

**“Capitalocene or Anthropocene?”
Challenging the Marxist Narrative
- AND -
The Science of the Anthropocene:
from Eco- to Anthropocene Feminism**

**by
Lillian Deeb**

B.A. (Hons., Dbl Maj.), York University, 2014

Extended Essays Submitted in Partial Fulfillment of the
Requirements for the Degree of
Master of Arts

in the
School of Communication
Faculty of Communication, Art, and Technology

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SIMON FRASER UNIVERSITY
Fall 2019

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Approval

Name: Lillian Deeb
Degree: Master of Arts
Title: “Capitalocene or Anthropocene?”
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The Science of the Anthropocene:
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Supervisory Committee:

Svitlana Matviyenko
Senior Supervisor
Assistant Professor

Zoë Druick
Supervisor
Professor

Date Approved: December 4, 2019

Abstract

Essay 1: This essay takes an approach informed by Marxist Feminism and posthuman feminism in looking at the recent discussions within Marxist Ecology with a focus on the debate between John Bellamy Foster and Jason W. Moore about the ontology of the climate crisis, expressed as contestation between the terms “Anthropocene” and “Capitalocene.” By contextualizing this debate in the works of Marxist and posthuman feminist thinkers Maria Mies, Silvia Federici, and Joanna Zylińska among others, the essay argues that while “Capitalocene” more accurately describes the forces responsible for the crisis, “Anthropocene” is still a useful critical tool for structuring humanity’s relationship with the world around us. Further it is argued that while the notion “Capitalocene” identifies the way that capitalist relations have characterized nature, we must draw on the feminist scholars who have been developing a new ethics for the Anthropocene as thinking beyond capitalism and its human-centric ontology.

Essay 2: This essay looks at the narratives around “the Anthropocene,” the new geological age that many scholars argue the Earth is now in. In looking at these various discourses, with special attention paid to the narratives from scientists and those in the Anthropocene Working Group, this essay will argue that the science of “the Anthropocene” has developed as a way to legitimize capitalism and the gender and racial hierarchies that it depends on. As such, “the Anthropocene” should be developed, beyond the science, as a critical tool to think through how to live within ecological crisis. In order to do this, we should follow the posthuman feminists who have already begun this work by thinking through questions of ‘ethics’ instead of ‘value.’ By reorienting the discussions around ‘ethics,’ questions about relationships between humans and between humans and the Earth stay central to the discussion, opening us up to the new ways of organizing the world by subverting the logic of capitalism and its systemic alienation that caused ecological crisis to begin with.

Keywords: Posthuman Feminism; Marxist Feminism; Marxist Ecology; Ecological Crisis; the Anthropocene; Capitalocene; feminist philosophy of science; ethics; value; situated knowledge

Dedicated to Zahwa, Ghassan, and Hannan Deeb. Thank you for the constant support and inspiration.

Acknowledgements

I would like to acknowledge that these essays were written on unceded Coast Salish land. In particular, they were written on the lands of the xʷməθkʷəy̓əm (Musqueam), Skwxwú7mesh (Squamish), Səl̓ílwətał (Tseil-Waututh), and kʷikwə́łəm (Kwikwetlem) Nations. It should be acknowledged that I benefit from their ongoing displacement, though I was born in “Canada” due to the destabilizing Western interventions in the Middle East, where my parents are from. As a non-white settler, a first-generation “Canadian,” I know what it is like to belong to a land but have no, or very limited, access to it due to the violence that capitalism requires and perpetuates. These essays are all about this kind of violence under capitalism: relationships founded on dualism, hierarchy, and genocide. These essays are part of my contribution to reconciliation, and thinking through the violence of colonialism.

Despite the founding violence of “Canada,” good things thrive on Coast Salish land, too. I want to thank my supervisors first and foremost. Svitlana Matviyenko could not have been more generous with her time and encouragement. She introduced me to countless new thinkers and changed my relationship to knowledge, enabling me to think through and write about academic scholarship in a productive way. I have learned so much about writing, thinking, and teaching from her and can honestly say these essays would not exist without her. Because of Zoë Druick, I was able to reframe the whole project. She taught me to look towards the future instead of simply critiquing the old, dead, white guys who define many of the traditions of thought that I engage with in these essays. Further, she introduced me to many thinkers who have become important signposts for these essays. The two of them formed the best committee possible, and I cannot thank them enough.

I want to thank my friends and colleagues in the School of Communication, for constantly giving me good advice and keeping me calm throughout the process. Siobhan Watters and Elizabeth Sarjeant are the most brilliant and thoughtful friends I could have asked for. You both teach me everyday that our interpersonal relationships, our chosen family, are the foundation for anti-capitalist struggle. To the “Lady PhD” group (that included many MAs), I feel so honoured to be surrounded by such talented, smart, and hilarious women. To my East Van friends, knowing that I have a wonderful community at

school that also happen to live in my neighbourhood has been a source of comfort throughout the process of thinking and writing. Graeme Webb, Matt Greaves, Benjamin Anderson, Graham Mackenzie, and Alicia Massie: thank you for endless support.

To my fellow union thugs: thanks for teaching me good praxis everyday. In particular, I want to thank Yi Chien Jade Ho, Scott Yano, Zachariah Williams, Derek Sahota, Karen Dean, Zora Feren, Seamus Grayer, Alex Kline, Sydney Ball, Helena Krobath, Vince Tao, and Liam McClure. It was through the Teaching Support Staff Union and the Vancouver Tenants Union that I was able to figure out how these things I have written and thought about can turn into practice. It is this part of my life that inspires my thinking the most, because the way we advocate, organize, and decolonize in our daily work informs most of my dissatisfaction with the scholarship that I critique below, and how I was able to assess what scholarship actually performs the work to tear down the structures of capitalist epistemology and ontology. Solidarity forever!

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Essay 1:

“Capitalocene or Anthropocene?” Challenging the Marxist Narrative

Introduction: Anthropocene or Capitalocene?

In 2000, when Paul Crutzen, a Nobel Prize winning atmospheric chemist, and Eugene Stoermer, a leading researcher on diatoms (a kind of algae) and professor of biology, introduced the term “Anthropocene” as a new geological epoch, scientists and non-scientists have debated the term. Scientists defined it as a new geological epoch where the activities of human beings are the dominant force driving changes to the Earth’s geological strata (Crutzen and Stoermer 2000, 17). In early 2019, scientists of the Anthropocene Working Group voted to officially recognize it as a new geological epoch beginning in the mid-20th century (AWG 2019). Though it was not intended for use as a political tool or to place blame, the term has become increasingly common in many fields and in the media. As such, it is a contested term: there are debates emerging around what it means in terms of climate change, how it should be understood, and even whether or not the term itself accurately names the phenomenon that it is intended for. Through these debates, the term has taken many shapes.

For many, it is clear that capitalism is the driver of anthropogenic climate change. Greta Thunberg, a 16-year-old climate activist from Sweden, has recently become famous for her straightforward speeches. In an address to the UN’s Climate Action Summit on September 23, 2019, she memorably said “You have stolen my dreams and my childhood with your empty words. And yet I’m one of the lucky ones. People are suffering. People are dying. Entire ecosystems are collapsing. We are in the beginning of a mass extinction, and all you can talk about is money and fairy tales of eternal economic growth. How dare you!” (NPR 2019). While she may not be saying that capitalism in any form will necessarily produce ecological crisis, she reminds us that “‘business as usual’ and some technical solutions” will not be enough to avoid the disastrous consequences (NPR 2019). While she is not arguing for socialism or revolution, she is getting at an important observation: that despite the climate science being clear for decades now, the political and economic reform has not followed suit. So, it is necessary to ask why this is the case.

The impact of ecological crisis is not just limited to the feedback loops initiated due to global warming caused by increasing levels of carbon dioxide (CO₂) in the atmosphere. In addition to this, scientists speak about the environmental impact of the energy industry, of cleaning agents, of mining, transportation and war, and of diminishing

biodiversity, biogeography, and ecosystem around the globe (the sixth mass extinction or Anthropocene extinction) which have been going on since the Holocene but have “greatly accelerated” (Angus 2016) over the last few centuries (Dirzo *et al.* 2014; Kolbert 2014; Kolbert 2015). While the scientists who developed the Anthropocene as a new geological epoch are not looking to see who or what is responsible for global warming, many on the left are. For this reason, in this essay, I will begin with a critique of capitalism (Foster, Holleman, Clark 2019). Though there is much disagreement within the anti-capitalist left, as one of the longest standing bodies of thought critiquing capitalism, I take Marxism as a starting point in order to understand the structural features of capitalism and get to the root of the problems it perpetuates. I write it with a hope that on this basis, systems that do not replicate the destructive features of capitalism can be built while simultaneously developing the existing systems that already resist capitalism. Examples of this include social movement unions, which are unions based on solidarity and member-mobilization that operate against institutional hierarchy, and Indigenous ways of life that have survived centuries of colonialism by cultivating non-hierarchical relationships to each other and the land. The key question becomes, then, what are the destructive features of capitalism? The following essay will engage the authors who are concerned with this question, focusing on the work of Jason W. Moore with subsequent analysis of John Bellamy Foster’s work and his associated colleagues through *The Monthly Review Press*.

I will take a critical approach to the following analysis, deeply informed by Marxist Feminism and post-human feminism. Like the Marxist Feminists, I have a deep suspicion about Marx’s gender-blindness, though retain the analysis that capitalism relies on structural exploitation in order to generate surplus value (Federici 2012; Federici 2019; Mies 2014). Like the posthuman feminists, I agree that the Anthropocene must be thought in feminist and posthumanist terms. Here, feminism is about rejecting Eurocentric humanism that is centered on white, European, cisgendered, heterosexual individualism (Braidotti 24; Simpson 2017). From posthumanism, I take the position that human beings are *not* the most important species on the planet (Zylinska 2014; Braidotti 2017). This posthuman perspective is especially important because, while Moore explicitly draws on well known Marxist Feminists, he does not look at the posthuman feminists who have developed a deep and sophisticated understanding of the Anthropocene in order to decenter humanity from the ethical considerations necessary

for building a better world and living through climate change (Colebrook 2017; Zylinska 2014). I want to acknowledge that there is tension between these two positions, as Silvia Federici and Maria Mies tend to rely on gender binaries and as such a problematized but still problematic understanding of nature, however fleshing this out is beyond the scope of this essay. Despite this tension, thinking with these frameworks together creates a basis to more fully demonstrate the problems that arise from Marxist Ecology and as such provide better understanding of how to live within ecological crisis, when a solution is not here (yet).

John Bellamy Foster and Jason W. Moore are two of the most well known Marxists who research and articulate the Marxist position on ecology and climate change. They both contribute significant historical research on the state of the Earth and the role capitalism, as a way of organizing human beings and the world around us, has played in initiating climate change. In their engagement with each other's work, a debate has emerged between them, culminating in a disagreement on the question of whether or not the term "Anthropocene" should be replaced with "Capitalocene." While Foster *et al.* accept the term "Anthropocene" as the age we live in (Foster *et al.* 2019, Angus 2016), Moore and a growing number of scholars advocate for a different term: Capitalocene (Moore 2015; Haraway 2015; Hern and Johal 2018; Malm 2018). Foster and the Monthly Review contributors have been considering the scientific debate on the Anthropocene as a background for arguing that Marx was an inherently ecological thinker, and that his critique of capitalism demonstrates that a 'metabolic rift' has opened up between humans and the Earth since capitalism's beginnings. Moore, and others, argue that this is inaccurate, and that the term "Capitalocene" should replace it, because it more accurately identifies the function and role of capitalism as a way of organizing nature, regularly engaging in 'metabolic shifts' to maintain the production of surplus value. In this way, they are getting at the root of the ontology of ecological crisis, so their position is worth parsing at length given the urgency of these matters. While it has been discussed, and will be referred to in this paper, as a 'debate,' I will argue that regardless, my intention to keep their differences in mind, there is an agreement between these thinkers and it is more significant than their disagreement. Much can be gained from a detailed cross reading of their work. This essay will highlight the potential gains by means of critical reading.

An overview of their work will show that the Marxist heuristic is excellent for diagnosing problems created by capitalism. Their work through Marx offers many resources from which to understand ecological degradation through the logic of capitalism and the pursuit of profit at any cost. However, it is less clear that it will necessarily point to real solutions or practical steps forward to build a new world. Marx wrote *Capital* more than 150 years ago, and while there has been a significant amount of important analysis and extension of his work, no clear path to socialism, or even a clear vision of what socialism might look like, has emerged or gripped the masses. Further, the Marxist heuristic needs to be updated since the world has changed for us just like we have changed the world. While I argue that Marx's work is still relevant today in the sense that the surplus value that is generated through capitalism is fundamentally reliant on the systematic exploitation of labour and resources, and that this fuels and expands structural oppression, I also argue that given how different the horizon of possibilities are through the common use of technology and how this has changed our interpersonal relationships, the heuristic needs to be updated because possibilities that could not have even be thought at the time Marx was writing are daily occurrences today. Finally, it needs to be revised to take in consideration the problems of gender and race, as Marx does not offer sufficient analysis. While he does acknowledge gender as a source of oppression and condemns colonization for the systematic violence that it entails, he puts forth some problematic arguments articulating his vision of humanity's transition to communism through capitalist structures. For example, he articulated an understanding of the violence of colonialism, but initially saw the proletarianization of indigenous people as beneficial to them in the long run, because they were brought into the circuit of industrialized capitalism and as such would be on the path to socialism (Coulthard 2014, 10). For this reason, and many others, the heuristic needs to be updated to understand our historically and geographically specific time and place in addition to how to build a world that rivals it, embedded with different values and ethics. Additional steps must also be taken in order to determine what the practical way forward is; this is especially true when we consider the urgency to change for environmental considerations.

Both Foster and Moore contribute to the research on diagnosing the problems created by capitalism at a very high level; they put together pieces of history that have been pulled apart by capitalism and the commodity form. It is extremely important that humanity learns how to put them back together so we can be properly armed with the

information necessary to bring a halt to these violent and mystifying forces. With this in mind, looking at their work together provides a high level overview of how exploitation and appropriation has taken its course systematically throughout history, alongside the systematic exploitation and appropriation of women and colonies. Though they both point to the connection of these kinds of exploitation and appropriation, they focus on the economic and ecological aspects of the violence of capitalism. For this reason, their account of the development of capitalism is a great beginning, but should by no means be taken for the full account of the impact of capitalism in the world or even be taken as a sufficient basis for a theoretical framework to give such an account. This essay will explore in more depth Moore's arguments in *Capitalism in the Web of Life* in order to demonstrate why the Marxist Ecology approach to understanding the latter question, that of what might replace capitalism in order to avoid climate crisis, has fallen short of its explicit task.

The structure of the essay is as follows: I will begin with a literature review of the key books that form the foundation from which this debate emerged. Then I will discuss the reception of *Capitalism in the Web of Life*, as the reactions to the book also contributed to the perceived debate between these scholars. I will give a brief outline of Moore's view of the problem, then will begin going through his arguments in detail: the first around how he sees the problem of dualism, the second being the dialectic between capitalism shifting between strategies of capitalization and appropriation, and the third being his understanding of how capitalism tends towards economic crisis and how this is exacerbated due to climate change. I will argue against his assertion that the metabolic rift is a dualistic approach to understanding humanity's place in climate change, and in favour of using "the Anthropocene" as a way of periodizing history in a way that helps us avoid climate crisis. Further, I will demonstrate that the metabolic rift understood through the Anthropocene is a more useful *tool* for critical thought because it emphasizes the establishment of a new relation (or a lack thereof) between humans and Nature that, as philosophers of science argued, occurred around the time of the advent of modern science in the late 16th – 17th centuries (Koyre 1957). It is important because this is the founding violence of the experience of capitalism. It's something that everyone to a degree feels, but if humanity is to learn the lessons from the "women, nature, colonies," that are being taken advantage of on a global scale as they say, it is precisely this alienating effect of capitalism that is the root of all violence and must not be replicated in

whatever future way we organize each other and the Earth. Secondly, I will argue that Moore's concept "the Capitalocene" does not facilitate resistance to ecological crisis, as it keeps discussion focused on the crises that capital faces due to its own forces of production, circulation, distribution, and consumption instead of leading towards discussions on how to build alternatives in our current world; in this way, it also absolves humanity of the responsibility and urgency to take up these discussions. Finally, I will argue that we should not cede the term "Anthropocene" to the scientists by replacing it by the more "accurate" term "Capitalocene." If we do, we risk discursively foreclosing possibilities to move beyond capitalist relations and discursively cement its place at the centre of humanity's ontology; even if we were able to move beyond capitalism, any subsequent way of organizing humans and the earth would still be in reference to the Age of Capitalism.

A Note on "Nature"

Since this is an important notion for the debates at hand, it is necessary to say a few words about how the authors understand it. It will be seen in the quotes below that Moore uses it in multiple ways. For Moore, "Nature" (with a capital N) is a product of the capitalist project, "the scientific and symbolic creation of nature [...] as something that could be mapped, abstracted, quantified, and otherwise subjected to linear control", also called "external nature" (Moore 2015, 86). He contrasts this to what he calls historical natures, or the web of life that evolves historically (Moore 2015, 18), in an attempt to understand nature as something more just the objects of capitalism, in order to get beyond the idea that nature is an external limit to capitalism. This way he argues that both nature and capitalism are coproduced (Moore 2015, 29). Foster, Angus, Burkett, Clark, and York are much less explicit about how they use the term, but it can be inferred that since they all speak about capitalism denying humans "any relation to nature—even for their survival—unmediated by the institutions of private property" (Foster 2000, 67), it is clear that they are using it as a broad term, and as something that humans should have access to, not just because they view humans as part of nature (Foster *et al.* 2010, 228). Largely they use the term to talk about anything in the world that was not created by human beings (Angus 2016, 118). In this way, they talk about 'organic' or 'inorganic' relations.

I follow Timothy Morton by way of Joanna Zylińska in my understanding of nature: I have no coherent definition of it. I think it makes more sense to speak of the “environment,” (Zylińska 2014, 20) rather than nature, because this word is too embedded in the Cartesian binary that will be elaborated on in the discussions below, and too associated with value judgements: often nature or that which is natural is discussed as something “good.” For this reason, I agree with Morton that in order to think ecologically, as thinking about “all the ways we imagine how we live together,” we must let go of this notion of “nature” (Morton 2010, 4). Also following Carolyn Merchant, we can see how Western science has intentionally constructed nature as female and something to be controlled, and that in controlling women through the witch hunts in Europe between the 12th and 17th centuries, Western science was created (Merchant 1989). This groundwork of controlling women and their reproductive capacities laid the foundation for gaining access to the reproduction of labourers and labour power (Mies 2014). From this perspective, it is clear why in removing these reified notions of “nature,” we can begin to think ecologically and construct alternatives to capitalism that do not reproduce the same structures that capitalism was built upon.

The Intellectual History of the Debate

Before digging into the substance of Jason W. Moore’s argument in *Capitalism in the Web of Life*, it is necessary to give an overview of the literature that came before this book in addition to the edited collection that cements the question in the discourse ‘*Anthropocene or Capitalocene?*’. John Bellamy Foster is a professor of sociology, initially writing about monopoly capitalism who became interested in environmentalism in relation to Marx in the 1990s. Paul Burkett is a professor of economy, looking at issues of “green” capitalism. Richard York is a professor of sociology and co-editor of the journal *Organization & Environment*. Brett Clark is a sociology professor, who focuses on issues of ecology, political economy, and science. Ian Angus is an ecosocialist known for editing the journal *Climate and Capitalism*. Finally, Jason W. Moore is a historical geographer and environmental historian. Each author has written important books that form the basis for this debate. I will briefly summarize their contributions, and then I will address the reception of Moore’s book, which also participates in the formation of the discourse around the theoretical question articulated by these authors either taking sides or bridging their positions of the matter. The first five authors are all directly or indirectly

affiliated with *Monthly Review Press*, largely representing the main Marxist authors that Moore argues take a dualist position in arguing for and developing the Anthropocene. I will do this in chronological order of publication.

John Bellamy Foster published *The Vulnerable Planet: A Short Economic History of the Environment* in 1994, in which he connects a long history of ecological degradation to the history of capitalism. For him, the Industrial Revolution is an important point where this can be seen in history. As he demonstrates, “poets, novelists, journalists, physicians, Romantic social analysts, and defenders of the working class [during the Industrial Revolution] gave eloquent testimony to the horrors of the new industrial system” (Foster 1994, 52), and the ecological destruction it was initiating. He argues that capitalism is inherently destructive because it is premised on four counter-ecological tendencies: “(1) the only lasting connection between things is the cash nexus; (2) it doesn’t matter where something goes as long as it doesn’t re-enter the circuit of capital; (3) the self-regulating market knows best; and (4) nature’s bounty is a free gift to the property owner” (Foster 1994, 120). Further, he argues that capitalism as a mode of ecological destruction disproportionately affects women and people of colour all across the globe. He notes that in the United States, “over 70 percent of African Americans, 50 percent of Latinos, but only 34 percent of whites live in the areas with the greatest air pollution (Foster 1994, 138). Finally he argues that women have always been at the forefront of fighting capitalism’s ecological destruction because its drive toward profit generation above all else prevents them from maintaining life through cultural practices (Foster 1994, 140). In doing all this, he shows that capitalism has relied on nature’s “free gifts” as an accumulation strategy from the beginning of its history.

Paul Burkett, in 1999, published *Marx and Nature: A Red and Green Perspective* in an attempt to understand Marx’s understanding of nature. His goal was to defend Marx against critics who argue that first, he fell prey to thinking that capitalism could completely overcome all natural constraints, that his understanding of communism extended capitalism’s logic of human domination over nature, and that as such, communism like capitalism would perpetuate hostility between humans and nature; second, that Marx and his labour theory of value completely discount nature’s contributions to production; and third, that Marx did not conceive of nature’s role in any of capitalism’s contradictions (Burkett 2014, xxix). He defends Marx on all counts, demonstrating that he was an inherently ecological thinker, stemming from two of Marx’s

key methods of analysis: his “consistent treatment of human production in terms of the mutual constitution of its social form and its material content” (Burkett 2014, 1) and his “dialectical perspective on the historical necessity and limits of particular forms of human production” (Burkett 2014, 2). In this way, he demonstrates a connection between Marx’s understanding of nature, a historical materialist understanding of capitalism, questions of capitalism, value, and nature, and nature and communism.

One year later, in 2000, John Bellamy Foster publishes *Marx’s Ecology: Materialism and Nature*, which he states can be viewed as a complement to Burkett’s work, described above. In this book he further defends Marx’s against the charges of being anti-ecological by tracing Marx’s own understanding of materialism to the root, the materialist philosophy of Epicurus (Foster 2000, viii). He shows this by demonstrating that Marx’s concept of a “rift” in the metabolic relation between humans and the earth is to “capture the material estrangement of human beings within capitalist society from the natural conditions which formed the basis for their existence” (Foster 2000, 163), which is fundamental to the idea of private property. In this way, primitive accumulation is about the “dissolution of the organic relation between human labour and the earth” (Foster 2000, 170), which was further “evident on a more global level” because “whole colonies saw their land, resources, and soil robbed to support the industrialization of the colonizing countries” (Foster 2000, 164). He shows that Marx saw nature and humanity as dialectically intertwined, and that Marx’s understanding of communism, which was about abolishing private property (Foster 2000, 79) is fundamentally also about abolishing the rift between nature and humanity.

In 2010, John Bellamy Foster, Brett Clark, and Richard York published *The Ecological Rift: Capitalism’s War on the Earth*. In it, they set out to establish a connection between their assertion that capitalism is fundamentally destructive to most human beings and the Earth, that the economics of “green” capitalism is based on flawed logic, to relate all of this to the science of climate change, to articulate the dialectical ways of thinking that establish these things as true, and to pose possible ways out of capitalism and the inevitable climate crisis. They tackle an extremely vast array of issues in ecological thinking, like the myth of the paperless office (Foster et al. 2010, 183), the problems with thinking that capitalism’s technical fixes to ecological degradation will save humanity from climate change (Foster et al. 2010, 43), the ways that capital has shifted and transformed itself historically in order to solve or avoid

economic crises resulting from limitations of nature and natural resources (Foster et al. 2010, 82), and many more things. This is all done to establish that capitalism has created a metabolic rift between humanity and the earth, and following Marx, to call for the social control of the means of production through workers' associations. This would organize humans and nature in a rational way, and as such, eliminate the metabolic rift (Foster et al. 2010, 406). By connecting the oppression of women, poor people, and people of colour to ecological degradation and the science announcing the Anthropocene to false hope that technology and "green" capitalism will save humanity and the earth, they create a powerful narrative around Marx's notion of the metabolic rift.

Jason W. Moore published *Capitalism in the Web of Life: Ecology and the Accumulation of Capital* in 2015. The book argues that previous articulations of the Anthropocene and ecological degradation have maintained a Cartesian dualism between nature and society or nature and humanity. He argues for a nondualist framework in order to understand the way that capitalism has been able to survive as a way of organizing nature, that has always relied on a dialectic of capitalizing on and appropriating the work of "women, nature, colonies" (as qtd in Moore 2015, 240) in order to continually accumulate profit and capital. Moore suggests that climate change poses a unique barrier to capital accumulation because it is causing the "cheap natures" that capitalism has relied upon in order to generate surplus value are becoming increasingly more expensive. Due to this tendency, Moore foresees that capitalism will inevitably produce an economic crisis that it cannot resolve by its usual means, completely undermining itself and providing an opportunity for humanity to rethink notions of value in order to create a more equal society (Moore 2015, 290). Since the Anthropocene is plagued with Cartesian dualism, he suggests that the new epoch that humanity and the earth has entered is more accurately called 'the Capitalocene.'

Ian Angus, in 2016, wrote *Facing the Anthropocene: Fossil Capitalism and the Crisis of the Earth System*, where he follows the science of the Anthropocene, in order to discuss a biophysical phenomenon as a socio-ecological phenomenon (Angus 2016, 21). He argues this is important because in order to avoid climate crisis, it is necessary to understand the social factors that have initiated climate change. For Angus, it is clear that climate change is a product of capitalism and its dependence on fossil fuels. Finally, he argues that "another Anthropocene is possible, if the majority of humanity fights back. What should our objectives be, and what kind of movement do we need to achieve

them?” (Angus 2016, 21). He clearly summarizes the climate science, looking at planetary boundaries, different stratigraphic signals that might signal the beginning of a new epoch, the ways that the earth will change depending on how much more it warms, accepting the science on its own terms, but demonstrating caution for what it means for social scientists. As he clearly puts it, “while geologists search for an exact decade or even an exact day, a Marxist analysis looks for a longer period of social and economic change during which the Holocene ended and the Anthropocene began” (Angus 2016, 110). He goes on to look at the point in time that many of the scientists of the Anthropocene Working Group have put forward as the beginning of the Anthropocene: 1950, or “the Great Acceleration.” He looks at concrete socio-economic factors of that time period and demonstrates how each clearly facilitate climate change and the data that the scientists have been communicating. Ultimately, he argues that we must build a decentralized anti-capitalist environmental movement in order to avoid ecological crisis and create societies that do not maintain the inequality and structural oppression characteristic of capitalism.

Also in 2016, Jason W. Moore edited the collection *Anthropocene or Capitalocene? Nature, History, and the Crisis of Capitalism*. Some of the other contributors include Donna Haraway, a feminist philosopher of science and technology, Christian Parenti, an economist and investigative journalist, and Elmar Altvater, the late professor of political science known for his contributions to critical political economy. Moore introduces the book by sharing the anecdote that the first time he heard the term Capitalocene, it was from Andreas Malm¹ at a conference in 2009. For Moore, he and others came to this term independently because “the Anthropocene argument poses questions that it cannot answer. The Anthropocene sounds the alarm—and what an alarm it is! But it cannot explain how these alarming changes came about” (Moore 2016, 3). He goes on to argue that, though there are more satisfying alternatives to “Anthropocene,” “Capitalocene” is the only one that “captures the basic historical pattern modern of world history as the “Age of Capital”—and the era of capitalism as a world-ecology of power, capital, and nature” (Moore 2016, 6). Each contribute a unique critique of the term Anthropocene and in most cases argue for “Capitalocene.” The arguments against the Anthropocene range from the fact that, those who have defined it are focusing the conversation away from ecological “degradation” to ecological “change” in

¹ Malm also argues for “Capitalocene,” but as will be discussed below in the section called *Moore*

order to be seen as civilized and not biased (Crist 2016, 16), to disagreeing with the dates proposed as the start of the “Anthropocene” (Haraway 2016, 51), to say that it inaccurately identifies the cause of the problem as humans and their actions instead of capitalist rationality that has always been geared towards externalizing social and environmental cost (Altvater 2016, 150). The end result is a powerful argument for critiquing the term Anthropocene in favour of “Capitalocene” from many different angles.

Most of the reception of Moore’s book has been quite positive. Many scholars agree with him, that a dualism is indeed plaguing ‘Green Thought’ and Marxist ecology, and that he overcomes this dualism (Paye 2018; Surprise 2019; Hu 2019; Somerville 2018; Thomas 2017) and that “Capitalocene” is a better way of conceptualizing our current epoch (Baer 2017; Jagodzinski 2019). Some note that he draws on important feminist thinkers like Silvia Federici and Naomi Klein in tending to the need to overcome this dualism (Debney 2017, 128) and understanding capitalist accumulation strategies and value relations (McKinney 2017, 206). Other authors, while are ultimately supportive of the book, critically address some of the book’s arguments. These include Moore’s position on having “an adequate historical interpretation of the problem” of climate change overrides “the urgency to communicate the realities of biospheric change” (as qtd in Thomas 2017) and that Moore, while clear that Green thinkers have downplayed the necessity to properly historicize climate change, has not adequately provided an alternative vision to capitalism and its modes of production and accumulation (Soper 2016, 51). In this way, many scholars are clear that Moore’s articulation of the problems of dualism and how they have had an impact on the key questions facing humanity due to climate change are helpful.

One reviewer, Peter Somerville (2018), while looking at multiple books that address the questions of whether or not capitalism has caused climate crisis and what can provide a way to avoid the coming ecological crisis, directly compares the work of Moore and Foster and draws a conclusion by waging the terms “Anthropocene” and “Capitalocene.” He argues that Foster’s work on the Anthropocene and the metabolic rift is helpful for understanding capitalism’s contribution to climate change, but does not think it is an effective conceptual tool since the Anthropocene is a term mired in confusion (Somerville 2018, 112). He then goes on to argue that since “Capitalocene,” defined as “a historically specific unity of humanity and nature” (Somerville 2018, 111) more accurately demonstrates that it is not all humans who have created climate

change, but those who have controlled capital (Moore 2019). As such, he agrees with Moore that “it is not humanity’s separation from Nature that matters” (Moore 2015, 78), but “the shift from one way of organising nature to another” (Somerville 2018, 112). Even though Somerville notes that Moore is unclear what might replace capitalism (Somerville 2015, 112), he is clear that Moore’s work is important in thinking through this question.

This literature raises at least three important questions: how are the above scholars defining the “Anthropocene” and the “Capitalocene”?; what happens when or if we choose one term over the other?; and is Marxist Ecology able to point to a path forward to avoid ecological crisis, or at least to live with the consequences of it? The analysis below will focus on Moore’s main arguments around dualism, the dialectic between capitalization and appropriation, and capitalism’s tendency to produce economic crises in order to pose possible answers to these questions.

Moore’s View of the Problem

In *Capitalism in the Web of Life*, Jason W. Moore puts forward three interrelated arguments. The first is that there is a prevalent Cartesian dualism between nature and society or nature and humanity that plagues much thinking about capitalism and climate change regardless of political orientation, including those on the Left. For this reason, we need to get beyond this binary logic that understands climate change as the convergence of “nature + capitalism,” via a new conceptual tool that denotes the historical co-production and unity of “capitalism-in-nature/nature-in-capitalism”; he calls this tool “the double internality” or “the *oikeios*” (Moore 2015, 13). The second argument is that, using this framework to understand that capitalism is not just an economic system but “*a way of organizing nature*” (Moore 2015, 2, emphasis in original), we can then see that historically it has been able to function, thrive, and expand because of its ability to capitalize on and appropriate Cheap Natures.² Through its appropriation of “women, nature, colonies” (as qtd in Moore 2015, 240), capitalism has been able to accumulate. He explains that:

² In *Capitalism in the Web of Life*, he asserts there are *Four Cheaps*, that being labor-power, food, energy, and raw materials (Moore 2015, 17). In 2017, he and Raj Patel co-authored *A History of the World in Seven Cheap Things* in which they articulate seven things: Nature, Money, Work, Care, Food, Energy, and Lives.

Without women, nature, and colonies--a stylized list, to be sure--accumulation falters. The appropriation of de-valued work must necessarily outweigh the capitalization of work, lest the costs of the Big Four inputs [because when the price of these Cheap Natures] begin to rise, [...] opportunities for accumulation through commodity production and exchange (M-C-M') begins to decline. (Moore 2015, 240)

We see this how this functions through Marx's lesser-known "general law" of underproduction" (Moore 2015, 280). Finally, he argues that because of its tendency towards these kinds of accumulation patterns, capital always tends towards internal crisis when the cost of these Cheap Natures becomes too high. When this happens, capital must undergo a series of metabolic shifts in order to appropriate more or different Cheap Natures to resolve the crisis. Further, since capitalism requires constant expansion and new technical fixes to overcome barriers, the cost of reproducing capitalism, whether through capitalization or appropriation, is constantly increasing and as such is undermining itself. For this reason, he argues that the era we live in is more accurately understood as the "Age of Capital" or the "Capitalocene," rather than the "Age of Man," or the "Anthropocene" (Moore 2015, 77; Moore 2017).

Moore and the Problem of Dualism

Moore points to the Nature/Society binary and Cartesian dualism as the core of "the violence of modernity" and the need to "move beyond the dualisms of race, gender, sexuality, and Eurocentrism" (Moore 2015, 4). All of these dualisms rely on the fiction that there are natural, fundamental differences between races, genders, and so on, relying on a particular understanding of 'nature' to justify the hierarchies that follow from this logic. These hierarchies have become embedded in the social, political, technological, and economic systems that govern our lives. These dualistic hierarchies are often, if not always, at the root of systemic violence and, as he points out, are the main rationale for how capitalism has organized the world. However, he understands the scholars who use the term "Anthropocene" to maintain a dualistic way of understanding the world around us, even though there is much agreement between his articulation of a nondualist framework to understand climate change and theirs. This discussion on dualism and the Anthropocene is necessary to parse, though, because the discourse within Marxist Ecology has shifted around this question, causing a few scholars to respond to his assertions (Malm 2018; Foster and Burkett 2018). The remainder of this

section will demonstrate that there is much similarity in these apparently different ways of thinking, and show why it is important that we think through the problems using insights from all, because ultimately it is important to get beyond the human-nature binary that is at the root of climate change.

Moore defines the problem of Cartesian dualism as it applies to the problem as such: “Capitalism--or if one prefers, modernity or industrial civilization--*emerged out of Nature*. It drew wealth *from* Nature. It disrupted, degraded, or defiled *Nature*. And now, or sometime very soon, Nature will exact its revenge. Catastrophe is coming. Collapse is on the horizon” (Moore 2015, 5). Throughout the book, he calls this narrative of those who use the term “Anthropocene,” Green Arithmetic (“political economy plus Nature equals converging crises” [Moore 2015, 2]), or Green Thought. He describes this work as Cartesian because it “conceptualize[s] society and nature as ontologically discrete” (Moore 2015, 19). In doing this, it “remov[es] constitutive relations from the historical phenomena under investigation” (Moore 2015, 21), and treats them both as static, unchanging objects, where Capitalism or Society “act[s] upon a structurally invariant, external Nature” (Moore 2015, 19). According to Moore, most significant ways that this dualism plays a part in Green Thought have to do with the articulation of the theory of the metabolic rift. He claims it posits Nature and Capitalism or Society as things that interact with each other, and the discussion within Green Thought on what is often referred to as “natural” or “planetary limits.”

Moore understands the theory of the metabolic rift as a kind of fetishistic materialism, “in which living flows are narrowly biophysical, can be disrupted, and can be subsequently repaired to some Edenic, pristine state” (Moore 2015, 15). In this way it is reductionist and is an “interactionist” theory of the world (Moore 2015, 46), which reproduces Cartesian dualism as an interactionist theory of mind and body, largely attributing this articulation of the metabolic rift to John Bellamy Foster, Brett York, Richard Clark (*The Ecological Rift* 2010), and Ian Angus (*Facing the Anthropocene* 2016). In his view, “Metabolism-centered studies face an unresolved contradiction: between a philosophical-discursive embrace of a relational ontology (humanity-*in*-nature) and a practical-analytical acceptance of the Nature/Society dualism (humanity *and* nature)” (Moore 2015, 75), and as such has become a metaphor for the separation of Nature and Society, instead of understanding it as a method to trace capitalism’s “shifts” in organizing life and nature in the pursuit of profit and as a way to join all of these

moving parts as an organic whole, as it was initially intended by Marx and Foster's earlier conceptions of it (Moore 2015, 84). He says the emphasis on "disruption and separation" in the metabolic rift theory treats nature as an external limit, as "social systems [...] are separate from natural systems. Social systems *disrupt* natural systems. As capitalism develops, the disruption of nature escalates, leading to 'planetary crisis.' Catastrophe ensues" (Moore 2015, 77).

He wants to replace this Cartesian binary between nature and society with a non-dualistic way of looking at the world, what he calls the double internality or the *oikeios*. He defines the *oikeios* as "a way of naming the creative, historical, and dialectical relation between, and also always within, human and extra-human natures" (Moore 2015, 35). The word comes from Greek philosopher-botanist Theophrastus meaning "relationship between a plant species and the environment" (as qtd in Moore 2015, 35). It is a methodological tool to keep this kind of relationship at the centre of one's analysis because "this reorientation opens up the question of nature--as matrix rather than resource or enabling condition--for historical analysis" (Moore 2015, 35-6). When conceptualized this way, nature is not just another factor in how we understand the world, it is the very substance that everything is able to develop through. In order to understand reality on its own terms, not on capital's terms, one must step out of the Cartesian binary and see how agency functions through the bundling of "human and extra-human natures" (Moore 2015, 37). In this way, one can see that "the crises of capitalism-in-nature are crises of what nature *does for* capitalism, rather more than what capitalism *does to* nature" (Moore 2015, 27). Moore views this new concept as "a radical elaboration of the dialectical logic immanent in Marx's concept of metabolism" (Moore 2015, 45). Instead of elaborating on the dualism of metabolic rift, Moore argues that one should pay attention to the 'metabolic shifts' that capitalism undergoes as a way of organizing nature in order to sustain itself (Moore 2015, 84). This shift articulates the difference between an analysis that accepts reified terms as its basis and as such perpetuates the power structures that produced climate crisis and an analysis that can lead one to understand how to subvert these power structures in order to live within and mitigate climate crisis.

It is unclear what leads Moore to such conclusions about Foster *et al.*'s work. Often when they are cited, their whole book is cited with little articulation of the arguments being referred to (Moore 2015, 28, 43, 84). For example, he says "Marxist

ecology = society + nature': an arithmetic rather than dialectical procedure. There are social limits, and there are natural limits. But the boundaries between the two units-- Nature/Society--are nowhere specified; and the ways in which Social limits make Natural limits, and vice versa, are unexplored. The *history* of each limit is asserted rather than historically constructed" (Moore 2015, 80). He does not cite any specific instances that demonstrate this interpretation. A closer look at the book demonstrates that its framework is explicitly dialectical, looking at the Earth and everything contained within it as one whole with many moving parts (Foster *et al.* 2010, 6, 18, 32, 215). The main argument is that capitalism, as a system of exploitation through alienation, has increasingly alienated us from the Earth because increasingly, the market is the primary way for human beings to access their basic needs. This mystifies humanity's relationship to the Earth and enables capital and capitalists to act in ways, to set in motion metabolic shifts (Foster *et al.* 2010, 84), that have caused ecological destruction through a series of new planetary patterns only possible because of the warming of the Earth due to the build-up of carbon in the atmosphere, biodiversity loss, and changes in the nitrogen cycle (Foster *et al.* 2010, 157). These are a few patterns that scientists have identified, urging humanity to make different choices than we have in the past in order to keep our planet within ranges that mean the damage that has already occurred can be reversed. In *The Ecological Rift*, these are called planetary limits or boundaries (Foster *et al.* 2010, 74).

Moore sees the way Foster *et al.* conceive of planetary limits as dualistic because they only conceive of nature in a passive way, where capitalism acts upon the Earth. Moore argues that we have to understand any limits, planetary or otherwise, as historically co-produced by capitalism and the Earth. However, they are not ahistorically claiming that there are unchanging boundaries in Nature that will cause catastrophe; they are looking at the evidence that scientists have been putting forward and contextualizing it by adding a political-economic dimension to help paint a more accurate picture of how we got here so that we can figure out a path forward (Foster 2010, 436). Moore does acknowledge that "Historical natures are subject to broadly entropic processes--the degradation of nature--but these are also reversible within certain limits" (Moore 2015, 84), but asserts that the way Foster *et al.* discuss them are "a fetishization of natural limits" which is "problematic analytically, because it blinds us to the ways that capitalism unfolds historically through the web of life" instead of allowing us to ask: "how

are distinctive metabolisms of capital, power, and production unified, however unevenly, across the long arc of capitalist history?” (Moore 2015, 80). It is clear that Moore takes issue with the fact that Foster *et al.* conceive of natural limits and the metabolic rift, but a closer look at their argument shows that there is agreement on the significance of natural limits and that crossing planetary boundaries is a consequence of how capitalism organizes humans and nature alike in the pursuit of profit. *The Ecological Rift* explicitly argues that “capital engages in a series of shifts to sustain production” (Foster *et al.* 2010, 82), using concrete examples to do so. Further, since their conversation is more centered around scientific research, when they discuss limits, they mean the point at which climate change cannot be reversed, exactly the kind of limits that Moore accepts (Moore 2015, 84). He points to the need for a non-dualist understanding of the current state of our world and how we got here, however he maintains the categories even though he blurs their boundaries.

Generally, Foster *et al.*'s work tends to focus more on the science of climate change, rather than its history as Moore does. As such, this makes their work different because Foster *et al.* tend to present the science in an uncritical way, even though they acknowledge the connection between Western Science and capitalism and remain extremely critical of the latter whereas Moore is critical of both. It is understandable that one would interpret their willingness to follow the science as closely as they do off-putting: after all, this science is the product of extractivism (Yusoff 2017) and even the scientific community had ceded that the data demonstrates it is not all of humanity that is responsible for climate change, but those who own the means of production (Zalasiewicz *et al.* 2019, 258; Malm and Hornborg 2014; Chakrabarty 2009; Todd 2015; Hern and Johal 2018). However, it is possible to develop the Anthropocene as a concept and the science that props it up while being critical of it. While it might be suspect to conceive of science as an objective, ahistorical measure of the world, it is important to recognize that scientists are measuring something real that has significant implications for everyone living on Earth, even though humans will feel it in uneven ways. Scientists might not fully agree that capitalism has a negative impact on humans and their relationship to the Earth in the pursuit of surplus that proliferates and valorizes CO₂ emissions, but this is why it is necessary to interject in the definition of the term and ensure that the historical processes that have allowed this to take place do not get erased from the narrative

around our new epoch, even if the scientific community has decided this new epoch did not begin until the 1950s.

This discussion on dualism would greatly benefit from a posthuman feminist intervention because they decenter humanity from their analysis. In doing this, they effectively dissolve the dualism that Moore and Foster both point to as the origins of systematic violence done to the Earth, women, people of colour, and those who do not own the means of production in a more fruitful, and successful, way. The way that Joanna Zylińska discusses ethics in the Anthropocene and how this relates to thinking across different scales (Zylińska 2014) or Claire Colebrook's (2017) discussion on posthuman feminism as critical discourse on scale and difference moves the conversation from *who* is discussing the Anthropocene (or Capitalocene) in a dualistic way to identifying the heart of the problem: the fact that there needs to be a discussion of understanding the new geological epoch that the Earth has entered due to humanity's actions is taking place means humanity is facing a crisis of thinking (Zylińska 2014, 19) that has been produced by dualistic hierarchies. As Colebrook says "rather than think of this line as privileged and epochal, we might ask for whom this stratum becomes definitive of *the human*" (Colebrook 2017, 10). As will be discussed below, indigenous people and women have always experienced capitalism as a crisis. The fact that scientists, many of whom have tried to be apolitical, are just now recognizing the damage that has been mounting for centuries because it may finally impact them too is telling. So, while Moore's criticism and dissatisfaction of the scientists' conception of the Anthropocene is significant, it should not be where analysis concludes.

Before moving on, it is worth looking briefly at Malm's defence of Foster, York, and Clark in his book *The Progress of the Storm*. Here, though he also argues for the term "Capitalocene," he makes the crucial point that, based on a kind of "phraseology" that Moore himself also employs in his work, Moore's assessment of their work is dualistic in the sense that it demonstrates "an ontological and epistemic rift" (Moore 2014, 86) when using the word 'and' as a conjunction. In his work, Moore insists that since Foster, York, and Clark use phrases like 'labour and nature' instead of 'labour-*in*-nature and nature-*in*-labour,' they are being Cartesian. However, as Malm points out, this is not Cartesian because it is necessary to distinguish between things in the world in order to understand them, but that does not necessarily mean that they are separate entities, made of separate substances that operate in oppositional hierarchy with one

another as Cartesian dualism operates. Malm quotes one of Moore's assertions that "Capitalism makes nature. Nature makes capitalism" (Moore 2015, 18) and then he responds: "Neither of those propositions is true. Capitalism emphatically does not make nature; nature most definitely does not make capitalism. It is the utter disharmony between the two that needs to be accounted for, and it is that which the theory of the metabolic rift has so consistently foregrounded" (Malm 2018, n.p.). It is an inescapable part of the English language to speak using these kinds of conjunctions, even when discussing things that are dialectically intertwined with each other.

The Dialectic of Capitalization and Appropriation

With the nondualist framework as articulated above, Moore argues that "the problem of crisis unfolds through the unifying relations between the zone of commodification and the zone of reproduction. The tendency of surplus capital to rise, and of the world-ecological surplus to fall, are intertwined" (Moore 2015, 91). He argues that the usual Marxist framework typically conflates overaccumulation and overproduction, and as such is unable to understand the correct way to periodize history and thus misdiagnose the problem(s) that we are facing. For Moore, the true problems of early capitalism stemmed from the underproduction of "labor, food, energy, and materials relative to the demands of value production" (Moore 2015, 92), which was partially solved in the move in the 1760s from wood as fuel to much cheaper coal as the main fuel source powering capitalist expansion. Marx's "general law of underproduction" states that "the rate of profit is inversely proportional to the value of the raw materials" (Marx 1990b, 111), because constant capital is comprised of both fixed capital and circulating constant capital where the tendency is for fixed capital "to "run ahead" of raw materials" (Moore 2015, 93). In other words: "the "overproduction" of machinery (fixed capital) finds its dialectical antagonism in the "underproduction" of raw materials (circulating capital)" (Moore 2015, 93-4). This "general law" helps us to understand how "overproduction" and "underproduction" fit together in periods of accumulation in order to continually generate surplus value.

Moore goes on to argue that value "is encoded simultaneously through the exploitation of labor-power in commodity production, and through the appropriation of nature's life-making capacities" (Moore 2015, 95); surplus value is generated by dialectically related processes of capitalizing on production and appropriating

reproduction. Since we know from Marx's general law of underproduction that profit is directly related to the value of raw materials, clearly capital's goal is "to appropriate unpaid work/energy faster than the tendentially rising capitalization of global nature" (Moore 2015, 96) in order to avoid economic crisis. He calls this "accumulation by appropriation" which "involves those extra-economic processes--perhaps directly coercive but also cultural and calculative--through which capital gains access to minimally or non-commodified natures for free, or as close to free as it can get" (Moore 2015, 95). In this way, appropriation is not only important in the processes of primitive accumulation, but is "equally about the culture hegemonies and scientific-technical repertoires that allow for unpaid work/energy to be mobilized, on a sustained but not sustainable basis, for capital accumulation" (Moore 2015, 95).

Moore understands work to be "the totality of waged and unwaged activity performed by humans and the rest of nature within reach of capitalist power. The *unpaid* "work of nature"--over the short-run of agriculture, the intergenerational time of childrearing, the geological time of fossil fuel creation--is the pedestal upon which the *paid* "work of capital" unfolds" (Moore 2015, 201). This reorientation of (unpaid) human and extra-human work/energy in the service of capital as the most important way that surplus value is generated is why he says a new epoch must be understood as the "Capitalocene." This is significant because this is the most concrete way that his framework begins to approach overcoming any problems of dualism: he acknowledges that understanding work in this way means reproductive work must be involved in determining socially necessary labour time, which is not currently the case in capitalist valuations. It is for this reason that Moore argues that capitalism has real historical limits, and that they "derive from capital as a relation of capitalization and appropriation" (Moore 2015, 101), they are internal, not external, to capitalism.

When he looks at the scholarship of the Marxist Feminists who have pointed to this problem, he simultaneously agrees that Marxists have been blind "to the foundational contributions of another kind of invisible work: the daily and intergenerational reproduction of human life. Such work, as we know, is overwhelmingly performed by women" (Moore 2015, 52), but then says the feminists treat Marx too harshly because he did, in fact, recognize this problem (Moore 2015, 222-3). It does make sense to distinguish between Marx and Marxists, but it also accurate for Silvia

Federici and others to say that Marx did not articulate the significance of this problem.

As she points out:

Marx's analysis of capitalism has been hampered by his inability to conceive of value-producing work other than in the form of commodity production and his consequent blindness to the significance of women's unpaid reproductive work in the process of capitalist accumulation. Ignoring this work has limited Marx's understanding of the true extent of capitalist exploitation of labor and the function of the wage in the creation of the divisions within the working class, starting with the relation between women and men.
(Federici 2012, 92)

Moore points to the necessity of understanding socially necessary labour time as connected to social reproduction and everything he calls Cheap Natures in order to comprehend how surplus value is generated (Moore 2015, 222), but Marx's own definition of socially necessary labour time does not include this (Marx 1990a, 129). Moore points to the few sentences in Marx's well known discussion on *The Working Day* where reproduction of the worker is discussed, but not much else (Moore 2015, 222).³ It is worth noting that at no point does he mention that the book *Patriarchy and Accumulation*, where he gets his often quoted phrase "women, nature, colonies," was written by a scholar who thinks it is impossible to use Marx to think about gender relations because the gendered division of labour was naturalized to him (Federici 2019, 171; Mies 2014, 27, 33, 47-8) and explicitly ties the gendered division of labour and the enforcement of strict gender binaries to the appropriation of nature throughout human history in order to stay alive (Mies 2014, 49). He does not see that both Federici and Mies explicitly revise Marx's theory of primitive accumulation in a way that de-centers the employment relationship in order to discuss how the origins of capitalism have been a history of violence against "women, nature, colonies" (Federici 2019, 17; Mies 2014, 75), and as such would not advocate to call our current epoch "the Capitalocene," as it would

³ Marx says "But the value of labour-power includes the value of the commodities necessary for the reproduction of the worker, for continuing the existence of the working class. If then the unnatural extension of the working day, which capital necessarily strives for in its unmeasured drive for self-valorization, shortens the life of the individual worker, and therefore the duration of his labour-power, the forces used up have to be replaced more rapidly, and it will be more expensive to reproduce labour-power, just as in the case of a machine, where the part of its value that has to be reproduced daily grows greater the more rapidly the machine is worn out. It would seem therefore that the interest of capital itself points in the direction of a normal working day" (Marx 1990a, 377). Clearly he is identifying the value of the reproductive work needed for labourers to get to work every week, but does not at any point to the fact that this is gendered work, or even how capitalism systematically devalues this work through the gender binary.

re-embed capital as the centre of their work instead of focusing on the violence it causes and, more importantly, resistance to it and alternative ways of organizing humans and their relationships with each other and the world around us.

In summary, Moore identifies the cause of capitalist accumulation and generation of surplus value to the dialectic between the capitalization on its ability to commodify the world and its appropriation of “women, nature, colonies,” that are actively created in order to maintain accumulation, but further obscures the problem through the discovery of Marx’s lesser known “general laws” and an adaptation of the Marxist Feminist arguments. He does this to accurately historicize the problem and as such, think through ways to better solve it (Moore 2015, 169), but in the end turns the conversation back to Marx to find a solution and misrepresents the Marxist Feminist position which, importantly, is that we must move on from Marx if we are to find solutions that adequately solve the issues that arise from capitalist accumulation, patriarchy, and racism, among others (Mies 2014, 95; Federici 2019, 152). This is imperative for the Marxist Feminist position because Marx did not flesh out the violence embedded in the gendered division of labour that capitalism relies on, and in fact reinforces it by not including social reproduction in his understanding of socially necessary labour time, thus excluding it from analysis on how capitalism generates surplus value. Further, given the additional historical context that Mies and Federici articulate when they look beyond the employment relationship and to the witch-hunts in Europe, which were necessary for disciplining women in order to turn them into housewives and control the production of future labourers and how this relates to the expansion of capitalism through colonization (Mies 2014), it is becomes clear that capitalism has always been a crisis for “women, nature, colonies.” While Marx acknowledges this, he does not provide the conceptual tools to fully address it.

Capitalism tends towards economic crisis

When we understand surplus value as tied to the dialectic of capitalization of production and appropriation of as many cheap natures for as little as possible, we can see how capitalism tends toward crisis as the cheap natures it relies upon become difficult to access. Moore says there are many contributing factors for this to happen. One of the most “cumulatively significant” reasons this has happened at any point during capitalism’s history is that “the accumulation of capital becomes more wasteful over

time” in addition to the fact that it is constantly trying to expand because “capital, over time, must pay a greater share of its costs of doing business” (Moore 2015, 98). Most unique to the era of neoliberalism is a contradiction that he points to, when capitalism begins to generate “negative” instead of “surplus value” (Moore 2015, 276). Moore defines negative-value as “the accumulation of limits to capital in the web of life that are direct barriers to the restoration of the Four Cheaps” (Moore 2015, 277). Through the lens of negative-value, we can see three problems: “1) the ongoing, and impending, non-linear shifts of the biosphere and its biological systems; 2) the rising costs of production; and 3) the ongoing overaccumulation of capital” (Moore 2015, 278). Though generally capitalism undergoes a series of metabolic shifts in order to gain access to new or different Cheap Natures when costs rise, he says with negative-value destabilizing surplus value, capitalism is facing a completely different kind of problem.

One can see how this plays out when Moore gives concrete examples to work through. He discusses “the superweed effect” where weeds are evolving to survive RoundUp, an herbicide “fundamental to genetically modified soy and other crops” (Moore 2015, 283). Since often capitalism solves its problems through technical fixes or capitalism’s technics, defined as “specific crystallizations of tools, nature, and power” (Moore 2015, 100), of which RoundUp was one, capital is already looking for a new herbicide called 2,4-D which is a well-known carcinogen and endocrine-disruptor (Moore 2015, 283-4). In addition to the superweeds that are developing, another problem associated with the use of RoundUp is the collapse of honeybee colonies. In order to overcome this, the last decade has seen the costs of pollination triple (Moore 2015, 286). In this way, we can see that as capitalism tries to maintain its “ecological surpluses,” climate change will “in the coming two decades, so thoroughly mobilize until-now latent negative-value--fed by capitalist agriculture and in turn undermining the Cheap Food model--that it is difficult to see how capitalist agriculture can survive” (Moore 2015, 290).

For Moore, this kind of internal undermining of capital’s ability to function opens up the possibility to begin challenging its own ontology. Through the example of Cheap Food, he suggests we can see an alternative path that can be “followed through class struggle--but a class struggle understood as a contest over the configuration of the oikeios. [...] In this respect, the barriers to a new agricultural revolution are not limited to biophysical natures as such; they are also co-produced through the class struggle, itself

co-produced through nature” (Moore 2015, 287). He asserts that “The class struggle of the twenty-first century will turn, in no small measure, upon how one answers the questions: What is food? What is nature? What is valuable?” (Moore 2015, 287).

The most unique aspect of Moore’s argument is the following: capitalism undermines itself by making it more expensive to function. He is clear that ecological crisis is the largest manifestation of this tendency and it is not clear that capitalism will be able to overcome this fundamental threat (Moore 2015, 290). His solution of class struggle oriented towards the development of a new kind of value, one that comes from the framework of the *oikeios* leaves the reader wondering how to begin such an undertaking. Moore takes great care to explain how capitalism tends towards crisis, but in the process shifts what he views as the crucial conversation away from how this impacts humans and nature alike. In this move, he cements his impressive contribution to the scholarship as a Marxist who is obviously concerned about the destructive features of capitalism but does not think beyond it. This indicates the significance of his assertion that “it is not the [sic] humanity’s separation *from* Nature that matters” (Moore 2015, 78). While the book does provide explanation of how we got into our current crisis and how it can possibly lead to the “liberation for all life,” it does little to explore what is being done to combat capitalism, what alternatives to capitalism are being built, but most importantly how capitalism is actually driving a rift between humanity and our ability to access basic needs without the market. This is paramount given his conclusion that costs for food, for example, will continue to rise due to increasing production costs. Since capitalists are eager to maximize profit by pushing these kinds of costs onto the consumer, this will play out in predictable ways by putting an even bigger barrier to access to nutrition, furthering inequality to an even greater extent.

Given his conclusion, that humanity must generate a new understanding of wealth and value in order to give rise to something new, it makes sense to question the term “Capitalocene” or any other name that inscribes capitalism as the centre of all our relationships. If one follows Moore in giving up the term “Anthropocene,” one will be discursively foreclosing the possibilities for conceptions of value and a non-dualistic way of relating to each other and the world around us. Should humanity ever move past capitalism as a way of organizing the environment, it would always be at the “base” of our existence. While in the long run this might not matter, it will certainly matter in how we conceive of alternatives because, as Joanna Zylińska reminds us, the stories that

humanity tells itself *do matter* in that “they can enact and not just describe things” (Zylinska 2014, 11). Further, the weight and import of climate change is obscured in that responsibility is deferred to those who own the means of production, excluding everyone else, from being part of possible decision-making processes around how to mitigate and live within climate crisis. Instead of rejecting the Anthropocene as a product of the extractivist-driven science that has allowed it to measure itself (Yusoff 2017), one should take this as an opportunity to exercise critical thinking and understand how the Anthropocene points to more than a crisis of the earth system (Angus 2016), but a crisis of thinking that has allowed climate crisis to progress to the extent that it has (Zylinska 2014, 19 quoting Timothy Morton’s *Ecological Thought*), and to listen to the “women, nature, colonies” who have been saying that capitalism has always meant death and destruction.

Conclusion

The discussion going on between leftist thinkers and activists on “the Anthropocene” and its many troubling aspects, from climate change to extinction, is diverse and complex. Overall it seeks to understand humanity’s relationship to the Earth, and what part humans *of and against* capitalism have played in producing such a devastating impact on their own habitat. While many of these arguments (including those addressed in this essay) have a validity to them, it is important to acknowledge the urgency of this situation and evaluate them on the basis of an awareness that many tend to dismiss today and that still return – today we see it though the words of a young woman.⁴

This essay has looked at *Capitalism in the Web of Life* and its attempt at answering these questions. In his book, Moore argues that there is a dualism prevalent in the way many people, including Marxist Ecologists, think about the problems at hand and this dualism has stopped them from fundamentally understanding how capitalism and ecological crisis are inextricably bound together. He argues that capitalism has expanded and thrived over the past few centuries by capitalizing on that which is commodified and by appropriating “women, nature, colonies,” which he also terms

⁴ I want to acknowledge that Greta Thunberg is by no means the only young female speaking to large publics on this issue, but she is definitely the most well known. It is outside the scope of this paper to discuss the structural features that have enabled this.

Cheap Natures. Finally, because capitalism needs access to Cheap Natures for as cheap or free as possible at all times, it has undergone many metabolic shifts in the way it organizes humans and nature through production and reproduction. In the process of doing this, capitalism has undermined its access to Cheap Natures by constantly increasing costs of production while simultaneously causing ecological crisis, which is now posing barriers that capitalism may not overcome. In arguing this, he asserts that we should not accept the term “Anthropocene” for the current geological epoch, because we are actually living in the “Age of Capitalism,” or the Capitalocene: the time period that all work/energy is oriented towards serving capital’s quest to generate increasing amounts of surplus value, regardless of the consequences for human beings and the Earth alike.

Ultimately, Moore and Foster are contributing to the questions outlined above in a very similar way: both go back to Marx and his understanding of value in order to demonstrate how capitalism and climate crisis go hand in hand. Foster develops the concepts of “the Anthropocene” and ‘the metabolic rift’ that is at the heart of capitalism’s system of production via the commodity form and alienated labour in order to do this; Moore develops the concept of “the Capitalocene” and ‘the metabolic shifts’ that capitalism undertakes in order to resolve economic crises and maintain access to the Cheap Natures that it is dependent upon. Neither position contradicts the other and, in fact, both kinds of analysis support each other. From this vantage point, it is clear that the Marxist heuristic is extremely helpful in determining the structural problems that arise from capitalist modes of production and accumulation. However, as argued above, it is necessary to update this heuristic because the world is very different from what it was when Marx was alive and, as the Marxist Feminists point out, there was a lot that Marx was blind to in his own time. While Foster and Moore are not blind in the same way to these gaps in Marx’s thinking, neither of them adequately integrate the Marxist Feminist position into their analysis of capitalism in relation to climate change.

I am agnostic on the question of which term, “Anthropocene” or “Capitalocene,” is more accurate, which is the core concern of their debate. On the one hand, I agree with many of the criticisms of the term “Anthropocene” that have been described in this essay. Further, it seems as though, in focusing too much on capitalism, “Capitalocene” tends to absolve humanity of its responsibility to its further generations and the rest of life on the planet in placing the blame on a small number of people, the owners of

production means, politicians, and so on. On the other, “Capitalocene” does more accurately reflect the fact that it is the capitalists and not all of humanity, who are responsible for climate change. There is a power in naming capitalism the force that, through systematized alienated labour, has fundamentally changed the Earth and our relationship to it, and that this alienation has manifested physically in our bodies, minds, and planet. This is an important truth to foreground in an analysis of climate change, especially when thinking about how avoid, or at least live through, climate crisis. Both terms have the ability to highlight different things that are relevant to thinking through alternatives to capitalism.

With this in mind, I have argued that, in the times of “capitalist realism” when “it is easier to imagine the end of the world than the end of capitalism” (Fisher 2010, 2), the term “Anthropocene” functions importantly as a critical tool in order to demonstrate the problem of ecological rift, or disconnection, from the Earth. In this way, it draws our attention to the alienation systematized through capitalism, but allowing us to learn “the arts of living on the damaged planet” sharing it with “the ghosts and monsters of the Anthropocene” (Tsing *et al.* 2017). From this view, we can imagine and create possibilities that embrace and shape life through new ethics, connections, and collectivities beyond the human world. For this reason, the term ‘Anthropocene’ should not be given up by critical scholars and activists on the left, resigning it to the meaning the scientists have given it, because their science is a product of capitalism. This can be seen in the fact that they placed the start of the Anthropocene around 1950, a time known to be a ‘Golden Age’ of capitalist production. It is clearly an indication that capitalism and the science and technology that it relies on to pursue profit is largely invisible to these scientists who wish to remain neutral. Capitalism is premised on and gains legitimacy through its white-supremacist, capitalist, patriarchal science. Its origins brought about a dualism between men and women, white and black bodies, society and nature. It is not surprising that it took centuries for capital’s science to finally register the violence of its logic, only believing that there is a crisis when there are sufficient geological and socio-economic markers. To give up this term is to give up the potentiality for meaning beyond capitalism, discursively foreclosing the possibility for collective meaning-making in addition to invisibilizing much work that has been done already in complicating and reclaiming this term (Zylinska 2014; Todd 2017; Whyte 2017).

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Essay 2:

**The Science of the Anthropocene:
from Eco- to Anthropocene Feminism**

Introduction: Narratives of the Anthropocene

“A concept is a brick. It can be used to build a courthouse of reason. Or it can be thrown through the window.”

— Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*

I want you all to take a look around and find someone you don't know. Maybe somebody who doesn't look kind of like you. Maybe somebody who might be of a different religion than you, maybe they come from a different country. My question now to you is: are you willing to fight for that person who you don't even know as much as you're willing to fight for yourself? Are you willing to fight for that person who you don't even know as much as you're willing to fight for yourself? [...] If you are willing to love, [...] if you and millions of others are willing to do that, there is no doubt in my mind that not only we will we win this election but together we will transform this country.

— Bernie Sanders (Rally at Queensbridge Park), Oct. 23, 2019

Merriam-Webster's definition of 'Anthropocene' is “the period of time during which human activities have had an environmental impact on the Earth regarded as constituting a distinct geological age.” The term was coined in the 1980s by the late Eugene Stoermer, a professor of biology who was a leading researcher of diatoms (a kind of algae), and popularized by Paul Crutzen in 2000, a Nobel Prize winning atmospheric chemist. Since then, the term has been used and debated by journalists, politicians, activists, scientists, social scientists, and humanities scholars because the naming a new geological age at a moment of ecological crisis, and the narrative surrounding this new age, can and will have a profound impact on how humanity prepares to live within and beyond this crisis. There are many narratives, including those who deny climate crisis, and as such it is important to take stock of them in order to enumerate the ways they shed light on the situation, from the perspectives of those in power to the perspectives of those will be impacted the most.

We can distinguish different narratives of “the Anthropocene” among the groups of different political spectra. For example, even if it is not fully univocal, the neoliberal narrative, whose representatives often advocate for “sustainability” as a strategy to keep business running, culminate in actions and denialist claims by Donald Trump and his

administration. On November 5, 2019, Donald Trump announced he would be taking the United States out of the Paris climate agreement (Holden 2019), an agreement that nearly 200 countries world-wide signed committing to limiting global warming, cutting greenhouse gases, and holding each other accountable to reaching their targets. When Mike Pompeo, the US secretary of state, announced this, he said the agreement imposed an “unfair economic burden [...] on American workers, businesses and taxpayers” (as qtd in Holden 2019). Trump has previously called climate change a hoax made up by China (Worland 2019), but has also demonstrated contradictory opinions, like citing it and its consequences as a reason to protect one of his seaside golf resorts in Ireland from erosion (Schreckinger 2016). In this way, Trump signals at least one of the contradictions of neoliberalism very succinctly.

For activists like Rita Wong, an artist and professor at Emily Carr University of Art and Design, “the Anthropocene” is a conceptual instrument for mobilization of resistance in accordance with upholding the laws of Indigenous people. In Vancouver and Burnaby, where Wong has been engaged in the protests against the Trans Mountain pipeline, we are on Coast Salish land. She puts it in very succinct terms:

We're in a colonial system that's always trying to turn everything into a resource to be extracted. But the Coast Salish way of thinking about it is that you're in a reciprocal relationship with the land. In the way that you wouldn't exploit or sell your mother, you wouldn't do that to the land either. So, it's not just a protest, it's more a return to Indigenous ways. And when I say return to Indigenous ways, I think that that is being led by Indigenous peoples, but it also is inclusive of non-Indigenous people. (as qtd in Mlynek 2019)

Thinking with Wong here tells a place-specific story about “the Anthropocene” as a duty to uphold Indigenous law, especially as settlers, in our daily lives and in our resistance to capitalism in climate change. In this example, the relation is quite literal: she was arrested for protesting the Trans Mountain Pipeline that the Canadian government bought from a private Texas-based oil company. Especially given that most of British Columbia is unceded Indigenous land, the Canadian government does not have legitimacy here. In this context, the concept “Anthropocene” exposes the ongoing violence of colonialism.

There is a lot of discussion of “the Anthropocene” in Marxist and anti-capitalist circles, attempting to understand the historical circumstances that have brought about

climate change and ecological crisis. Within this school of thought, there is no consensus on the major issues within the discourse. Many eco-socialists, Marxists, and anti-capitalists have both embraced (Foster 2019, Angus 2016) and rejected (Moore 2015; Hern and Johal 2018; Malm and Hornborg 2014) the term. Some have been critical of it but have accepted that it is part of the discourse now (Chakrabarty 2009; Todd 2015; Haraway 2015). Through this contestation, it has become a useful tool for critiquing capitalism as an economic system based on the pursuit of surplus value through the commodity form. In this system, each commodity has a use-value and an exchange-value, where surplus value, that is profit, must be generated through exchange. The Marxist position holds that surplus value is generated through the systematized exploitation of labour: no labour is paid the full value of its worth, and this is how surplus value is created. Further, the ability to gain access to raw materials and the necessary amount of labour power is done by organizing nature, whether this means enclosing it so no human can have free access to the land, or by using it as a resource to be turned into commodities, or to use it as a dump to ensure that waste does not re-enter the circuit of capital.

There have been many calls on the left to reject “the Anthropocene” in order to radicalize the discourse -- as a way of understanding the historical age we are living in and humanity’s relation with the world around it. These thinkers claim that in indicating the cause of changes in human agency, it falsely generalizes all humans, by overlooking crucial class differences (Moore 2015; Hern and Jobal 2018; Malm and Hornborg 2014). As such, the concept would require an extremely large grand narrative to maintain, falling short in our particular historical contexts (Hern and Johal 2018). Further, they maintain, it is the capitalist mode of production and accumulation in the pursuit of surplus value that has caused climate change (Moore 2015; Foster *et al.* 2010; Angus 2016). Following this, some argue that “the Anthropocene” is proof that climate change is inherently destructive and that any critique of climate change necessarily requires analysis of capitalism and a strategy of transition to socialism (Foster *et al.* 2019; Angus 2016; Klein 2015). Others argue that climate change is developing capitalism’s contradictions to such an extent that it might undermine itself economically, giving humanity an opportunity to rethink capitalist conceptions of value in order to form alternatives (Moore 2015). All agree that capitalism is central to understanding the social forces that initiate climate change, and as such many argue that we should call our

current epoch the Capitalocene or Corporatocene (Moore 2015; Haraway 2015; Hern and Johal 2018). Each of these critiques provide important sign-posts in a conversation about the Anthropocene as a critical tool, and while many if not all of these scholars rely on and draw from feminist scholarship in some way to demonstrate their arguments, the discourse referred to above does not fully integrate an important lesson from Marxist Feminism: that in order to understand the full impact of capitalism, we must de-centre the wage-relationship in order to get beyond the economics of capitalism.

In the epigraph of this essay, there is part of a transcript of Bernie Sanders's speech at a rally at Queensbridge Park in New York. In it, he asks everyone if they are willing to fight for each other, including for those who have not been born yet to live "on a planet that is healthy and habitable" (Sanders 2019). Though this kind of discourse is not often understood as narrating "the Anthropocene," I want to invite the reader to begin thinking about it this way: that it is about fundamentally reorienting how we think through our relationships with each other and with the world around us. In the speech, Sanders asks people if they are willing to love each other, and to continue fighting for each other, even if he becomes president. He stresses that change has to be a collective process, and that it will not work if he is the only one working towards transformation, even if he is the person at the top of the global hierarchy. If we wake up to a different world tomorrow, one where humanity has figured out a way to stop emitting carbon dioxide into the air, where we are no longer reliant upon fossil fuels, and it becomes clear that we can stay within the planetary boundaries to reverse climate change, would it still make sense to declare that we are in a new geological epoch? My response is yes, it does, because "the Anthropocene" has the potential to mean so much more than simply the Age of Humans, who have caused enormous ecological degradation: it is about cultivating different ways to relate to each other and our world that reject the hierarchy and dualism that capitalism and ecological crisis have produced and are produced by.

Below, I will address the concerns raised above and argue that, it is clear when looking at the Indigenous, eco-feminist, and posthumanist scholarship, the notion of "the Anthropocene" has already been developed in a sophisticated way as a critical tool for understanding relationships on Earth between humans, and between humans and the world around them. Further, in their analysis, they develop alternatives to capitalism as a way to exist within, and possibly avoid, the climate crisis that science tells us is imminent. I will argue that "the Anthropocene," when drawing on but going beyond its

scientific definition, can be used as a critical tool to understand the underlying causes of climate change and what can be done to subvert the logics of capitalism and ecological crisis. This tool is urgently needed in order to understand how ecological crisis has come about, but more importantly, to recognize how individualism and the atomization of the processes that keep humans and everything else on Earth alive through the commodity form as organized by capitalism is one of, if not the most, significant structural barrier to living through climate crisis, and the many challenges it will bring.

By focusing on key moments and questions in eco-feminism and Anthropocene feminism, this essay will show that the transition from thinking about 'value,' knowing that value under capitalism tends towards reification and thus facilitates atomization, to thinking about 'ethics,' which necessarily opens up questions about relationships between humans and their human and beyond human communities, develops "the Anthropocene" as a critical tool. Through this critical tool, we can think beyond the science of "the Anthropocene" and the logics that have produced climate crisis in a way that allows us to develop alternative systems to capitalism, and ways to live within ecological crisis. This essay will proceed in two parts. First, I will give an analysis of scientific discourse and method in order to see how it understands value. Then, I will look at the feminist critiques and epistemologies of the scientific method. I will then get into the science of "the Anthropocene" through the publication by many members of the Anthropocene Working Group (AWG) called *Anthropocene as a Geological Time Unit*. Second, I will look at the contribution of Indigenous and Feminist Marxists and Eco-Feminists in their interrogation of capitalism, value, and science. In this discussion, it will be shown that since they all focus on the question of 'value,' they develop fewer tools capable of moving beyond capitalist ways of thinking. By exploring contributions of post-human feminists to discourse on "the Anthropocene," it will be shown that their focus on 'ethics' shifts our attention to questions of relationships. This will demonstrate that from the viewpoint that everything is connected and seeing ecological crisis as a question of needing new collectivities, "the Anthropocene" can be developed as an urgent call to "make kin" with all (Haraway 2015b; Haraway 2016) in learning "the arts of living on a damaged planet" (Tsing *et al.* 2017).

Science and “the Anthropocene”

The scientific narrative of “the Anthropocene” is the dominant one, as it is from the science community that this term comes. As will be shown in the following analysis, by dating “the Anthropocene” at 1950, it tells a story that capitalism has become naturalized in the process of serious ecological crisis; by placing it at a time when capitalism can be described as a “golden age,” it marks the beginning of an epoch, without acknowledging the roots of the crisis that can clearly be shown as beginning centuries before.

Science became a dominant practice in the 20th century. As a practice and as a discourse in this time period, it has been developed in order to be ‘objective,’ ‘neutral,’ and ‘value-free.’ However, thinking through “the Anthropocene” will bring this assertion into question. Science is at the forefront here, because it is by relying on scientific knowledge that we can measure the changes taking place to the Earth and project what will happen if things continue in the same manner as they have. Given this, it is important to briefly understand scientific method and its criticisms before getting into the science behind “the Anthropocene” as a new geological age, and which narratives it serves. This section will briefly outline the scientific method developed between the 17th century and the 1950s, when serious debate about epistemology of science begun to take place. I will outline the position of two significant figures in the debate, Karl Popper and Paul Feyerabend. While their positions are extremely valuable in beginning to question the epistemologies produced through this kind of scientific method, a more full and complicated criticism comes from an analysis provided by the feminist philosophers of science. There are many disagreements between them, but an overview of their work will demonstrate that it is important to address historical biases embedded in science due to gender exclusions, that “value-free” science can not be the goal of feminist philosophy of science because there is no “view from nowhere,” and that situating knowledge and knowledge creation within communities provides a powerful way of understanding how to move past this tendency embedded in Western scientific method.

What is a scientific method? While defining such a thing becomes difficult because all “definitions involve value judgements” (Stiles 1942, 13), it can be described in general terms as “techniques and attitudes”, “two closely integrated elements if the so-called scientific method” (Stiles 1942, 13). There are five techniques of the scientific

method: (1) recognize and define the problem, (2) formulate a hypothesis based on the facts at hand, (3) test the hypothesis through a controlled experiment, (4) collect, organize, and coordinate the generated data in a way that identifies relationships, and (5) draw conclusions by checking it against the hypothesis formulated in technique 2 (Stiles 1942, 13-14). From here, hypotheses could be revised based on the new data available, generated through the controlled experiment in technique 3. When satisfied, technique (6) is the application of the new knowledge to the problem identified in technique 1. The scientific attitudes to employ during the enactment of these techniques are: (1) an inquiring mind and a sensitivity to problems, (2) intellectual honesty, which requires “the habit of divesting oneself of prejudice, and of being honest enough to admit an error when facts indicate that one has been made” (Stiles 1942, 16), (3) the habit of open-mindedness, in the sense that no answer to any problem should be considered final, (4) accuracy at all steps of investigation, which means using the best technical instruments whenever possible, (5) look for the “true and natural causes for observed phenomena rather than accepting supernatural explanations” (Stiles 1942, 17), (6) suspend judgement until adequate data has been acquired, which requires patience, and finally, (7) be critical and constantly look for flaws in every element in the experiment involved (Stiles 1942, 18). Stiles also suggested that this method, while works best in a controlled field, can be used for real life “personal problems,” like needing to find a job (Stiles 1942, 19).

After describing the scientific method’s techniques and attitudes, he said, “The scientific method may be narrowly defined as *the use of certain techniques of logical procedure combined with certain attitudes by which one can effectively solve problems*” (Stiles 1942, 20 emphasis in original). In this way he describes the scientific method as he taught it in 1942, the scientific method that had been developing since the 17th century. The base of this methodology involves isolating specific things in order to make predictions, generate data, and test these predictions in order to record and measure relationships. It is up to the individual scientist to then be constantly self-reflexive and practice good habits of mind in order to stay curious and catch any bias they may hold or flaws that may have occurred. At once, the scientist needs to be critical of themselves but confident enough to draw conclusions.

Criticism of this scientific method is common from many philosophical positions. Karl Popper is known for his criticisms of scientific methodology. Specifically, he is

known for attempting to distinguish science from pseudo-science, where most criticism of science was asking the questions about *when* a theory becomes scientific or how to establish through criteria whether or not a theory is scientific (Popper 2002). He thought the most common way of distinguishing between science and pseudo-science (and metaphysics) had to do with the empirical method of science, an inductive method that proceeds from an observation or experiment. However, he realized that many pseudo-sciences, like astrology for example, also claimed to proceed in an inductive, empirical way. Specifically, he was concerned with Sigmund Freud's psychoanalysis, Karl Marx's theory of history, and Alfred Adler's individual psychology. Since they all proceeded, in his estimation, by looking to verify their respective theories, they all seemed to have a unique ability to explain almost any particular event or behaviour through their theory. In contrast to this, Einstein's situation was very different: his method was risky because it involved making a prediction that could completely disprove his theory of relativity (Popper 2002). In this way, he established the importance in understanding science as something that must be falsifiable and self-reflexive. He was critical of those methods who were only interested in *verification*, because those produced the results that were sought, rather than results based in evidence.

Paul Feyerabend, by contrast, while also critical of scientific method and thought it produced premeditated results suggested that any adherence to rules like the ones Popper and Stiles have outlined will restrict scientific discovery, and that no method guarantees scientific knowledge as its outcome (Feyerabend 2010). For him, "the only principle that does not inhibit progress is: anything goes" (Feyerabend 2010). He argues against scientific "facts" being understood as being devoid of opinion, belief, or culture is an untenable position to hold. By this, he means to provoke the reader and point out that all methodologies have their limits, and blind faith in methodology, when there are plenty of case studies to demonstrate that progress in science was due to mistakes or idiosyncrasies, simply turns into ideology. For this reason, he argues that history should be taken into account when understanding the "facts" that science is built on.

The criticisms outlined here, where the whole process takes place outside of lived experience in controlled environments, where relationships are deemed to exist based on measurements between objective facts, with only the individual scientist's curiosity and intellectual honesty to ensure all factors are taken into account, are well established. Both Popper and Feyerabend, though they have significant disagreements

and come from very different positions, demonstrate that the scientific method is clearly fallible, and that perhaps it is based on some erroneous notions of universality and objectivity, where both the scientific 'fact' and the researcher are seen as objective *because* the analysis is done in the laboratory, away from lived experience. These criticisms are valuable, but definitely not exhaustive of exposing the assumptions that scientific methodology contains. These two thinkers critiqued the scientific method, but ultimately reinforced the power of scientific knowledge. They do not question the position of the subject practicing science; this will be taken up below by feminist thinkers.

Feminist philosophy of science is another significant position from which science and the scientific method has been critiqued. This is clear because feminism, as a "social and political stance that minimally involves a commitment to egalitarian values" is inherently at odds with the idea that science, or any system of knowledge production, could be "value-free" (Crasnow 2013, 413). Helen Longino, an American philosopher of science teaching out of Stanford, is one of the most important critics to begin this analysis. She is critical of the idea that science that is practiced by a single individual could ever produce objective knowledge. For her, "scientific inquiry *is* a social practice and if it is to be non-arbitrary and minimize subjectivity, it *must be a social practice*. [...] It is produced not by collecting the products of individuals into one whole, but through a process of critical emendation and modification of those products by the rest of the scientific community" (Longino 1989, 265). In this way, the more diversity included in science communities, the more likely "its practice will be objective" or result in understandings of science that are more reliable and valid across more contexts (Longino 1989, 269). She briefly also mentions the political economic considerations of "big science" funding scientific inquiry, and that a "capitalist, male dominated society would reflect a preoccupation with hierarchy, control, antagonistic and competitive relationships, and sexual and racial essentialism" (Longino 1989, 269). For this reason, she argues that rationality "*requires* a social context for its effective exercise" (Longino 1989), and as such it is necessary to look at the way rationality operates through data collection, how this translates to scientific hypotheses, and the social context in which this all takes place.

Evelyn Fox Keller, a physicist and feminist philosopher of science, has argued that contemporary feminism changed the position of women in science because not only are there more women doing science, this has made space of a 'feminine' view of the

world in science (Keller 2004, 11). This has made a difference in the field of biology, for instance, in that seemingly innocuous descriptions of egg cells initially described by male scientists as passive actually fundamentally obscured the biological phenomena taking place (Keller 2004, 8). Further, she has argued that science needs to be historicized, because science has an impact far beyond knowledge creation in the lab. For this reason, science studies, that which seeks to “attend to the historical and social contingency of the particular kinds of human practices that, at any given time or place, are said to constitute ‘doing science’” (Keller 1995, 11), is crucial, because scientists were not writing about or in some cases even acknowledging the “social contingency of scientific values” (Keller 1995, 12). If they were writing about such contingency, it was only to disparage the “politically correct” culture that required them to, without any respect for those in science studies (Keller 1995, 13), and in some cases, without even reading the work of those they were criticizing (Keller 1995, 14).

It is important to remember that simply because (masculine) science is not “value-free” as it is purported, does not mean good science *would* be value-free. On the contrary, understanding Feminist Epistemologies and Feminist Standpoint Theory demonstrates that there can be no “view from nowhere” or rejects “the god trick” (as qtd in Crasnow 2013, 417). Though clearly the view from “the woman’s perspective” generalized does not move past the problem identified, being sure to situate knowledge from a particular standpoint is a necessary step in understanding the values that are indeed embedded in the scientific method. Feminist epistemology further shows that “the epistemology of ignorance” of these values is not benign, but comes from specific choices to pursue some knowledge over others (Grasswick 2011, xix). Much Feminist Epistemology is still focused on *which* values to cultivate over others, within a method similar to the traditional scientific method outlined at the beginning of this section, simply with more attention paid to the social context of the facts and relationships being studied (Rolin 2011, 40; Daukas 2011, 48). Even still, it provides an important justification for the democratization of science and the necessity to understand science as having an obligation to “meet the needs of communities that are situated outside the dominant culture and experience multiple impacts, such as from poverty, poor access to medical care, environmental contaminants, stress, war, racism, colonialism, and sexism” (McHugh 2011, 183). In this way it talks about values in a structural sense, where they

are not operating individually or invisibly, but in a way that facilitates a connection to they way knowledge is understood and produced in context.

Nancy Arden McHugh stresses this point, as a scholar who went to Vietnam to study how the change to a market economy impacted Vietnamese people in 2004 (McHugh 2011, 185). She realized, upon seeing the huge aftermath of the US's use of Agent Orange, a powerful herbicide used by the US military forces for a decade during the Vietnam war that has caused serious health problems for millions of Vietnam's citizens, that the "predominant scientific methodologies [...] which rely upon isolating substances to understand their effects of isolating organisms to understand their effects" are perhaps not capable of addressing the needs of the communities (McHugh 2011, 186). For this reason, she argues for a "situated communities approach" where "research is to be initiated from the complexity of the everyday world" because "though researchers do come with a knowledge-set about their study and the subjects of their study, depending on how they are situated they may not necessarily have insider knowledge of the intricacies of a community" and thus may do research that produces knowledge that does not actually solve the problem the community is having (McHugh 2011, 193). From the position of situated knowledge, where knowledge is created from a perspective, for a purpose within a particular community, Feminist Epistemology provides a way forward, beyond the sanitized "value-free," hierarchical, masculine science and scientific method.

With this context, I will now turn to an analysis of the science of "the Anthropocene" with the purpose of demonstrating how the scientists of the Anthropocene Working Group have reproduced many of the issues outlined above. In their attempt to be neutral, they have embedded the power structures that created ecological crisis within the naming of "the Anthropocene" as a new geological epoch.

The Anthropocene as a Geological Time Unit

On May 21, 2019, the Anthropocene Working Group (AWG)⁵ decisively voted in favour to treating the Anthropocene as "a formal chrono-stratigraphic unit defined by a GSSP" (Global boundary Stratotype Section and Point) and that "the primary guide for

⁵ AWG is a group of scientists, lawyers, and others formed under the body that oversees the geological time chart, the International Commission on Stratigraphy (ICS).

the base of the Anthropocene be one of the stratigraphic signals around the mid-twentieth century of the Common Era” (AWG 2019). Over the next two years, the group will be doing research and aim to put out a report in 2021 that will state the precise place and time that marks the beginning of the Anthropocene by determining which type of “physical evidence in the sedimentary record that represents the start of the epoch” (Subramanian 2019). 4 of 33 members voted against these resolutions because they feel there are multiple beginnings to the Anthropocene; they believe that identifying a single moment will not facilitate “scientific understanding of human involvement in Earth system change” (As qtd in Subramanian 2019). Little about their reasons for voting against these motions has become public knowledge or part of the discourse.

Scientists initially proposed this as a term to describe a new geological epoch where humans and human-initiated activities have come to be the dominant force behind changes in the geology of the Earth (Crutzen and Stoermer 2000, 17). Scientists have explicitly been against this term being used as a political tool (Lewis and Maslin 2015; Crutzen and Stoermer 2000, 18, Crutzen 2002). The rationale for this is to keep science away from politics: geology should be focused on the questions of geology. In this view, there is no particular group of people with their politics that is more responsible for climate change than any other; “Anthropos” assumes anyone, whoever they are. While this is an extremely broad approach to studying geology, it is limited in the sense that it explicitly intends to silo off geology and the naming of a new geological age from the political consequences that this kind of naming will inevitably bring about. Even with these limitations placed on its study and discussion, there has been much debate within the scientific communities on how to periodize the epoch we are currently in. Some argue for 1610 to be the start of “the Anthropocene,” as a marker for the impact on the Earth after genocide in the Americas at the beginning of colonization (Lewis and Maslin 2015), some argue for 1784, at the invention of the steam engine (Crutzen and Stoermer 2000), and some argue for 1950, the beginning of “the Great Acceleration” of capitalist expansion after World War II (Zalasiewicz *et al* 2015). At the same time, some scholars are not sure whether it should be historicized at all (Ginn 2015, Lewis and Maslin 2015) and whether or not we should even define the term “Anthropocene” (Ruddiman *et al* 2015). Each origin tells a very different story about “the Anthropocene,” and what it would take to live within it.

Despite the effort to keep it away from politics, the term quickly left the scientific circle far behind. It is becoming one of the major widely recognized scientific terms, increasingly used in non-scientific communities, the term has begun to cohere, though is very much contested in all fields. Jason W. Moore argues that, the age we live in should be called “the Capitalocene,” because it is capitalism, not all humans as such, that have caused ecological crisis (Moore 2015) Ian Angus and John Bellamy Foster, two well-known ecosocialists, embrace the term “Anthropocene,” arguing that it is proof that capitalism is inherently destructive and must be replaced with socialism (Angus 2016; Foster 2019). Donna Haraway, a feminist philosopher of science, prefers the term “Capitalocene,” but acknowledges that “Anthropocene” is now part of the discourse (Haraway 2015) Matt Hern and Am Johal, two independent Canadian scholars, argue vehemently against “the Anthropocene” and in favour of “the Capitalocene” or “the Corporatocene” for reasons similar to Moore’s (Hern and Johal 2018). This is not exhaustive of how contested the term is, but it gives a broad overview of the disagreements. Further, it does not discuss ways in which their views are similar, even between those arguing against “the Anthropocene” and for a different term. What this contestation does show, though, is that no matter which view of “the Anthropocene” is taken, it is an explicitly political project.

Even within science, though, the debate is shifting from the apolitical stance it was intended for to acknowledging that at least one political interpretation of the scientific data is valid. This can be seen in the publication of *The Anthropocene as a Geological Time Unit*. This was intended to be a definitive guide to the scientific evidence and debates around “the Anthropocene.” It was published about three months before the AWG vote on naming “the Anthropocene” as starting in 1950 took place. The book is a collection edited by Jan Zalasiewicz, the chair of the AWG, Colin N. Waters, the secretary of the AWG, and Mark Williams and Colin P Summerhayes, both members of the AWG. The volume contains contributions from many members of the AWG and includes contribution from non-members. The volume provides a rationale for why one of the stratigraphic signals taking place around the 1950, a time referred to as the “Great Acceleration,” should mark the beginning of the Anthropocene. The volume provides a high level overview of all the different elements of the science that demonstrate a change has indeed occurred in the geological strata of the Earth. By way of understanding this in the context of placing an origin for “the Anthropocene,” the authors

go though some important moments in social history that have been offered by various scientists, assessing possible beginning points for “the Anthropocene.” Nine beginning points are posed and discussed. The most significant for the purposes of this essay are 1610, coinciding with the colonization of the Americas as proposed by Lewis and Maslin (2015), the Industrial Revolution, as initially proposed by Crutzen and Stoermer (2000), and “the Great Acceleration,” as proposed initially by Zalasiewicz *et al.* (2015), a publication authored by almost every member of the AWG.

The earliest point in time, 1610, coincides with the colonization of the Americas and the Colombian Exchange. This names the exchange of plants, animals, and insects between Europe and the Americas, whether this exchange was intentional or not (Lewis and Maslin 2015, 174). This exchange created a “unique signature in the stratigraphic record,” and signals a permanent and significant change in the diets for a large portion of humanity alive at the time. A further argument for this time involves the decline in atmospheric CO₂, called the Orbis Spike, which they attribute to the “large decline in human numbers” in the Americas; in 1492 when Europeans arrived in the Americas, there was an estimated 61 million people living there. By 1650, due to exposure to European diseases and war, that number declined to 6 million people (Lewis and Maslin 2015, 175). They argue, since there were fewer humans cultivating the land, forests and vegetation grew back, causing a dip in atmospheric CO₂. In this way, they argue that the origin of “the Anthropocene” should be placed here, especially given its historical importance; they suggest, following many scholars, that the Industrial Revolution would not have been possible without the colonization of the Americas. In this way, “dating the Anthropocene to start about 150 years before the beginning of the Industrial Revolution is consistent with a contemporary understanding of the likely material causes of the Industrial Revolution” (Lewis and Maslin 2015, 177). In *The Anthropocene as a Geological Time Scale*, Michael Wagemann, Mark Williams, Erich Draganits, Jan Zalasiewicz, Colin Waters, and Matt Edgeworth do not give much attention to this idea. They state that the atmospheric CO₂ levels in 1610 were normal for the Holocene and do not address the Columbian Exchange as an exchange of plants, animals, and insects. While they understand the “attraction” of dating “the Anthropocene” here, they conclude that the data does not support this assertion (Zalasiewicz *et al.* 2019, 250).

John McNeill discusses the Industrial Revolution as one of the possible origins of “the Anthropocene.” He argues that from the perspective of global carbon dioxide

emissions, there is no significant change during that time, but that a graph shows it as the beginning of a steady, and then steep increase once we reach 1950 (Zalasiewicz *et al.* 2019, 254). Will Steffen then argues that the origin should be placed at the mid-20th century, or “the Great Acceleration,” what is now “a shorthand term for the sharp increase in the magnitude and rate of change of human activities and their impacts” (Zalasiewicz *et al.* 2019, 254). He looks at 12 trends between 1750 – 2010, describing them as “indicators for the structure and functioning of the Earth System” (Zalasiewicz *et al.* 2019, 257). These trends measure atmospheric carbon dioxide, nitrous oxide, methane, stratospheric ozone, surface temperature, ocean acidification, marine fish capture, shrimp aquaculture, nitrogen to coastal zone, tropical forest loss, domesticated land, and terrestrial biosphere degradation (Zalasiewicz *et al.* 2019, 257). In all cases, except shrimp aquaculture, there is a significant increase in the indicator or an obvious acceleration of a trend. Steffen further looks at 12 socio-economic trends, analyzed 3 different ways, acknowledging that treating humanity as one whole “masks very large inequalities amongst various countries, societies and groups within countries” (Zalasiewicz *et al.* 2019, 258). While they are clear they do not want to determine who is “responsible” for climate change, they do acknowledge that their data demonstrates that it is not the product of the actions of ‘mankind as a whole,’ but of the “industrial capitalists of the wealthy countries” (Zalasiewicz *et al.* 2019, 258). In acknowledging this, they cite Andreas Malm and Alf Hornborg, two Marxist scholars who write about capitalism and ecology.

Given that even the scientists are beginning to recognize that capitalism is part of what is driving ecological change, it makes sense to look at the scholarship coming from the Marxist, ecosocialist, ecofeminist, posthuman, Indigenous, and anti-capitalist thinkers on climate change and “the Anthropocene.” In looking at the narratives that these thinkers construct, we can see the intellectual resources that are available in trying to understand what other kinds of worlds are possible, beyond capitalism and its dependence on extractivism. This essay will discuss prominent narratives of “the Anthropocene” from the Marxists and anti-capitalists, demonstrate the value of these narratives as a starting place to understand anthropogenic climate change, explore the Indigenous and Feminist Marxist scholarship that they draw on but do not fully integrate into their analysis, and explore alternative conceptions of “the Anthropocene” by Indigenous and posthumanist feminist scholars. The purpose is to understand why

orienting research questions around new kinds of ethics, rather than new kinds of value, develops “the Anthropocene” into a more useful tool for assessing alternatives to capitalism and ways we can avoid, or at least live with, the consequences of climate change.

The Power of Periodization

It is important to start with a reminder that, “Origins [...] are another word for an account of agency or a trajectory of power” (Yusoff 2018), especially when thinking through “the Anthropocene,” as a term that comes to us from geologists who do not intend to interpret anything beyond the science. Western science is not objective or neutral as it has always been connected to and facilitates the domination of men over women, men over nature, and humanity over itself (Merchant 2006, 515; Mies 2014, 88; Federici 2004). Further our knowledge of geology was initially driven by the pursuit of extractivism (Yusoff 2018). A Western scientist origin story of “the Anthropocene” starting in the 1950s is the answer you would expect; around the 1950s is when capitalists finally got it right: the perfect combination of religious, legal, and scientific apparatuses to sufficiently embed capitalism in systems of power and thus invisibilize much systematic violence and structural discrimination, and the relationships that valorize them. It is a reasonable conclusion given the expanse and scope of how deep capitalism has penetrated the psyche of the humans who hold power in this world (like those in the AWG), even if intellectually they acknowledge that the data supports Malm and Hornborg’s position that it is industrial capitalists of the wealthy countries, not humanity as a whole, who are responsible for producing climate change. Indeed, they chose the “conservative” (Zalasiewicz *et al.* 2012, 2012) option to formally recognize the Anthropocene as our current geological era and to propose its beginning in 1950.

As Todd has noted, dating the beginning of “the Anthropocene” here is a form of erasure (Todd 2018), because it effectively (if unintentionally) whitewashes the white supremacist capitalist patriarchy that Western science originates from. This is clear from the social markers that they use to demonstrate why the 1950s should be the beginning of the new epoch which include real GDP, foreign direct investment, primary energy use, fertilizer consumption, paper production, transportation, telecommunications, and international tourism: all of these are socioeconomic factors motivated by capitalist production in the pursuit of profit (Zalasiewicz *et al.* 2019, 257). That they chose to

establish “the Anthropocene” based on socio-economic development factors is not surprising, as these kinds of measurements are part of how we understand global warming projections and predictions. When one looks at the scientific data they present on carbon dioxide emissions, for example, one can see why they advocate for the 1950s. They argue that the increase in oxygen levels that Lewis and Maslin point to around 1610 is within the normal levels of fluctuation in the Holocene and so it cannot be firmly connected to the “decline” of Indigenous people in the Americas as Lewis and Maslin suggest (Zalasiewicz *et al.* 2019, 250). They argue that the 1950s is more accurate, but since other epochs had been dated imprecisely after time has passed⁶, the difference between Crutzen and Stoermer’s (2000) initial start date of 1784 and theirs might become insignificant.

Placing the start of “the Anthropocene” at the 1950s is indicative of the fact that capitalism and the science and technology that it relies on to pursue profit has become invisible to these scientists who wish to remain “neutral.” Like Foster *et al.* (2019), I argue that this is a clear indication of what eco-socialists, eco-feminists, and Indigenous scholars have been saying all along: that capitalism is premised on and gains legitimacy through its white-supremacist, capitalist, patriarchal science, that the origins of capitalism brought about a dualism between men and women, white and black bodies, society and nature, and that it took centuries for capital’s science to finally register the violence of its logic, only believing that we have entered a crisis when there are sufficient geological and socio-economic markers. Understanding this origin story as a “trajectory of power” means understanding the power in naming the 1950s as the beginning of a new geological epoch without having to account for the fact that CO₂ emissions at that level are only possible because of centuries of capitalist accumulation via witch-hunts, colonization, and class war that have historically been legitimized through the church, the state and its legal systems, and the study of Western science and medicine (Mies 2014; Federici 2004; Merchant 1980). From this perspective, it is clear that the scientists’ view of “the Anthropocene” is worthy of critique for all the reasons that the Marxists and anti-capitalists point to, as articulated above. However, the Marxist Ecologist position stays within the confines of capitalist thinking in that it still reproduces a system of

⁶ They give the example of few people caring “whether the Cenozoic began 66 million years ago or 65.99 +/- 0.12 million years ago [...] a difference roughly equivalent to that between 1784 and 1950” (Zalasiewicz *et al.* 2019, 254).

knowledge by valorizing and exploring capitalism as the starting and ending point for analysis.

This can be seen when looking at the work of John Bellamy Foster, and Jason W. Moore. While they have significant disagreements between them, both draw on the eco-feminist and Marxist Feminist scholarship that came before them in discussing “the Anthropocene.” Foster’s approach advocates for the term “the Anthropocene” by developing Marx’s theory of the ‘metabolic rift’ between humans and nature (Foster 2000). He argues that in order to avoid climate crisis, a revolution is necessary to change our capitalist forms of production and value to a socialist one. He advocates that this transition take place through workers’ associations and workplace democracy, in the same way that Marx conceived of communism (Foster 2000). With this goal in mind, when looking at his other work, it is significant that he always points to the important work that women and people of colour are often at the forefront of resistance to capitalism (Foster 1994), but does not go beyond this in looking at how alternatives were also being created through this resistance. Foster continues to advocate “the Anthropocene” as proof that we must advocate for ending capitalist accumulation processes through workers rights against imperialism. As he puts it “the poor shall inherit the earth or there will be no earth left to inherit” (Foster *et al.* 2019), though he does not point to any specific way that it is possible to do this, and does not include a discussion in this analysis on what this would mean for relationships beyond the employment relationship, which is one of the key contributions of anti-capitalist feminisms.

Moore’s work contributes to this discourse and shifts the question of “the Anthropocene” (“Age of Man”) by arguing that it is more accurate to call this age “the Capitalocene,” because climate change is proliferating the contradictions of capital to such a degree that it will undermine the ways in which it has historically been able to pursue surplus value. In drawing on the Marxist Feminists’ critique of the Marxist conception of socially necessary labour time, Moore articulates that, beginning with the original processes of primitive accumulation, capitalism has been able to generate surplus value through a series of ‘metabolic shifts’ that enable capital’s access to free or cheap “natures,” by alternating between capitalization through the labour process and appropriation of the work of “women, nature, colonies,” especially in order to resolve economic crises (Moore 2015). Since climate change is making even these processes more expensive, he anticipates that capitalism will face its most significant economic and

ontological crisis yet, “making possible new, emancipatory and egalitarian vistas” (Moore 2015, 290). In a similar way to Foster, he focuses on the economic impact and reform that can be made *because* of the looming crisis ahead. In this way he draws on the scholarship of anti-capitalist feminisms, but does not follow their key contributions through to develop “the Anthropocene” as something that could be beyond capitalism, and keeps the center of the conversation on capitalism. In this way, both contribute to understanding “the Anthropocene” as a concept, and develop it as a way of connecting structural oppression initiated by capitalist forces to climate change, critiquing the science and origin story of the scientist’s “Anthropocene,” neither are able to take us beyond the ‘science’ of capitalist economics. Since both depend on primitive accumulation, the next section will discuss the way Glen Coulthard, Silvia Federici, and Maria Mies revise Marx’s theory of primitive accumulation in order to decenter the employment relationship, after a brief articulation of Carolyn Merchant’s arguments about science and ecology in *The Death of Nature*. In this way, “the Anthropocene” can be developed as a critical tool that helps to facilitate thinking through ways humanity can live with, or avoid, climate crisis.

From Eco- to Anthropocene Feminism

Carolyn Merchant’s *The Death of Nature* is a classic text in ecofeminism, that connects the scientific revolution to the systematic oppression of women through the witch hunts and the rise of a view of a mechanical view of nature as something to be divisible into many parts (Merchant 1990, xvi). Though physics research is shifting to understanding the world as “undivided, multidimensional wholeness” (Merchant 1990, xvii), which is antithetical to a mechanistic understanding of nature, the violence done to the relationship between humans and nature has not recovered. Merchant argues that understanding the women’s movement and the environmental movements in the USA together “can suggest new values and social structures, based not on the domination of women and nature as resources but on the full expression of both male and female talent and on the maintenance of environmental integrity” (Merchant 1990, xix). Throughout the book, she discusses the mechanical framework associated with the scientific revolution and “its associated values of power and control sanctioned the management of both nature and society” (Merchant 1990, 235). Merchant is clear that the rise of capitalism, modern science, the subjugation of women, and ecological

degradation are dialectically interlinked, and that the former two are dependent on the latter two. As many scholars note, this is because capitalist forms of accumulation are dependent on the appropriation of free or cheap labour from “women, nature, colonies” (Mies 2014; Moore 2015; Federici 2012). This work is an important signpost for establishing this connection so that we can better understand the origins of “the Anthropocene.” While this ecofeminist contribution to understanding the social origins of climate change is extremely important, it tends to treat gender as a binary, and maintains the questions of liberation within questions of value. The following section will elaborate on this, specifically looking at the processes of primitive accumulation at the origins of capitalism in order to demonstrate why discussing ‘value,’ while important, will not help us develop ways to live within, or avoid, ecological crisis.

Decentering the Wage Relationship

Marx’s theory of Primitive of Accumulation can be summarized as “the historical process of divorcing the producer from the means of production,” (Marx 1990, 875) which constitutes the prehistory of capitalism. In taking away the means of production and subsistence from human beings, processes are set in motion that turn everything into the constitutive agents of capital: “On the one hand, the social means of subsistence and of production [...], on the other the immediate producers into wage labourers” (Marx 1990, 875). At the end of this process, Marx says “free workers” are made; they are free in that they are not considered part of the means of production, unlike slaves or serfs, and as such they are “free from, unencumbered by, any means of production of their own” (Marx 1990 874). In order for capitalism to stay the dominant mode of production, it must maintain the separation of producer from means of production and subsistence and the “free” workers, the worker is *made* to be “free” in this particular sense. In this way, it “clear[s] the way” for capital on a “continually extending scale” (Marx 1990, 874).

From this it is clear that Marx intended to articulate how people are forced off land that they once occupied or had claim to in order to have private individuals have control of the land, whether or not the land that had been traditionally occupied by groups of people or the state. He demonstrates that the church and the legal system were utilized in order to legitimize and ensure this change through force. He is also clear that this meant a fundamental change to the way humans were able to gain access to the world around them in order to maintain their lives. Finally, he ends up focusing on

capital's need for creating the 'free' labourer, because in order to produce commodities through the factory, and in order to build the machines required for the factories, capitalists needed labourers who would be willing to move to the cities and work in the factories. This happens by violently forcing people off the land, so they are "unencumbered" by owning their means of production and subsistence and must sell their labour power in order to get money so they can begin paying for access.

In order to update the Marxist heuristic, which is excellent for diagnosing the structural problems embedded in capitalism but less helpful going beyond capitalist relations, it is necessary to move away from what Glen Coulthard calls Marx's "normative developmentalism." Marx's initial view is that proletarianization is a "historically inevitable process that would ultimately have a beneficial effect on those violently drawn into the capitalist circuit" and thus focuses on the creation of the 'free' labourer, because it would bring those who were colonized "into the fold of capitalist-modernity and thus onto the one true path of human development---socialism" (Coulthard, 2014, 10; Federici 2019, 31-33) though this changes throughout Marx's studies (Coulthard 2014, 10). Marx does not demonstrate the significance of the trauma that comes with being removed from the land you live on and are obligated to, even if he does briefly acknowledge it. Thinking through 'the labourer,' only defined in a strictly 'economic' way, is a conceptual tool that will necessarily leave out much of human experience that is effected by our economic system; it will not help us think through racism, for instance, in the same way that Mies thinks it is impossible to use Marxism to "think gender relations" (Mies 2014, 27, 33, 47-8; see also Federici 2019, 171).

By shifting the "investigation from an emphasis on the capital relation to the colonial relation," one is able to move past the limitations of Marx and Marxist thought (Coulthard 2014, 10; Mies 2014, 74-76). This is important because, while proletarianization of indigenous people did occur, it was not central to the functioning and effectiveness of primitive accumulation in Canada (Coulthard 2014, 12). It is actually the "history and experience of dispossession, not proletarianization" that has most shaped colonialism in Canada (Coulthard 2014, 13). By doing this, the conversation then shifts away from the wage relation to many different points in history, like the experience of being removed from the land, thus destroying the knowledge and practices that had existed before capitalist expansion, whether this is regarding the experience of Indigenous people in Canada (Coulthard 2014, 13), the murdering of women who had

knowledge of the land and their bodies during the witch hunts in Europe from the 12th to 17th century (Mies 2014, 81), or the destruction of subsistence farming by the laws introduced through the Structural Adjustment Programs in many counties in Africa (Federici 2019, 107), all in the service of capital via primitive accumulation. If one understands primitive accumulation to be “the historical process of divorcing” humans (rather than “the producer,”) from the land and their means of subsistence in addition to “the means of production,” the moment of dispossession becomes extremely important to the process by which space is “cleared” for capitalism to take root.

If one accepts Marx’s notion that the wage labour is the most significant way primitive accumulation and the expansion of capitalism has changed human lives and practices, then we accept the patriarchal and racist divisions that it implicitly reinforces. By centering the importance of wage labour in his analysis, Marx does not articulate the way that “women, nature and colonies were externalized, declared to be outside civilized society, pushed down, and thus made invisible as the under-water part of an iceberg is invisible, yet constitute the base of the whole” (Mies 2014, 77). This externalization is how “Mother Earth, Women and Colonies” were “defined into nature” (Mies 2014, 75), being seen as wild things needing to be civilized, or subordinated to patriarchal discipline and control. Both Federici and Mies are clear that this ‘naturalization’ of the work that “women, nature, colonies” do is how their exploitation has become invisible and considered to be outside of the wage relation, as it is not “productive” labour, in the sense that it is not directly valued by capital (Federici 2019, 17; Mies 2014, 75). Focusing on the wage-relation thus normalizes

the disaccumulation of our precapitalist knowledges and capacities, which is the premise on which capitalism has built the exploitation of our labor. The capacity to read the elements, to discover the medical properties of plants and flowers, to gain sustenance from the earth, [...] remains a source of ‘autonomy’ that had to be destroyed. The development of capitalist industrial technology has been built on that loss and has amplified it.
(Federici 2019, 191)

It is from this perspective that we can understand how devastating dispossession from the land for Indigenous people in Canada, the women subsistence farmers in Africa, or the women murdered as witches who’s way of life was and continues to be “deeply informed by [...] the land as a system of reciprocal relations and obligations” because it erases what this way of life “can teach us about living our lives in relation to

one another and the natural world in nondominating and nonexploitative terms” (Couthard 2014, 13). From this view we can also see how the “dualism” or “polarization, between the patriarchs and nature, and between men and women” was able to develop as “science and technology became the main ‘productive forces’ through which men could ‘emancipate’ themselves from nature, as well as from women” (Mies 2014, 75). Mies calls this the patriarchal predatory division of labour.

Understanding the patriarchal predatory division of labour deployed in order to support the structuring of life around needing an employment relationship or having an individual be responsible for you through their employment relationship (children, housewives) demonstrates that there is so much more to life than when we analyze only the employment relationship, or the employment relationship in isolation. Making life and the human action necessarily for its maintenance, via soft and direct violence, oriented towards the service of capital accumulation is how capitalism makes production cheaper over time (relative to profit-making). This is because, the more independent of “nature” humans are, i.e. the more ways there are of overcoming “nature,” the more readily human action can be appropriated by capital. When understood from this position, it is clear that understanding “the Anthropocene” or “Capitalocene” as the onset of a new economic crisis which presents a new opportunity to reconceptualise value misses the crucial point that it has been a crisis for “women, nature, colonies” for centuries now; this new ‘crisis,’ should not be the sole impetus for action.

Collard and Dempsey’s concept of “accumulation by difference-making,” makes this even more precise. They build on the work of Silvia Federici and Maria Mies with the express purpose of linking the stories of the witch-hunts and colonialism to “these other Anthropocene origin stories” (Collard and Dempsey 2018, 1350). They argue that the contradictory relationship between people represented in Mies’ iceberg metaphor⁷, those “above- and below-water [...] tends towards crisis, towards the Anthropocene” (Collard and Dempsey 2014, 1358). They argue that the gendered division of labour that is established through colonization and the witch-hunts are how capitalist expansion can maintain itself because through this division of labour, women, nature, and colonies “absorb the harms that devaluation fixes can only ever displace” (Collard and Dempsey 2018, 1358). In understanding ‘difference’ in “accumulation by difference-making”, they

⁷ See Mies 2014, 77, Collard and Dempsey 2018, Figure 1, 1357.

follow Ruth Gilmore's "death-dealing' difference – abstracted, hierarchical difference that those in power cast as innate" and understand this is a "condition of possibility for the Anthropocene" (Collard and Dempsey 2018, 1352). In accumulating differences or divisions between people *and* the creation of these differences, we can see how "these processes are directly linked to the so-called Anthropocene, in that the planetary-scale degradation we face is made possible by this very difference-making" (Collard and Dempsey 2018, 1359). For this reason, they argue that analysis must center bodies in understanding of "the Anthropocene," because, as Federici points out, it was the first machine to be 'created' by capitalism by demanding disciplined labour (Collard and Dempsey 2018, 1360). In this way we are pushed "towards an intersectional, power-laden and de-sanitized story of "the Anthropocene," foregrounding the bloody force needed to birth this epoch, a force centred especially on making and marking difference" (Collard and Dempsey 2018, 1360), and when thought of this way, can be joined with the stories told by "indigenous, feminist and critical race scholars who counter the notion that "the Anthropocene" is a story of unintended effects" and can focus us on the solidarities amongst history's "rebellious" subjects (of which the witch is one) necessary to "ideally reverse the Anthropocene" and overthrow capitalism (Collard and Dempsey 2018, 1361). This focus on history's rebellious subjects is important for "the Anthropocene," as we all will need to participate developing alternatives to capitalism.

In addition to this, we should not take the destabilizing impact of economic crisis as the impetus for thinking through new kinds of value (Moore 2015, 290). Reacting to economic (or even planetary) crisis, while necessary, will always put us a step behind, and keeps us at the mercy of the economy. As Leanne Simpson says, "the impetus to act and to change and to transform, for me, exists whether or not this is the end of the world. If a river is threatened, it's the end of the world for those fish. It's been the end of the world for somebody all along. And I think the sadness and the trauma of that is reason enough for me to act" (Simpson 2017, 74). It has been a crisis for "women, nature, colonies" (Mies 2014) since the beginning of the witch hunts, since the beginning of primitive accumulation, and since the beginning of colonization; if humanity only react to crisis, we will always be behind in understanding the root of the problem and the alternatives to capitalism that have survived it's violence. For this reason, like Collard and Dempsey, I argue we should follow Lewis and Maslin in their dating of "the

Anthropocene” at 1610, to firmly establish a narrative connecting these trajectories of history.

When the invisibilization of the work that “women, nature, colonies” have done for the last few centuries all over the world in the service of capital accumulation is understood, it can be seen that the rebellious subject is one that is made by refusing the logic of capitalism and wage labour. Tracing “the Anthropocene” through primitive accumulation via revisions of Marx by Indigenous and Feminist Marxists clearly demonstrates that capitalism and the structures it requires to maintain growth and expansion is what gives rise to climate change; understanding “the Anthropocene” as something more than capitalism, though, is how one can begin to think of alternatives that go beyond the binaries that capitalism violently instilled in individuals and continues to rely upon today in order to maintain power. Formulating and building alternatives to the status quo can always begin by re-thinking the ethics of the reproduction of life, of the interpersonal relationships that are built around this, and of the diverse identities that develop when doing this work (Henry 2018, 1369; Collard and Dempsey 2018, 1361).

From Notions of ‘Value’ to Notions of ‘Ethics’

The Marxist and anti-capitalist narrative articulated above raised the concern that it is not all human beings who are responsible for climate change, but the capitalists who have the power to perpetuate particular kinds of valorization which are generated by the systematic exploitation of labour power and the appropriation of free or cheap nature from “women, nature, colonies,” since their work/energy is not considered to be “productive” or directly involved in the labour process (Moore 2015; Mies 2014; Federici 2012). In looking at the revisions of primitive accumulation by Coulthard, Mies, and Federici, the conversation shifted from systems of capitalist production to how capitalism changes the relationships between human beings and between humans and the world around them. Positioned in this way, I agree that not all human beings are responsible for capitalism, it is important to acknowledge two facts: the first being that the vast majority of humans are complicit in supporting capitalism because they need to participate in wage labour in order to survive, and as such are helping to produce climate change but under conditions that we did not choose. The second is that building alternatives to capitalism will require the participation of the vast majority of human beings in order to restructure relationships, economies, and democracies in a way that

will allow humans to live through or avoid climate crisis. For this reason I will turn to the feminist and indigenous scholars who have already begun the process of developing the Anthropocene as a critical tool for thinking through humanity's current predicament.

Many scholars discuss the need for thinking through a new kind of ethics for the Anthropocene in order to inscribe value to life generally, not just human life (Huffer 2017, 67; Alaimo 2010, 158; Zylinska 2014). In *Minimal Ethics for the Anthropocene*, Joanna Zylinska uses "the Anthropocene" "less as a scientific descriptor and more as an ethical pointer, outlining our human obligation towards the universe---of which we are only a tiny part" (Zylinska 2014, 66). She does this because she sees the violence that human narcissism has played in history, in that "Narcissism, self-interest and self-comfort thus overshadow any possibility of the emergence of an ethical response and ethical responsibility in relation to the predicted events" (Zylinska 2014, 109). It is the hubris of thinking from a single perspective for one species that Zylinska aims to problematize. The ethics that she proposes would best serve thinking through the Anthropocene is an ethics "not just about being-in but also about being-with. The processual and co-emergent nature of what we are calling the world applies to all sorts of thickenings of matter across different scales" (Zylinska 2014, 93). This thinking-with is key, as Zylinska follows Karen Barad in asserting that everything is inherently connected. In this way, "ethical articulations therefore always perform an ontological function: they stabilize and organize the universe for us, but in a way that is to benefit not just us but also *the universe as such*" (Zylinska 2014, 32). For this reason, Zylinska contributes to post-anthropocentric or posthuman thought. While she is clear that individual action will not mitigate climate change (Zylinska 2014, 43), understanding the Anthropocene as an ethical pointer is about taking responsibility for what has already happened in order to live through what is to come. This way, "the Anthropocene" can be thought of universally, across different scales, but without mistaking this position for being an "objective" or "neutral" position.

In the edited collection *Anthropocene Feminism*, many authors discuss the need to understand ethics and human action from an anti- or post-humanist perspective, "delinking the human agent from this universalistic posture, calling him to task, so to speak, on his concrete actions" (Braidotti 2017, 22). By doing this, they reject the identification of white, European man as standing in for humanity as a whole while simultaneously preventing the ability to reproduce the human narcissism that allowed

that kind of thinking to proliferate in the first place by always understanding human beings in relation to the world around them. This anti- and post-humanism is a way of combatting Hern and Johal's concern that "the Anthropocene" as a new epoch would require an absurdly large grand narrative to maintain in that requiring understanding of everything in its context means, especially when oriented around a question of ethics, that any thoughts or actions undertaken in an attempt to take responsibility for what has happened and to live with the consequences will require place-specific analysis and action. This is why thinking in terms of ethics across different scales, as Zylinska (2014), Yusoff (2018), and Colebrook (2017, 11) do, instead of value, as Moore advocates, leads to a deeper understanding of what needs to be done, and how to not repeat the same mistakes.

The question of ethics understood as being responsible for the "intra-actions" (Barad 2007, 33) always in existence (because no one and nothing exists in isolation) in the context of thinking through the implications of "the Anthropocene," both as a new geological epoch and as a critical tool, necessarily brings one back to reflect upon the interpersonal relationships that are normalized and enforced under capitalism. Glen Coulthard and Leanne Betasamosake Simpson discuss grounded normativity as, "the ethical frameworks provided by these Indigenous place-based practices and associated forms of knowledge. Grounded normativity houses and reproduces the practices and procedures, based on deep reciprocity, that are inherently informed by an intimate relationship to place. Grounded normativity teaches us how to live our lives in relation to other people and nonhuman life forms in a profoundly nonauthoritarian, nondominating, nonexploitive manner. [...] Our relationship to the land itself generates the processes, practices, and knowledges that inform our political systems, and through which we *practice solidarity*" (Coulthard and Simpson 2016, 254). While they do not explicitly tie this to thinking about "the Anthropocene," it is clear that their words are applicable to thinking through "the Anthropocene," especially when thinking through the need for place-based practices and knowledges in order to live with the consequences of colonization that have led to climate change. In this way, perhaps it is necessary to follow Darin Barney, through Zylinska, to take up post-masculine courage. Being post-masculine does not make it feminine, but it does require letting go of the masculinist relations characterized by individualism and the need to control everything around oneself (Zylinska 2014, 14-15). Through this, the masculine-feminine binary is broken

and instead one can begin thinking through issues of “the Anthropocene” around individualism and its inherent hierarchy that has produced the climate change versus the non-hierarchical collectivism that the anti- and post-humanist and Indigenous scholars clearly point to as ways to live with the consequences of climate change or even avoid further ecological degradation.

Conclusion: From Individualisms to Collectivities

This essay explored various narratives surrounding “the Anthropocene,” beginning with its conception from the science community, to the Marxists and anti-capitalists, to the Indigenous and Feminist Marxists, to the posthuman and indigenous scholars thinking through the term. I have argued that “the Anthropocene” has been developed as a critical tool to think through the consequences of anthropogenic climate change. While initially, the term “Anthropocene” was intended by scientists to be only about the science in order to avoid its use as a political tool, they have recently acknowledged that it is not all humans who are responsible for climate change, but largely the “industrial capitalists of the wealthy countries” (Zalasiewicz et al. 2019, 258). In tracing science as a dominant discourse of the 20th century, then analyzing the science of “the Anthropocene” and demonstrating the power of periodization, I have demonstrated that all science, but especially the science giving rise to this new geological age, is political. When understood in this way, it is clear that the beginning of the Anthropocene should be dated at 1610, following Lewis and Maslin, because it is clear that the expansion of capitalism through colonialism is the moment that humanity’s relationship with themselves and the world around them broke; capitalist value relations took over, fundamentally changing the horizon of possible relations, which has brought us to this moment of ecological crisis.

From there, I demonstrated that anti-capitalist narratives, while importantly demonstrating the systematic exploitation embedded in capitalism through wage labour, are still focused on questions of value which confines thinking to the capitalist framework. For this reason, following posthuman and anthropocene feminism, I argue we need to shift the conversation from thinking through alternative forms of value to thinking through ethics. This is necessary because questions of value seem to re-embed possibilities of hierarchy and dualism; this can especially be seen as plaguing the feminist philosophers of science and the Marxist Ecologists. Ethics, however, orients us

around questions of relations, positioning us well to think about ethics across scales. Further, following Zylinska, it is useful to think about “the Anthropocene” as an ethical pointer, one that thinks about geology in a conceptual and metaphorical way, preventing us from thinking about it as a reified thing and taking the science that produced it too seriously, especially because they have dated “the Anthropocene” in the 1950s. As Todd says, this date erases the historical context and centuries of violence against women, people of colour, and nature in the pursuit of capitalist accumulation that has brought about this ecological crisis. With this in mind, it’s further necessary to talk about ethics for “the Anthropocene” as stemming from the fact that everything is inherently connected, because upholding false atomization is endemic to the logic of capitalism and climate crisis.

Following Leanne Simpson and Glen Coulthard, we need place-specific alternatives to capitalism in order to live within climate crisis, based on their notion of grounded normativity. They conceive of this as a kind of ethics that is place-specific, deeply embedded in the land; it is the land that generates process, practice, and knowledges that in turn, inform political practice and solidarity. In this way, the question of ethics fully transitions us from thinking through different individualisms and questions of value, to questions of collectivism and new collectivities.

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