STABLE SYSTEM, CHANGING CLIMATE: Capitalism and the Warming of the Arctic

Cecilia Gingerich

I. Introduction

In recent years, the effects of climate change have grown increasingly evident. From rising temperatures and sea levels to persistent droughts and unseasonal hurricanes, the last few decades have contained more environmental deviations than can be attributed to natural variation. The scientific community has reached a consensus that climate change is manmade—a direct result of large quantities of greenhouse gasses being released into the atmosphere over the past few centuries. Yet few serious societal changes have been made, or even considered. Indeed, as I will explore in this paper, society has largely been—as the saying goes—open for business as usual.

I begin by examining some of the basic mechanisms of capitalism and why they are incompatible with ecological sustainability. Such mechanisms include profit motive, how value is measured in a capitalist system, the process of capital accumulation, and a systemic contradiction. I then briefly critique the inclusion of these mechanisms in the "green" capitalist solutions to climate change that have become popular today. Next, I present the case study of climate change in the Arctic, since it is one of the regions in which climate change is occurring most rapidly. I will consider how the problematic mechanisms of capitalism I identify have contributed to the recent warming of the Arctic, and how they currently influence the policies that will determine the region's future. Lastly, having shown the basic mechanisms of capitalism to be ecologically unsustainable, I ultimately conclude that climate stability cannot be achieved through them.

II. Profit Motive and Value in a Capitalist System

Perhaps the most discussed climate change issue during the past few years in the United States has been the construction of the Keystone XL Pipeline. The pipeline was proposed by the North American energy corporation TransCanada in 2008, and was designed to carry crude oil from the Athabasca Oil Sands of Alberta, Canada, to Steele City, Nebraska (Hovey 2008). People across the political spectrum have raised concerns about the environmental impact of the pipeline. Many cite the high probability of oil spills and the potential damage to several delicate ecosystems. However, it is the pipeline's latent contribution to climate change that provoked famed climate scientist and activist James Hansen to proclaim that if the Keystone XL is built, it will be "essentially game over" for any hope of reestablishing a stable climate (McGowan 2011).

Of course, some argue in favor of the pipeline by claiming that it could create new jobs and make the nation more energy independent. Still, studies vary widely on the number of permanent jobs the pipeline would provide, and while the pipeline would certainly help to make the United States less dependent on foreign oil, it would do nothing to move the country towards independence from fossil fuels. Yet the pipeline was not proposed by the government or any elected body for the "benefits" now under discussion. Rather, it was proposed by a mega corporation that was motivated by the sole objective of all companies in a capitalist system: profit.

Profit motive is perhaps the most commonly recognized mechanism of capitalism, and it is quite controversial. While there are many ways to debate profit motive, my purpose here is to determine why it is incompatible with ecological sustainability. To understand profit motive, it is essential to understand the meaning of profit in the context of capitalism. Colloquially, the

term "profit" is used to express "a valuable return" (Merriam Webster 2013). In economics, we most commonly think of this return in terms of money. Yet money is, of course, merely a representation of value, and so it is really *value* itselt that must be defined in order to understand profit. The question thus becomes: how is value measured in a capitalist system?

A useful starting point from which to approach this question is Karl Marx's famous distinction between a commodity's "use value" and its "exchange value." In the first chapter of *Capital Volume I*, he writes that it is "the usefulness of a thing" that gives it a use value (Marx 1990, 126). He clarifies by stating that use value is "conditioned by the physical properties of the commodity," or, in other words, is attached to the commodity's nature as a material object (ibid.). He concludes that natural resources, such as "air, virgin soil, natural meadows, unplanted forests, etc.," thus have use value, since they all can be useful to humans (ibid., 131). By this definition, oil (even from the tar sands of Canada) clearly has a use value, since it is a major energy source. However, it is equally clear that this is not the type of value that TransCanada is marking down in its ledgers.

In order to understand the nature of the value marked in ledgers, we must turn to the other type of value Marx discusses: exchange value. Essentially, he uses this term to refer to the type of value a commodity has in the market. This is not to suggest that a commodity's exchange value is the same as its price; rather, exchange value is determined by the exchange relation between commodities. Marx uses the example of corn and iron, which have an exchange relation because a certain amount of corn equals a certain amount of iron (ibid., 127). Thus, all natural resources clearly also have this type of value in addition to their use values—including the oil that the Keystone XL Pipeline would transfer for later sale.

Joel Kovel elucidates why breaking value into these two categories is incompatible with ecological sustainability in his consideration of the nature of each type of value. In *The Enemy of Nature: The End of Capitalism or the End of the World?*, Kovel describes the nature of use values as "essentially concrete" and having a "qualitative function" (2007, 135). He goes on to explain, "Being qualitative, [use-value] retains the essential feature of differentiation, that distinct elements can recognize one another and form links and associations" (ibid.). An example of this is our relation to fresh water: through its use value we are able to recognize it as a liquid substance that is part of our environment and that we, as humans, depend on to live.

However, water is bought and sold in the market, and so also has an exchange value. Yet exchange value has a mystifying effect, which means that the qualitative function of water is no longer present. Explaining this characteristic of exchange value, Kovel writes, "Here, in sharp contrast to use-values, the sensuous and concrete are eliminated by definition and *a priori*. All that is retained as the mark of exchangeability is quantity: this item, x, is exchangeable for so many of y, which in turn is exchangeable for so many of z, and so forth, with no intrinsic end" (ibid., 135-136). This process of quantification is particularly hard on natural resources, because the process obscures that those resources—and all products that rely on them—are not infinitely reproducible.

Quantifying natural resources obscures not only those resources' positive qualitative functions, but also their negative qualitative functions. Not only is it important to be able to recognize that fresh water is needed for human life, it is also important to be able to recognize that, when burned, oil releases a gas that causes our planet's climate to change. Yet since the exchange value of oil does not reflect this function, we cannot expect a company like

TransCanada—which, like all companies in a capitalist system, recognizes only exchange values—to recognize it. The company's ledgers are full of numbers, not a list of the qualitative functions of their product.

The discussion now returns to profit motive, since in a capitalist system profit is based on exchange values. Profit is therefore represented quantitatively: numbers on a balance sheet detached from the qualitative functions of the products they represent. Clearly, the qualitative function is still important because it dictates the demand for a product. However, even this nod to a product's use value does not address the issue of its possible negative effects on the environment. For example, oil will be bought and sold only as long as it is used as an energy source. For however long that lasts, the profits from such transactions will represent only oil's exchange value. Thus, the companies that collect those profits need never consider anything outside that exchange value, and indeed should not if they hope to survive in a competitive market.

Although qualitative functions of commodities are outside the logic of profit motive, this certainly does not mean that companies have never been forced to consider such functions. However, the key word here is "forced," since factoring in any negative functions—such as the fact that oil produces carbon dioxide, which causes climate change—would undoubtedly lead to additional costs, or less profit. Recently, some attempts have been made to remedy this conflict of interests, which I analyze in greater detail in a later section. For now, I will simply state that these attempts have been ineffective, which is unsurprising given that they aim to counter the natural progression of profit motive, one of the system's basic mechanisms.

III. The Process of Capital Accumulation

No discussion of profit motive should be considered complete without considering the reason profit motive exists in capitalism and what its ultimate objective is. The reason can be found in one of the system's even more fundamental mechanisms: capital accumulation. In Kovel's words, this is capitalism's foundation on an economy "geared to run on the basis of unceasing accumulation" in which "each unit of capital must, as the saying goes, 'grow or die'" (ibid., 121). The mechanism is perhaps most obvious at the level of the individual capitalist, who needs to "constantly search to expand markets and profits or lose his position in the hierarchy" (ibid.). However, large corporations and national economies are also organized around this capitalist principle, and so too seek to continually expand.

Indeed, even mega corporations in monopoly-dominated industries like oil and gas continue to accumulate more capital, despite the fact that they hold positions at the top of the hierarchy. This highlights one of the potential problems of capital accumulation: it can go too far. There are few who criticize the developments made possible in the technology sector during eras like the Industrial Revolution. However, as the wealth of the global capitalist system becomes concentrated in fewer and fewer hands—as the mechanism demands—the present benefits of the accumulation process might rightly be questioned.

While control of all wealth by a few elites undoubtedly bodes poorly for the future of societal structures like democracy, it could also jeopardize the future of our physical environment. If the CEOs of Exxon Mobil and Royal Dutch Shell alone were able to determine whether or not we embrace energy alternatives to fossil fuel, a sound bet could be placed against the embrace of viable alternatives. Although this example might be a bit extreme, the

giants of the oil and gas industry do have a great deal of political and economic power both in the United States and globally, and—according to the process of capital accumulation—we can expect that power to only grow.

Considering this potential impact of capital accumulation on the environment, Kovel considers capital accumulation to be "the root of capital's wanton ecodestructivity," since "under such a regime the economic dimension consumes all else" (ibid.). He goes on to note that "nature is continually devalued in the search for profit along an expanding frontier" and that "the ecological crisis follows inevitably" (ibid.). Here, he references the important relationship between the accumulation process and profit motive: accumulation is the *what* towards which profit motive is aimed, and also the *why* for which it occurs.

However, the process of capital accumulation does not always progress smoothly. Marx says one of the main causes of crisis in the system is an internal contradiction between the "forces of production" and the "relations of production." Here, "forces of production" refers to the combination of human labor power and all the things that aid in production (tools, machinery, land, infrastructure, materials, etc.). The term "relations of production" refers to the relationship between the system's two major classes, Capital and Labor, in which the former exploits the latter. The conflict of interest within this second element alone is thought to lead to social and political change. In addition, the contradiction is thought to lead to economic crises, and specifically to crises of overproduction.

A crisis of overproduction occurs when there is an excess supply of a commodity, or in other words, when there is not enough demand. Such crises have occurred throughout the history of capitalism, and are frequently studied. However, sociology and economics professor

James O'Connor contends that there is another contradiction in capitalism that exists between the forces of production and relations of production on one side, and the *conditions of production* on the other (1998, 160). He predicts that this "second" contradiction of capitalism will eventually produce a crisis of supply rather than demand—a crisis of underproduction of capital (ibid., 161).

Since the conditions of production are the added element in this second contradiction, it is important to know exactly how O'Connor defines them. He looks to Marx's definitions of the conditions, which include the "laborpower" of workers, "communal, general conditions of social production," and "external physical conditions" (ibid., 160). He then updates each category in modern terms, stating that laborpower is now discussed "in the terms of the physical and mental well-being of workers" and that communal conditions are discussed in terms like "social capital" and "infrastructure" (ibid., 160-161). He defines external physical conditions as "the viability of ecosystems," and provides some specific examples, including the stability of coastlines and watersheds as well as soil, air, and water quality (ibid., 160).

O'Connor asserts that the conditions of production are currently external to the system, and so constitute an added cost. More specifically, he states that "individual capitals" lower costs by externalizing (or not including) costs on the conditions of production, which ultimately causes those costs to rise for capital overall (ibid., 177). Perhaps the most obvious examples of crises that have been caused by such costs are those related to resource scarcity, like the resource-related crises of the nineteenth century (of coal, for instance). However, as some critics have pointed out, even these crises did not significantly affect the capital accumulation process overall, despite the fact that the depletion of a specific resource is detrimental to the

environment (Foster 2002).

Still, crises directly related to resource scarcity will likely become more common with increased world population and unpredictable climate change. We have seen such crises already, including the devastating drought of the summer of 2011 in Somalia, which cost tens of thousands of lives and has been linked to climate change (Straziuso 2013). The drought produced a food shortage: a crisis of underproduction. Of course, the economic effect of such a crisis in Somalia is different than it would have been in a more industrialized nation in which more food is produced to be sold on the market. However, there are already indications that similar climate change-related droughts are occurring elsewhere around the planet, including in the agricultural areas of the United States (Gaskill 2012).

By focusing on specific material resources used in production, O'Connor's critics have applied too narrow a definition to the term "conditions of production." Going back to O'Connor's original three-part definition, we can see that his concept of the conditions is much broader. One condition that stands out in light of climate change is infrastructure, which he lists as a "communal" condition of production. With two-thirds of the world's largest cities (of populations over five million) built at least partially on low-lying coastal areas, the infrastructures of these cities are increasingly at risk of damage by rising sea levels and extreme storms caused by climate change (Greenfieldboyce 2007). Such damage has already been shown to contribute unsuspected costs to infrastructure, and if climate change intensifies, it seems likely that these costs could lead to the type of economic crisis O'Connor predicted.

IV. The Limitations of "Green" Capitalism

One of the primary reasons that it is important to clearly identify the mechanisms of capitalism discussed in the previous sections as ecologically unsustainable is because they often form the basis of proposed solutions to environmental problems. Such solutions fall into the category of "green" capitalism, which is a broad term used to refer to solutions that aim to resolve environmental issues through a capitalistic, market-based system. Many of the most popular proposals to combat climate change fall into this category, and have been endorsed not only by the mainstream environmental movement, but also by many leaders in the business world. Indeed, the main draw of green capitalism seems to be that it allows business to continue as usual.

Specific green capitalist solutions to climate change vary widely, but here I consider a couple examples that illustrate how they encapsulate the mechanisms of capitalism. The first is the buying of carbon offsets, which allows governments, companies, and even individuals to pay a fee to "offset" their carbon emissions. The purpose of these offsets is to attach some value to carbon emissions, since those emissions cause climate change. Most are purchased in a compliance market in which governments or corporations must buy them in order to meet previously agreed-upon quotas (like those set by the Kyoto Protocol). These offsets allow such entities to pay to reduce fossil fuel use in general (by, say, investing in renewable energy) instead of limiting their personal fossil fuel consumption.

The fact that quotas on carbon emission are being set should not be underappreciated. However, carbon offsets seem to have little to no impact on the problematic mechanisms of capitalism. Their goal is not to curb the growth of large, fossil fuel-burning corporations, and as

a consequence such corporations are able to grow, and the process of capital accumulation is able to continue. Fossil fuel-dependent corporations maintain their positions at the top of the economic hierarchy, and the use of renewable energy remains limited. In fact, global carbon dioxide emissions reached a record high of 35.6 billion tons in 2012, and the rise has been directly attributed to an increase in in carbon emissions caused by the burning of fossil fuels ("Global carbon dioxide emissions reach new record high" 2012).

In light of this general support for the status quo, it is unsurprising that there exists a growing voluntary market for carbon offsets. This market differs from the compliance market in that it relies, at least in part, on marketing to attract customers. However, many of the most common marketing narratives flaunt the fact that their product requires no significant change in behavior from customers. Heather Lovell, Harriet Bulkeley, and Diana Liverman examine several such narratives in their 2009 paper "Carbon Offsetting: Sustaining Consumption?," including one that they refer to as "quick fix for the planet," whereby "any consumer can purchase offsets now, rather than undertaking perhaps more fundamental and (so the argument goes) slower changes to corporate practices or individual behavior" (2365). This narrative clearly acknowledges that carbon offsets are not aimed at achieving fundamental, systemic change.

A second example of a green capitalist solution is the development of "green" products, particularly those that claim to support climate stability by requiring less energy in production. This solution, like carbon offsets, may have some minor benefits, such as raising awareness among consumers about how much energy goes into making the products. However, most companies that produce such products certainly do not want consumers to buy fewer products,

lest they should make less profit. Thus the products also depend on (and support) the process of capital accumulation. An example of this type of green product is Aquafina's 2009 water bottle design. It used less plastic and reduced the amount of petroleum used in manufacturing, but did not address any of the more fundamental environmental problems associated with bottling, shipping, and selling water for profit.

Alternatively, some companies may state that their products are "green" because they are made to last longer; these companies may even urge their customers to buy fewer products and consume less. Still, the goal of such companies is to make money, and so they must sell their "sustainable" products at a price that prohibits the majority of people from buying them. Relying on a niche market is not a problem for a company, however, so long as it continues to make a profit. In fact, targeting a niche market may even be the objective in some cases. This highlights once again the indiscriminate, quantitative nature of profits in capitalism and the inability of green capitalism to alter that nature in any meaningful way.

V. The Warming of the Arctic

While the effects of climate change can be seen around the planet already, they are perhaps nowhere more evident than in the Arctic. This is undoubtedly due to the fact that in the past half-century, temperatures in the region have risen roughly twice as much as the global average ("The Melting North" 2012). In Greenland, for instance, this has meant an increase of 1.5°C since 1951, compared with an increase of just 0.7°C globally for the same period (ibid.). As temperatures have increased, the region's characteristic ice has thinned and melted at an alarming rate. This is due in part to the albedo effect, which occurs when light-reflecting snow and ice is replaced by more absorptive, darker-colored water or land (ibid.).

In July 2012, an unprecedented—and largely unpredicted—melting of the Greenland ice sheet occurred: a 97 percent surface melt over four days (Goldenberg 2012). The ice sheet contains almost seven hundred thousand cubic miles of ice, the second largest in the world after the Antarctic ice sheet (Walsh 2012). Scientists were so surprised by its melting that they admitted in a statement posted on NASA's website that they initially believed there was a mistake in their data (Goldenberg 2012). As the ice melted, it drained directly into the ocean and thus contributed to higher sea levels. For this reason, some scientists have even considered the 2012 melting of the Greenland ice sheet to be the "big X factor" in creating the devastating storm surges of Superstorm Sandy (Walsh 2012).

Arctic sea ice has been similarly shrinking. Head of the Polar Ocean Physics Group and Cambridge professor Peter Wadhams predicted in September 2012 that it might melt completely by 2015-16 (Vidal 2012). Sea ice does not contribute to rising sea levels like melting land ice, but the loss of sea ice could also severely disrupt the region's ecosystems. For example, ice algae depend on sea ice to live, since they grow within and on the underside of sea ice during the spring ("The Melting North" 2012). In turn, the lifecycle of the lipid-rich crustacean known as the copepod revolves around the seasonal ice algae and phytoplankton blooms (ibid.). The copepod is a critical food source for many of the region's largest animals, including walruses and polar bears, and so these animals' futures could also be jeopardized by the disappearance of sea ice and its accompanying algae (ibid.).

The thawing of the region's permafrost could have even more widespread ecological consequences. Currently tons of carbon dioxide and methane (an even more potent greenhouse gas) are trapped in the permafrost, and they could be released in large quantities if

warming continues (ibid.). The reason such emissions would be undesirable is of course because greenhouse gases cause climate change. We also know how and why greenhouse gas emissions increased so drastically over the past few centuries. They came with the development of fossil fuel-powered industry and the capitalist system that supported it.

Even though the region had little industrial development of its own, this historic link allows us to attribute the current climate change in the Arctic to capitalism. Allowing the system to continue unchanged can only lead to similar results, to continued warming in the Arctic and around the world. The recent transformation of the Arctic shows that the effects of climate change may occur significantly more quickly than initially predicted, which suggests that a gradual transfer from capitalism to a more ecologically sustainable system may not be drastic enough. Rather, it appears that what is needed to prevent further climate change is a rapid, fundamental break from capitalism.

VI. Prospects for the Arctic

Unfortunately, such a break does not appear to be taking place. The well-worn mechanisms of capitalism permeate nearly every position and policy that recently has been put forth regarding the region's future. Nearly all of society's most powerful actors—from corporations to states, and even international organizations—have welcomed the warming of the Arctic as a political and economic opportunity. They see in the region's natural resources the potential for profit, and in its melting sea ice the possibility of reduced shipping costs. Essentially, they see a new economic frontier.

Perhaps the most discouraging policies to have emerged are those concerning the Arctic's oil and gas reserves. The region is thought to contain 13 percent of the world's

undiscovered oil and 30 percent of its undiscovered natural gas (ibid.). Of course, burning these reserves would further climate change and its accompanying disasters. Still, the United States, Norway, Russia, and Greenland have all opened their portion of the Arctic to offshore exploration (ibid.). Several major business deals have followed, including Royal Dutch Shell's payment of 2.2 billion dollars for exploration rights off the shore of Alaska in 2005 and 2007 (ibid.). Although Shell found oil and gas in the area in the 1980s, it chose not to pursue it at the time because oil was then worth only fifteen dollars a barrel (ibid.). The recent deal came when that price shot up to over fifty dollars a barrel.

Clearly the motivation behind Shell's deal in Alaska was profit. Profit was also the motivation behind the United States' entry into the deal. In fact, in the case of the Arctic, states' policies have often seemed as motivated by profit as any corporation's, as evidenced in the extensive debates taking place over the rights to shipping routes in the region (provided that ice melts enough to open such routes). China, for example, has expressed interest in the North-East Passage above Russia and the North-West Passage above North America, since the passages would cut thousands of miles off the nation's current Atlantic-bound shipping route, which passes through the Strait of Malacca and the Suez Canal ("Banyan: Asia and the Arctic dragons" 2012).

New shipping routes have also attracted attention because they could allow for the extraction and transportation of the region's natural resources. These include not only oil and natural gas, but also elements like gold and uranium, rare earth minerals, and gemstones (ibid.). As access to these resources has expanded, the eight nations that claim land in the Arctic—Denmark, Canada, Finland, Iceland, Norway, Russia, Sweden, and the United States—

have all reevaluated their boundaries. This preparation for development comes despite the fact that the eight nations belong to an intergovernmental organization known as the Arctic Council, which initially claimed conservation as one of its primary goals (Bloom 1999).

The Arctic Council recently denied the environmental organization Greenpeace observer status because several of the Arctic governments "have been put off by Greenpeace's aggressive methods" ("The Melting North" 2012). Similarly, all the nations that have been granted permanent observer status are European, and have expressed support for the economic opportunities that warming in the region present. One such opportunity that has attracted considerable attention in Europe is Arctic tourism, which is expected to grow substantially with the more human-friendly environment that rising temperatures will create (European Commission 2005).

These development-oriented policies and positions provide a particularly clear example of the connection between profit motive and the process of capital accumulation. States seem particularly willing to exploit the economic potential of the Arctic, which reflects their need to recover after the economic crisis of 2008. In times of relative economic stability, it might be possible that pressure from below could force democratic governments and international organizations to consider the long-term environmental effects of their policies. However, during a period of economic instability, short-term economic interests will rise to the top of government agendas. The process of capital accumulation dictates that national economies must expand, and so we should not be surprised when states value development over conservation, especially during a time of crisis.

Also, it is important to remember the type of economic crisis James O'Connor predicted in his second contradiction of capitalism, even if the governments of the world fail to do so. Already, flooding associated with higher sea levels caused by melting in the Arctic has had significant economic costs. The cost of Superstorm Sandy in the United States alone is estimated in the tens of billions of dollars (Rapoza 2012). Due to its significant damage to infrastructure, the storm's impact on the "conditions of production" is still being felt months later. As the Arctic continues to melt, such storms will become more common, and more economic costs will follow.

VII. Conclusions

In June 2012, *The Economist* ran a sixteen-page special report on the current perils facing the Arctic from both climate change and development-oriented perspectives. In an attempt to speak to its business readers' sensibilities, the magazine stated in its conclusion that The World Bank has estimated the cost of adapting to climate change between 2010 and 2050 to be seventy-five billion to one hundred billion dollars a year ("The Melting North"). This quantitative figure tells us nothing about the impact of climate change on our environment, or the conditions of our lives. It is possible that this figure does not reflect such changes at all.

Furthermore, if policies in the Arctic are any indication, we should be wary of the way capitalism might "adapt" to climate change. Many of its fundamental mechanisms are incompatible with ecological sustainability—from the way it measures value to the profits it defines in terms of such value. Perhaps most importantly, capitalism is based on a process of continual accumulation, and accumulation is, by its nature, unsustainable.

Since these mechanisms are inherent to the capitalist system, it is not surprising that nearly all of the powerful actors operating within that system—from states to private corporations—have failed to craft policies that break with the mechanisms. The rise of green capitalism to the forefront of mainstream climate change debate indicates the degree to which the mechanisms are entrenched. We can expect the positions and policies that have contributed to climate change in the Arctic and around the world to continue until the capitalist mechanisms themselves are identified as problematic, and targeted specifically.

Bibliography

"Banyan: Asia and the Arctic dragons." 2012. *The Economist*, September 1-7.

Bloom, Evan. 1999. "Arctic Council." US Department of State, Reproduced with permission from the *American Journal of International Law*, 93 AJIL 712, copyright The American Society of International law. Accessed on 25 March 2013. <http://www.state.gov/e/oes/ocns/opa/arc/ac/index.htm>.

European Commission. 2005. "Arctic Sea Ice Thickness: Past, Present and Future." International Workshop, Rungstedgaard Conference Center, near Copenhagen, Denmark, 8-9 November.

Foster, John Bellamy. 2002. "Capitalism and Ecology: The Nature of the Contradiction." *Monthly Review*, Vol. 54, Issue 04 (September). Accessed on 22 March 2013. <http://monthlyreview.org/2002/09/01/capitalism-and-ecology>.

Gaskill, Melissa. 2012. "Climate Change Threatens Long-Term Sustainability of Great Plains." *Scientific American*, 27 November. Accessed on 22 March 2013. <http://www.scientificamerican.com/article.cfm?id=climate-change-threatens-second-dust-bowl>.

"Global carbon dioxide emissions reach new record high." *Max-Planc-Gesellschaft*. 12 December 2012. Accessed on 24 April 2013. <http://www.mpg.de/6678112/carbon-dioxide- climate-change>.

Goldenberg, Suzanne. 2012. "Greenland ice sheet melted at unprecedented rate during July." *The Guardian*, July 24. Accessed on 25 March 2013. <http://www.guardian.co.uk/environment/2012/jul/24/greenland-ice-sheet-thaw-nasa>.

Greenfieldboyce, Nell. 2007. "Study: 634 Million People at Risk from Rising Seas." *NPR*, 28 March. Accessed on 23 March 2013. <http://www.npr.org/templates/story/story.php?storyId=9162438>.

Hovey, Art. 2008. "TransCanada Proposes Second Oil Pipeline." *Lincoln Journal-Star* (Downstream Today), 12 June. Accessed on 13 March 2013. <http://www.downstreamtoday.com/news/article.aspx?a_id=11336>.

Kovel, Joel. 2007. *The Enemy of Nature: The End of Capitalism or the End of the World?*, London: Zed Books.

Lovell, Heather, Harriet Bulkley, and Diana Liverman. 2009. "Carbon Offsetting: Sustaining Consumption?" *Environment and Planning A*. 41: 2357-2379.

Marx, Karl. 1990. *Capital Volume I*. Translated by Ben Fowkes. England: Penguin Books.

McGowan, Elizabeth. 2011. "U.S. Climate Protests Shift to Blocking Keystone XL Pipeline Approval." *Reuters*, 27 June. Accessed on 13 March 2013. <http://www.reuters.com/article/2011/06/27/idUS323166223820110627>.

"The Melting North." 2012. *The Economist*, June 16-22.

O'Connor, James. 1998. *Natural Causes: Essays in Ecological Marxism*. New York: The Guilford Press.

"Profit." 2013. *Merriam-Webster.com*. Accessed on 15 March 2013. <http://www.merriam-webster.com/dictionary/profit>.

Rapoza, Kenneth. 2012. "One Week Later, The Cost Of Superstorm Sandy." *Forbes*, 5 November. Accessed on 25 March 2013. <http://www.forbes.com/sites/kenrapoza/2012/11/05/one-week-later-the-cost-of-superstorm-sandy/>.

Straziuso, Jason. 2013. "Somalia Famine Partially Blamed On Climate Change In New Study." *Huffpost Green*, 15 March. Accessed on 22 March 2013. <http://www.huffingtonpost.com/2013/03/15/somalia-famine-climate-change_n_2883088.html?utm_hp_ref=gree>.

Vidal, John. 2012. "Arctic expert predicts final collapse of sea ice within four years." *The Guardian*, September 17. Accessed on 25 March 2013. <http://www.guardian.co.uk/environment/2012/sep/17/arctic-collapse-sea-ice>.

Walsh, Bryan. 2012. "Climate Change: Polar Ice Sheets Melting Faster, Raising Sea Levels." *Time*. November 30. Accessed on 25 March 2013. <http://science.time.com/2012/11/30/climate-change-polar-ice-sheets-melting-faster-raising-sea-levels/>.