some Ecological Implications of Marx's Critique of Political Economy. *Science & Society*, 60(3), pp. 332-359.

Burkett, P. (1998). Nature's 'Free Gifts' and the Ecological Significance of Value. *Capital & Class*, 68(2), pp. 89-110.

Burkett, P. (1999). *Marx and Nature; A Red and Green Perspective*. New York, St. Martin's Press.

Burkett, P. (2003). Nature and Value: A Discussion. *Science & Society*, 67(4), pp. 452-462.

Burkett, P. (2006). *Marxism and Ecological Economics; Towards a Red and Green Political Economy.* Boston, Brill.

Buttel, F. H. (1997). Social Institutions and Environmental Change. In: Michael Redclift and Graham Woodgate (Eds.), *The International Handbook of Environmental Sociology*. Cheltenham, Edward Elgar Publishing, pp. 40-54.

Charman, K. (2008). False Starts and False Solutions: Current Approaches in Dealing with Climate Change. *Capitalism Nature Socialism*, 19(3), pp. 29-47.

Club of Rome (2009). *About Us: The Story of the Club of Rome.* Retrieved March 24, 2009 from [http://www.clubofrome.org/eng/about/4/].

Commoner, B. (1973). *The Closing Circle*. London, Jonathan Cape.

Cox, H. (1999). The Market as God: Living in the New Dispensation. *The Atlantic Monthly,* 283(3), pp. 18-23.

Cox, R. (1983). Hegemony and International Relations: An Essay in Method. *Millennium – Journal of International Studies*, 12(2), pp. 162-175.

Craig, P. (2001). Energy Limits on Recycling. *Ecological Economics*, 36(3), pp. 373-384.

Daly, H. & Cobb, J. (1989). *For the Common Good; Redirecting the Economy Towards Community, the Environment, and a Sustainable Future.* Boston, Beacon Press.

Daly, H. (1999). *Ecological Economics and the Ecology of Economics; Essays in Criticism*. Cheltenham, Edward Elgar Publishing.

Darwin, C. (2006). *On the Origin of Species by Means of Natural Selection; or the Preservation of Favoured Races in the Struggle for Life.* New York, Dover Publications.
Diamond, J. (2005). *Guns, Germs and Steel: A Short History of Everybody for the Last 13,000 Years*. London, Vintage Books.
Diamond, J. (2006). *Collapse: How Societies Choose to Fail or Succeed.* New York, Penguin Books.
Doyle, T. (1998). 'sustainable development' and Agenda 21: The Secular Bible of Global Free Markets and Pluralist Democracy. *Third World Quarterly*, 19(4), pp. 771-786.
Dunlap, R. (1997). The Evolution of Environmental Sociology: A Brief History and Assessment of the American Experience. In: Michael Redclift and Graham Woodgate (Eds.), *The International Handbook of Environmental Sociology*. Cheltenham, Edward Elgar Publishing, pp. 21-39.
EC (2005). *Communication from the Commission to the Council and the European Parliament; Draft Declaration on Guiding Principles for 'sustainable development'.* May 25th. Retrieved June 19, 2009 from [http://eur-lex.europa.eu/LexUriServ/site/en/com/2005/com2005_0218en01.pdf].
EC (2008a). *Communication from the Commission to the European Parliament and the Council; The European Union and the Arctic Region.* November 20th. Retrieved April 16, 2009 from [http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:DKEY=483680:EN:NOT].
EC (2008b). *Climate Change: Commission Welcomes Final Adoption of Europe's Climate and Energy Package.* Retrieved April 23, 2009 from [http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/1998&format=HTML&aged=0&language=EN&guiLanguage=en].
EC (2008c). *Communication from the Commission to the European Council: A European Economic Recovery Plan.* November 26th. Retrieved May 1, 2009 from [http://ec.europa.eu/commission_barroso/president/pdf/Comm_20081126.pdf].
EC (2009a). *Environment - Climate Change.* Retrieved April 18, 2009 from [http://ec.europa.eu/environment/climat/home_en.htm].
EC (2009b). *'sustainable development'.* Retrieved June 19, 2009 from [http://ec.europa.eu/environment/eussd/].
EEA (2000). *Are we Moving in the Right Direction? Indicators on Transport and Environment Integration in the EU.* Retrieved June 22, 2009 from [http://www.eea.europa.eu/publications/ENVISSUENo12/term2000.pdf].
Foster, J. B. (1994). *The Vulnerable Planet; A Short Economic History of the Environment.* New York, Monthly Review Press.
Foster, J. B. (2000). *Marx's Ecology: Materialism and Nature*. New York, Monthly Review Press.
Foster, J. B. (2002). II. Capitalism and Ecology: The Nature of the Contradiction. *Monthly Review*, 54(4), s.p. Retrieved June 15th, 2009 from [https://www.monthlyreview.org/0902foster.htm].
Foster, J. B. & Clark, B. (2003). Ecological Imperialism: The Curse of Capitalism. In: Leo Panitch and Colin Leys (Eds.), *Socialist Register 2004.* New York, Monthly Review Press, pp. 186-201.
Foster, J. B. et al. (2008). Ecology: The Moment of Truth – An Introduction. *Monthly Review*, 60(3), pp. 1-12.
Foster, J. B. (2008). Ecology and the Transition from Capitalism to Socialism. *Monthly Review*, 60(6), pp. 1-12.
Fritsch, B. (1995). On the Way to Ecologically Sustainable Economic Growth. *Revue International de Science Politique*, 16(4), pp. 361-174.
Georgescu-Roegen, N. (1975). Energy and Economic Myths. *Southern Economic Journal*, 41(3), pp. 347-381.
Georgescu-Roegen, N. (1979a). Comments on the Papers by Daly and Stiglitz. In: Kerry Smith (ed.), *Scarcity and Growth Reconsidered*, Baltimore, John Hopkins Press, pp. 95-105.
Georgescu-Roegen, N. (1979b). Myths about Energy and Matter. *Growth and Change*, 10(1), pp. 16-23.
Georgescu-Roegen, N. (1981). The Crisis of Natural Resources. *Challenge*, 24(1), pp. 50-57.
Germain, R. & Kenny, M. (1998). Engaging Gramsci: International Relations Theory and the New Gramscians. *Review of International Studies*, 24(1), pp. 3-21.

Gramsci, A. (1978). *Selections from Prison Notebooks*. Quintin Hoare and Geoffrey Nowell Smith (Eds.), London, Lawrence and Wishart.
Greenpeace (2009). *Victory! Philips Accepts Recycling Responsibility.* February 26th. Retrieved June 13th, 2009 from [http://www.greenpeace.org/international/news/victory-philips260209/].
Grimes, P. (1999). The Horsemen and the Killing Fields: The Final Contradiction of Capitalism. In: Walter Goldfrank, David Goodman and Andrew Szasz (Eds.), *Ecology and the World-System*. Westport, Greenwood Press, pp. 13-42.
Guardian (2007a). *Russia Plants Flag on North Pole Seabed*. August 2nd. Retrieved April 16, 2009 from [http://www.guardian.co.uk/world/2007/aug/02/russia.arctic].
Guardian (2007b). *Canada Uses Military Might in Arctic Scramble*. August 11th Retrieved April 16, 2009 from [http://www.guardian.co.uk/world/2007/aug/11/oil.arctic].
Guardian (2008a). *Arctic Declaration Denounced as Territorial 'Carve Up'*. May 29th. Retrieved April 16, 2009 from [http://www.guardian.co.uk/environment/2008/may/29/fossilfuels.poles].
Guardian (2008b). *Europe Joins International Contest for Arctic's Resources*. November 21st. Retrieved April 16, 2009 from [http://www.guardian.co.uk/world/2008/nov/21/arctic-energy-eu].
Guardian (2008c). *Who Is Fighting Over Food?* April 9th. Retrieved April 29, 2009 from [http://www.guardian.co.uk/news/blog/2008/apr/09/foodriots].
Guardian (2009a). *Copenhagen Scientists Compile List of Climate Change Clinchers*. March 12th. Retrieved April 26, 2009 from [http://www.guardian.co.uk/environment/2009/mar/12/ copenhagen-summary].
Guardian (2009b). World Will Not Meet 2C Warming Target, Climate Change Experts Believe. April 14th. Retrieved April 18, 2009 from [http://www.guardian.co.uk/environment/2009 /apr/14/global-warming-target-2c].
Guardian (2009c). *Fred Pearce's Greenwash: Exposing False Environmental Claims.* Retrieved April 23, 2009 from [http://www.guardian.co.uk/environment/series/greenwash].
Guardian (2009d). *Russia Plans Military Task Force to Patrol Arctic as 'Cold Rush' Intensifies.* March 28th. Retrieved April 16, 2009 from [http://www.guardian.co.uk/world/2009/mar/28/russia-gas-oil-arctic-nato].
Guardian (2009e). *Multinationals Eye Up Lithium Reserves Beneath Bolivia's Salt Flats*. June 17th. Retrieved June 20, 2009 from [http://www.guardian.co.uk/world/2009/jun/17/bolivia-lithium-reserves-electric-cars].
Guha, R. (2000). The Paradox of Global Environmentalism. *Current History*, 99(640), pp. 367-370.
Hällström, N. (2008). What Next? Climate Change, Technology and Development. *Development*, 51(3), pp. 375-381).
Hardin, G. (1968). The Tragedy of the Commons. *Science*, 162(3859), pp. 1243-1248.
Harvey, D. (1982). *The Limits to Capital*. Chicago, University of Chicago Press.
Harvey, D. (1998). Marxism, Metaphors and Ecological Politics. *Monthly Review*, 49(11), pp. 17-36.
Harvey, D. (2004). Retrospect on The Limits to Capital. *Antipode*, 36(3), pp. 544-549.
Hornborg, A. (2003). Cornucopia or Zero-Sum Game? The Epistemology of Sustainability. *Journal of World-Systems Research*, IX(2), pp. 205-216.
Huber, M. (2008). Energizing Historical Materialism: Fossil Fuels, Space and the Capitalist Mode of Production. *Geoforum*, 40(-), pp. 105-115.
Hutchings, K. (2002). *Imagining Nature: Blake's Environmental Poetics.* Montreal, McGill-Queen's University Press.
IMF (2007). *Biofuel Demand Pushes Up Food Prices.* October 17th. Retrieved April 28, 2009 from [http://www.imf.org/external/pubs/ft/survey/so/2007/RES1017A.htm].
International Rivers (2008). *Laos Dams Threaten Homes, Incomes and Fish, Say Campaigners.* October 3rd. Retrieved June 20, 2009 from [http://internationalrivers.org/chi/node/3419].
IPCC (2007a). *Climate Change 2007: Synthesis Report; an Assessment of the Intergovernmental Panel on Climate Change.* Retrieved March 25, 2009 from [http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf].
IPCC (2007b). *AR4 Synthesis Report Annex II.* Retrieved April 23, 2009 from [http://www.ipcc.ch/pdf/ assessment-report/ar4/syr/ar4_syr_appendix.pdf].

IPCC (2009). *About Us: Mandate.* Retrieved March 25, 2009 from [http://www.ipcc.ch/about/index.htm].
Jorgenson, A. & Kick, E. (2003). Globalization and the Environment. *Journal of World-Systems Research*, 9(2), pp. 195-203.
Kang, H. & Schoenung, J. (2005). Electronic Waste Recycling: A Review of U.S. Infrastructure and Technology Options. *Resources, Conservation and Recycling*, 45(1), pp. 368-400.
Kolstad, C. & Xing, Y. (1998). Do Lax Environmental Regulations Attract Foreign Investment? *Departmental Working Papers,* University of California, wp28(98pt1), pp. 1-26.
Kovel, J. (1997). The Enemy of Nature. *Monthly Review*, 49(6), pp. 6-15.
Kovel, J. (2007). *The Enemy of Nature: The End of Capitalism or the End of the World?* London, Zed Books Ltd.
Lacher, H. (1999). Embedded Liberalism, Disembedded Markets: Reconceptualising the Pax Americana. *New Political Economy*, 4(3), pp. 343-360.
Li, M. (2008). Climate Change, Limits to Growth, and the Imperative for Socialism. *Monthly Review*, 60(3), pp. 51-67.
Lohmann, L. (2008). Carbon Trading, Climate Justice and the Production of Ignorance: Ten Examples. *Development*, 51(3), pp. 359-365.
Lohmann, L. (2009). Carbon Trading: Solution or Obstacle? *The Corner House*. Retrieved June 27, 2009 from [http://www.thecornerhouse.org.uk/pdf/document/Indiachapter.pdf].
Mandel, E. (1981). Introduction by Ernest Mandel. In: Karl Marx, *Capital: A Critique of Political Economy; Volume Three*. London, Penguin Books.
Marx, K. (1977). *Capital: A Critique of Political Economy; Volume One*. New York, Random House.
Marx, K. (1991). *Capital: A Critique of Political Economy*; Volume *Three*. London, Penguin Books.
McCarthy, J. (2004). Privatizing Conditions of Production: Trade Agreements as Neoliberal Environmental Governance. *Geoforum*, 35(1), pp. 327-341.
Meadows, D.H., Meadows D. et al. (1972). *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind.* New York, Universe Books.
Meadows, D., Randers, J. et al. (2004). *Limits to Growth: The 30-Year Update.* White River Junction, Chelsea Green Publishing Company.
Moore, J. (2000). Marx and the Historical Ecology of Capital Accumulation on a World Scale: A Comment on Alf Hornborg's "Ecosystems and World Systems: Accumulation as an Ecological Process." *Journal of World-Systems Research*, 6(1), pp. 134-139.
Morton, A. (2007). Disputing the Geopolitics of the States System and Global Capitalism. *Cambridge Review of International Affairs*, 20(4), pp. 599-617.
NOAA (2009). *Trends in Atmospheric Carbon Dioxide.* Retrieved May 2, 2009 from [http://www.esrl.noaa.gov/gmd/ccgg/trends/].
O'Connor, J. (1998). *Natural Causes, Essays in Ecological Marxism.* New York, The Guilford Press.
Oosthoek, J. (2008). The IPCC and the Ozone Hole: A Warning from History. *Globalizations*, 5(1), pp. 63-66.
Opschoor, J. B. (1997). Industrial Metabolism, Economic Growth and Institutional Change. In: Michael Redclift and Graham Woodgate (Eds.), *The International Handbook of Environmental Sociology*. Cheltenham, Edward Elgar Publishing, pp. 274-286.
Perelman, M. (2007). Primitive Accumulation from Feudalism to Neoliberalism. *Capitalism Nature Socialism*, 18(2), pp. 44-61.
Polanyi, K. (2001). *The Great Transformation: The Political and Economic Origins of Our Time*. Boston, Beacon Press.
Ponting, C. (1992). *A Green History of the World: The Environment and the Collapse of Great Civilisations*. New York, St. Martin's Press.
Redclift, M. (1993). 'sustainable development': Concepts, Contradictions, and Conflicts. In: Patricia Allen (Ed.), *Food for the Future; Conditions and Contradictions of Sustainability*. New York, John Wiley & Sons, pp. 169-192.

Redclift, M. & Woodgate, G. (1997). Sustainability and Social Construction. In: Michael Redclift and Graham Woodgate (Eds.), *The International Handbook of Environmental Sociology*. Cheltenham, Edward Elgar Publishing, pp. 55-70.
Rosenberg, D., Berkes, F. et al. (1997). Large-scale Impacts of Hydroelectric Development. *Environmental Reviews*, 5(1), pp. 27-54.
Rosewarne, S. (1997). Marxism, the Second Contradiction and Socialist Ecology. *Capitalism Nature Socialism*, 8(2), pp. 99-120.
Sachs, W. (1997). 'sustainable development'. In: Michael Redclift and Graham Woodgate (Eds.), *The International Handbook of Environmental Sociology*. Cheltenham, Edward Elgar Publishing, pp. 71-82.
Sachs, W. (2008). Climate Change and Human Rights. *Development*, 51(3), pp. 332-337.
Scholte, J. (1997). Global Capitalism and the State. *International Affairs*, 73(3), pp. 427-452.
Shamsuddoha, M. & Chowdhury, R. (2008). The Political Economy of UNFCCC's Bali Climate Conference: A Roadmap to Climate Commercialization. *Development*, 51(3), pp. 397-402).
Shell (2009). *Sustainable Development in Shell.* Retrieved June 27, 2009 from [http://www.shell.com/home/content/responsible_energy/integrated_approach/sd_in_shell/sd_shell_08042008.html].
Stroshane, T. (1997). The Second Contradiction of Capitalism and Karl Polanyi's The Great Transformation. *Capitalism Nature Socialism*, 8(3), pp. 93-116.
Sweezy, P. & Magdoff, H. (1988). *The Irreversible Crisis; Five Essays.* New York, Monthly Review Press.
Sweezy, P. (2004). Capitalism and the Environment. Monthly Review, 56(5), pp. 86-93.
The Coca-Cola Company (2009a). *Energy Management and Climate Protection*. Retrieved April 26, 2009 from [http://www.thecoca-colacompany.com/citizenship/energy_climate_protection.html].
The Coca-Cola Company (2009b). *Sustainability*. Retrieved June 27, 2009 from [http://www.thecoca-colacompany.com/citizenship/index.html].
The Group of Lisbon (1995). *Limits to Competition.* London, The MIT Press.
The New York Times (2009). *Transcript: Barack Obama's Inaugural Address.* January 20th. Retrieved April 30, 2009 from [http://www.nytimes.com/2009/01/20/us/politics/20text-obama.html].
The Nobel Foundation (2009). *The Nobel Peace Prize 2007.* Retrieved May 1, 2009 from [http://nobelprize.org/nobel_prizes/peace/laureates/2007/].
The World Bank (2009). *About Us.* Retrieved June 27, 2009 from [http://web.worldbank.org/WBSITE/EXTERNAL/EXTABOUTUS/0,,pagePK:50004410~piPK:36602~theSitePK:29708,00.html].
UK Renewable Fuels Agency (2008). *The Gallagher Review of the Indirect Results of Biofuels Production.* July. Retrieved June 20, 2009 from [http://www.renewablefuelsagency.org/_db/_documents/Report_of_the_Gallagher_review.pdf].
UN (1982). *United Nations Convention on the Law of the Sea.* Retrieved April 19, 2009 from [http://www.un.org/Depts/los/convention_agreements/texts/unclos/unclos_e.pdf].
UN (1997). *UN Conference on Environment and Development.* Retrieved March 24, 2009 from [http://www.un.org/geninfo/bp/enviro.html].
UNESCO (2009). *About Us.* Retrieved June 27, 2009 from [http://portal.unesco.org/en/ev.php-URL_ID=3328&URL_DO=DO_TOPIC&URL_SECTION=201.html].
UNFCCC (1998). *Kyoto Protocol to the United Nations Framework Convention on Climate Change*. Retrieved April 23, 2009 from [http://unfccc.int/resource/docs/convkp/kpeng.pdf].
UNFCCC (2008). *National Greenhouse Gas Inventory Data for the Period 1990-2006*. Retrieved May 2, 2009 from [http://unfccc.int/resource/docs/2008/sbi/eng/12.pdf].
UNFCCC (2009a). *Kyoto Protocol: Status of Ratification.* Retrieved April 23, 2009 from [http://unfccc.int/files/kyoto_protocol/status_of_ratification/application/pdf/kp_ratification.pdf].
UNFCCC (2009b). *Parties & Observers.* Retrieved May 2, 2009 from [http://unfccc.int/parties_and_observers/items/2704.php].

UNFCCC (2009c). *Project 0743 : 22.5 MW Bhilangana Hydro Power Project (BHPP).* Retrieved June 27, 2009 from [http://cdm.unfccc.int/Projects/DB/RWTUV1161877931.96].

Wallerstein, I. (1998). Contemporary Capitalist Dilemmas, the Social Sciences, and the Geopolitics of the Twenty-First Century. *Canadian Journal of Sociology*, 23(2/3), pp. 141-158.

Wallerstein, I. (1999). Ecology and Capitalist Costs of Production: No Exit. In: Walter Goldfrank, David Goodman and Andrew Szasz (Eds.), *Ecology and the World-System*. Westport, Greenwood Press, pp. 3-11.

Wallerstein, I. (2002). *The Capitalist World-Economy; Essays by Immanuel Wallerstein.* Cambridge, Cambridge University Press.

Warnock, J. (2003). The Green Movement: Why Does it Remain Reformist? *Canadian Dimension*, 37(5), pp. 43-46.

WCED (1987). *Our Common Future.* New York, Oxford University Press.

Widmer, R., Oswald-Krapf, H. et al. (2005). Global Perspectives on E-waste. *Environmental Impact Assessment Review*, 25(1), pp. 436-458.

Xing, L. & Hersch, J. (2002). Understanding Capitalism: Crises and Passive Revolutions. *Competition & Change*, 6(2), pp. 193-212.

Xing, L. & Hersch, J. (2006). Understanding Global Capitalism: Passive Revolution and Double Movement in the Era of Globalization. *American Review of Political Economy*, 4(1/2), pp. 36-55.