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**RETURNING TO NATURE: ENVIRONMENTAL HISTORY'S POSTHUMAN
DIRECTION**

By
William H. Smith III

A Thesis

Submitted to the
Department of History
College of Liberal Arts and Sciences
In partial fulfillment of the requirement
For the degree of
Masters of Arts in History
At
Rowan University
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Thesis Advisor: Q. Edward Wang, Ph.D

Dedications

I would like to dedicate this work to my mom, Joyce G. Reilly (nee Tobar)

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I would like to thank Dr. Michael Davis of the Geography Department at Kutztown University of Pennsylvania for his unwavering adamant explanations of environmental consciousness people must have, in order for the planet's natural world to thrive in the face of humanity's need to consume. Your passion towards the beauty the natural world, and your assertion to conservation, have both been major motivational tools to my own consensus of environmental change as I move forward to being a professional historian in environmental history. I would like to personally thank the History Department of Rowan University for guiding me towards the success of this work. I also praise Dr. Qingja Edward Wang of the History Department at Rowan University, for being my biggest inspiration throughout the journey towards the end of this work. Every time I have come to your office with an idea, you have encouraged it, even when I got annoyed with the historiography, you saw the potential of my thought processes with historical theory and environmental history. To my mother, Joyce Reilly, Alex and I became the men we are now because of you. Every point I had in doubt, in question, you have provided the best options in the circumstances presented. You have opened my eyes to the beauty of the natural world, and I have learned to understand while the world may be how it is, we, the individual, have the power to change, and assist in making this world a more informed and engaged place than what we have lived in. To Jessica Lotufo, you have done more than I can ever ask for. You taught me that, even when the world closes, to never close with it, remain to who you are, and continue on to inspire others. I am excited to discover what is the next step for us, together. I love you very much Jessica, never forget that.

Abstract

William H. Smith III
RETURNING TO NATURE: ENVIRONMENTAL HISTORY'S POSTHUMAN
DIRECTION

2017-2019

Qingja Edward Wang, Ph.D.
Master of Arts in History

The purposes of this thesis were to (A) determine a new historiographical direction for environmental history through analyzing posthuman environmental change, (B) to present a new historical analysis of posthumanity, reinforced by scholarly accomplishments with the anthropocene, that allows the historian to discuss environmental history with humanity as a secondary character, and (C) to show how both the historiography of environmental history, as well as specific case studies of climate, infestations, and natural disasters, are able to present this new direction for environmental history. What has been the end result is that humanity will always improve their condition of sustainability, and the limitless ambitions of humanity should be common knowledge for environmental historians. Humanity's improvements to their condition of sustainability have allowed nature to become historically analyzed as a primary agent of environmental change, challenging the environmental historian's current dichotomy of humanity and nature competing for survival.

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Introduction

In 2013, Paul Sutter wrote about the state of environmental history in the twenty-first century, that environmental history has grown within the last twenty years since 1990 due to an emphasis on the concept of hybridity as it relates to the environment¹. In 2019, I would argue that this concept of hybridity remains crucial, because environmental historians remain committed to this understanding of the lasting impact of the forces that change the environment. And because environmental historians are greatly concerned about the dichotomy that exists between both human and nonhuman agents, there needs to be a shift from simply explaining this dichotomy, as a means to explain environmental change in favor of understanding the greater impact of *nonhuman* agents on the environment.

I affirm with Sutter that the concept of environmental causation, that is to say the factors to dictate change, are part of an environmental historians work, but where I look to move beyond Sutter's work is how environmental historians must assume that humanity is living in a more nonhuman state of mind². In 2018, humanity has become increasingly reliant on technology to survive, especially with the increased use of smartphones and tablets to hold information, but also as our technology has increased, so has our need to increase the space of the Anthropocene.

The shift in ideology can be best determined by the contemporary treatment of human nature. Contemporary ideology of humanity bases human equality by race,

¹ Paul Sutter. "The World with Us: The State of American Environmental History" *Journal of American History* Vol. 100, Issue 1 (June 2013) pp. 96

² Sutter 98

gender, and social structure, but we still think of ourselves as superior or inferior to others, a dualism that is part of human nature because they possess the free will to determine the causality of existence³. This idea of free will, as exercised by humanity, is the main factor to allow humanity to justify acting upon the environment. Further, the increase of the Anthropocene has cemented humanity's agency on the environment, especially since humanity has increased efforts to act against the environment within the last ten years. As the climate changes, there have become more frequent natural disasters and encroachment of invasive species on new territories. Albeit small examples to discuss, I argue that now is the time for environmental historians to reassess agency, as it relates to the direct impact of nonhuman agents on environmental change, especially since these examples reflect the current trend of the natural world.

Environmental historians must also not be so quick to discourage or downgrade the role of agency as it relates to environmental change, because this concept has been utilized to investigate how humans and nonhumans *separately* impacted the environment⁴. This assessment of independent agency on the natural world is unfair, because with every major environmental change that humanity commits, there is always a pushback by natural forces, a reaction against the Anthropocene by nature, be it through the form of an infestation or a natural disaster, and that environmental historians should become more increasingly concerned about how nonhumans act as a reactionary to human progress, and provide a greater change on the environment in the process.

I also argue that this emphasis of nonhuman environmental change also refers back to my original point about the world humanity lives in in the twenty-first century. I

³ Francis Fukuyama. *Our Posthuman Future: Consequences of the Biotechnology Revolution*. New York: Picador 2002 151

⁴ Sutter 98

get up every day to the sound of my alarm from my smartphone, and every day, after I use at least three household appliances to make my breakfast. I turn on my television, or I use my cellular telephone to find out some new form of medium to help humanity do and think better: Hiring people to deliver groceries by other humans, new information about the health benefits of certain foods, places around the world that are advertised as paradise on Earth, and most recently, the use of robots for customer service aid.

Everyday, the natural world is destroyed to serve this human improvement, while the after effects of these improvements are more prevalent, examples of which include deforestation, waste, and certainly pollution. Humanity needs the natural space to improve its condition, which is the reality of our contemporary comforts, our advanced societies, and our more informed age of living. The reality of these comforts is that the natural world is more prone to ecological destruction in the last twenty years than in the last 200. In the wake of this, the environmental historian must be able to understand the role of nature in environmental history not just the inevitable success of humanity against nature, but how nature can influence environmental change in the process.

Methodology

The methodology for this work is complex, using multiple theoretical terminologies to explain the emphasis of nonhuman agency. The use of the word “agency”, in the case of environmental history, does apply to the causal factors for environmental change. However, environmental historians have used agency to strictly discuss the role of humanity in environmental change. Humanity’s interaction with the

natural world is self-evident, and for environmental history to move forward with its historiography, agency towards nonhumans must take precedence.

The origins of nonhuman agency began as rhetoric in the 1960s, when environmental history started in America as a separate school of thought. For this first generation of environmental historians, their serious regard was to investigate how humanity acted upon the environment, but there were also historians that advocated how nature played a role in the changes to the environment.

However, to understand the greater presence of nonhuman agents, this discussion of the historiography also needs to assess how nonhuman agents pushed back against humanity's concepts of "progress", "civilization", and "urbanization". By the 1980s-1990s, postmodernist theory challenged the legitimacy of history as an academic profession, and environmental history began to quietly investigate the concept of agency as it relates to changes on the environment, providing credit where credit is due. Finally, environmental history in the twenty-first century has grown to do three key things: It expanded as a topic of discussion to historians in Europe and Asia, American environmental historian shifted their attentions towards the American South, and the concept of environmental history itself became host to an array of newer histories that stemmed from environmental history: Disaster history, climate history, etc.

Despite the changes throughout environmental history's historiographical narrative, there is one question that still remains: *Can* nonhuman agents of environmental change able to influence new theories on environmental history? Yes, nonhuman agents do influence environmental change, but no, because on the context that the historians studies it. To give nonhuman agents their due credit, the environmental historian must

place them in a global context. In fact, this global context is required of environmental history, because it limits our profession to think about the environment as it changes independently in countries throughout the world⁵.

The importance of getting environmental history to drift away from regional fields of study, I.E. American history, European history, etc., will also the aid profession's ability to understand how nonhumans from one country affect the environment of another, particularly with the outbreak of spotted lanternflies (*Lycorma delicatula*), native to Asia, in Berks County, Pennsylvania. In fact, the use of this global context also provides more information on the state of the global environment, but we need to have more objective approaches to scientific disciplines such as zoology and ecology, because while environmental historians use their works as sources, they, as of yet, do not *directly* concern themselves with these scientific fields of academia⁶.

The Anthropocene: Humanity's Limitless Ambitions

While environmental historians have gone to great lengths to understand the minutia of environmental change between humanity and nature, I propose that environmental history must cast aside the human element of environmental change, in order to understand environmental change in a posthuman world. Justifying posthumanity is in response to the strides by postmodernist theorists, that since postmodernism legitimized history as an academic profession, posthumanity can legitimize nonhuman agency towards environmental change. To understand this concept of environmental

⁵ Richard C. Foltz "Does Nature Have Historical Agency? World History, Environmental History, and How Historians Can Help Save The Planet" *The History Teacher*, Vol. 37, No. 1, Special Feature Issue: Environmental History and National History Day 2003 Prize Essays (Nov., 2003) 11

⁶ Foltz 25

change in a posthuman world, which for many historians is the historical analysis of life with the extinction of humanity, I propose that environmental history can utilize a posthuman analysis to exclude humanity's accomplishments, that environmental historians are able to understand how nonhumans interact with natural space. Further, this posthuman discussion by environmental historians must not separate humans from nonhumans, in terms of competition against each other for survival, but rather an interconnectedness between both humans and nonhumans, which in this case, nature⁷. In fact, by studying both humans and nonhumans together, the environmental historian is able to understand how nonhumans are making a much larger impact on natural space due to the influences of humanity.

In accompaniment with posthuman analysis to justify nonhuman environmental change, what has also allowed nature to become the environmental historian's primary subject of analysis is through works on the concept of the Anthropocene. Spearheaded by scholars such as Dipesh Chakrabarty and Zoltan Simon, the Anthropocene has placed the efforts of humanity to improve their condition of sustainability into one single concept. Further, the Anthropocene has revealed some stark contradictions about environmental history, that humanity has conditioned nature to a state of global environmental catastrophe⁸. In sum, the Anthropocene has presented the limitless ambitions to which humanity will interact with the world. And for the environmental historian, the Anthropocene has justified all human interactions as a foregone conclusion.

⁷ Ewa Domenska. *Posthumanist History*, in: *Debating New Approaches to History*, ed. by Peter Burke and Marek Tamm. London: Bloomsbury 2018 333

⁸ Zoltan Boldizsar Simon "Why the Anthropocene has no history: Facing the Unprecedented" *The Anthropocene Review*, Vol. 4, No. 3 (2017) 241

To be frank, why should environmental historians still care about humanity in today's age of information and technology? Because of globalization, humanity is in a juxtaposition where their interactions with natural and human space will *always* lead to the same outcome: Changes to both forms of space. Why should environmental historians spend their time focusing on the history of the human condition, when they already know this outcome? One could argue it is the discourse, the we need to elucidate just how great a length humanity has gone to shape the Earth in their own image: An image of a perfect world prompted on a billboard amidst an ocean of waste.

I ask this not for the discredit of environmental historians who have spent their time to understand the human condition, but rather to emphasize that these works written on environmental change tell a different perspective of the same story: Humanity does "X", Nature responds with "Y". That dichotomy is disingenuous to Nature itself, because the reactions that Nature provides to human and natural space, which is also disingenuous, are not reactions at all. They are responses. Responses that reflect how humanity's *need* to improve, which forever grows as its appetite for improvement increases throughout history, undercuts the power of nature. Nature's responses are due to the conditions humanity has created, but because humanity will continue to improve their conditions, environmental historians do not need to study what is already self-evident. This criticism of environmental history's practices comes directly from Simon's criticism of historical understanding, that philosophers of history like Reinhart Koselleck debated on studying humanity in a historical context, that the course of human events throughout history were supposed to happen⁹. However, Simon also contends that the

⁹ Zoltan Boldizsar Simon "The Story of humanity and the Challenge of Posthumanity" *History of the Human Sciences*, Vol 20, Issue 10 (2018) 3

origins of posthumanity came from transhumanist ideology, that the immediate presence of technologies that improve the human condition¹⁰. However, in Simon's discusses of the relationship between transhumanism and the human condition, he is ultimately concluding that posthumanity exists as "the *temporal* other of humanity"¹¹. Further, to Simon, Western historical narratives allows posthumanity's placement as a temporal other, but with the intention to balance humanity's role by assessing the telos to which humanity's role exists in history¹².

Applying this information provided by Simon, from this posthuman analysis, can the environmental historian study Nature's responses? How does the Anthropocene legitimize the role of nature as a *direct* form of environmental change? This is ultimately a question of agency. Nature has always had its own responses to any form of changes towards natural space, utilizing forces of nature as part of Nature's efforts to regulate any and all imbalances to natural space. On the other hand, because humanity continues, throughout its history, to improve its condition, Nature's processes of regulating imbalance, before humanity's intervention, have now been forced to speed up, responses by Nature of which that are having to cater to human industrialization and pollution on such grandeur of a scale in the globalized age. What must now be explained is the discourse of Nature's responses, the size and scope of their destructive force, as well as how environmental historians must theorize about how Nature can respond to human and natural space.

¹⁰ Ibid 11

¹¹ Ibid 13

¹² Ibid 17

Organization

The organization of this work will be divided up into four chapters, each of which discuss the trends in historiography for to allow environmental history to move forward into this posthuman perspective, as well as specific examples of Nature's responses that emphasize a posthuman perspective. Chapter Two will discuss the historiography of environmental history, tracing the origins of the profession in America during the 1960s into the present day. I specifically start in the 1960s, because the post-World War Two period allowed newer histories, which include environmental histories, to become legitimate institutions by the twenty-first century onward. Throughout the chapters in this section, there will be an analysis of the socio-political conditions that allowed environmental history to grow and establish itself as a separate school of thought, while also discussing what environmental historians were writing about during this period (and each subsequent historiographical period). By tracing the historiography, what I do not want to do is summarize the historiographical changes, rather I want to discuss, in tandem with the historiographical narrative, how nonhuman agents have quietly grown to become a direct agent of environmental change. In the end, this emphasis of the nonhumans in environmental history will be the main focus of this work, and the main purpose to trace the historiography.

Further, Chapter Two will discuss environmental history from 1960 and into the 1980s. Starting here is important because 1960 is where environmental history became a separate school of thought, formulated from the social awareness of the environment by Americans in the 1960s, the creation of the Environmental Protection Agency in the 1970s, and the lack of environmental interest by the 1980s. During this period, nonhuman

agents such as infestations and natural disasters were part of the rhetoric, not as intensely discussed, because these early historians were concerned strictly with how humanity has impacted environmental change. However, they did make note of their existence, but the 1980s did not allow Americans to give great thought about environmental history. In fact, environmental history in the 1980s quietly professionalized with the creation of the Journal of Environmental History.

Chapter Two will also investigate the factors that expanded environmental history from the 1990s up until 2013. During this period, there is an increased study of social histories such as the history of gender, and environmental history undergoes radical changes to its theory and historical scholarship. What allowed environmental history to change was the growth of historical fields that stemmed out of environmental history, examples of which include disaster history, history of the germ, climate history, etc. What became most prominent about environmental history in the 1990s is how it became more regionally focused, as historians expanded their academic prose out of America to environmental histories across continents, particularly in areas where environmental information is most prominent in Europe like Great Britain, or in Asian countries such as China and Japan. Further, environmental historians that possessed an American historical background began to shift focus to the American South to study environmental history, which had before been seen as backwards, but environmental history dispelled any notion of the American South possessing any backwardness, revealing how connected humanity is to the environment in the process. In fact, from this emphasis on the American South, this is where the notion of a nonhuman agent was given *direct* influence in environmental history. In fact, during the early 2000s, environmental historians began to discuss the

roles of nonhumans, as they related to environmental change, and from this, birthed the dichotomy between human and nonhuman environmental change.

Chapter Two will also discuss how the historiography of environmental history has drifted to studying nonhuman agent from 2013 to the present day. I start at 2013, because this is where environmental historian Paul Sutter reassesses environmental history's historiographical trajectory, and what measures have been taken to move the profession forward. Further, Sutter also becomes one of the first historians to analyze the presence of a nonhuman agent in environmental history. The works printed after 2013 also provide a continuation of what was previously introduced in the early 2000s, this idea of a nonhuman agent, except the difference with these later works is an increased emphasis to use scientific sources to explain how the nonhuman agent is present in environmental history. It should not take a blunt work, one that needs to directly address an issue of the increasing nonhuman reactionary process against humans like Ted Steinberg's *Acts of God: An Unnatural History of Natural Disaster in America*, to elucidate the destruction nonhumans can wrought on the natural world.

In fact, environmental historians *need*, with the utmost urgency, to understand nonhumans as a major cause for environmental change, particularly as a direct causal factor. We have used the last five years since 2013 to print works that address the nonhuman element, but we need to understand that power those nonhumans have. To look at this in a contemporary context, moving forward into the twenty-first century, the progress of humanity has become increasingly needing to prepare itself to face natural disasters, its agricultural practices involve taking precautions against species that will ravage crops. This world we now live in is in a perfect stage for environmental history to

step in and persistently ask what are the conditions these nonhumans are living in to allow their presence to become increasingly detrimental to humanity.

However, to move the historiography beyond examples of environmental change historians have discovered, and the elucidation of their importance, I will use Chapter Three to explain the role of climate as a form of posthuman environmental change. This chapter will serve what I see as a crystallizing moment for environmental historians, where we should think less about practical explanations of environmental history, in favor of more theoretical applications of where we can elucidate the presence of the nonhumans, no longer being The Other of environmental history. Environmental history has already mapped the extent of humanity's destruction upon the natural world, but we have yet to successfully scratch the surface of how an infestation or a natural disaster can impact the natural world. In the case of climate, it is its own agent of environmental change, conditioned by humanity, for years, acted on its own to provide the conditions which upset the human condition, but also how does climate react to the human condition. Namely, what are the conditions that force climate to provide natural occurrences humanity is all too familiar with?

Chapters Four, and Five, will be used to discuss specific examples where nonhuman entities have become direct forces towards environmental change, infestations and natural disasters, in that order. The analysis of both chapters will come from old works beginning in the 1960s, where environmental history first began, and into the present day. Both infestations and natural disasters reflect practical examples where a nonhuman entity of environmental change was present, explain their own historiography

the same as climate, as well as how a posthuman analysis of these subjects can be asserted.

From accomplishing this, I do run a risk of running parallel with several other well-established historiographies, most notably the history of life sciences and medicine, the history of science and technology, and certainly agricultural history. However, I see this as an excellent juxtaposition, because even though I am aware of the potential at stepping into other historiographies, I intend to analyze from strictly an environmental context. I do not want to cross over to other histories, because I want to explain how the conditions that allowed the nonhumans to become prominent. Further, my carefulness against any crossover of historiography is my deliberate attempt to understand where other histories have allowed for environmental history to take prose, because the separate histories aforementioned have given environmental history the legitimacy to exist, but also to allow environmental historians to step in and question where environmental change seeks to legitimize these other histories. It is the symbiotic relationship between multiple historiographies that have lent environmental history aid in its own legitimacy as a school of historical thought. From all of these cases, the environmental historian must look at them as a global concept of study, and in fact, from these cases, the idea of regional environmental history is directed to lose favor, because we must analyze how catastrophes travel across continents, examples of which include migratory patterns of insects, or understand the pattern of travel for a natural disaster such as a hurricane.

Chapter Four will talk about my analysis of the role of infestations in the environment. From this chapter, an infestation does imply an emphasis on insects, but an infestation could also mean an influx of atypical species of animals, or plants, or disease,

that are starting assimilate into urban settings, as a means of adaptation to the changing environment. So I structure this chapter, following the historiography of infestations, to emphasize the practical influence of environmental change, epitomized by plants, insects, and disease as forms of infestations. My main accomplishment with this chapter will be to both present enough literature to support this notion of a nonhuman entity, but also to show the power of the creatures that encroach and ravage human landscapes, and in some cases, leave of legacy of fear to humanity that transcends generations. In the end, this chapter will seek to understand the inherent endgame of infestations, be it actually reacting against humanity's environmental impact, or if these creatures of nature have their own intended purpose of doing things such as encroachment on humanity's sphere of existence, as well as the ravaging of natural landscapes, be it known or foreign to infestations, either through migration or search for food.

Chapter Five will discuss an all too familiar subject to environmental historians: Natural disasters. In fact, while disaster history has become a major subfield of environmental history in the twenty-first century, histories of natural disasters have been around since the 1960s. What allowed natural disasters to gain steam as a subfield is through the emphasis of nonhuman agency, but the discussions of natural disasters as an entity has always taken some form in environmental history. In each of their works, environmental historians view natural disasters as the reactionary against human interaction on the environment, and it becomes a dichotomy of humanity's attempt to defend housing developments or a city against disasters such as an earthquake or a hurricane. In fact, some works spend time to look at the events leading up to a disasters arrival in an area, and it is worth mentioning that the reactionary factor environmental

historians pose a disaster is presented when looking at works dealing with nineteenth century and twentieth century disasters such as the Johnstown Flood of 1889 and the San Francisco Earthquake of 1906.

Where I choose to take the discussion of natural disasters is how environmental historians view the destruction disasters wrought. When analyzing natural disasters in a posthuman world, some questions must come to mind, namely the following: What were the repercussions for things such as land retreat due to changes in sea level? Why would a natural disaster be forced to travel from Jamaica, through Florida, and up through Egg Harbor, New Jersey, bringing with it its own destructive force? Are these disasters becoming more frequent due to the designs of humanity, because the building of skyscrapers, gas stations and shopping malls are forcing natural occurrences to become more frequent, or are the disasters occurring out of their own volition?

When speaking about natural disasters as an entity, the historian must ask these questions, so as to judge the placement of disasters in relationship to humanity's actions upon the environment. In fact, my own analysis of natural disasters, as they relate to being entities of environmental change, would suit the environmental historian well, because we must understand the economic implications for which humanity changes the natural world. In its simplest form, humanity has been driven by economic gain to act upon the natural world, without even the slightest regard to the repercussions that followed, until social awareness of environmental change in the 1960s allowed humanity to reassess its impact on the planet.

In my discussions of natural disasters, I will also be analyzing the amount of financial loss and gain humanity faced to both prepare against (if any attempts were

made) and defend itself against disasters. The purpose of this being to disprove any ignorance by humanity to understand the natural world, particularly as several industrial revolutions spawned throughout Europe and America in the nineteenth century. Further, this discussion of human finances will be to also allow environmental historians to gauge how much concern humanity gives towards both the natural world and the spaces that humanity lives in. In the end, by assessing economic decisions made by humanity, this section will dispel any notion of environmental awareness, reveal the commentary that humanity made about the natural world in modernizing times, but also to elucidate another important avenue that give natural disasters their own place as a subject of human change and conditioning of the natural world.

The Historiography of Global Environmental History

The ultimate challenge of the historian is to discuss historiography, but with every topic discussed, there needs to be this historiographical basis so as to prove worth of historical scholarship. Historians must not shrug this theoretical base, and must not avoid historiography, especially with topics like environmental history, where the historiography has not only been minutely determined, but also leaves open questions for new scholarship to be written going forward into the next century. This is not to suggest that environmental history is unfinished, because environmental history, like any historical subject, remains in constant flux. However, what separates environmental history's historiography from others is how it is able to remain in this state of flux. Within the last twenty years, humanity has increased their need for consumption, but also an increased need for alternative fuels, in accompaniment with scientists across the world becoming increasingly concerned about the world's average climate increasing due to climate change, causing drastic changes to the natural world as a result. This is a pivotal moment for environmental history both influence the power of environmental change, as well as to take another great leap forward with its historiography.

It is important to understand that environmental history is not a typical historical subject, uniquely situated as a bridge between the scientific and historical communities. In fact, because environmental history is that bridge for science and history, the historian can reinforce scientific claims of agency towards environmental change, while using history to justify the scientific state present. What remains is the direction of historical scholarship to understand this information presented by these scientists.

The focus will be on the global perspective on environmental history, which will elucidate the growth of environmental history as a global topic. The benefit of a global perspective with environmental history is that it bridges established and fledgling historiographies, but the challenge comes from those historiographies that are fledgling, because there is either little to no information on the regions environmental history, or that the environmental history being written by the region is askew when compared to others. Further, this perspective eliminates the bias from academic elitist attitudes such as Americanist or Europeanist beliefs.

To this end, I argue, global environmental history does not argue one solitary group of historians to be *the* group that defines the course of the historiography. Rather, global environmental history places each regions history, analyzing its growth, while also determining how does the theoretical influence of American environmental history allow a Chinese environmental historian to rethink their own environmental history. What this cross-analysis of global environmental history, region by region, has ultimately accomplished, is determine another new phase for environmental history, that this group of scholars has ultimately been driven to think about environmental change the same way that contemporary scientists study the natural world: With a relationship to another part of the world.

Why should historians be concerned about global perspectives if Americanists or Europeanists can exist among environmental history? We should seek to eliminate this bias from environmental history, because it ill suits the profession's scholarship to be enwrapped by this regional favoritism. Further, the future of environmental history depends on this global effort, because with the contemporary consensus of understanding

environmental change across the planet, environmental historians also need to follow this model in the process. Towards this end, we understand the direction of each regions natural world, and already have an established historical base to understand the changes to the natural world as a whole. However, while the debate of methodology and bias remains consistent, especially the slant towards the power of region, what has been established is the genesis of environmental history, namely how a period of social change influenced greater environmental consciousness among historians.

Environmental History's Origin

The genesis of environmental history started in America. Looking at the earliest incarnations of environmental history, historians can debate that the theoretical origin of environmental history began in Ancient Greece, with Herodotus's observance of the changes to the natural world over time, that this is the start of environmental history¹³. Others could argue that environmental history began with the Frontier Thesis by Frederick Jackson Turner, that this is a predecessor to environmental history that argued the components of environmental change. I would say that while these examples can be argued as environmental history's progenitors, these early incarnations of environmental history were never put into the academy, viewed as theoretical rhetoric that did not have enough of an academic base to blossom. Instead, the social climate of America after World War Two became the primary catalyst for environmental history's fruition.

When analyzing this influence, America, particularly in the 1960s, was already in a state of major social revolution. With the Civil Rights movement redefining race in

¹³ Alfred W. Crosby "The Past and Present of Environmental History" *American Historical Review*, Vol. 100, No. 4 (Oct., 1995) 1183

America, the Vietnam War testing American foreign policy, and the Women's Right's movement allowed for greater comprehension of a non-male dominated society in America, which subsequently allowed for gender rights for non-heterosexual communities to blossom in the process¹⁴. With environmental history, it became situated in this important period in American history, and what allowed environmental history to approach historical thought was the environmental movement, in accompaniment with Rachel Carson's pivotal book *Silent Spring*, which discussed the effects of the misuse of pesticides, both of which gave Americans ideas about environmental consciousness¹⁵. From this social consciousness about the environment in America, environmental history was able to take off in the academy, with the earliest writings in the 1960s discussing the relationship between humanity's consumption as humanity ravaged the natural world.

In accompaniment with social implications, environmental history was also able to fruition due to the influence of postmodernist theories on historiography. With the works of scholars like Michel Foucault, postmodernist theory legitimized history as an academic profession, particularly through epochs such as exchanges of ideas and representation of the self. From this structural perspective presented by Foucault, environmental history is in juxtaposition with natural history, that the continuity of the natural world, and the historical analysis of such, is in relationship to the degree of space that the natural world provides for both humanity and animals¹⁶.

In fact, the use of space is what brings postmodernist theory to environmental history. In its simple form, space, and the use of space, is what environmental history

¹⁴ Crosby 1187

¹⁵ Crosby 1182

¹⁶ Michel Foucault. *The Order of Things* New York: Random House Books, 1970 148

discusses, namely because humanity acts upon areas of land in the natural world for human progress. However, through the use of space, changes to the natural world can only be determined from the character that only humanity can possess to change the natural world¹⁷. In order for environmental history to exist beyond the issues between the natural world and human progress, the environmental historian needs to assess the continuity of nature, how it has been able to condition itself over the course of time¹⁸. In fact, the conditioning of the natural world, along with the discussion of space, is another aspect that the environmental historian focuses on, because while humanity uses the space provided by the natural world to increase their need for progress, the conditioning of the environment acts as a reactionary power by nature towards human progress, but also provides the environmental historian with the degree of influence humanity has towards the natural world. Further, human conditioning of the natural world remains important because the environmental historian is also able to establish the relationship humanity has to the natural world; beyond human progress, beyond human use of space in the natural world, humanity's ability to think about the natural world, the manners and reasons through determinate knowledge of the natural world that only humanity can utilize, is what has allowed environmental history to become a school of thought in the academy.

Environmental History in the 1960s

In the 1960s, American environmental historians discussed the relationship of human environmental change to American intellectual history. To these historians,

¹⁷ Foucault 153

¹⁸ Foucault 159

environmental change was about the human institutions that shaped the environment, but with little regard to the natural world¹⁹. Samuel P. Hays's work on the Progressive Era conservation movement in the early twentieth century began with the lack of attention Americans gave towards the natural world, but still created policies on environmental regulation, i.e. the creation of dams and irrigation²⁰.

Hays was able to present conservation as it related to American political decisions, and that conservation of the natural world, to early twentieth century Americans, is not worth the time nor effort²¹. To historians of the 1960s, Hays also argues that they should care about conservation, that this concept allows environmental history to progress by emphasizing how technology has influenced humanity's influence on environmental change²². Further, Hays uses this work to also argue the potential for environmental history to grow can also be accomplished if the historian focused their attention towards the groups that conservation was able to thrive, because Hays understood conservation as it related to human consumption²³. Humanity's need for resources was never about conserving as much as possible, rather Hays argues that the conservation movement intended to regulate the amount of resources consumed, because the conservationists determined that humanity, in all forms of capitalist progression, will consume natural resources, but larger factories and corporations had more influence on environmental change²⁴. For Hays, this example of the conservation movement helped

¹⁹ Richard White "Environmental History: The Development of a New Historical Field" *Pacific Historical Review*, Vol. 54, No. 3 (University of California Press, Aug., 1985) 335

²⁰ Samuel P. Hays *Conservation and Gospel of Efficiency: The Progressive Conservation Movement, 1890-1920*. Cambridge: Harvard University Press, 1959 3

²¹ Hays 3

²² Hays 4

²³ Hays 4

²⁴ Hays 263

spearhead environmental history, and determined the degree of attention historians must give to understand environmental change as a historical subject.

Where Hays focused on a historical example of environmental change, Roderick Nash focused on a particular subject that environmental historians can get behind: Nature. In his book *Wilderness and the American Mind*, Nash is adamant that for historians to understand human environmental change, environmental historians must not focus entirely on what humanity has done to change the environment. Rather, Nash elucidates at the power of nature itself, and that humanity must be able to determine what constitutes a wilderness, which in itself lies a challenge from the complex and subjective definitions that humanity has given the wilderness²⁵. However, these attempts to define the wilderness, while fruitless, have left what Nash argues to be an opportune moment for Americans to *think* about the wilderness, to understand not only what constitutes the wilderness, but also how did the concept of the wilderness change for Americans over the course of time, especially when for Nash, Americans possessed an “alien presence” during the colonization of North America²⁶.

Using this survey of American history to explain the changing concepts of the wilderness, Nash determines that Europeans that came to the New World saw the wilderness in North America as a harsh environment that could only be described by references to the Christian Bible and Greek Mythology. From this, the Europeans used this template to teach each other to be aloof towards the wilderness²⁷.

During the eighteenth and into the nineteenth century, the concept of the wilderness manifested as a condition of human-induced environmental change. To Nash,

²⁵ Roderick Nash *Wilderness and the American Mind*. 5th ed., New Haven: Yale University Press, 2014 4

²⁶ Nash 7

²⁷ Nash 19

this conditioning of the environment was due to Americans emphasis on a prospective market, financed by a civilized landscape rife with farms and factories, viewing the wilderness as an “obstacle”²⁸. During the course of the nineteenth century, on the other hand, as Romanticism and Transcendentalism gained ground in American societies, these concepts transformed the wilderness to Americans by being a place of mystery and awe²⁹. Further, the use of these ideas in the nineteenth century allowed the wilderness, particularly the American wilderness, to become an exceptional place³⁰. While this idea of an exceptional wilderness was prevalent throughout the nineteenth century, Transcendentalist Henry David Thoreau spearheaded the beauty of the American wilderness, but he argued that American society is able to thrive with the wilderness³¹. Towards this end, American intellectual brought the wilderness into a new perspective, which continued into the next century

In the wake of the wilderness’s intellectual transformation in America, transitioning from the wilderness being a savage landscape to an exceptional paradise, this change in ideology transitioned into greater conscientiousness among Americans about preservation of the natural world. To Nash, American preservation of the wilderness ran in conflict with American growing material culture, namely the observed disappearance of the West as it became open up for farming and the building of railroads, in accompaniment with increased buffalo slaughters³². Further, this effort to preserve the wilderness also ran in conflict as Americans increased clearing forests that resulted in dramatic abnormal climate changes such as erosion, drought and flood across the

²⁸ Nash 41

²⁹ Nash 57

³⁰ Nash 71

³¹ Nash 94

³² Nash 100

country³³. As a result, American consciousness about the wilderness saw the rise of political legislation the second half of the nineteenth century onward that intended to preserve certain areas of the American wilderness, namely the Adirondack mountains in New York, and the Yellowstone region in Utah.

However, despite this progress towards environmental consciousness, Nash still is adamant that the preservation of the wilderness will still face conflict with progress, that Americans still continue to argue progress but still find methods to live with nature despite destroying nature in the process. In the end, Nash has used the theory to contextualize the transformative intellectual history of the environmental, putting the environment, particularly in America, as a testament to human intervention. However, from this work, environmental history in the 1970s would also transform same as the American concept of the wilderness did with Nash.

Environmental History in the 1970s

Following the introduction of environmental history in the 1960s, the 1970s allowed the profession to gain steam. Even though environmental history is still dominant in America, the creation of the Environmental Protection Agency, in accompaniment with various legislations such as the Clean Water Act and Endangered Species Act, as well as the creation of Earth Day, increased social consciousness about the natural world³⁴. Further, environmental history also became an established school of thought,

³³ Nash 105

³⁴ Crosby 1187

with academic journal publishing works on environmental history, as well as the establishment of the Journal of Environmental History³⁵.

In the wake of this series of changes made to the profession, environmental history increases their focus on human environmental change, but due to the influence of Nash, environmental historians also began to emphasize the role of nature as it related to human environmental change. Further, nature becomes a central character for environmental historians, especially when more information was published on climate, but it remained as a secondary character to humanity, because this generation was still focused on the power humanity possessed to change the natural world. However, while humanity remained the focal point for environmental historians, the power of nature was also starting to emerge, with historians emphasizing the reactionary force of nature. To this group of historians, forces of nature we know of today as natural disasters were the primary focus, presenting cataclysmic periods in American history where humanity's ability to prosper was tested.

For this generation of historians, shifting the narrative away from humanity's environmental destruction is important to note, because this remains a trend for environmental history that continues into the present day. The 1970s allowed this idea of nature, namely nature's role in environmental change, to flourish. However, environmental historians in the 1970s analyze nature's role as reactionary to human environmental change, still concerned with human environmental change, but argue that nature has means to fight back against environmental change. What has resulted has been

³⁵ Crosby 1187

described by historian Richard White as a more “ethical basis of the human relationship to nature”³⁶.

To renowned historian Donald Worster, the Dust Bowl is a testament to nature’s reactionary power towards environmental change. In the events leading up to the Dust Bowl, Worster argues that this natural disaster was a result of America’s capitalist need for progress, that Americans in the Midwest were content to “deliberately, self-consciously, set itself to the task of dominating and exploiting the land for all its worth”³⁷. In the wake of the Dust Bowl’s reactionary power in the Midwest, this disaster promoted New Deal era policies to understand the ecological comprehension of the Dust Bowl. To Worster, these policies concluded that nature was intended to help sustain humanity³⁸, however Worster’s work mirrors Hay’s theories of human sustainability, but moves away from Hays because of the Dust Bowl’s destruction to the Midwest. Further, Hays focused on a major period of human consumption, at a time where American capitalism was taking a new phase, in order to understand the relationship between both consumption and conservation of the natural world, whereas Worster analyzed a period of environmental change where human consumption was increased, but because American capitalism was in a state of depression, nature was able to exploit with a disaster that upset economic progress. This connection between economic growth and environmental change is the primary connection that environmental historians make from the 1970s onward. While environmental historians in the 1960s are the first to understand this connection, they were disinterested with the reactionary power of nature, only the

³⁶ Richard White “Environmental History: The Development of a New Historical Field” *Pacific Historical Review*, Vol. 54, No. 3 (University of California Press, Aug., 1985) 314

³⁷ Donald Worster. *Dust Bowl: The Southern Plains in the 1930s*. New York: Oxford University Press, 1979 4

³⁸ Worster, *Dust Bowl: The Southern Plains in the 1930s* 198

power of human environmental change. In the end, Worster was able to pioneer a new direction for environmental history that helped piece together what historians in the 1960s were only able to theorize.

While environmental historians Donald Worster focused on environmental change as it related to economic change, others like William McNeill presented another aspect of environmental change, but strictly focused on a nonhuman subject: Disease. To McNeill, disease has been a direct influence on human history, but what McNeill argues previous books on disease were missing was a historicized component to determine “how varying patterns of disease circulation have affected human affairs in ancient times as well a modern³⁹. When compared to Worster, Worster focuses on the economic grounds that allows for nonhumans to react against human environmental change, whereas McNeill presents the conditions that allows for a natural element such as disease, in this case, to encroach on humans. Further, McNeill presents the conditions that have allowed for a disease to permeate in society, i.e. human population growth allows for diseases to pass through from one host to the next in a community⁴⁰. To McNeill, disease presents a global narrative, discussing periods in history across the world where diseases were able to successfully interact with the human and natural world, but what remains common is that the growth of human consumption directly relates to the growth of both micro and macroparasitism diseases⁴¹. From this, McNeill presents another aspect of reactionary power that nonhumans have towards human environmental change, and that this work by McNeill provides one of the first global perspectives of environmental change. However, while McNeill discusses this global perspective, paying explicit attention to trans-

³⁹ William McNeill. *Plagues and Peoples*. New York: Anchor Books, 1976 23

⁴⁰ McNeill 68

⁴¹ McNeill 73

Atlantic distribution of disease during Europe's colonization of the Americas, the 1970s also presented the relationship between nonhuman environmental change across the world, and that the presence of a disease in society is determined by the conditioning humans have presented to the natural world. Towards this end, McNeill's work may have had a global perspective, but environmental history remained a dominant school of thought in America.

Because of environmental history's dominated Americanist perspective in the 1970s, Joseph Petulla was able to write *American Environmental History* in order to discuss America's role in environmental history, namely to the degree of environmental change America has committed over the course of its historical narrative. Throughout Petulla's historical narrative of American environmental change, Petulla affirms that the course of America's environmental history was about use of resources as it related to America's changing policies on capital gain⁴². Further, the changes in American capitalism were also what Petulla considers to be necessary means to which Americans ultimately destroyed the natural world, utilizing political policies to favor personal and private property ownership, and industrial growth, over concerns of the natural world⁴³. However, despite the influence of environmental historians determination of human environmental change and economic growth, the 1980s took a different direction that slowed down the historian's interest in the subject, not to grinding halt, but not nearly as influential as the 1970s.

⁴² Joseph Petulla *American Environmental History*. San Francisco: Boyd and Fraser Publishing Company 1977 10

⁴³ Petulla 14

Environmental History in the 1980s

Where the 1970s have pioneered new innovations to environmental history, providing information on the greater role of nonhumans as they relate to environmental change, but the socio-political state of America in the 1980s, particularly during the Reagan administration, forced a retreat from environmental awareness⁴⁴. However, while American politics downplayed the role of environmental change during the 1980s, historians during this period were able to create not only the Journal of Environmental History but also the American Association for Environmental History⁴⁵. The works on environmental history published during this period built upon Worster's earlier theories about the relationship between economic growth and environmental change. However, these historians focused on expanding the ecological impact humanity has conducted towards the natural world, but books were minimally published despite the academic changes environmental history was undertaking as a school of thought.

To renowned environmental historian William Cronon, he used the colonization of America in the seventeenth and eighteenth centuries, in accompaniment with the consumption practices of Native Americans, to further advance Worster's theories on the ecology of human environmental change. To explain this, Cronon argues that environmental change varied between the colonists of Europe and Native Americans, but Cronon blames both sides for changing the environment, namely the use of each group ecological techniques to reorganize plant and animal populations in New England⁴⁶. In

⁴⁴ Crosby 1188

⁴⁵ Crosby 1188

⁴⁶ William Cronon *Changes in the Land: Indians, Colonists, and the Ecology of New England*. Hill and Wang: New York, 1983 xiv

the end, the 1980s did not possess great deal of major accomplishments, but by the 1990s, environmental history became a major historical topic once again.

Environmental History in the 1990s

During the 1990s, the influence of globalization allowed for countries in both the Western and Eastern hemispheres to engage in more market trade with each other. With environmental history, countries in Europe, Africa and Asia began to publish works that reveal their own environmental histories, which, for the first time, drifts away from the influence of America. With the creation of academies such as the European society for Environmental Historians in 1999, this allowed for environmental history to globalize by attracting more historians of environmental history⁴⁷. In fact, this global trend of environmental history remains the current perspective of the profession, because the influence of American environmental history remains in perspective to the rest of the world. Further, to understand this global perspective of environmental history, the historian must not become wrapped with any bias towards one particular group of environmental historians, rather they must understand the interconnected behavior of environmental change across regions.

Following the publishing of his influential book on the Dust Bowl, Donald Worster brought a nonhuman perspective on environmental history that was not otherwise introduced in the 1970s. To Worster, the environmental historian must use climate reports and scientific data on changes in crop reports and weather patterns, because this information can determine how environmental factors can change the course

⁴⁷ Georg Iggers, Q. Edward Wang, and Supriya Mukherjee. *A Global History of Modern Historiography*. New York: Routledge 2016 333

of growth and declination to the human population⁴⁸. Further, Worster argues that the environmental historian must also understand the causal factors of environmental change beyond humanity's economically based decisions to change the natural world. To explain these causal factors, Worster isolates two spheres of existence that the environmental historian can utilize: The natural and cultural sphere of existence. From this, the environmental historian is able to isolate the roles that humanity and nature have on environmental change, in order to determine which group had more influence on environmental change, despite humanity's growing industrialization⁴⁹.

Where Worster discussed the relationship between humanity and nature, William Cronon revisited the concept of production as it related to environmental change. In fact, Cronon argues that the rates and types of change committed by humans are what constitute environmental change⁵⁰. Further, Cronon is also critical of previous narratives that presented environmental history as a cyclical topic, as well as with random regard to natural disasters such as climate change and earthquakes⁵¹. In the end, the 1990s opened more avenues for environmental history to be reassessed, especially with human based environmental change being the centerpiece of this analysis, however the next century built upon what the 1990s introduced and expanded it to broader perspectives.

⁴⁸ Donald Worster. "Transformations of the Earth: Toward an Agroecological Perspective in History" *The Journal of American History*, Vol. 76, Issue 4 (Mar., 1990) 1089

⁴⁹ Worster "Transformations of the Earth: Toward an Agroecological Perspective in History", 1090

⁵⁰ William Cronon. "Modes of Prophecy and Production: Placing Nature in History". *The Journal of American History*, Vol. 76, No. 4 (Mar., 1990) 1126

⁵¹ William Cronon. "A Place for Stories: Nature, History, and Narrative". *The Journal of American History*, Vol. 78, No. 4 (Mar., 1992) 1368

Environmental History from 2000 to the Present Day

Where American environmental historians such as Cronon and Worster have debated on the theory of environmental history in the 1990s, other upcoming environmental historians are bringing global environmental history to prose in the new millennia. The trends of theory continue from 2000 onward into the present day, but this new century expands beyond the scope of dichotomous theories; environmental history will no longer simply be about humanity fighting to live on. Each using increased ideologies about production, in accompaniment with changing ideas on capital gain, while nature remains as an arcane tool of resistance to what humanity intends to accomplish. Nature will be given more devotion to historical study, beyond the dichotomy of its reactionary status to humanity, becoming a direct influence of environmental change. Further, the global influence of environmental history has also become more prominent, but while the regional emphasis by Americanists and Europeanists is still ongoing, the environmental historian can now use these regional histories to bridge one another.

To historian Piero Bevilacqua, global environmental history is the new phase of environmental history to promote this interconnectedness between regions⁵². Towards this, Bevilacqua determines that understanding global environmental history is also able to determine the trends in environmental topics such as depletion of the ozone layer and destruction of forest areas around the world⁵³.

⁵² Gabriella Corona, Piero Bevilacqua, Guillermo Castro, Ranjan Chakrabati, Kobus du Pisani, John R. McNeill, and Donald Worster. "What is Global Environmental History? Conversations with Piero Bevilacqua, Guillermo Castro, Ranjan Chakrabati, Kobus du Pisani, John R. McNeill, and Donald Worster" *Global Environment, Vol 1, No. 2* (2008) 229

⁵³ Corona 230

To Ranjan Chakrabarti, on the other hand, global environmental history remains a concept that involves human environmental change, but the role of humanity on environmental change has increased a great deal, especially since with historians publishing works on histories of the human experience in medicine, public health and disease⁵⁴. Further, Chakrabarti also elucidates that global environmental history still needs to consider a nonhuman perspective in order for it to grow as a school of thought, which can be determined from histories on climate and climate change⁵⁵.

Where some historians have asserted the importance of global environmental history, other historians have dissented on the classification of global environmental history. To Kobus du Pisani, global environmental history would eventually be defined by the prevailing New Global History movement, which has determined that global environmental history is a history focused on globalization factors of human environmental change⁵⁶. John McNeill also affirms with du Pisani, but where McNeill differs from du Pisani is that global environmental history must provide a global-scale analysis of human environmental change, comparing human acts of environmental change such as pollution or deforestation⁵⁷

Topics of Global Environmental History

While global environmental history has presented new methodologies for the profession, it is also important to discuss what are some of the regions on global environmental history that have been published. One of which is environmental history of

⁵⁴ Corona 231-232

⁵⁵ Corona 231

⁵⁶ Corona 232

⁵⁷ Corona 233

Africa, and according to historian William Beinart, Africa's environmental history relates to post-colonialist scholarship, emphasizing "appropriation of natural resources such as wildlife, forests, minerals, and land by companies and settlers"⁵⁸. Further, what Beinart has determined is that from this post-colonial perspective, appropriation of resources was an attempt to suppress predation and insect-borne diseases on the continent⁵⁹. By the twentieth century, scientific investigation has determined that Africa's issues with drought and famine have been the result of the appropriation of resources conducted during the colonial period⁶⁰.

In accompaniment with this influence of colonial powers on Africa, Beinart also argues that the environmental historian must also understand the role of nature due to environmental change. While humanity greatly impacted Africa's natural landscape, Beinart concludes that changes in the environment can also be observed through changes in local taxonomies and information on diseases such as HIV and AIDS⁶¹.

On the other hand, with the environmental history of China, Bao Maohong is hard-pressed that the influence of American history, particularly with bringing environmental history to prose, remains the major influence of Chinese environmental history⁶². To explain their environmental history, Chinese historians have taken a three fold process, dividing environmental change with Ancient, Modern, and Contemporary periods of Chinese history. With the Ancient period, which is from the late imperial period of 1840 ACE, environmental change was dictated by Dao, Confucian and

⁵⁸ William Beinart. "African History and Environmental History" *African Affairs*, Vol. 99, No. 395, Centenary Issue: A Hundred Years of Africa (Apr., 2000) 271

⁵⁹ Beinart 272

⁶⁰ Beinart 276

⁶¹ Beinart 294

⁶² Bao Maohong. "Environmental History in China" *Environmental and History*, Vol. 10, No.4, 10th Anniversary Issue (November 2004) 476

Buddhist religious beliefs, resulting in overgrazing and arcane methods to tame the Yangtze River⁶³. By the Modern Chinese historical period, which Maohong argues is from 1840-1949, environmental change in China shifted towards northern China, particularly over humanity's private and public control of water in the region⁶⁴. Further, the modern period was also host to attempts at environmental conservation, particularly by the Chinese government to suppress hunting of animals, except for scientific research, and promote planting of trees⁶⁵.

Where Maohong is extremely critical, however, is the direction of Chinese environmental history in the Contemporary period, which is from 1949 to the present day. Maohong is also convinced that Chinese environmental history can have a contemporary perspective, because there is enough contemporary information to assert how humanity was changing the environment from the Cold War onward. First, the environmental historian needs to utilize Marxism to explain China's influence towards environmental change, since this is the major socio-political ideology in the country⁶⁶. Second, Chinese environmental historians need to cross analyze the country's influence on environmental change as to relates to Western countries such as Britain and the United States⁶⁷. To Maohong, this remains an important concept because China's economy was in direct competition, and cooperation, with countries in the West, in accompaniment with the direct influence of rapid industrialization that China was undergoing during this period⁶⁸.

⁶³ Maohong 479

⁶⁴ Maohong 485

⁶⁵ Maohong 486

⁶⁶ Maohong 491

⁶⁷ Maohong 492

⁶⁸ Maohong 492

While environmental historians have presented new regional environmental histories in non-Western countries, it is also important to analyze how environmental histories have come to prose in Europe, namely in Northern Europe. To Mark Cioc, Linner Ola-Bjorn and Matt Osborn, the majority of European environmental histories have been concentrated in Germany, Finland and Great Britain. With all these countries, what remains consistent is human activity on environmental change, be it through political legislation or efforts to find new sources of energy⁶⁹. However, what differentiated from each of these countries in Northern Europe is the degree of influence each country has towards environmental change, to which while Great Britain and Finland have discussed human based environmental change, Germany has no solid academic grounding in environmental history⁷⁰.

What is most striking is the degree of influence that Great Britain has on environmental history, because in accompaniment with analyzing human environmental change, British environmental historian I.G. Simmons used big history to understand the long duree of environmental history, but focuses on the means to which human activity has influenced environmental change due to changes in agricultural and industrial practices⁷¹. Further, Simmons determines that human induced environmental change has exponentially increased following the end of World War Two, and that while humanity is committed to the use of fossil fuels, greener technologies such as biofuel, wind and solar power have been introduced to act as a counterbalance to the destructive force fossil fuels

⁶⁹ Mark Cioc, Bjorn-Ola Linner and Matt Osborn. "Environmental History Writing in Northern Europe" *Environmental History*, Vol. 5, No. 3 (Jul., 2000) 399

⁷⁰ Cioc 399

⁷¹ I.G. Simmons. *Global Environmental History: 10,000 BC to AD 2000*. Edinburgh: Edinburgh University Press 2008 59

have towards the environment⁷². In the end, the use of a global perspective has allowed for non-American countries to write about environmental history, the question remains *if* American environmental history has a place in the global trend of environmental history.

America's Intervention with Global Environmental History

The short answer is that while American historians are to be given credit for the genesis of environmental history, it is important to note that their integration into the global perspective of environmental history was meticulous. It was a difficult task, because American historians, in one form or another, have discussed environmental history, be it with either specific historical periods of environmental history, or innovative methods in historical theory. In essence, Americans were always discussing environmental history since the profession's inception. However, what has remained constant is that American historians have creation another important impact to the global perspective on environmental history.

Throughout the course of the twenty-first century, America's intervention with global environmental history has been to discuss not only the continent's role in environmental change, but also to elucidate how to look beyond the human influence of environmental change. Critical of America's role in global environmental history, Thomas Lekan has adamantly argued that in order to globalize American environmental history, American historians need to compare their influence on environmental change with other countries like China and England⁷³. Further, Lekan also argues that this cross analysis by American environmental historians will eliminate any bias present in

⁷² Simmons 174

⁷³ Thomas Lekan. "Globalizing American Environmental History" *Environmental History*, Vol. 10, No. 1 (Jan., 2005) 51

Americanist attitudes in the academy, which are very much existent today, promoting “common ground among thematic lines”⁷⁴.

Despite the presence of bias from Americanists, particularly with the boasting of America’s academic superiority on the subject, American historians such as Ted Steinberg have used big history to explain environmental change in American history. While I.G. Simmons also used big history in his book, what made Steinberg different was that not only did Steinberg publish his work on the subject first, but that Steinberg focuses on nature first, looking at American environmental change as a challenge of humanity’s use of nature to remain sustainable on Earth⁷⁵. Further, Steinberg elucidates that Americans, following their independence from Great Britain, have had little regard to environmental change, despite the environmental movement in the 1960s, where Congress passed several policies in the 1990s on the mitigating economic growth and ecological cost⁷⁶. In the end, Steinberg is hard-pressed that this dichotomy of ecology and the American economy remains going into the present day.

American Environmental History Goes South

While American historians were discussing new changes to the profession of environmental history, twenty-first century American environmental historians were beginning to write about environmental history in the American South. To Otis Graham, the pioneer of environmental history in the American South, he sees the American South no longer as a backward place due to its history of resistance to Reconstruction and the

⁷⁴ Lekan 51

⁷⁵ Ted Steinberg. *Down to Earth: Nature’s Role in American History*. New York: Oxford University Press, 2002 3

⁷⁶ Steinberg 300

Civil Rights Movement, revealing a natural landscape of beaches and animals, overshadowed by human pollution and factories⁷⁷. Further, Graham has also elucidated that the relationship between humanity and nature remains the focal point of environmental change in the American South⁷⁸. To Christopher Morris, the American South has a fascinating interconnected history, bridging other histories such as agricultural and landscape history, in accompaniment with Morris's theory that Southern environmental history does not focus on the dichotomy between humans and nature⁷⁹.

Following the introduction of Southern environmental history, Paul Sutter's influential work on Providence Canyon in Georgia is one of the first monographs to analyze the concept of ecology, which is a new concept for Southern environmental history. To Sutter, ecology of Providence Canyon reflects New Deal conservation policies to understand the landscape's changing ecology, namely how studying soil erosion ultimately contributed to human environmental change⁸⁰.

New Perspectives from American Environmental Historians

On the one hand, American environmental historians directed newer methodologies by presenting the environmental history of the American South. On the other hand, American historian Donald Hughes was able to isolate methodological shifts in environmental history, determining what Hughes refers to as the dimensions of environmental history. The first of these dimensions that Hughes discusses is nature and

⁷⁷ Otis L. Graham "Again the Backward Region? Environmental history in and of the American South" *Southern Cultures*, Vol. 6, No. 2 (University of North Carolina Press, Summer 2000) 53

⁷⁸ Graham 57

⁷⁹ Christopher Morris. "A More Southern Environmental History" *The Journal of Southern History*, Vol. 75, No. 3 (Southern Historical Association, August 2009) 587

⁸⁰ Paul Sutter. *Let Us Now Praise Famous Gullies: Providence Canyon and the Soils of the South*. Atlanta: University of Georgia Press, 2015 4

culture, which discusses the factors that dictate environmental change, examples of which include research on environmental topics such as geology and climate change⁸¹.

Second, research in the historical and scientific dimension forces the environmental historian to understand environmental change, using topics such as disease and changes to an ecosystem, to understand the overall changes to the natural world⁸².

With the final dimension of environmental history that Hughes reveals, which is time and space, this is the most important dimension that environmental historians must discuss.

To Hughes, time and space not only shows the environmental historian how much environmental change has evolved with new technologies and ideologies about the natural world⁸³.

The Anthropocene as Environmental History's Next Theoretical Phase in Historiography

While twenty-first century historians have brought larger perspectives to environmental history, especially with the global perspective dominating discussions on environmental history, what has begun most recently, recently being the last decade by theorists, is reimagining the degree of influence humanity has towards environmental change, encompassed by discussions of a concept known as the anthropocene, which has allowed environmental historians to understand anthropogenic environmental change, and the degree of its influence, to “ think holistically across a range of biotic, abiotic, and anthropogenic processes such as species loss, climate change, ocean acidification,

⁸¹ Donald Hughes. “Three Dimensions of Environmental History” *Environmental and History*, Vol. 14, No. 3 (August 2008) 323

⁸² Hughes “Three Dimensions of Environmental History” 326

⁸³ Hughes “Three Dimensions of Environmental History” 326

disruption of biogeochemical cycles, and spread of exotic species, rather than treating these as separate issues”⁸⁴. Environmental change is human made, but with conceptualizing environmental change through the anthropocene, the environmental historian is now able to understand *how* much influence humanity has on environmental change. Environmental historians can now understand the long-term effects of environmental change caused by humanity⁸⁵.

Where humanity was previously driven by economic gain, and bettering the human condition of sustainability, the anthropocene has now introduced environmental historians to a more concise and contemporary analysis of humanity’s influence on environmental change. One of the changes in methodology the anthropocene has introduced is the relationship between human-managed changes to the natural world, in tandem with how nature has been able to change and adapt due to this anthropological influence (Holmes 99). From this, the anthropocene has also provided the historian with a comprehension, and relationship, between the natural world and understanding the dynamics of changes to an ecosystem⁸⁶.

While the environmental historian may have enough cause to justify the use of the anthropocene, praise must be given to Dipesh Chakrabarty for helping the environmental historian theorize its importance. In Chakrabarty’s discussion, he reveals that there is a dualistic role of the anthropocene, involving both the scientific and moralistic/popular lives of humanity’s impact on the natural world⁸⁷. With the moralism of the anthropocene, this concept discusses humanity as a geological force, dictated by its

⁸⁴ George Holmes “What do We Talk About When We Talk About Biodiversity Conservation in the Anthropocene” *Environment and Society: Advances in Research* 6 (2015) 87

⁸⁵ Holmes 93

⁸⁶ Holmes 103

⁸⁷ Dipesh Chakrabarty “Anthropocene Time” *History and Theory* Vol. 57, No. 1 (March 2018) 9

sociological-institutional roles over the course of geological time⁸⁸. With the scientific perspective, Chakrabarty argues that this concept of the anthropocene is applicable with relationship to geological time, while also asking how does humanity's own history fit into the concept of planetary evolution⁸⁹. In fact, with relationship to Earth's planetary history, humanity's existence comes much later in the long duree of this historical narrative, but constitutes the majority of questions about humanity's role in environmental change⁹⁰.

Conclusion: Nonhuman Environmental Change: The Future of Environmental History

With the influence of the anthropocene directing contemporary theory on environmental history, the environmental historian must now begin to think beyond the role of anthropological environmental change. Where the anthropocene, and the theorists of the anthropocene like Dipesh Chakrabarty, discussed the extent and limitless ambitions of human environmental change, what needs to happen next is for environmental historians understand how can an infestation or a natural disaster influence environmental change, when compared to human acts such as building a factory or deforestation. I argue that because the anthropocene elucidated the role of human environmental change, the historian can now shift their focus on how nonhumans have reacted against the anthropocene.

By focusing on nonhumans, environmental history will have successfully made another leap in its historiography, that the means of environmental change are no longer

⁸⁸ Chakrabarty "Anthropocene Time" 9

⁸⁹ Chakrabarty "Anthropocene Time" 24

⁹⁰ Chakrabarty "Anthropocene Time" 30

solely in the hands of humanity. And more certainly, that human progress has long-term effects on the natural that are beyond extermination, that nature has its own agency to react against human progress, react against humanity's need to change the space of the natural world to better the human condition.

Despite this, why should environmental historians care about nonhumans when environmental scientists make studying the natural world their cause? Because environmental historians can reinforce scientific work, no longer treating them as rhetoric to better advance historiography, rather to directly investigate environmental change, complimenting environmental scientists in the process. Towards this end, environmental historians, already knowledgeable about the anthropocene, can still historicize environmental change while making a more interconnected relationship between the academies of history and environmental science. Nonhuman environmental change is the bridge between these two academies that, due to the anthropocene has forced environmental historians to discuss, what needs to happen now is that historians needs to start asking is this: How do nonhumans change the natural world in their own respect?

Within this work, there will be three distinct topics discussed that I have determined will best fit this theoretical shift: Climate, Infestations, and Natural Disasters. With these topics, attention will be drawn to the historiography, namely how historians were able to historicize each topic. Further, following the discussion of historiography, discussion will then transition to the roles of environmental change that each topic has influenced. From this discussion, the historian will learn both how each nonhuman has been either a reactionary or direct influence for environmental change, while also

understanding how the anthropocene has influenced their interaction with the natural world.

This discussion of nonhuman environmental change will be a strictly global perspective, since each nonhuman topic discussed does not solely exist within the boundaries of their own country. Infestations are when a non-native entity interacts with abnormal space outside their usual sphere of existence. Natural disasters are a meteorological occurrence where great climatic forces are released in volatile and destructive ways that upset both human and nonhuman living conditions. However, with both of these environmental changes, what encompasses their existence is climate. In the discussion of climate, this is where the anthropocene will be elucidated, because climate change remains the major concept to discuss anthropological environmental change. However, the concept of climate remains a gradual process of environmental change, whereas infestations and natural disasters are an immediate reaction to the anthropocene, climate is a gradual process that sets the stage for natural disasters and infestations to persist.

However, with globalization, climate change has become an evermore reality around the world, and threatens the human condition of existence as the natural world runs out of space. Human progress has forced nonhumans to increase their interactions with both the human world and the natural world, what remains is that discussion of nonhuman environmental change, and for the historian to prove how nonhumans are changing the natural world. And that discussion begins with climate.

Climate as a Concept of Posthuman Environmental Change

Historians already understand the conditioning that humanity can do towards the environment, but how can they understand if nonhumans influence environmental change? The answer to this lies in the historian's comprehension of climate. Climate acts as a canvas for environmental change, reflecting the repercussions of decisions made by humanity to suit the needs. The influences of humanity upon the planet has resulted in continuously stark changes to the natural world, examples of which include abnormal weather patterns such as increased humidity and temperature flux, both of which lead to drastic changes to normal natural changes including migratory patterns, droughts or dry spells in a given area, and also increased encroachment of sea levels upon human space.

This chapter will not only discuss the history of climate in the post-World War 2 era, both as a subject of meteorological and historical analysis, but also how each decade into the twenty-first century has changed climate's scholarly analysis. Further, this chapter will also determine the relationship between climate and the anthropocene, particularly how historians, by the twenty-first century, have committed to posthuman analysis of environmental change. In accompaniment with the role of climate in relationship to the anthropocene, discussion will then transition to the greater influence of climate upon the human condition, particularly the economic and ecological cost humanity has undertaken to allow climate to increase its influence on human and natural space. A conclusion will then be directed at the lasting legacy of climate, and what can the environmental historian study to understand climate's role in environmental change.

Because climate is the main concept that assesses the changes to the natural world, the historian is already able to analyze climate as its own concept separate from humanity. However, the historian must also take care to make clear that while humanity has, yes, made a great deal of environmental impact, humanity has also made it clear of their larger influences on the natural world. The social and political debates conducted on climate change and climate denial are certain fact that humanity has changed the language to treat climate as an entity on its own, and historians ever since the 1970s onward have endeavored to elucidate climate as a worthy means of scholarship

Climate's Theoretical Influence to Environmental Historians

During the 1970s, climate's first initial thought was to assess the changes to climate as it related to natural occurrences, i.e. volcanic activity. However, meteorology during this period revealed more information on weather reports from America, Europe, including Russia, and Asia. From this, climate has become a global topic, and in order to historicize this topic, historians need to understand the relationship that climate has with historical periods such as the Middle Ages, in order to understand the time scale of change⁹¹. In the end, periodization allowed climate to take new directions going into the 1980s.

Scholars, namely historians and meteorologists in the 1980s, on the other hand, used from the rhetoric of the 1970s, particularly using historical events, in order to determine how climate interacts and determines human history. This period is where climate becomes its own agent, and historians have acknowledged the existence of past

⁹¹ H.H. Lamb *Climate: Past, Present, and Future*. New York: Methuen, 1972 409

climates, that climate is capable of becoming its own subject of history, and that there is a strong correlation between human social and economic activity and climate⁹².

The growing need for humanity to increase its production, namely of agriculture, has been in constant conflict against industrialization and urbanization ever since the post-World War 2 period⁹³. These scholars of the 1980s have also concluded that climate has an empirical role in history, that climate must be viewed in conjunction with cultural change, and that the human experience has forced climate to create issues for human adaptation⁹⁴. Further, because of this relationship climate shares with humanity, and because climate can be historicized, scholars in the 1980s championed the idea that climate is an independent concept to study. However, historians during this period remained skeptical of historicizing climate, but found promise using climate to study past weather patterns with the intention to understand present and future weather patterns⁹⁵.

Further, in accompaniment with studying weather patterns using meteorological data, the historian can also historicize climate by analyzing business records, personal accounts and local histories, because these works provided information on weather changes and weather hazards that subsequently would lead to larger climatic repercussions such as infestations⁹⁶. But in order to understand these works, the historian must also gauge the legitimacy of the meteorological information, because while the information may *appear* accurate for the historian's preference, there still needs to be a

⁹² M.J. Ingram, and H.H. Lamb. "Climate and History" *Past & Present*, No. 88 (Aug., 1980) 141

⁹³ Michael R. Rampino. *Climate, history, periodicity, and predictability*. New York: Bernard College. 1987 51

⁹⁴ David Hackett Fischer. "Climate and History: Priorities for Research" *The Journal of Interdisciplinary History*, Vol. 10, No. 4 History and Climate Interdisciplinary Explorations (Spring 1980) 826

⁹⁵ Robert H. Claxton. "Climate and History: From Speculation to Systematic Study" *The Historian*, Vol. 45, No. 2 (February 1983) 222

⁹⁶ Claxton 227

second opinion from either the historian's interdisciplinary training, or someone else's, in subjects related to climate such as meteorology or paleography⁹⁷.

However, as historians are able to understand the human experience, as it relates to climate, more scholars endeavored to fully understand the degree of human activity that influenced climate change on a larger scale, a trend was spearheaded throughout the 1980s. As a result of this commentary to allow historians to collaborate with the sciences, scholars in the 1980s have determined that there is a *direct* anthropogenic role in climate change, and that by historicizing climate, the historian is now able to determine the long-term ramifications for human changes to the environment. Humanity has, in the end, changed the environment to suit their needs for consumption, and at the risk of forcing dramatic changes to the natural world in the process.

From the 1980s up until the twenty-first century, this discussion of conflict between humans against nonhumans has persisted throughout historical debates on environmental history. By looking at nonhumans separate from human intervention on environmental change, the concept of a posthuman perspective has gained steam, and can possibly encourage historians to analyze past the human condition of the environment.

In the case of climate, a posthuman perspective not only can, but it is certainly capable of occurring. Because scholars in the 1980s legitimized the role of climate, acting as its own causal factor for environmental change, albeit as a reactionary towards anthropological change, posthumanist thinkers have advantageously used this rhetoric to elucidate that role of climate; that to understand climate is an entity of environmental change, the historian must determine how to separate climate's relationship with the anthropocene.

⁹⁷ Claxton 229

One of the first initial questions that historians must consider is how do we separate climate from the anthropocene using a posthuman perspective? Since historians need to understand past climates, they need to find periods of human consciousness of the role of climate's dynamic processes, i.e. features such as topography, soil structure, etc⁹⁸. Further, what is most striking is that this environmental consciousness was not new for humans, because humanity has been aware of their impact on the environment, but there has also been conscientious effort from humanity to understand the larger ramifications of nature: catastrophe⁹⁹.

But if humanity remains aware of the power of nature, especially the destruction that can follow, what would provide a challenge for humanity to be more environmentally conscious? Industry. Industry, which includes the introduction of the factory and the concept of the metropolitan area, has been a driving force for human modernity, but the role of industry needs to be understood by the reactionary attitude of humanity; that humanity began to focus more on their growing populations than the natural world, especially as medicine became increasingly advanced through asserting a hygienic lifestyle¹⁰⁰.

The question that still has remained so far throughout this chapter is how do historians separate climate from the human nonhuman dichotomy of environmental change, to which the answer comes from the changing theories during the nineteenth century and twentieth century. During this period, what began was Braudel's

⁹⁸ Jean-Baptiste Fressoz and Fabien Locher. "Modernity's Frail Climate: A Climate of Environmental Reflexivity" *Critical Inquiry*, Vol. 38, No. 3 (Spring 2012) 582

⁹⁹ Fressoz 583

¹⁰⁰ Fressoz 590

conceptualization of geological evolution without any regard to human impact¹⁰¹.

Further, the growth of economic theory and sociology disconnected climate from their discussions, especially when theorists focused on the internal factors that changed their discipline, i.e. economic theory became based off economic variables¹⁰². In the end, the separation of climate, and in turn its genesis as a separate concept of study, allows the environmental historian to justify that it can be seen as a causal factor for environmental change

Since theorists have committed to separating climate from interdisciplinary studies, environmental historians stand to benefit by employing a posthuman perspective on climate. The posthuman perspective involves the methodological separation of climate, particularly the nonhuman factor of environmental change, from the human factor of environmental change. Further, since we already know the impact humanity has on the environment, climate acts as a prime example of posthumanity, since climate change perpetuates throughout history. However, to philosopher of history Z.B. Simon, historians must cast aside the imaginary and novel attitude of historical writing, in favor of “focusing on beings that envisioned as literally *post human*”¹⁰³. Climate is one of those beings, but the methodology to explain climate is the next task.

From focusing on this posthuman perspective, the environmental historian can finally give proper attention, and even agency, to climate as a nonhuman. But the question then remains is this: *Can* nonhumans have the same level of historical assessment as humans do? Yes, and this comes from the methodological treatment

¹⁰¹ Fressoz 595

¹⁰² Fressoz 595

¹⁰³ Zoltan Boldizsar Simon, “(The Impossibility of) Acting upon a Story that We Can Believe” *Rethinking History*, Vol.22, Issue 1, (2018) 114

historians give their subject, or subjects. The first of these is the historians central subject of history, because it has consistently been with regard to a human subject, be it an individual or a group, to which the historian focuses on *their* plights, *their* struggles, and *their* concluding success and or failure in a society. However, with nonhumans, the environmental historian can treat this subject with the same regard as a human, especially since that climate has *always* been existent in the past and the future, and as such can be treated with the same historicizing methodologies as the human subject¹⁰⁴.

Further, posthuman theory has also taken shape due to the changing cultural attitudes of humanity, that humanity has forced historians to think about the world from a futuristic perspective. First off, there is no end of history, which is why a nonhuman component would make sense to drive historical scholarship, but the proliferation of popular culture that looks to the future such as television shows like *Westworld* and *Orphan Black*, or even movies like *Blade Runner* and *Terminator*, because of the premise to which the technology of the future rests¹⁰⁵.

In an extreme case, posthuman theory can also force the environmental historian to think about the conditions of the natural world when humanity has become extinct, because what remains when the human proponent of environmental change is gone? All that remains are the nonhumans, the *only* subject that is left, and it still has a history, because it has changed over time, suited now not to the needs of humanity, or as a reactionary because of humanity, but because there is a future for climate, something that humanity has proven¹⁰⁶.

¹⁰⁴ Simon “(The Impossibility of) Acting upon a Story that We Can Believe” 116

¹⁰⁵ Stefan Helgesson, and Jayne Svenungsson *The Ethos of History: Time and Responsibility*. Oxford: Berghahn, 2018 196

¹⁰⁶ Helgesson 197

But what kind of change would climate go through in this scenario? Historians have shrugged away from humanity, elucidated that climate can influence environmental change, what remains? To answer both of these questions, the future of climate rests on its own historical narrative, always existing in the face of human cultivation, in order to provide a series of changes that Z.B. Simon elucidates “unprecedentedness as being the preceding state of affairs from time to time”¹⁰⁷.

In fact, by invoking climate as a subject of environmental history, another question arises as to what happens to the anthropocene. In this case, the anthropocene, I affirm, is left in the middle of this debate pioneered by Dipesh Chakrabarty’s assessment of the history of time: millions of years of humanity’s existence on Earth versus the exponential growth of capitalism within the last five hundred¹⁰⁸. Further, the role of the anthropocene must also be seen as a conscious effort. Everything humanity does is a conscious effort, acting upon the world they see it, and understanding what must be done to change it to suit humanity’s needs¹⁰⁹. However, where climate acts against this idea of consciousness, it is the idea that climate is an instinctive entity, not reacting, but rather interacting with the changing forces around it. This conceptualization of climate I provide comes from the growth of world history’s conceptualization of the anthropocene as part of planetary evolution, that humans are part of the Earth’s history, and the functions of the Earth, should be the focus of environmental historians, not just focus so much attention on humanity, because despite their influence on change, they have only been around for a small portion of Earth history¹¹⁰.

¹⁰⁷ Helgesson 203

¹⁰⁸ Dipesh Chakrabarty “Anthropocene Time” *History and Theory* Vol. 57, No. 1 (March 2018) 6

¹⁰⁹ Chakrabarty “Anthropocene Time” 14

¹¹⁰ Chakrabarty “Anthropocene Time” 25

What now remains then is the role of climate as a posthuman entity of environmental change. Climate acts as the other of environmental history, poised to allow the environmental historian to see beyond what humanity is capable of doing¹¹¹. This is where the environmental historian can use scientific information to assess the unprecedented changes that happens in the natural world¹¹². But in order to elucidate the role of climate, the environmental historian must see it as being above the role of human environmental change. That is not to say that humanity has not made a great deal of environmental change towards the world, but rather to make clear the power of other forces that can alter the environment. Climate provides both the reactionary towards humanity, but also its own instinctive role that determines when to react against humanity. In the case of the reactionary, climate forces natural changes to occur when humanity creates long-term changes to the natural world. Climate can force a natural disaster to change sea level, increase or decrease air pollution, and also change migration patterns, a topic that is later covered in this thesis with infestations. This reactionary is based on the grandeur scale of influence humanity has made to improve their condition in the world, i.e. the building of the metropolitan areas, increased technological advancements, etc.

Climate's instinct, on the other hand, is what I see directing climate's posthuman role for environmental history. Because climate must be understood as *the* subject of an environmental historian's narrative, and since humanity is no longer the key player to focus on environmental change, climate observes what happens in the natural world,

¹¹¹ Simon, "The Story of humanity and the challenge of posthumanity" 13

¹¹² Zoltan Boldizsar Simon, "Why the Anthropocene has no history: Facing the Unprecedented" *The Anthropocene Review*, Vol. 4, No. 3 (2017) 243

paying explicit attention to any abnormal changes in the environment. Then, climate introduces a natural weather pattern such as a thunderstorm because of those changes. However, sometimes those weather patterns will either grow or shrink in an area leading to a catastrophic effect such as lack of precipitation in areas whose flora and fauna depend on it, as well as lack of glacial ice forcing changes survival habits for fauna in arctic and polar regions.

But climate can go beyond short-term changes, especially when assessing natural disasters, which will be discussed in another chapter of this work. Aside from natural disasters, large-term environmental changes, which I would argue are prolonged short-term changes, are what makes climate role that more applicable to posthuman theory. To understand this, the environmental historian needs to understand the trends of occurrences such as rainfall, as it relates to flooding of an area, or even the lack of rainfall in an area that relies on it. However, it is important for historians to also understand the role of climate as it relates to human-created climate change. In this scenario, climate must remain the center focus of the historian, but as it relates to humanity, humans are now the reactionary factor of environmental change, but it's the decisions of humanity, namely their decision to act upon the environment in their quest towards modernity, is where the historian needs to assess humanity's economic implications to act upon the environment. In the end, the historian is able to assess a direct correlation between the natural world and capitalism.

From this perspective, I focus specifically on capitalism, because it's the main economic model that can be attributed to the most environmental change in the world, namely due to capitalism's ability to increase greenhouse gases due to the rise of more

industrial development in countries in the Western Hemisphere and in the East with China and India¹¹³. Further, because of rapid capitalist growth across the world, historians must be able to determine how climate's central role of environmental change is to showcase the role of humans, and that increasing economic gain asserts humanity's reactionary towards an already existent natural world.

I deliberately flip the narrative, because not only was nature here before humanity, but also since posthuman theory requires the historian to focus beyond humanity, it would only make sense that we begin to see humanity in a lesser perspective. I do not think humanity is special or unique in this regard, because since humanity possesses free will, to which free will has allowed them to do what they will at their own leisure, historians are able to easily make narratives out of this shared ideology¹¹⁴. However, to move environmental history forward, we must care as much about the power that humanity has anymore. Humanity, from my analysis, becomes the reactionary to the natural forces that exist on Earth, because all that remains when humanity is gone is nature.

Further, because of humanity's dependency on the Earth to sustain life, the concept of climate change brings to question how can the historian separate capitalism and economic history from environmental history. I am resolved that this need to focus on capitalism and economic history has got to be the wedge that environmental historians need to separate from their work to bring climate to greater potential within the idea of a posthuman environmental history. In this situation, environmental historians must disregard the economic gain, the capitalist wealth, and ultimately the financial plight of

¹¹³ Dipesh Chakrabarty "Climate and Capital: On Conjoined Histories" *Critical Inquiry*, Vol. 41, No. 1 (Autumn 2014) 11

¹¹⁴ Chakrabarty "Climate and Capital: On Conjoined Histories" 17

humanity to improve their condition as it relates to environmental change. They instead must focus on the role of nature, the science that supports climate change, the science that analyzes how climate's hand is forced to react against this change, and also the science that suggest that the influence of humanity is miniscule when researching climate change¹¹⁵.

I do not deny that humanity has not made a great impact on the climate, because the current status of the natural world is drastically due to anthropological change, but when we assess the history of the Earth, the roles of humans is a microcosm. Climate is larger than the role of one planet that has one group of beings that are changing that one planet's environment. This focus is part of the short-sightedness that environmental historians currently face, because they need to see past this monolithic narrative of looking at humanity's role, look to relationships that climate has with other planets to understand if humanity's changes are any significant on Earth than on other planets, especially planets where sentient beings are nonexistent¹¹⁶.

However, because of the historiography of environmental history, it will take time for environmental historians to free themselves from including humanity, especially since that humanity continues to make such as large impact on Earth's natural world. But I say that this monolithic narrative of humans acting upon the environment is short-sighted by environmental historians, because it eliminates the power of nature, it downplays the larger power that nature possesses, especially since that humanity is coming into the spheres of existence *after* nature had already been existent. However, environmental historians have every reason to be locked in to discussing humanity, because of

¹¹⁵ Chakrabarty "Climate and Capital: On Conjoined Histories" 21

¹¹⁶ Chakrabarty "Climate and Capital: On Conjoined Histories" 22

humanity's multifaceted abilities to advance their societies, and especially with its relationship to climate, because the natural world has been a canvas for humanity to act.

But climate still has a larger role to play than humans do. Is it immoral, or even completely wrong, to say that humanity has a dwindling role to play on climate change? No, but rather we must not be so quick to conclude to solely place blame, or credit, on what *humanity* has done. Environmental historians must think about the climate in which humanity is acting upon, i.e. if there is an effort to create a metropolitan center (city or town) in a state like New York, the environmental historian must first determine the location of that city's natural landscape was before its creation. Then, they must assess how has climate has permitted humanity's ability to thrive, but also understand how climate has reacted against human change.

Climate's Practical Influence on Human and Natural Space

From this historical discussion of climate, leading into the determination of the Anthropocene by historians like Chakrabarty and Simon, the environmental historian can now officially conclude that humanity will always improve their condition of sustainability, at the expense of nature. However, studying humanity's role in environmental change is something that must no longer be emphasized, because as long as humanity as the idea of improving their condition, to live better tomorrow than yesterday, it will always be at the expense of nature, in some form. While the environmental historian can definitely take the time to understand how multi-faceted humanity's improvements to their condition will go, it will still evidently lead to

humanity's improvement. From this, a posthuman analysis can be emphasized, which directly elucidates the role of climate as its own proponent of environmental change.

This emphasis for what can be considered to be a posthuman analysis is definitely a major methodological transition for the environmental historian, especially since humanity's limitless ambitions will always lead to the same outcome: The decimation of natural space. To fully understand climate's independent role of environmental change, the posthuman analysis of climate is directed at the literature of scholars from the 1990s onward, examples of which include the Department of Energy (DOE) Multi-Laboratory Climate Change Committee. The Committee contends that climate is a proverbial hydra, possessing many different factors which dictate its change, what they concluded is testing the amount of carbon dioxide that is creating greenhouse gas emissions, but with attention to the causes and effects that dictate its influence¹¹⁷. Further, the role of climate remains a global concept of analysis, especially regarding to the changes in agriculture that occur between nations like England, Russia and the United States¹¹⁸. In fact, using case studies provided by scholars like Lamb and Glantz, the committee projected the degree of change that will affect natural space across the world, examples included were rising sea levels in coastal states in America, losses of boreal forests in Canada, and increased reliance on fodder reserves during projected increased colder summers in Iceland¹¹⁹.

To scholars like John M. Reilly and Margot Anderson, climate is a natural concept that will also have practical economic impact across the globe. While the DOE

¹¹⁷ United States Department of Energy, *Energy and Climate Change: report of the doe Mutli-Laboratory Climate Change Committee*, Michigan: Lewis Publishers Inc 1991 87

¹¹⁸ Ibid 110

¹¹⁹ Ibid 111

emphasized the theoretical framework to study climate, Anderson and Reilly emphasize the reality of climate's role towards the human condition. Climate is a multi-faceted machine that has multiple biological factors that allow for direct attacks towards natural and human space: Micro-scale changes from carbon dioxide levels, which lead to middle scale changes of natural occurrences such as temperature, rainfall and warmer winters, which then conclude with macro-scale changes of forest migration and drier climates¹²⁰. While this breakdown of climate change reflects the behavior of climate, the practical reality of climate's influence reflects changes in the human condition like agriculture. While agriculture is an important aspect of human sustainability, climate can ultimately dictate the abilities for humanity to use natural space for agriculture. Agriculture's dependency on water can be directed by climate, because if the natural space is dry, and in a warmer climate, the amount of water needed would need to gradually increase to accommodate that natural space¹²¹. In very humid and arid countries like Australia, their agriculture is susceptible to enhanced greenhouse effects, which acts as a detriment because of the extreme climate of the region¹²². Further, the greenhouse effects can also disrupt Australia's economic model on agriculture, effecting prices of goods but also how quantities of goods exported in the global market¹²³.

In his anthology on global climate change, Richard Wyman presents different perspectives from scholars on climate's larger impact on the natural world. To scholars like Paul Ehrlich, climate's agency, as derived from human environmental change, the scope of its influence comes from the global analysis of humanity's interaction with

¹²⁰ John Reilly, and Margot Anderson *Economic Issues in Global Climate Change: Agriculture, Forestry and Natural Resources* Boulder: Westview Press 1992 5

¹²¹ Ibid 149

¹²² Ibid 320

¹²³ Ibid 323

natural space. To Ehrlich, the transfer and distribution of energy, across both human and natural space, is the crux of the human condition, that both established countries like the United States, and impoverished countries like India, impact the amount of carbon dioxide that travels throughout the world, constituted by the amount of energy from decisions such as industry, population, etc.¹²⁴. Further, the issue with climate change is that, ultimately, climate's influence can not only force migration of species, and change the natural space of the world, but also change the natural space to prevent evolution of plant and animal species¹²⁵. In accompaniment with the larger amount of changes to natural space, human activity such as deforestation rapidly increases the amount of carbon dioxide to enter the atmosphere, in accompaniment with rapid industrialization of natural space, which forces climate change to interact with natural and human space¹²⁶. While deforestation is a major catalyst to force climate's hand, the changes to animal behavior are another example of climate's role that must be elucidated. Climate change ultimately forces animals to adjust their migration and habitation, namely through the conditions of natural space climate change destroys¹²⁷.

Ian Whyte's work, on the other hand, spearheads the realities of climate as its own form of environmental change. Where scholars before Whyte showcase the multifaceted degree that climate change interacts with natural and human space, Whyte argues that the sensationalist mass media of the globalization period brings issues for humanity to fully understand the power of climate change¹²⁸. Climate's actions against human and natural space are still debatable, but Whyte presents the conditions that can argue for climate

¹²⁴ Richard Wyman *Global Climate Change And Life on Earth* New York: Routledge 1991 x

¹²⁵ Ibid xi

¹²⁶ Ibid 47

¹²⁷ Ibid 150

¹²⁸ Ian Whyte *Climate Change and Human Society* New York: Halsted Press 1995 5

independent role in environmental change¹²⁹. While discussing changes in sea level and deforestation, Whyte also discusses the issues, and discourse of studying future climates. To Whyte, scholars can learn about the conditions of climate change from past climates, particularly the changes in the Holocene, as well as the differing attitudes to the improvement of the human condition in earlier climates¹³⁰. However, while studying past climates is of benefit to determine future climates, especially with regard to humanity's contemporary responses to climate change in the globalization period¹³¹.

Where works in the 1990s brought a lot of questions about the conditions that allow climate to operate as its own, namely as the decisions of humanity to improve their condition evolve at the expense of nature, these scholars emphasize the dichotomy of humanity fighting against nature. To counteract this dichotomy, scholars in the twenty-first century onward follow the influence by Ian Whyte, emphasizing climate's greater power as a form of environmental change. Following Whyte's work, what the scholars of this generation conclude is that climate change is directing its own influences on human and natural space. To explain this, Ernesto Zedillo's anthology on climate change presents humanity's abilities to understand its threat to the human condition from the Kyoto conference onward. Discussing the realities of anthropogenic climate change, Stefan Rhamstorf's article in the anthology argues that the amount of carbon dioxide released into the air reflects human decisions¹³². To Stephen Schneider, on the other hand, climate change is also a dangerous and volatile agent of environmental change. Schneider is critical of the decisions by humanity to combat climate change, that the

¹²⁹ Ibid 8

¹³⁰ Ibid 95

¹³¹ Ibid 174

¹³² Ernest Zedillo *Global Warming: Looking beyond Kyoto* Washington D.C.: Brookings Institution Press, 2008 38

Kyoto conference gave humanity a greater sense of consciousness about their impact, but the issues with climate are the changes in biodiversity greatly elucidate changes to natural space¹³³.

Mike Hulme, however, argues that scholars should focus their attention on the direct power of climate, that the determinist perspective scholars have presented about climate undercuts the greater power of climate as a form of environmental change¹³⁴. By studying climate as its own form of environmental change, Hulme seeks to eliminate humanity's role with climate change, because determinism suggests that climate is a strictly human component, that changes to natural space will make humanity "hostage to the fortunes of climate, too passive and powerless to respond proactively, or even reactively, to changes in environmental fortune"¹³⁵ To move studying climate forward, scholars need to focus on what Hulme refers to as climate reductionism, focusing on climate as the "interactions of their parts or else to simpler or more fundamental entities or relationships"¹³⁶. To Hulme, scholars must study climate's interactions with human society, that climate's global influence is reflected by the changes in climate in countries like Great Britain, Germany and the United States¹³⁷.

However, following Chakrabarty's influential works on the anthropocene, Merrill Singer's work demonstrates how climate affect the human condition on different socio-economic grounds. To Singer, climate's interaction with humanity reflects the decisions of the human condition: Where humanity's poor decisions, to improve the conditions of

¹³³ Ibid 61

¹³⁴ Mike Hulme "Reducing the Future to Climate: A Story of Climate Determinism and Reductionism" *Osiris*, Vol. 26, No. 1, Kilma (2011) 247

¹³⁵ Ibid 250

¹³⁶ Ibid 253

¹³⁷ Ibid 257

some and not others, exposes the less fortunate of humanity to climate's power against natural space and the human condition¹³⁸. Further, because globalization has exposed humanity to more destructive conditions of sustainability, Singer determines the extent of climate's interaction with human space, namely climate's juxtaposition of natural occurrences like hurricanes, is at the expense of human space in impoverished areas of El Salvador, Puerto Rico and Bangkok¹³⁹. Further, climate also provides its own conditions to displace populations, which Singer argues reflects not only human policies, particularly the "profitmaking, activities without fear of punishment and others endure the adverse aspects of their enforcement"¹⁴⁰, but that climate is given the agency to act in certain areas of the world.

Climate's Final Legacy in a Globalized World

In the end, climate is a concept of environmental change that, from the anthropocene, has begun to act as its own form of environmental change. From focusing on climate, as its own agent of environmental change, this ultimately eliminates the traditional narrative of humans against nonhumans, of one subject being decidedly good against another who is emotionless and fearless in the face of environmental change. From analyzing at climate as a form of environmental change, this dichotomy that has dominated historical narratives has shifted to looking at how climate has existed for years, and now *humanity* is the one fighting for survival, and in the process, are forcing climates hand to react in violent manners that upset the natural world.

¹³⁸ Merrill Singer *Climate Change and Social Inequality: The Health and Social Costs of Global Warming* New York: Routledge (2019) 3

¹³⁹ Ibid 15

¹⁴⁰ Ibid 197

Climate's role as a form of posthuman environmental change reflects the human condition, but its ability to act on its own reflects years of humanity's inability to understand the greater power of nature. Ultimately, the ability for climate to act on its own has been dictated by the anthropocene, but climate is a concept that also sets the stage for greater forces of nature that impacts the human condition. The two best examples for this would be through infestations and natural disasters.

Posthuman Environmental Change and the Role of Infestations

Within the last twenty years, infestations have increased in their frequency, as globalization and anthropological change have changed the behavioral patterns of these infestations. Environmental scientists have heavily researched infestations behavioral change, but where environmental historians interject is through determining the historical context of infestations. Further, due to the influence of the anthropocene, the environmental historian is now able to fully comprehend the power of these infestations. What is the next phase of infestations role as a subject of environmental history is their own posthuman analysis, focusing on how infestations act as a primary factor of environmental change. From the previous chapter, climate creates the conditions for nonhumans to interact with the natural world, despite humanity's directed approach to interact with the natural world, but infestations affect the natural world as a passing agent, interacting with the natural world for a short period of time. Due to humanity's changes to the natural world, most especially due to globalization, infestations are now more active and aggressive towards on the natural world, increasing their time and interactions on the natural world. Where climate created the conditions of environmental change, infestations are a reactionary subject of environmental change that affects both the human condition and the natural world at large.

This chapter will discuss the role of infestations as an element of posthuman environmental change, three distinct subsection that analyze works by both historians and scientists, transitioning from this analysis into a final discussion of analysis of infestations would encompass. Within the perspective of posthuman environmental

change, infestations can be categorized into three subgroups: Insects, Disease, and Plants. From each of these groups, it is important to note that these groups will have their own scientific and historical discourse, but each With insects, this concept is commonplace for both scholars of the natural world and historians, because of common knowledge of locusts from the biblical period. However, works on infestations published from the 1990s onward has provided a plethora of information for scholars, from analyzing sea lice in Australia, Mexican boll weevils, mosquitoes from Africa, and beetles of many shapes and sizes across North America. Studying infestations has come at a fortuitous point to allow posthuman environmental history to fruition. Plants on the other hand, have a direct influence from the anthropocene, because they are introduced by humans, be it through their own travel or indirectly planted to promote agriculture in a region. However, these plants have either become a nuisance in the minds of humanity, a nuisance that humanity wants to eliminate, or a destructive force that changes the natural landscape of the region in question.

With disease however, historians of life science and medicine have spent a great deal of time to discuss the role of disease in changing the human condition, but for the environmental historian, the discussion they present can be different from historians of life sciences and medicine. When analyzing histories of life science and medicine, they present disease with relationship to the discourse of the disease itself, namely how it has affected the human condition over the course of time. Where environmental historians can discuss disease is in relationship to the causal properties, namely how the anthropocene has conditioned diseases to proliferate in a space. Further, since diseases persist in both humans and nonhumans, environmental historians can also discuss how

animals are being affected by disease, particularly the resulting issues diseases present for wildlife populations. In this example, environmental historians can discuss the issues presented to longer trends of health to the natural world, as well as any trends to human health when discussing anthropogenic spheres of existence. In the end, disease acts as a reactionary to the anthropocene, but is what could be argued to be the most devastating because of its immediate, and in some cases prolonged, damage to the human condition.

The Historiography of Infestations

Infestations began as a separate topic of environmental history in the 1970s. While historians at this time were publishing works to discuss the influence of human based environmental change, Roderick Nash's work on American ideas of nature had allowed the theory of nature's role in environmental change to proliferate. In fact, because of Nash, the historian is now able to understand how nature acts as a reactionary to human progress, that it upsets the human condition due to prolonged human environmental change. In the case of infestations, this aspect of human based environmental change is a gradual process, but humanity needs to provide the proper conditions to allow them to interact in certain environments. The first written work on this concept was William McNeill's monograph *Plagues and Peoples*, which analyzed the impact of diseases around the globe. While this work discussed global topics of disease, which included popular topics such as the Black Death, McNeill also vehemently argues that disease fits into the larger role of human history, but also that diseases act as a natural imbalance¹⁴¹.

¹⁴¹ William McNeill. *Plagues and Peoples*. New York: Anchor books, 1976 23

From the examples McNeill provides, they each detail the causal factor which allow for a disease to exist, which McNeill derives is from either exposure to bacterial parasites, which take numerous forms, be it through vectors such as insects or rodents¹⁴². However, while diseases have evidently different modes of delivery, but what McNeill argues is that improvements to the human condition, namely the creation of more space at the expense of plants and animals, allowing for diseases to invade and interact with humanity¹⁴³. Where diseases are most prominent are in cities, but McNeill's own research focuses particularly on the ancient period, especially in the early second and third centuries A.D. where outbreaks of plague were new for Mediterranean populations in cities in both Greece and Rome¹⁴⁴.

During the exploration years however, McNeill discusses the capabilities for diseases to travel, with humanity being the primary vector. The introduction of smallpox and various other diseases were the primary cause for devastating Amerindian populations, but the Europeans who introduced these diseases did so in an unfamiliar natural world in the Americas that did not have the resistance to such diseases as in Europe¹⁴⁵. In the end, McNeill began the discussions on disease, elucidating the means to which that human based interaction with the natural world.

While environmental historians in America were disinterested in environmental history in the 1980s, environmental history in the 1990s revitalized scholarship on infestations. Further, within the historiography of environmental history in the 1990s, works written during this period also came at the beginning of globalization, which

¹⁴² McNeill 30

¹⁴³ McNeill 71

¹⁴⁴ McNeill 131

¹⁴⁵ McNeill 218

allowed the historian to understand a wider range of scholarship outside of America. For this generation of environmental historians, America's influence in environmental change was brought in retrospect to environmental change in countries in Europe and Africa.

However, the works during this period were still concerned with the relationship between humanity and nature, but they focused on the long duree of human environmental change, following the influence of Steinberg and Cronon who argue the great power of nature as well as the scope of influence humanity has made to allow infestations to exist across the world. In fact, for this generation of historians, they used McNeill's influence of infestations as a global reactionary to human progress, in order to elucidate the broader scope of power anthropological environmental change has allowed infestations to proliferate. Towards this end, these historians provide a contemporary comprehension of nature's power to react against humanity.

To Jared Diamond, humanity has always persisted in their need to improve their condition, but the debate surrounding the human condition becomes entangled by two thoughts: On the one hand, certain groups used guns and steel, bringing disease in the process, to secure political economic power, but on the other hand, historians are still trying to determine the intellectual implications for human mobility and technological advancements¹⁴⁶. However, for Diamond, historians can look beyond this theoretical concern for the human condition, focusing their attention on specific kinds of examples that improve the human condition, but also allow for disease to spread across the world. Encompassed in the concept of diet, humanity's improvement of their condition has also been with its consequences, because successful domestication of plants and animals has

¹⁴⁶ Jared Diamond, *Guns Germs and Steel: The Fates of Human Societies*, New York: W.W. Norton and Company 1997 24

allowed humanity to improve their health through trading, but diseases were able to spread to different regions in the process. Trade of these plants and animals throughout different regions exposed them to new climates across the world, and because they were exposed to foreign lands, the genes of the food traded had little resistance to diseases, especially since “low-latitude plants poorly adapted to high-latitude conditions, and vice versa”¹⁴⁷.

From this trade in food, the course of human improvement had changed the Eurasian natural world, but when exploration to the Americas began, the conquistadors and explorers from Eurasia had brought diseases that the Amerindians were not resistant to¹⁴⁸. In accompaniment with the spread of diseases that devastated Amerindian populations, Eurasian communities in the Americas were also able to implement the same agricultural practices and food production as used in Eurasia, because the Americas had the same temperate climate as across the Atlantic, allowing the Eurasian ideas of improving the human condition to exist¹⁴⁹. Towards this end, Diamond was able to explain to extent to which disease had spread across the world, using a global perspective to understand the long duree of human influence to understand the conditions to which diseases have existed in the natural world.

Following the influence of Jared Diamond, Noble David Cook focused on the historical narrative of New World colonization. When compared to Diamond, Diamond focused on the global perspective to which diseases spread, namely how Eurasians have created the conditions to allow diseases to spread. However, he elucidates in the reactionary power of the human conditioning of the natural world. With Cook, on the

¹⁴⁷ Diamond 184

¹⁴⁸ Diamond 357

¹⁴⁹ Diamond 370

other hand, he focuses on the historical narrative of colonization up until the middle of the seventeenth century. Cook does not shy from the brutality of the Portuguese and Spanish against the Amerindians, but he emphasizes the destruction of Amerindians by disease¹⁵⁰.

Cook's focus is on the natural world in the Caribbean and Mesoamerica, but what he argues to be a factor to consider is that diseases such as influenza and malaria has existed prior to contact by the Old World¹⁵¹. However, when discussing the discourse of human contact the Old World had with the New, be it the voyages of Columbus or of Las Casas, Cook argues that these explorers did not have the medical knowledge to quell the diseases they brought with them to the New World¹⁵². Further, the colonizers also were not aware of how diseases were carried, especially in the case of malaria, when sailors unknowingly infected with the *Plasmodium vivax* (quartan malaria) bacteria would travel to the New World¹⁵³. By the sixteenth century however, when Eurasia increased their settlement of the New World, the spreading of disease became more devastatingly varied. However, in accompaniment with introducing the diseases to the New World, what had allowed them to spread was, following Diamond's introduced notion, because of the lack of exposure the Amerindians had to diseases such as measles and smallpox¹⁵⁴.

In fact, the discourse of exposures to diseases Amerindians experienced are important to Cook, because where Diamond intended to understand how did disease make it to the New World, namely by the conditions Eurasians intended to implement on

¹⁵⁰ Noble David Cook *Born to Die: Disease and New World Conquest, 1492-1650* Cambridge: Cambridge University Press 1998 14

¹⁵¹ Cook 17

¹⁵² Cook 43

¹⁵³ Cook 49

¹⁵⁴ Cook 63

the world to improve their condition of sustainability, Cook used statistical and geographical information to elucidate the scope of the destruction. Further, from the destruction of Amerindian populations, Cook revealed the reactionary power of diseases, how even though humanity seeks to improve their condition, colonization of the New World left a devastating affect on the region as a result. Cook also revealed how disease infested the New World in waves, but namely that any forms of human contact the Amerindians had with the Eurasians allowed the vectors and micro-bacteria existent in both bodies to pass and interact, that there was no form of protection from mumps, measles or smallpox¹⁵⁵.

Where the 1990s pioneered the concept of infestations, particularly the power of infestations, the historiography of environmental history transitioned into the next century focusing on differing regional changes to the natural world. For these scholars, they intended to understand the presence of nature's reactionary power, as introduced in the 1990s, through the use of regional histories, in order to determine the different methods of anthropological environmental change that were present across the world. In these regional histories of environmental change, the scope of human environmental change was given a much larger influence, and the reactionary power of infestations was given more emphasis due to new information about human consciousness to improve their condition. To this generation, they intended to understand how the human consciousness about their impact on the natural world, but also how did the presence of infestations make human consciousness aware of the power of infestations.

When compared to historians of the 1990s like Diamond and Cooke, this generation greatly explained the role of human consciousness, as it related to

¹⁵⁵ Cook 209

environmental change, but their works were in the example of global relations. For these historians, on the other hand, infestations are given the same degree of analysis, still emphasizing a global component to environmental change, but these historians ask different questions about the discourse of environmental change. How would infestations in urban cities upset the human condition? Are all infestations man made, and if so, where does nature fit into the narrative? But most importantly, how can nonhumans like infestations provide a greater influence on environmental change, that humanity has conditioned their influence? In fact, it is because of globalization that these questions were answered, and with regional history, historicizing infestations became greatly increased during this historiographical period.

One of the first works to follow this direction was Adrienne Mayor's work on the use of chemicals such as poison gas in times of war during the ancient period. What is striking about this work is Mayor's assertion of humanity's ability to weaponize nature¹⁵⁶. Where this discussion parallels with environmental change is that while humanity acts upon the natural world to improve their condition, the deliberate use of nature to upset the human condition runs against the traditional narrative of infestations discussed so far. Up until this work, infestations were part of a reactionary force originated from humanity's interaction towards natural space. With Mayor, humanity is now being revealed as to making a conscious effort to impose the power of nature against humanity.

What this allows the historian to understand is how nature will be an agent of power for humanity. Further, humanity's relationship with nature will be interdependent

¹⁵⁶ Adrienne Mayor. *Greek Fire, Poison Arrows & Scorpion Bombs: Biological and Chemical Warfare in the Ancient World*. New York: The Overlook Press 2003 28

with one another, particularly as a means for groups of humanity to use power against other groups of humanity. It is important to also note that these infestations were also forced by humanity, that humanity's knowledge of the effects of places like fetid swamps could be used to force changes to the human condition, resulting in either loss of lives or populations falling gravely sick to diseases like malaria. In other cases, human populations during periods of war would devise ways to actively impose infestations on humanity, not through deciding areas of battle, but using nature itself as weapons to upset the human condition¹⁵⁷.

In times of war during the ancient period, one example Mayor discusses was how armies would manipulate water supplies against their enemies. The techniques that humanity would use, in accompaniment with damming rivers and flooding out enemy cities, included poisoning water supplies with animal carcasses¹⁵⁸. Further, from presenting works by Thucydides, Mayors also elucidates how armies like the Sicilians forced the Athenians into unhealthy environments such as swamps and marches in order to both deny favorable battlefields, but also impose diseases that would exist in those areas onto humanity¹⁵⁹.

In another example Mayor provides, armies in the ancient period would also directly use animals to impose infestations on enemies. In one example, armies would use mice infected with bubonic plague during war, but Mayor argues that armies justified their use by comparing their influence to the Old Testament narrative with the Philistines, that their acquisition of the Ark of the Covenant from the Israelites lead to their stricken

¹⁵⁷ Mayor 39

¹⁵⁸ Mayor 109

¹⁵⁹ Mayor 115

with disease from the mice¹⁶⁰. In another example, what became a more widely used form of infestations in war was the use of insects. A common practice of armies to utilize insects in war was catapulting hives of hornets or wasps at enemies, which Mayor argues to be a tactic that transcends throughout antiquity up until the Vietnam War¹⁶¹. Further, armies would also fill jars with poisonous insects such as scorpions and wasps, to then throw them at enemies and the toxins would decimate soldiers¹⁶². From Mayor's work, infestations were given a practical example of use to humanity, benefitting the human condition in the process. Towards this end, the idea of infestations, in their relationship to environmental change, has transitioned to a practical example of human influenced environmental change, and that humanity has the power to use nature to improve their condition.

Another example of infestations being used by humanity was Daniel Barenblatt's work on Japan's biological warfare during the Second World War. While used in war, when compared to Mayor's work, Barenblatt emphasized the power of disease, that the Empire of Japan deliberately created diseases during war to "turn life against life in such a way that may be easily blamed by its perpetrators on a "natural outbreak", or merely an "emerging", previously unknown disease¹⁶³.

To Barenblatt, like Mayor, the use of disease by Imperial Japan was a narrative of power imposed on countries they controlled like China and Korea, namely through going beyond morality to achieve dominion over others¹⁶⁴. From this narrative, the Japanese

¹⁶⁰ Mayor 175

¹⁶¹ Mayor 180

¹⁶² Mayor 185

¹⁶³ Daniel Barenblatt. *A Plague Upon Humanity: The Hidden History of Japan's Biological Warfare Program*. New York: Harper Collins Publishing, 2005 xxi

¹⁶⁴ Barenblatt xxiv

first experimented on prisoners to determine the best tactics to debilitate populations, most notably through exposures anthrax, to then subsequently document the course of the exposures: Internal bleeding, abdominal pain, etcetera¹⁶⁵. Further, the Japanese then determined the methods of delivery for the diseases. For Barenblatt, the methods of exposure the Japanese used were multifaceted, using air raids to drop crops like wheat and cotton that were infected with bacteria and bubonic plagued fleas¹⁶⁶. In the end, Barenblatt and Mayor's examples of war showed the degree of human consciousness using infestations to upset the human condition of others.

In accompaniment with war, human consciousness towards infestations became the common theme for historians during this phase of historiography. Where humanity used war to understand the benefits and power of nature, humanity also observed their condition of sustainability, namely their living conditions, to that of encroachment by infestations. Focusing on first world countries in Europe, as well as the United States, historians analyzed how humanity understood their relationship to infestations, but also how humanity intended to combat infestations to improve their condition.

In the United States, Peter Coates fixated on periods of human immigration to America as they related to infestations of nonnative flora and fauna. To Coates, he elucidates that periods of great immigration to America, namely in the 1900s and 1960s, allows the environmental historian to bring nonhumans into the historical narrative of immigration, that plants and animals introduced into America's natural world in the twentieth century, warrant a historical analysis of "how animate forms of nature can

¹⁶⁵ Barenblatt 119

¹⁶⁶ Barenblatt 143

become embroiled in the cultural politics of nationalism”¹⁶⁷. These ideas of immigration would then transition with globalization in the 1990s, where Americans intended to halt immigration to prevent the growth of America’s ecological footprint¹⁶⁸.

For Coates, this discussion of nonhuman immigration originated from Sagoff’s research on ideas of immigration between America and Europe. To Americans, the natural world should remain pristine, while Europeans saw the natural world as a blend between nature itself and the presence of humanity¹⁶⁹. However, during globalization, this ideology of comparing nonhuman and human immigration to America became debunked, American scientists determined that there were mass scale invasions by insects like Asian tiger mosquitoes, to which Coates elucidates that in America “Biotic takeover rather than coexistence has been the overall long-term outcome of species migration”¹⁷⁰. In the end, Coates is hard-pressed that while countries have transitioned from systematic racism against other humans, Americans are still concerned about nonnative infestations, but also that nonnative infestations can act as challenge to national identity¹⁷¹.

While environmental historians like Coates discussed the role of infestations into the psyche of nation-states, namely the identity of nation-states, David Barnes analyzes France’s efforts to eliminate diseases in the late nineteenth century. Further, from increased human knowledge of improved living and sustainability during this period, the discourse of diseases originates from filth¹⁷². Focusing on the conditions to allow the spread of diseases such as tuberculosis, smallpox and cholera, in accompaniment with

¹⁶⁷ Peter Coates. *American Perspectives of Immigrant and Invasive Species: Strangers on the Land*. Los Angeles: University of California Press 2006 7

¹⁶⁸ Coates 161

¹⁶⁹ Coates 25

¹⁷⁰ Coates 175

¹⁷¹ Coates 188

¹⁷² David S. Barnes *The Great Stink of Paris and the Nineteenth Century Struggle against Filth and Germs*. Baltimore: The John Hopkins University Press 2006 3

discussing the discourse of germ theory in France, Barnes focuses on the intellectual history of France to improve the human condition¹⁷³.

The origins of France's effort to understand germs began in the 1840s, when hygienists analyzed the degree of sanitary conditions in the country, examples of which included waste disposal in public spaces, washing clothes in dirty water, but waste being disposed became overwhelming for street¹⁷⁴ cleaners. From this, French health officials began to investigate the negative effects of improving the human conditions, studying disease to understand both the conditions of its existence, as well as the geographical implications, which France distinguished between four different causal factors: Academic, individual, folk, and local¹⁷⁵. From this classification, Barnes determines the diverse conditions for diseases but also that each classification has their own intellectual stigma of medical knowledge and its application in their everyday life¹⁷⁶.

In accompaniment with theoretical concepts of disease, what became the legacy of this period were the practical applications of prevention from the nineteenth century onward. Following these investigations, France in the twentieth century became more conscious about the kinds of conditions to allow germs to exist, but can be prevented with good personal hygiene¹⁷⁷. In the end, from Barnes's work, infestations like disease are now viewed in relationship by the long-term conditions humanity created on the natural world, and that humanity's efforts at urbanization allow for diseases to exist if humanity chooses to maintain poor living conditions.

¹⁷³ Barnes 10

¹⁷⁴ Barnes 81

¹⁷⁵ Barnes 108

¹⁷⁶ Barnes 110

¹⁷⁷ Barnes 261

From the works on infestations starting in the twenty-first century, historians writing about infestations from 2008 onward have further investigated the role of human conditioning the natural world, particularly at periods of great urbanization and technological advancement. For these historians, humanity was still questioning their approaches to modernization, but particularly in relationship to how infestations will force humanity to rethink their methods of sustainability. When compared to historical work pre-2008, they did discuss discontents towards improving the human condition, but this group of historians provided examples of infestations that were introduced by means of economic development on a global scale.

In his research on DDT, David Kinkela is adamant that America's use of the chemical was to advance agriculture, but at the cost of public health issues for the country¹⁷⁸. Further, the use of DDT came at a period where Americans wanted to move beyond the issues of Third World economies, with Americans scientists and politicians using DDT to put the country in an international perspective, using the chemical as a tool to improve conditions where both American agriculture and economy were prevalent, examples of which include Africa and India¹⁷⁹.

The use of DDT was in defense against outbreaks of diseases like malaria and typhus, but for Americans, namely the Rockefeller foundation, the use of the chemical became increased because it had little detriment to human health¹⁸⁰. However, despite the influence of the chemical, Kinkela discusses how scientists like Rachel Carson, as well as the generations involved with the Green Revolution, argued that DDT possessed

¹⁷⁸ David Kinkela. *DDT and the American Century: Global Health, Environmental Politics, and the Pesticide that Changed the World* Chapel Hill: The University of North Carolina Press 2011 7

¹⁷⁹ Kinkela 9

¹⁸⁰ Kinkela 73

devastating effects for both humans and nonhumans¹⁸¹. In fact, Kinkela is particularly focused on Carson's work, because chemicals can effectively be used to condition the natural world to suit human sustainability¹⁸². In the end, eliminating the use of DDT on agriculture provided little to no success, to which Kinkela elucidates that generations of insects after DDT's discontinuation became resistant to the chemical, and had also created deaths from both insect-borne diseases and the chemical itself¹⁸³. To Kinkela, humanity's efforts to condition the natural world, for the sake of modern agricultural practices in the twentieth century, continued to make humanity susceptible to disease while also destroying the natural world in the process.

While Kinkela focused on how DDT created conditions for an infestation like disease and insects to exist, in its own failure to prevent the spread of these infestations, historian James Giesen presents an economic perspective on the role of the Mexican boll weevil into the American South during the Post-Reconstruction period, which lasted from the end of the nineteenth century and up until the Great Depression. Aptly referred to as a pest, Giesen analyzes the role of the pest in the destruction of cotton production, but also that humanity also influenced its destruction in the process¹⁸⁴. For the boll weevil, its migration into the country during the early twentieth century “destroyed *tens of billions of pounds* of pounds of cotton since its arrival in the United States, the value of which approached one trillion dollars”¹⁸⁵. However, the discourse of its migration was a gradual process, and both southern and non-southern farmers were aware of crop destruction by

¹⁸¹ Kinkela 108

¹⁸² Kinkela 117

¹⁸³ Kinkela 173

¹⁸⁴ James Giesen. *Boll Weevil Blues: Cotton, Myth, and Power in the American South*. Chicago: University of Chicago Press, 2011 xiv

¹⁸⁵ Geisen xi

the boll weevil, to which Giesen focused on the socio-political transformations of the American South, namely how farmers faced falling land prices, and politicians signed bills to quell the weevil's invasion, which ultimately fell to the responsibility of farmers to educate themselves about how to handle the pest¹⁸⁶. While Giesen's focus was on the historical narrative of the boll weevil's agricultural force, "it was the *idea* of the boll weevil, more than the physical destruction it wrought, that most profoundly changed the region".

The destructive power the weevil brought to the South created a collective social anxiety in the country among Americans, in both the North and South, that even though it will either die or migrate out of the country, people still revered in its power¹⁸⁷. That power of the boll weevil that Giesen elucidated, the fear, showcased its abilities as an infestation. In fact, the legacy of the boll weevil in the twentieth century onward was its being immortalized on statues, in schools, and in music¹⁸⁸. However, the historian could argue that the boll weevil was successful as an infestation, that since it changed human psyche on agricultural practices, its existence came as established agricultural practices in the South were in a state of transition¹⁸⁹. The historian can use Giesen's work to conclude the kind of power an infestation had on the human condition, and the arrival of the boll weevil came when agriculture was already in a state of transition.

Due to Dipesh Chakrabarty's influential work on the anthropocene, the study of infestations is another aspect of environmental change that fall into a posthuman category. The historians that have written on infestations have prepared the posthuman

¹⁸⁶ Geisen 25

¹⁸⁷ Geisen xi

¹⁸⁸ Geisen 175

¹⁸⁹ Geisen 174

analysis, but it was Chakrabarty's work that elucidated this is the direction of environmental history. Why should environmental historians consider infestations as a sole proponent of environmental change, when humanity is the major figure for creating the natural world to suit their need to sustain the populations? First, environmental historians need to accept that humanity's ability to *choose, decide, and create*, to dictate the conditions of their existence, and also to understand what are the proper conditions of sustainability as a species, has been the only narrative throughout the historiography of environmental history. Even in the works on infestations, diseases and insects, which have been what these historians discussed, have been left as useful as a footnote, when compared to the amazing strives made to improve the human condition, be it at the expense of both natural space and human life in the process.

To explain this, the environmental historian must be able to bridge the gap between history and environmental sciences. To bring the posthuman analysis of infestations to prose, the historian needs to read about the degree of ecological change humanity brings to the natural world. From understanding ecology, the historian can fully understand the presence of infestations in their relationship to environmental change. The environmental historian must also study the changes to the life cycles of insects, their changes in behavior, as well as what has humanity contributed to their existence. Further, using works written about insects will also allow the historian to get out of the archives, to focus their tired attention to build on former scholarship, that they can use scientific works to understand the nonhuman condition: *their* spaces of living, *their* attempts to improve their own sustainability as a species, when faced against the power of humanity, and especially how humanity has forced changes to the insect psyche, that in their drastic

changes to the natural world, humanity has in turn forced insects to seek new ground, new places to interact, some of which are almost unnatural. Finally, environmental historians must also elucidate how diseases have taken different forms through human condition of the natural world. Through the use of works on diseases, historians are able to understand the ecological implications for the existence of a disease. Further, the historian can also determine how humanity not only introduces diseases to a natural space, but also how does humanity react to areas where a disease is prevalent in a natural space.

While this is easier said than done, the historian can understand the global ecological implications of the anthropocene. In fact, is it fair to say that the historian must in turn, betray humanity to achieve this? Yes, on the one hand, because the historian must conclude that humanity will, forever, choose to take action to improve and to build from previous conditions to make better ones for themselves. No, on the other hand, because historians need humanity to tell the narrative of infestations, that without humanity's desire to improve conditions, humanity's knowledge of the Self, infestations would not be in such an important transitional period. Where historians must separate humanity from infestations is placing infestations, and their power on the human condition, *first*, but this is only after the historian had read about the natural world as told from the perspectives of ecologists, epidemiologists, and entomologists.

However, do infestations then, by making humanity the secondary reactionary force, cause the issue of posthuman environmental change to lose traction? No, because again, since humanity is needed to understand posthuman environmental change, what the historian must determine the power of these infestations. Humanity provides

infestations with the power, the impetus, to act in the natural world, upsetting both human space and natural space, but the historian's need to cling onto humanity has outlived its usefulness.

Bridging the Gap: Applying Scientific Works on Infestations

While historians have written extensively about infestations, to bring a posthuman perspective to this aspect of environmental history, discussion must also be directed at scientific works on infestations. One of the first discussed topics in the post-World War Two period was the roles of disease, to which Sir Macfarlane Burnet and David White stress the relationship between humanity and the natural world, that humanity's crowded streets and city dwellers are vectors for disease, because of humanity's set idea for controlling their condition of sustainability¹⁹⁰. However, both of these scholars argue that the course of diseases act as reactionary to the balance of the natural world, and that humanity had created a series of imbalances to existing plant and wildlife populations which had forcing diseases to exist¹⁹¹. James Busvine, on the other hand, argues that the presence of infestations like insects remain reactionary towards the human condition, but know how to interact in different conditions and temperatures¹⁹². Following the influence of Busvine, J.L. Cloudsley-Thompson affirms in the power of insects, that they, as an infestation, have directed course of human history, and that historians should focus on insects the same way they elucidate the importance of "wars and famous battles, or

¹⁹⁰ Sir Macfarlane Burnet and David O. White. *Natural History of Infectious Disease* Cambridge: Cambridge University Press 1972 21

¹⁹¹ Burnet 138

¹⁹² J.R. Busvine. *Insects, Hygiene and History* London: The Athlone Press 1976 13

internal strife and corruption”¹⁹³. In the end, the 1970s had followed the path of historians to elucidate the power of nature, and certainly how it can challenge the human condition.

While scientists in the 1970s had argued for the greater emphasis of the role of infestations, in their relationship to humanity, scholarship in the 1990s onward have discussed the great influence of the human condition, namely how has humanity created the conditions to allow infestations to exist. What separates these works from historiography is that while the scientific data is updated, the same as historians use previous works to explain the historical direction of events, to the eyes of a scientist, they place the role of humanity first then analyze the reactions from infestations. Some of the first works that were written discussed direct human conditioning of the natural world, particularly during the early twentieth century onward. Early works on this focus emphasized humanity’s use of chemicals, which in turn created infestations in the process. In Jeanne Guillemin’s work on anthrax, she emphasized the use of the chemical has devastating effects on human health¹⁹⁴. However, the use of anthrax during the Cold War raised issues for Guillemin, namely Russia’s outbreak at Compound 19, which Guillemin argues was deliberate to understand the health detriments associated with anthrax¹⁹⁵. In the end however, while focused on Russia, Guillemin is also concerned about the direction of American politics, that the country may fall victim to economic ruin, being rendered unable in the future to combat disease¹⁹⁶. Edmund Russell, on the other hand, focuses on the discourse of America’s efforts to improve their conditions of

¹⁹³ J.L. Cloudsley-Thompson *Insects and History* New York: St. Martin’s Press 1976 3

¹⁹⁴ Jeanne Guillemin *Anthrax: The Investigation of a Deadly Outbreak* Berkeley: University of California Press 1999 5

¹⁹⁵ Guillemin 111

¹⁹⁶ Guillemin 271

sustainability, that politics dictated the speed of knowledge to control nature¹⁹⁷. Where Russell is focused the most is America during the Post World War Two period, because the use of chemicals like DDT with the idea that typhus and malaria were more serious than exposure to DDT¹⁹⁸. However, the resulting issues that the initial use of chemicals like DDT led to issues for agricultural production, especially since crop dusting was in vicinity to suburban landscapes¹⁹⁹. In the end, the use of chemicals did nothing to combat infestations invading the country²⁰⁰.

While scientists actively researched about diseases and insects, invasive plants became a new center of focus of infestations for scientists. Within the works on this subject, there is an emphasis on how humanity reacted against plant encroachment, but also what were some of the conditions that had allowed plants to infiltrate human space in the process. Charles Elton contends that infestations have exploded because of humanity, that acting upon natural space has forced plants to break through barriers that would have otherwise prevented their spread²⁰¹. Further, Elton argues that the ecological breakouts by plants must be understood particularly how does humanity balance their population growths with either eradication or quarantine²⁰². However, while species of plants and animals can, at times, share the same natural space, but plants like weeds would encroach in human space in the wake of creating crop fields, waste disposal sites, etcetera²⁰³. Time Engelkes and Nicholas J. Mills, however, argue that invasive plants are

¹⁹⁷ Edmund Russell *War and Nature: Fighting Humans and Insects and Chemicals From World War I to Silent Spring* Cambridge: Cambridge University Press 2001 11

¹⁹⁸ Russell 175

¹⁹⁹ Russell 213

²⁰⁰ Russell 232

²⁰¹ Charles S. Elton *The Ecology of Invasions By Animals and Plants* Chicago: University of Chicago Press 2000 15

²⁰² Elton 110

²⁰³ Elton 117

taking such a hold on the natural world that they may invite new species of herbivores. Explicit that these plant invasions are accidental, Engelkes and Mills focused on the conditions that allow an invasive plant to exist, namely that human introduction or migration of exotic plants to prey on native species, as well as the chemicals in natural space can dictate the infestation of an exotic species²⁰⁴. Further, both Engelkes and Mills are hard-pressed that the natural space that is promoting these infestations is a major cause for plants to invade natural space, especially when compared to the rate of insect growth²⁰⁵.

When compared to the influence of chemical status of natural space, Don Grant, Andrew Jones and Mary Trautner's study on pollution, namely the influence of plant infestations and the degree of toxins in a human space. In their study, the group concludes that plant behavior in their own host communities become forced to migrate out of human space²⁰⁶. Further, because of the degree of human consciousness about pollution, which exists on multiple levels of different socio-economic statuses, plants are changing their emission output due to the chemicals introduced²⁰⁷. In another study conducted by a team led by Don Driscoll, plants have also become an infestation due to the introduction of pasture plants by humanity. Further, plants that are being introduced as pasture plants are, in fact, altering the natural space to allow invasive plants to exist, examples of which plant growth, reproduction, disease resistance, and seed production²⁰⁸.

²⁰⁴ Tim Engelkes, and Nicholas J. Mills "A fast track for invasion: invasive plants promote the performance of an invasive herbivore" *Biol Invasions*, (2013) 102

²⁰⁵ Ibid 105

²⁰⁶ Don Grant, Andrew Jones and Mary Trautner "Social Forces, Vo. 83, No. 1 (Sep., 2004) 195

²⁰⁷ Ibid 199

²⁰⁸ Dan Driscoll, et al "New Pasture Plants Intensify Invasive Species Risk" *National Academy of the Sciences*, Vol. 111, No. 46 (November 18, 2014) 16623

Repeating the Life Cycle: Examples Where Posthuman Analysis Applies

From these examples provided by both historians and scientists, discussion must be directed at examples where posthuman analysis can be applied. A contemporary infestation that the environmental historian can analyze would be the patterns of grasshoppers and locusts in China. Their presence itself has been of concern for areas of human space, particularly towards crops and grasslands across China²⁰⁹. However, the historian should point out the geographic diversity of locusts and grasshoppers, infesting China in the extreme northwest, the center, and near the southern border of the Tibetan plateau²¹⁰. Further, their migration into China from these areas is originating from neighboring countries like Mongolia and Kazakhstan, which the environmental historian should then cross reference the migratory patterns with areas that have large flooding issues from dammed rivers²¹¹.

Another example that can be discussed within this posthuman context is revisiting the spreading of disease, namely dengue fever from mosquitoes in Brazil. There is a distinct relationship between the spread of dengue, temperature and humidity, that the temperature of the country affects the amount of mosquito migration, and that dengue outbreaks reached a high during the summer periods in 2013²¹². Where environmental history can take precedence is in relationship to the use of climate reports, determining the course of climate change in regions of Brazil where dengue outbreaks were reported,

²⁰⁹ Long Zhange and David M. Hunter "Management of locusts and grasshoppers in China" *Journal of Orthoptera Research*, Vol. 26, No. 2 (2017) 156

²¹⁰ Ibid 155

²¹¹ Ibid 157

²¹² Danielle Andreza da Cruz Ferreira, et al. "Meteorological variables and mosquito monitoring are good predictors for infestation trends of *Aedes aegypti*, the vector of dengue, chikungunya and Zika" *Parasites and Vectors* (2017) 8

thereby concluding how anthropogenic changes have conditioned the existence of this disease.

With some insects however, especially in America, the changing behavior of pine beetles is noteworthy for a posthuman context. In fact, in one study on the mountain pine beetle in British Columbia, from 1999 to 2006, the infestations by these insects have grown rapidly within this timespan²¹³. In another study of pine beetles in 2011, particularly pine beetles of the American southeast, there is a present consensus that this is an infestation, especially since the region has minimal human population, minimum winter temperatures, but also heavily managed forests²¹⁴. From the conclusions drawn in the study however, temperature flux determine the degree of infestation, but also with the exception of drought, extreme weather conditions can also deny the beetle from infesting the region. In this case, the environmental historian should determine how humanity has contributed throughout the course of the beetle's infestation periods, concluding then if this beetle remains an infestation, as well as the conditions of its ability to infest.

However, we must also ask about the scope of this beetle as an infestation; how many southeastern states have reported infestations of the insect? Historians must also ask if the behavior of this pine beetle in America is different than those from the previous study in British Columbia? If so, how, if not, why?

With plants however, this form of infestation has the potential to bring in other infestations, examples of which include insects and even animals. They can sometimes attract insects that would regularly feed on the plant, as observed in a study of invasive

²¹³ Colin Robertson, et al "Determination of the compositional change (1999-2006) in the pine forests of British Columbia due to mountain pine beetle infestation" *Environmental Monitoring Assess* (2009) 596

²¹⁴ Adrian Duehl, et al. "Southern pine beetle regional outbreaks modeled on landscape, climate, and infestation history" *Forest Ecology and Management* 261 (2011) 474

light brown apple moths in California, but comparisons were made to invasive plants and native plants, to determine which form of food was their preference²¹⁵. Where environmental history can be used is with respect to the natural home of the moth itself, as well as other examples of plants used to coax infestations across the globe. What is most striking is that the influence of globalization has increased invasions of plants, which benefit environmental historians to understand their roles on their natural space of introduction²¹⁶.

Conclusion

There is a direct correlation between infestations and environmental change, namely the conditions of humanity have allowed for them to proliferate. There is enough substantial academic sources are at the disposal of the historian to understand this concept, and that can understand the reactionary factors of the anthropocene. What must happen then was already mentioned, that the historian must historicize the course of these infestations, understand the factors that allow them to persist, but also how much of a hand humanity has made to force infestations to increase their interactions with the natural world. The use of climate is of extreme benefit, because it helps environmental historians understand the following: Why would infestations come to certain natural spaces? Were these infestations instinctively coming to other areas of space on volition, or were giving the opportunity to by humanity? From this discussion on infestations, their destructive force does act as a reactionary to environmental change, but my final subject keeps getting stronger every day: Natural Disasters.

²¹⁵ Tim Engelkes and Nicholas J. Mills “A fast-track for invasion: invasive plants promote the performance of an invasive herbivore” *Biological Invasions* (2013) 102

²¹⁶ Ibid 101

Natural Disasters as a Form of Posthuman Environmental Change

In 2008, Hurricane Katrina became one of the most destructive hurricanes in modern history. Scholars across multiple disciplines have analyzed Katrina's causal effects, the social displacement and political response, as well as the degree of capital ruin as a result. Another aspect of posthuman environmental change, natural disasters act as a reactionary force against humanity, however, it is important to note that the influence of humanity has impacted their frequency and destructive force. While humanity has monitored the changes to the Earth's atmosphere, namely the conditions to allow the presence of a disaster, but that their existence in natural space has been directed by the economic decisions of humanity²¹⁷. Natural disasters act as a perfect reactionary towards the anthropocene, however natural disasters also provide a degree of analysis that warrants concerns for the historian, namely the conditions that have allowed disasters to increase in size and frequency. Because while humanity has still conditioned the natural world to act upon its own instinct for change, natural disasters remain part of human society, and certainly human consciousness, that have been as susceptible to the anthropocene as any other aspect of nature.

This chapter will analyze how natural disasters have acted as their own form of environmental change, that humanity's condition of sustainability has created natural disasters that have been taking new forms, mostly more destructive and violent, but that these natural disasters are adapting without humanity, creating devastating effect to the natural world, more so within the last twenty years due to globalization. Further, through

²¹⁷ Ted Steinberg *Acts of God: The Unnatural History of Natural Disaster in America* Oxford: Oxford University Press 2000 xxiv

the use of historiography, as well as works on climatology and meteorology, the adaptation of natural disasters will be elucidated, namely the scale of nature's influence. This discussion of both kinds of works on natural disasters, scientific and historical, will also determine the relationship between the human condition and natural disasters, particularly the depth of human influence that has allowed natural disasters to evolve. Transitioning from this discussion, analysis will then focus on the larger context of how natural disasters act as their own agent of environmental change, providing examples of disasters such as blizzards and hurricanes that show this independent nature of disasters. In fact, this posthuman analysis of natural disasters will be the most important aspect of this chapter, particularly if disasters are, in fact, getting more destructive by relying on human acts of pollution and deforestation. In the end, natural disasters either evolve, or transform through humanity's conditioning of natural space.

However, there are two parts the historian must use to to analyze natural disasters: The discourse of the disaster itself and the fallout. Within the discourse, this historian would begin by discussing the events leading up to the disaster, transitioning into discussion about humanity's abilities to combat the destruction wrought by the disaster. Since humanity has allowed for disasters to upset their condition of sustainability, the historian must be able to draw the connections between the human condition and the conditions that allowed the disasters to cause great destruction to the human condition.

Discussing the fallout of the disaster, the historian can understand not only how much natural, financial, and economic ruin the natural disaster created to natural and human space. This fallout of the natural disaster is the most important aspect for the historian, because while the conditions and discourse explain the power the disaster has

over humanity and the human condition, the fallout presents humanity's ability to recover, to improve their condition, but also emphasize the cost humanity has suffered due to these disasters. Ultimately, the fallout of a natural disaster shows the financial ruin, to socio-economic instability, and the political chaos of the anthropocene.

The organization of this chapter will begin with the historiography of natural disasters, in the larger historiographical narrative of environmental history, transitioning into subtopics divided by the different forms of disasters, analyzing examples provided by both historians and scientists. Conclusion will be directed at the direction of disasters, determining the greater influence humanity has made on their influence on the natural world. That, with natural disasters, this nonhuman element of environmental change, greatly effects both natural and human space.

The Historiography of Natural Disasters

Historical works on natural disasters began in the 1970s, to which historians that emphasized the role of nature in environmental change. With their works on natural disasters, the early historical works emphasize natural disasters is strictly a reactionary force to the human condition. These historians do not dismiss the power of natural disasters, but rather emphasize how intertwined humanity's role is with the power of natural disasters.

To David Worster, the Dust Bowl was a testament of human conditioning on the natural world, reflecting capitalist gain as the main motive for the Dust Bowl's destruction. However, capitalist gain may have allowed the Dust Bowl's force against the human condition, but the initial reaction to allow the Dust Bowl to proliferate was a

numerous amount of dust and dust storms that occurred leading up to the event, created by human-induced agricultural practices²¹⁸. Further, the Dust Bowl not only created agricultural issues, but also medical issues which some doctors argued it to be some form of pneumonia from the dust, which forced the creation of several emergency hospitals in Kansas, Colorado and Texas²¹⁹.

To Worster, America during this period was not knowledgeable about the natural world during this period²²⁰. Due to this, the Dust Bowl became a natural disaster that was fighting against both human conditioning of the natural world, as well as humanity's need for survival. However, while Nature, to Worster, had created methods of ecological change, he ultimately blames European colonization of the Americas, because since Europeans held little regard to the natural world, they could not prepare for events of great ecological disaster like natural disasters²²¹. Further, the Great Plains region was subject to the ideas of an agricultural society, in accompaniment with the occupations of the cowboy and the rancher, all of which did not allow for a consciousness about the natural world to exist²²².

In the wake of the Dust Bowl, and even throughout the course of the disaster's presence in the Great Plains, Americans created a series of recommendations for farmers and agriculturalists going forward²²³. Americans emphasized better education on the natural condition of grasslands, while also elucidating the degree of grazing in natural

²¹⁸ Donald Worster. *Dust Bowl: The Southern Plains in the 1930s*. New York: Oxford University Press, 1979 13

²¹⁹ Worster. *Dust Bowl: The Southern Plains in the 1930s* 20

²²⁰ Worster. *Dust Bowl: The Southern Plains in the 1930s* 43

²²¹ Worster. *Dust Bowl: The Southern Plains in the 1930s* 64

²²² Worster. *Dust Bowl: The Southern Plains in the 1930s* 94

²²³ Worster. *Dust Bowl: The Southern Plains in the 1930s* 200

space, especially if it leads to infestations of insects and disease, lack of soil nutrients, and wind erosion²²⁴.

In the 1990s however, as environmental historians revisited the power of nature, John Barry's work on the Mississippi Flood of 1927 emphasizes how the flood changed America's perspectives on the natural world. Focusing on the memory of members of the American Army Corps of Engineers like LeRoy Percy, the Mississippi Flood emerged at a period where American progress was at its peak in the twentieth century²²⁵. Further, the ideas that the Corps of Engineers had to combat the Mississippi River, but the Engineers had to increase the amount of levees and floodplains because the River's water levels were able to rise with each update the Engineers gave to the man-made channels and levees²²⁶.

Despite America's attempts to move the country towards a progressive future, Barry transitions into the discourse of events that happened as the Mississippi River flooded. Initially, following heavy rainstorms, the energy produced by the Mississippi River submerged nearly 1 million square miles, and also effected the Ohio and Missouri rivers²²⁷. While the Flood was running south to the Gulf of Mexico, Barry discusses how levee engineers tried to move civilians from affected cities like Greenville, as well as move water from the Mississippi River onto land, "hoping that the additional weight of water would stabilize and buttress the levee, preventing sand boils and sloughing"²²⁸.

²²⁴ Worster. *Dust Bowl: The Southern Plains in the 1930s* 203

²²⁵ John M. Barry *Rising Tide: The Mississippi Flood of 1927 and how it changed America* New York: Simon and Schuster Publishing 1998 21

²²⁶ Barry *Rising Tide: The Mississippi Flood of 1927 and how it changed America* 91

²²⁷ Barry *Rising Tide: The Mississippi Flood of 1927 and how it changed America* 175

²²⁸ Barry *Rising Tide: The Mississippi Flood of 1927 and how it changed America* 198

When the Mississippi Flood eventually receded, the fallout left American populations displaced, but lawyers of displaced cities like New Orleans could not appeal to everyone who suffered²²⁹. Further, the Hoover administration frantically had to change the agricultural practices of the Deep South like Arkansas and Mississippi, which suffered the most during the flooding²³⁰. Despite Hoover's efforts to alleviate the flood, particularly with raising money for flood relief, Congress, nor any part of the federal government, would not provide direct aid²³¹. In the end, Barry elucidates the pitfalls of humanity's ability to control this river were met with disaster, and the despite being able to recover, the Mississippi Flood still changed humanity's ideas of improving their condition.

During the twenty-first century, as environmental history became a global topic of discussion, historians during this period analyzed natural disasters using Barry's perspective, focusing on the discourse of the disaster and its fallout. However, twenty-first century historians focused on the reality of the power of these disasters, which must not be denied. Adamant about this perspective, Ted Steinberg, while focusing on the political ideologies of natural disasters, he argues how America has been changed by natural disasters, and that humanity "needs a passionate, critical engagement with the past to counter the denial and apathy that informs so many of the response to natural disasters in contemporary America²³²". Starting with natural disasters in the nineteenth century onward, Steinberg argues that Americans have had no idea how to react to natural

²²⁹ Barry *Rising Tide: The Mississippi Flood of 1927 and how it changed America* 350

²³⁰ Barry *Rising Tide: The Mississippi Flood of 1927 and how it changed America* 366

²³¹ Barry *Rising Tide: The Mississippi Flood of 1927 and how it changed America* 371

²³² Steinberg *Acts of God: The Unnatural History of Natural Disaster in America* xiv

disasters, that Americans insist on presenting the natural world as a chaotic place that attacks only poor people and people of color²³³.

To Steinberg, the human condition has been greatly upset by natural disasters within this time period. However, American ideas of natural disasters have viewed hurricanes and earthquakes as an imaginary concept, with policymakers using economic gain and denial of disasters power, to ultimately change American psyche to believe that there was still prosperity in the nation²³⁴. Further, in the wake of other disasters like the Labor Day Hurricane in 1935, what remained was a progrowth consensus for the country, despite Floridians placing blame on the American government for poorly reacting to the hurricane's fallout²³⁵.

Natural disasters in the post World War II period, on the other hand, are of importance to Steinberg, because of how Americans attempted to maintain economic growth through better knowledge of changing weather patterns. Steinberg elucidates that, despite the growth and modernization of the National Weather Service (NWS) from the 1980s onward, Americans insisted that the technology from the NWS does not need to be reliant on humanity to monitor the data²³⁶. In the end, Steinberg concludes that nature can be useful for corporate America's war against the poor, particularly with regard to *personal* financial gain, that the needs of the individual are outweighing the present issues of disaster's power against the human condition, against the clear and imminent

²³³ Steinberg *Acts of God: The Unnatural History of Natural Disaster in America* xxii

²³⁴ Steinberg *Acts of God: The Unnatural History of Natural Disaster in America* 38

²³⁵ Steinberg *Acts of God: The Unnatural History of Natural Disaster in America* 64

²³⁶ Steinberg *Acts of God: The Unnatural History of Natural Disaster in America* 172

danger presented by specific groups of people that can not be fortunate enough to improve their condition as others²³⁷.

Following the influence of Ted Steinberg, historians during the twenty-first century like Thomas Neil Knowles investigated the discourse of the 1935 Labor Day Hurricane, the first recorded Category 5 hurricane in America. Where Steinberg emphasized America's need for economic gain instead of the reality of nature's power to the human condition, Knowles analyzes the reality of Steinberg's argumentative perspective. What made the hurricane prominent was that it touched down at a time where technologies on weather that Americans use today were nonexistent, rendered virtually invisible until it landed in the Florida Keys²³⁸. In the 1930s, Knowles recognizes that Florida did create weather-watching technologies, as well as trained officials to bring an overall modernizing effort to meteorology for the country²³⁹.

Despite the efforts to understand the changes in weather patterns, the discourse of events with the hurricane, as well as the manpower used for hurricane evacuation, the officials in the weather control centers in Florida did not realize that the hurricane changed trajectory before any form of defense could be drummed up²⁴⁰. To Knowles, when the hurricane made landfall, the evacuation was frenetic, made so by the destructive power that the hurricane created against naturally formed sediment, coral reefs and channels of water in the Keys²⁴¹. While Knowles discusses the destructive force of the hurricane, along with defending and evacuating the Keys, he also emphasizes the

²³⁷ Steinberg *Acts of God: The Unnatural History of Natural Disaster in America* 210

²³⁸ Thomas Neil Knowles *Category 5: The 1935 Labor Day Hurricane* Gainesville: University Press of Florida 2009 3

²³⁹ Knowles *Category 5: The 1935 Labor Day Hurricane* 17

²⁴⁰ Knowles *Category 5: The 1935 Labor Day Hurricane* 122

²⁴¹ Knowles *Category 5: The 1935 Labor Day Hurricane* 169

discourse of humanity's ability to survive the hurricane. Families like the Russells who saw their home be decimated by the storm, were also trying to navigate through what Knowles describes conditions as "pitch-black, the noise of the wind is deafening, and the driven rain hits it feels like a sandblaster"²⁴².

While the discourse of the hurricane was drastic, Knowles attentively focuses on the fallout of the hurricane. Where Steinberg focuses on the fallout as a result of fundamental political ineptitude, Knowles focuses on the human experience. The population of the Keys was effectively displaced, examples of which include removing debris, rounding up survivors, but also being able to survive off minimally salvaged food, clothes and water²⁴³. Further, what subsequently followed was a barrage of outcry for Washington to blame people, mostly the Weather Bureau's inadequate information on the hurricane²⁴⁴. In the end, while the human condition was pushed beyond a limit for the times, the environmental historian has ultimately presented natural disasters within the confines of the dichotomy of the human condition against nature, but what makes these disasters powerful is how disasters have been viewed by humanity as "normal" processes of nature. However, while twenty-first century historians like Steinberg and Knowles discuss the greater power that the human condition has created, what comes next for environmental history are the factors that drive nature to unfold more destruction.

Applying Posthumanity to Natural Disasters

To bring a posthuman discussion of disasters into the purview of the environmental historian, we must study disasters that have affected the human condition

²⁴² Knowles *Category 5: The 1935 Labor Day Hurricane* 190

²⁴³ Knowles *Category 5: The 1935 Labor Day Hurricane* 250

²⁴⁴ Knowles *Category 5: The 1935 Labor Day Hurricane* 298

of the last twenty years. It is important to analyze within the time period of globalization, which I isolate from the 1990s into the present day. Globalization has made the largest influence to allow natural disasters their increased frequency and destruction, and historians need to understand disasters through resource management, both environmental and natural, as well as how past and contemporary knowledge of the natural world has produced the actions of past and contemporary institutions towards the natural world²⁴⁵.

Within the last twenty years, what the historian can study is the discourse of natural disasters such as earthquakes. In the Bay of Bengal, in order to understand the effect of these earthquakes, attention must be given to the management of earthquakes by humanity has to use geological and hazard data from past earthquakes²⁴⁶. Further, what is most striking about the earthquakes of this region must be discussion of the correlation between increased industrial involvement in South and Southeast Asia, and the changes in seismic destruction, which have increased in the globalization period²⁴⁷. Other countries like Guatemala, on the other hand, are uniquely geographically positioned to have a high amount of tropical depressions and hurricanes²⁴⁸. In Guatemala, the rainfall events in the country provide extreme runoff that lead to severe flooding issues in the process²⁴⁹. However, because of globalization, the historian can argue that the soil

²⁴⁵ Andrea Westermann and Christian Rhor “ Climate and Beyond. The Production of Knowledge about the Earth as a Signpost of Social Change: An Introduction” *Historical Social Research/ Historische Sozialforschung* Vol. 40, No 2 (152) Special Social Change (2015) 16

²⁴⁶ Edris Alam, and Dale Dominey-Howes “A Catalogue of Earthquakes between 810BC and 2012 for the Bay of Bengal” *Natural Hazards* 81 (2016) 2033

²⁴⁷ Alam “A Catalogue of Earthquakes between 810BC and 2012 for the Bay of Bengal” 2098

²⁴⁸ Gilles Brocard, et al “The Recording of Floods and Earthquakes in Lake Chichoj, Guatemala during the twentieth century” *J Paleolimnol* (2014) 156

²⁴⁹ Brocard “The Recording of Floods and Earthquakes in Lake Chichoj, Guatemala during the twentieth century” 159

sediment had begun to waste due to earthquakes, created by mining and other forms of industry in the country²⁵⁰.

For countries like China, earthquakes remain an important concept, where the anthropocene has made a large amount of impact in an already fragile region of the natural world. In East China, human settlement on the Yishu Fault Zone has rendered populations in the region susceptible to ruptures²⁵¹. Since earthquakes act as a natural occurrence, the fault lines are where human settlement is at its most vulnerable when fault lines and offset landforms are at its highest²⁵². From observing earthquakes, the historian is able to justify a posthuman analysis when analyzing the events of the Fukushima nuclear power plant accident in Japan, where huge amounts of radiation were released into the atmosphere²⁵³. In fact, what made it so striking of an issue was because of the amount of emissions the earthquake created for the region²⁵⁴. The monitoring of radiation remains the legacy of this earthquake, and its power to the human condition is one aspect of natural disasters that can be analyzed.

While studying the conditions that allow for one disaster to take is one method of analysis, the historian can also study the geographical variants that allow for earthquakes take hold. To Joanna Dyl, coastal cities are one area under great effect by natural disasters. Studying the effects of natural disasters in places like San Francisco show how lack of ecological knowledge is dangerous for coastal cities, especially when San

²⁵⁰ Brocard “The Recording of Floods and Earthquakes in Lake Chichoj, Guatemala during the twentieth century” 165

²⁵¹ Wenliang Jiang, et al. “Characteristic Slip of Strong Earthquakes Along Yishu Fault Zone in East China Evidenced by Offset Landforms” *American Geophysical Union* (2017) 1947

²⁵² Jiang “Characteristic Slip of Strong Earthquakes Along Yishu Fault Zone in East China Evidenced by Offset Landforms” 1954

²⁵³ Katsumi Hirose “2011 Fukushima Dai-ichi nuclear power plant accident: summary of regional radioactive deposition monitoring results” *Journal of Environmental Radioactivity* 111 (2012) 13

²⁵⁴ Hirose “2011 Fukushima Dai-ichi nuclear power plant accident: summary of regional radioactive deposition monitoring results” 14

Francisco is situated between two tectonic plates that are in a constant state of change²⁵⁵. Further, due to the Earthquake and Fire of 1906, knowledge increased of the San Andreas Fault where the city was built, especially with regard to the power that both aspects of the disaster: 514 city blocks and over 28,000 buildings²⁵⁶. In 1989, the Loma Prieta Earthquake, Dyl argues that it reflected the same level of destruction in 1906, but that scientists were unmoved by where the earthquake hit the hardest, because these group knew where the earthquake would strike, yet did not adequately prepare for it²⁵⁷.

In accompaniment with studying earthquakes, water based natural disasters like hurricanes and floods can also be researched as a posthuman concept of environmental change. In fact, these two aspects are of importance the historian must connect between globalization and the natural world. In the Caribbean, this region suffers the most from hurricanes, but historians need to track the climate conditions in order to understand the greater risk that hurricanes present for humanity, assessing wind strengths and storms that follow hurricanes to understand which regions will be affected the worst²⁵⁸. Further, the historian must also assess which Caribbean regions have the heaviest amount of human activity²⁵⁹. With Hurricane Katrina, focusing on urban history allows the historian to understand the power of the disaster, particularly how urbanization has changed the human condition, namely the idea of how a hurricane can displace populations²⁶⁰. The

²⁵⁵ Joanna Dyl “Lessons from history: Coastal Cities and Natural Disaster” *Management of Environmental Quality: An International Journal*, Vol. 20 Issue 4, 2009 462

²⁵⁶ Dyl “Lessons from history: Coastal Cities and Natural Disaster” 466

²⁵⁷ Dyl “Lessons from history: Coastal Cities and Natural Disaster” 469-470

²⁵⁸ Luisito Bertinelli “Hurricane Damage Risk Assessment in the Caribbean: An Analysis using Synthetic Hurricane Events and Nightlight Imagery” *Ecological Economics* 124 (2016) 136

²⁵⁹ Bertinelli “Hurricane Damage Risk Assessment in the Caribbean: An Analysis using Synthetic Hurricane Events and Nightlight Imagery” 137

²⁶⁰ Joe W. Trotter and Johanna Fernandez “Hurricane Katrina: Urban History from the Eye of the Storm” *Journal of Urban History* Volume 35, Number 5 (July 2009) 610

issue with Katrina was that the levees were destroyed by the hurricane, following a trend of an earlier hurricane in 1927²⁶¹.

With floods, on the other hand, the historian must recognize the conditions humanity has created to promote their frequency. Floods reflect a changing climate, not necessarily strictly within the discourse of hurricanes, but their presence is the result of humanity's efforts to dam or buttress them²⁶². Further, their influence on the human condition also reflects the amount of education humanity receives on the subject: hazard assessment, risk management, mitigation and preparedness²⁶³. In the end, the historian can better understand the greater influence of disasters as a meteorological occurrence, but that humanity must understand their destructive influence on the human condition²⁶⁴.

Contemporary Examples of Natural Disasters

While the destructive habits of natural disasters is self-evidently by humanity's hand, the assessment of disasters within the last six years should be of particular importance for the environmental historian. The last six years, between 2013 and now, have been host to some of, in humanity's lifetime, the most destructive natural disasters ever experienced. The degree of their destruction is reflected in works, work of which emphasize the discourse of the disasters and the losses of life, but also what humanity has done to rebuild, to improve their condition, as well as memories of the destruction in the minds of humanity.

²⁶¹ Trotter "Hurricane Katrina: Urban History from the Eye of the Storm" 611

²⁶² Neil MacDonald "On Epigraphic Records: A Valuable Resource in Reassessing Flood Risk and Long Term Climate Variability" *Environmental History*, Vol. 12, No. 1 (Jan., 2007) 138

²⁶³ Victor Stefanescu "Decision Support System Based on the History of Flood and Flash Flood events in Romania" *Natural Hazards* 65 (2013) 2332

²⁶⁴ Stefanescu "Decision Support System Based on the History of Flood and Flash Flood events in Romania" 2333

Take, for instance, Hurricane Sandy. Being from Philadelphia, Pennsylvania, the day it touched down on the Eastern Seaboard, what I remembered from it was a large pink cloud travelling over New Jersey, but nothing in Philadelphia. The next day, the news highlighted the destructive force, how far the coast got pushed and the political discourse by the states of New Jersey and New York to address the issue. What made Sandy such a devastating reflection of globalization is how the hurricane was able to grow to the force it eventually became known for. What the historian must do is focus on the scientific works that showcase the greater influence of these contemporary natural disasters on the human condition.

In their work, Charles H. Greene, Jennifer A. Francis and Bruce C. Monger emphasized how Sandy was able to grow due to warm ocean temperatures and a “southward dip in the jet stream over the Mississippi Valley that ushered in an invasion of cold Arctic air”²⁶⁵. The conclusive evidence made in the study was that the loss of sea-ice contributed to the strength of the hurricane, as well as stacked greenhouse gases²⁶⁶. In sum, this led to a three-step process of “(1) larger amplitude meanders in the jet stream, (2) more frequent invasions of Arctic air masses into the middle latitudes, and (3) more frequent blocking of the kind that steered Sandy to the West”²⁶⁷.

Douglas Reed, Roger Stephenson and Steven Hyland, on the other hand, focused on the responses, and their shortcomings of those responses, that water treatment plants in New York and New Jersey took to address the issues with Hurricane Sandy. In their work, which centered in on the Rockaway Water Treatment Plant in New York, what the

²⁶⁵ Charles H. Greene, Jennifer A. Francis, and Bruce C. Monger “Superstorm Sandy: A Series of Unfortunate Events?” *Oceanography*, Vol. 26, No. 1, Special Issue on Upper Ocean Processes: Peter Niiler’s Contributions and Inspirations (March 2013) 8

²⁶⁶ Ibid 9

²⁶⁷ Ibid 9

scientists determined is that there needs to be more interstate communication, but also that “ greater connectivity is necessary with partners in local and state EOCs to make the linkage for water sector requests that may exceed WARN/Intrastate capabilities”²⁶⁸. Further, there also needs to be more attention on water infrastructure, particularly presented issues of assessing damage loss by flooding²⁶⁹. Loss of power, however, was the single greatest threat during the flooding by Sandy. In the study, the prioritization of generators and other utilities for power caused massive displacement for New York communities, but there also needs to both prepare better local, state, and federal damage assessment, as well as situational awareness²⁷⁰.

To Adam Parris, the reality of Hurricane Sandy was the disaster’s ability to influence humanity to improve their condition. Because the disaster affected the Eastern Coast of the United States to such a degree, Parris argues that improving the human condition needs to be established by taking time to “reflect on how best to rebuild developed areas before the next crisis occurs, instead of committing to a disaster-by-disaster approach to rebuilding”²⁷¹. Further, Parris also emphasizes the limitations that disaster relief presents for the human condition, specifically that relief groups like FEMA only protect present lost assets, not future lost assets²⁷². In the process, American post-disaster development programs needs to take into account the issues of coast flooding and rising sea level, which follow with hurricanes²⁷³. In accompaniment with federal programs, Parris also argues that humanity’s efforts at urbanization need to consider the

²⁶⁸ Douglas Reed, Roger Stephenson and Steven Hyland “Recovering from Hurricane Sandy: Coordination, Planning Bolster Storm Response” *Opflow*, Vol. 39, No. 5 (May 2013) 12

²⁶⁹ Ibid 12

²⁷⁰ Ibid 13

²⁷¹ Adam Parris “How Hurricane Sandy Tamed the Bureaucracy” *Issues in Science and Technology*, Vol. 30, No. 4 (Summer 2014) 83

²⁷² Ibid 84

²⁷³ Ibid 86

idea of an impending flood with their building plans, which was ultimately addressed by the creation of sea-level rise tools and better management of urban infrastructure²⁷⁴.

What Parris concludes is that addressing the issues of hurricanes must be a conscious effort. Changes to infrastructure are not enough, especially when efforts must be made to eliminate the *long-term* effects of hurricanes, namely through the establishment of flood procedures to protect urban areas, as well as institute policies that reflect the “practical realities we face in an increasingly populated and stressed environment”²⁷⁵. Parris also proposes that research into hurricanes needs to be directed at direct responsiveness to the hurricane, that when it touches down, there is already an initial plan of attack, and relief funds in reserve²⁷⁶.

Following the discourse of humanity’s improvement presented by Parris, and the scope of destruction launched by Hurricane Sandy, Miriam Greenberg discusses how humanity was *unable* to improve their condition in the wake of Hurricane Sandy, following what she argues to be the same level of response as with other major events such as 9/11 and Hurricane Katrina²⁷⁷. For Greenberg, addressing Hurricane Sandy’s fallout not only had failed early engagement when the storm touched down, as well as lack of resources to address the long-term effects of the disaster²⁷⁸. However, what is most striking is how much consideration New York City elites on Wall Street gave little concern for disaster relief, particularly through the defunding of disaster aid programs like FEMA, CDBG, and PAB²⁷⁹. In the process, there was also a distinct parallel between

²⁷⁴ Ibid 87

²⁷⁵ Ibid 89

²⁷⁶ Ibid 90

²⁷⁷ Miriam Greenberg “Inside the Disaster: Hurricane Sandy and Post-Crisis Redevelopment” *Labor Forum*, Vol. 23, No. 1 (Winter 2014) 47

²⁷⁸ Ibid 48

²⁷⁹ Ibid 48

Hurricane Sandy and Hurricane Katrina's uneven redevelopment: "Increased wealth, population, and infrastructure for affluent neighborhoods like New York's Financial District and New Orleans' Lakeview, alongside decline, gentrification, and/or displacement in low-income neighborhoods like the Lower East Side, Chinatown, and the Lower 9th Ward"²⁸⁰.

In fact, the relationship that is drawn between Katrina and Sandy is mostly due to the economic displacement that existed in both New York and New Orleans, but Sandy was exceptional because humanity still improved their condition after 9/11. Apartment complexes and high-rise buildings were still erected in New York's major financial districts, but the issues that made profound were because FEMA was unable to aid the areas affected by mold contamination and structural damage, which lasted for weeks into months²⁸¹. In the end, the issues created by Sandy reflected humanity's inability to effectively prepare for its arrival.

While Hurricane Sandy reflected the realities of human economic displacement, another contemporary example can be the role of tornadoes, whose influence on the human condition can be traced as early as 1990. In Peter Felkner's case study on Wisconsin tornadoes, citizens were familiar with the presence of tornadoes, but Felkner is concerned with the discourse, namely how tornadoes are able to form when "The constant ebb and flow of tropical and polar air masses across the temperate latitudes keeps the atmosphere in a state of continual equilibrium"²⁸².

²⁸⁰ Ibid 48

²⁸¹ Ibid 49

²⁸² Peter S. Felkner "Tornadoes in Wisconsin: Two Case Histories" *Wisconsin Magazine of History*, Vol. 73, No. 4 (Summer, 1990) 244

Felknor focuses on two cases of tornadoes influence on the human condition. The first took place in the 1930s, by focusing on the human experience of events leading up to the touchdown of the tornado, Felknor emphasizes the changes in weather pattern to allow the tornado to rip through Wisconsin, examples of which include hail, dark clouds, as well as changes in wind shear that exceeded 100 miles per hour²⁸³. The second example Felknor discusses was on April 11th 1965, focusing on the experiences of members of the Monroe Police Department, Felknor focuses on the increased weather reports that were concentrated in the area²⁸⁴. Further, the discourse of the human experience Felknor discusses in this example also shows how destructive the tornado affected the region, but for Felknor, in accompaniment with destroyed cars and numerous amount of debris, the destructive force of the tornado was humanity's perception of the reality that the disaster brought to the region²⁸⁵.

In a study lead by B.E. Aguirre, the committee argues that there is a present human element to the power of tornadoes. The study analyzed the multifaceted dimensions of the human condition, highlighting the most prominent areas of environmental change where any idea of human influence was apparent, both urban and rural. From this, the members of the committee argued that both urban and rural human spaces affect the conditions that permit tornadoes to interact on natural and human space²⁸⁶.

Studying data taken of tornadoes across the United States between the 1950s and the present day, what the committee argued is that there are three different categories

²⁸³ Ibid 247

²⁸⁴ Ibid 253

²⁸⁵ Ibid 255

²⁸⁶ B.E. Aguirre, et al "The Human Ecology of Tornadoes" *Demography*, Vol. 30, No. 4 (Nov., 1993) 625

which can allow tornadoes to interact: “1) Metropolitan counties with central cities; 2) Other urban counties, that is, metropolitan counties without central cities and nonmetropolitan counties in which more than 50% of their residents live in urban areas (places having 2,500 or more inhabitants); and 3) rural counties, or nonmetropolitan counties in which fewer than 50% of the residents live in urban areas”²⁸⁷. From this geographical classification, the study was also able to determine what can be argued as the causal factors for a tornado, presenting the probability factors for a tornado, as well as the direct correlations and human behavior²⁸⁸. In the process, the committee also argues that humanity needs to have more consciousness about the realities of human environmental change, that the destructive force of tornadoes are affected by humanity empirical decisions of self improvement ²⁸⁹.

While tornadoes tend to have a geographic distribution, as created by the human condition, to understand their impact, discussion must also be directed at the urban environments, environments of which allow tornadoes to greatly interact. In their study, Joshua Wurman, Curtis Alexander, Paul Robinson and Yvette Richardson analyze how tornadoes are able to exact larger impacts on urban space, especially since that this space allows for long-track tornadoes to interact²⁹⁰. Further, the extent of a tornado’s destruction in an urban region comes from the deaths and structural damage to cities, which, in the case of urban centers like Chicago, would take an excess of over 20 billion dollars to repair and created a projected 13,000-45,000 people²⁹¹. However, the larger

²⁸⁷ Ibid 627

²⁸⁸ Ibid 630

²⁸⁹ Ibid 631

²⁹⁰ Joshua Wurman, Curtis Alexander, Paul Robinson and Yvette Robinson “Low-Winds in Tornadoes and Potential Catastrophic Tornado Impacts in Urban Areas” *Bulletin of the American Meteorological Society*, Vol. 88, No. 1 (January 2007) 31

²⁹¹ Ibid 42

issue present with tornadoes in urban space is the concept of permanent structural damage, which for other urban cities like New York City, which is an older city, making it more vulnerable to permanent structural damage²⁹². Ultimately, the greatest impact of tornadoes will be concentrated in urban centers, but humanity needs to take better consideration to the destructive force of these tornadoes, particularly with management and realize that “the eventuality of intense tornadoes crossing into urban areas cannot be avoided”²⁹³.

While tornadoes provide drastic impact to the human condition, a study conducted by Robert Lynch, Margaret Phillips, and Paige Jones, elucidated how tornadoes can affect natural space like ponds. Because tornadoes provide extremely fast winds, they bring up with them all sorts of debris that can expose ponds to contamination, examples of which include children’s toys, car parts, etc.²⁹⁴ In the study, the group identified the changes in oxygen from five different pond sites, namely through the amount of thermal stratification that existed in each of the ponds²⁹⁵. What was concluded was that the debris thrown into the ponds by the tornadoes forced oxygen to be released from the ponds, that ultimately “any oxygen diffusing into the water from the atmosphere or being produced by photosynthesis was rapidly being consumed by oxygen-demanding substances”²⁹⁶. In the end, the conditions of the ponds became dictated by human debris, but the power of a tornado is what the environmental historian should be concerned with the conditions that have allowed the disaster to demonstrate this degree of its destruction.

²⁹² Ibid 43

²⁹³ Ibid 44

²⁹⁴ Robert A. Lynch, Margaret L. Phillips and Paige Jones “Adverse Impact on Ponds of Organic Debris Deposited by Tornadoes”, *Journal of Environmental Health*, Vol. 63, No. 5 (December 2000) 11

²⁹⁵ Ibid 11

²⁹⁶ Ibid 12

While tornadoes themselves present self-evident danger to the human condition, the environmental historian must also determine if newer natural space has been conditioned by humanity to allow tornadoes to interact. In a study conducted by P. Grady Dixon, Andrew E. Mercer, Jinmu Choi and Jared S. Allen, analysis was directed at the potential for an extension of America's Tornado Alley, which is the classification of tornado activity from the Rocky to the Appalachian Mountains²⁹⁷. To this committee, there is new regional distribution for tornadoes, existent in an area of the American southeast as Dixie Alley, which has been reported to contain increased tornado activity in recent years²⁹⁸.

To determine if this distribution of tornadoes in Dixie Alley is valid, the committee focused on spatial data collected on tornado activity between 1950 and 2007²⁹⁹, as well as density maps to determine the geographic distribution of the tornadoes over the years³⁰⁰. What was concluded was that the heaviest concentration of tornadoes, within the last twenty years, has been fixated in Mississippi, Georgia, and Florida³⁰¹. What is most striking about the data is that the committee also proposed a hypothetical scenario that Dixie Alley is actually becoming its own zone of tornado activity, because of the growth in tornado density in the region³⁰². In fact, the committee agreed in the validity of Dixie Alley's legitimate independence from being an extension of Tornado Alley, because of the degree of tornado seasons that are prevalent in the Dixie Alley

²⁹⁷ P. Grady Dixon, Andrew E. Mercer, Jinmu Choi and Jared S. Allen "Tornado Risk Analysis: Is Dixie Alley an Extension of Tornado Alley?" *Bulletin of the American Meteorological Society*, Vol. 92, No. 4 (April 2011) 433

²⁹⁸ Ibid 433

²⁹⁹ Ibid 434

³⁰⁰ Ibid 436

³⁰¹ Ibid 437

³⁰² Ibid 439

region, as well as the notion that tornado risk has also legitimized Dixie Alley's independence³⁰³.

However, while the environmental historian can understand the gravity of tornado's impact on the human condition in America, discussion must also be addressed at the power of tornadoes in Europe. In Jurgen Greiser and Francesca Terenzi's study, tornadoes are prevalent in Europe, but the frequency of their existence is not as commonplace as in America³⁰⁴. However, Greiser and Terenzi are both adamant that the growth of urbanization in Europe can lead to a risk of tornadoes on the continent³⁰⁵. In their work, Greiser and Terenzi emphasize the losses created by tornadoes in Europe, as well as how tornadoes are able to interact with European urban areas. Like in America, European urban areas are susceptible to tornadoes, but the losses varied across the continent, to which Greiser and Terenzi emphasize that countries like the Netherlands is more prone to tornadoes which originally start as waterspouts³⁰⁶. However, Greiser and Terenzi also elucidate that calculating the data for tornadoes is also challenging because the continent is more prone to rare tornadoes that are the most destructive, rather than frequent and weak tornadoes³⁰⁷.

Humanity's Responses to Natural Disasters

While this was discussed early on in the chapter, the issue remains that while humanity will always improve their condition of sustainability, what should be of interest

³⁰³ Ibid 440

³⁰⁴ Jurgen Greiser and Francesca Terenzi "Modeling Financial Losses Resulting from Tornadoes in European Countries" *Weather, Climate, and Society*, Vol. 8, No. 4 (October 2016) 313

³⁰⁵ Ibid 313

³⁰⁶ Ibid 320

³⁰⁷ Ibid 322

for the environmental historian is the minutia of humanity's improvements against natural disasters. From studying this, the historian is able to understand how natural disasters have not only forced humanity to adapt, but also how their improvements are changing the ideas humanity has about the natural world. In the end, these adaptations by humanity, when faced with disasters, has revealed striking habits humanity has taken to improve their conditions of sustainability.

When faced with natural disasters, David Etkin and Ingrid Stefanovic's focus on eco-ethics reveals the vulnerability of both humans and nature³⁰⁸. For Etkin and Stefanovic, humanity can choose the degrees of mitigation between human development and human vulnerability, particularly since contemporary disaster plans have opened up more risk-prone behavior when faced with disasters like floods³⁰⁹. Further, to understand the strengths and weakness of disaster plans, humanity needs to have a more comprehensive understanding of infrastructure, human communication, and nature, in order to better address natural disasters³¹⁰. In the end, Etkin and Stefanovic are hard-pressed that humanity's relationship with the natural world is strained, because of how humanity chooses to "deal with natural hazards by either ignoring them (for example, by building in floodplains) or by transferring risk to future generations by designing vulnerable systems or communities that will eventually suffer a disaster"³¹¹.

In a study conducted by William R. Freudenburg, Robert Gramling, Shirley Laska, and Kai T. Erikson, these scholars emphasize that humanity has also used nature

³⁰⁸ David Etkin and Ingrid Leman Stefanovic "Mitigating Natural Disasters: The role of eco-ethics" *Ekistics*, Vol. 71, No. 427/428/429, The Natural City – Part 2 of 2 (July/August-September/October-November/December 2004) 170

³⁰⁹ Ibid 173

³¹⁰ Ibid 175

³¹¹ Ibid 176

to create conditions to the economic benefit of few, while to the detriment of many³¹². While this group of scholars determines the sociological transformations that have dictated environmental change, what they also elucidate is that humanity's exposures to disasters have been on racial and economic grounds, but that previous studies have dismissed humanity's exposures to disasters as a mostly random occurrence³¹³. However, this is not the case, because disaster plans, in the case of the United States, reflect economic decisions such as creating levees to protect floods, but "spreading the costs, concentrating the benefits and hiding the risks"³¹⁴.

While Freudenburg and his colleagues discussed the sociological and political implications for natural disasters, Myron Gutmann and Vincenzo Field's work on humanity's migration when Hurricane Katrina touched down on the United States. To both Gutmann and Field, the demographic shifts that occurred during Hurricane Katrina's period of occupation in the country, as well as its departure, bear a major effect on the migration patterns of human populations in the regions where Katrina was most prominent³¹⁵. While both scholars discuss other disasters that have occurred in America between the early and late twentieth centuries, examples of which included the Dust Bowl, Hurricane Andrew and the San Francisco Earthquake, their discussion of Katrina reflected the same trend of managed environments that existed with other major disasters during this period³¹⁶. However, what separated Katrina from the other disasters was that

³¹² William R. Freudenburg, Robert Gramling, Shirley Laska, and Kai T. Erickson "Organizing Hazards, Engineering Disasters? Improving the Recognition of Political-Economic Factors in the Creation of Disasters" *Social Forces*, Vol. 87, No. 2 (Dec., 2008) 1015

³¹³ Ibid 1017

³¹⁴ Ibid 1022

³¹⁵ Myron P. Gutmann, and Vincenzo Field "Katrina in Historical Context: Environment and Migration in the U.S." *Population and Environment*, Vol. 31, No. 1/3, Special Issue on Demographic Dynamics and Natural Disasters: Learning from Katrina and Rita (January 2010) 5

³¹⁶ Ibid 15

the hurricane interacted with natural and human space created by an excessive amount of energy, and that managed environments by humanity further speeds their migration from areas more susceptible to disasters³¹⁷.

Conclusion: The Reality of Unfolded Destruction

From analyzing both historical and scientific works, natural disasters are a vital posthuman subject for historians to consider. As humanity conditions the natural world in their image, this causes change to the climate, which subsequently allows for the destructive influence of natural disasters to take hold. Their frequency in the last twenty years reflects the conscious decisions of humanity. Humanity builds skyscrapers and suburban developments, proclaiming safety and a brave new world, but these structures are subject to earthquakes and floods, and yet humanity still chooses to dismiss the power of nature, and that natural disasters are still a commonplace element of environmental change that still reflects the decisions of humanity. In fact, the historian must now take the scientific information aforementioned to elucidate the greater conditions that natural disasters bring, reflect their power over humanity, and accept that society must accept their greater influence. Otherwise, natural disasters will continue to be a force of nature that will be treated as a footnote to economic gain, leaving out the greater human displacement that occurs as a result.

³¹⁷ Ibid 15

Conclusion: Dreams and Nightmares

Humanity takes. Humanity burns. Destroys. Changes. The conditions of humanity's ability to act on their impulsive ideas, reflecting a world that humanity proclaims as ideal, and that other human populations should follow suit and work to create a better world that has no future for nature. Yet, in the midst of all this, humanity prepares elaborate and wonderful designs of what are ideal worlds, examples of which include sweeping green landscapes where humanity survives and scenes of wonderful homes and shining suns beam down on a progressive paradise.

The reality is that it is not this. This is a fictitious imaginative idea of what the world *could* be, but has not been able to come to pass. Our natural world, in 2019, has been so drastically changed that any discussion of environmental change has resulted in any one of the following topics: the extinction of animal and insect species, the tons of waste that are found in oceans, areas of natural space that have been decimated to cater to humanity's survival. What is also surprising is the regard for it in political atmospheres, that while there are many people who call for environmental protection, humanity still increases its interactions on natural space. Humanity insists on putting the profits of their own wealth, over the natural spaces that are decimated by the human ideas of survival. I can conclude that humanity still decides to put themselves over the needs of the natural world, even in some cases, over other human populations, content that nature can just adapt around humanity's interactions with natural space. The issue with this is that because humanity still interacts with natural space, to improve its ever-growing global

population, humanity continues its perpetual cycle of improving its condition of sustainability, with little to no regard for the natural world.

Because of this self-centered approach by humanity, to improve their condition at the expense of nature, nature's role in environmental change is thereby granted its own agency. Nature's instinctive approach to environmental change, acting upon the conditions of the natural world to interact, own agency towards environmental change. Whenever this posthuman agenda of environmental change comes to mind, the average human, and certainly specific scientific communities can instantly say this is study without human influence, no anthropogenic influence. However, the historian can also say that this posthuman agenda of environmental change can instantly proclaim this concept as convoluted, that we need the human element to understand the course of historical events and narratives, that the role of humanity must be center stage to move our understanding of environmental change.

I am critical of this commentary, especially by historians. Because if humanity will always build buildings, always will create a new sport stadium, will always invent a new form of technology to help our condition of sustainability, why then is nature this passive evolutionary subject? Why does the environmental historian leave the work of changes to the natural world at the discretion of scientists, when environmental history studies the discourse of environmental change? The environmental historian is fully capable of studying environmental change within the context of nature's discourse, with the intent to integrate works of our colleagues in the scientific community, including how humanity has provided nature with its own agency.

Ultimately, this is what my work is about: Agency. In fact, agency is still a perplexing, and debatable topic, by environmental historians, especially when certain environmental historians focus on the direct agents that interact with natural space, I.E. the building of golf courses, and the shaping of natural parks, while other historians that focus on colonization emphasize how natural space has been shook up by colonizing impositions of human improvement and the drastic forces of nature that responded to these human ideas. But, I would say that the discussion of agency will always go in a circle, unless historians choose to accept self-evident truths of environmental change, particularly that humanity's dreams of a bright future can become reality, but these are dreams that are made at nature's detriment.

However, because of the dreams of humanity, while nature is destroyed, nature is also granted its own agency towards environmental change. I discussed how nature responds to the conditions humanity has created, in both natural and human spaces, and that nature is able to impose its own direct changes, but this is because I also propose a methodological change for historians. In order for environmental history to move forward, the environmental historian needs to take humanity down off the pedestal. This perspective does still call for humanity, but it is with relationship to what humanity has done. How does humanity create the conditions for nature to respond?

To be frank, we do not need humanity's fate to be the sole responsibility of the historian. But, in order to move beyond humanity, to emphasize nature, the historian must already understand that humanity's changes to natural space, to suit its improvement, will continue to perpetuate. Humanity will always improve, but nature will always respond against the human condition, in some form or another. Historians need to concern

themselves with the fate of nature, what will make this perspective from our colleagues in the scientific community will be that historians will study the discourse of nature, the same way they study the discourse of the human condition, historians will use the works of climatologists and ecologists to understand how nature has evolved as humanity evolves. However, in their discussions of nature, historians will also emphasize nature first, but with the intent to also discuss how humanity's conditioning has put a damper on nature's ability to evolve, that the human condition has forced nature to speed up its evolution exponentially, subsequently forcing to react in such destructive force, that climatologists and meteorologists grow increasingly concerned with issues of global warming and deforestation.

Climate

With each of the examples I have provided, I have showcased the multifaceted perspectives of our natural world, and the degree of influence that humanity has exacted over natural space. I also emphasize that some areas that some of the natural world are theoretical, while other concepts that I discuss are practical. Of course, the theoretical example, which in this case the concept of climate, does not mean that it is not practical, but rather its influence is based on the gradual changes to the natural world. However, the theoretical component of climate comes from its gradual process of influence, that because climate sets the stage for any eventual natural disasters or infestations that occur.

The practical component of climate comes from the idea of climate itself. It is a manifestation of change in the natural world, as represented through polar cap melting, abnormalities in global, regional, and local temperature changes. Climate also showcases

the changes natural space through the migratory changes of animals, the decay and deprivation of natural space that have been rendered inhospitable for marine, mammalian and arthropod life. Further, climate reveals the extinction of plant and animal species, how after being forced from native spaces of interaction, what was the eventual final legacy of the natural space, be it left to the use of humanity through self-improvement, or used to remove objects to humanity's detriment: Human waste.

However, what I hope from this work is that the historian can use climate to study it within the perspective of a geographical distribution. Because climate change is a self-evident concept across the world, especially in 2019, a future discussion that could be brought to light are the parts that have made climate change so prominent. I would propose that the historian discuss how climate change has greatly increased with globalization, studying how and why critical regions of the world like South and Southeast Asia not only are epicenters for global markets, but also possess natural space there that is the most critical for a stable global climate. Along with critical regions like South and Southeast Asia, I also propose that the historian can also study climate change's effects on urban environments, because while critical regions that constitute the most natural space that is left on the planet are important, the historian also should determine the impact of climate change in urban cities like London, Philadelphia, Moscow, etc. From this, discussion can be driven at how regionally climate change has varied across the planet, because while all improvements to the human condition contribute to climate change, the historian can now be able to understand which cities across the world are the most exposed to climate change. From this discussion, the historian can understand the greater impacts of climate change and the image of nations.

Take the United States of America for example, particularly the state of Mississippi. It is known as the Magnolia State, but because of climate change, magnolias can be at risk. Further, the sense of national pride also goes into the realm of sports, because what happens to hockey in northern American states and Canada, areas where hockey is a staple of communities? The idea of a unique exceptional natural space across the globe is snuffed out due to climate change.

One of the shortcomings from this work I would say comes from my discussion of climate itself. From my research, I focused specifically on how climate can provide the conditions to force nature's direct impact on environmental change, what I never was able to find was direct studies of climate in different regions over time. I have provided the multi-faceted conditions that allow climate to interact with natural and human space, namely how climate forces economic change for human space and drastic ecological changes to natural space, but what I would like to see from either another work, or if I were to do an expansion of this work, I want to see climate change's posthuman influence as a regional discussion. If historians choose to emphasize Nature in their environmental works, focusing on climate change's distribution throughout the world, understand how climate is affecting more than just the extreme corners of the world. Climate is interacting with all parts of natural and human space.

I do reiterate, the historian does not need humanity to be their primary subject of discussion to understand climate's role. This determination by historians to emphasize that humanity will *always* interact with natural space is self-evident. Instead, because nature acts upon instinct, assesses and interacts with the conditions of natural space, why is this impossible to historicize? Why does the historian leave the role of climate change,

and the impact of climate change, to the responsibility of scientists like climatologists and meteorologists?

Infestations

Probably the greatest example of this posthuman analysis comes from infestations. Changes to natural space while may affect climate, but infestations reflect the visible hand of the human condition. Human imposed changes to natural space such as acts of deforestation and pollution are what force infestations to interact with natural and human space. What also forces infestations to interact, particularly with diseases, are the conscious efforts of humanity, that even though disease exists in both natural and human space, humanity still insists on not taking proper protocol to eliminate these diseases, namely withholding vaccinations. From this, the power of diseases perpetuated a never-ending cycle of interaction with deadly diseases, long eradicated, to interact with human space. However, with the studies provided on the distribution of a disease, provided by an insect, the historian must ask what conditions would a disease like Zika be able to thrive? Would the disease begin to favor urban space or retreat to rural space? Does the disease, or even more broadly, any disease, favor a space by the amount of human and animal populations that are prevalent?

Plants and insects, however, provide the historian with the realities of contemporary improvement to the human condition. In the studies provided that focused on migration, the historian must ask how those insects forced off their natural habitat, by humanity, have been able to adapt to newer natural space. The historian should also emphasize how insects change the human psyche, because while humanity interacts with

natural space, insects migrate into these human spaces for the basis of their survival, be it through adaptation by loss of habitat, or adaptation by forage for food or breeding. However, to understand the posthuman analysis of insects, the historian must also emphasize how as insects adapt, they disrupt the human condition. Since humanity continues to improve its condition of sustainability, insects are able to disrupt human space by finding habitats in residential areas, in office buildings, as well as interact with native species of plants. What is most striking is that, in the case of Berks County, Pennsylvania, the infestation of Spotted Lanternflies, a species of insect native to India, Vietnam and China, have interacted with the native tree populations in the region. But the conditions of their origin are yet determined.

In the case of plants, however, this was a concept of infestations that, in my own research, yielded a self-evident process. Humanity imposes plants upon natural and human space, but their abilities to spread and multiply, in the case of weeds, are dependent upon the conditions of natural and human space itself. When compared to diseases and insects, plants are only able to act as an infestation if humanity allows them to interact. What constitutes a plant as an infestation is ultimately decided by humanity, that plant's ability to interact with human and natural space is decided by humanity.

This discussion of plants, and their passive role as an infestation, can draw into question the concept of agency, which the historian could bring back humanity's role of environmental change back into a primary role. Where I would push back against this is that because humanity directly allows plants to infest, not just providing the conditions of natural and human space, but that humanity directly oversees plants, without regard for what *could* happen as a result of these plants, then does plants role as an infestation

become more prevalent. In fact, humanity is ultimately providing the conditions for plants to interact, but while humanity initiates the interaction, the agency then shifts to plants, who are the subjects interacting with both human and natural space, not humanity. The same can also be said for insects and disease, because their agency towards environmental change is, like plants, initiated by humanity, but infestations become their own agent when they act on their own. In the end, humanity provides, or imposes, the conditions of infestations, infestations then subsequently interact as according to the biological responses that are prevalent in these subjects, thereby creating the foregone conclusion that infestations are able to become their own agent of environmental change.

A shortcoming, however, from this concept, came from the lack of regard to the conditions that can allow an infestation to interact. To better understand the role of infestations as their own agent of environmental change, the historian should emphasize the discourse of the human condition. How could an infestation be able to interact, when years of human induced industrialization, consumption, production, and other forms of interaction, provides the conditions? What makes an infestation *want* to interact with a non-native area? And more importantly, to reiterate from my previous question, how does the control of production, not just the discourse of production itself, but rather how much human production, allows infestations to interact? I would say that the means of production should be of great concern for the historian, when discussing infestations, and the legacy of Marxism has allowed the environmental historian to understand the relationship between nature's response and human industry.

Environmental historians can study works such as John Bellamy Foster's analysis of Marxism and ecology to understand the larger role of capitalism. To Foster, by

studying various materialist perspectives, Marx reveal the degrees of freedom that humanity will take, particularly with regard to self-freedom, to understand “how a materialist view of the nature of things provided the essential basis for a conception of human freedom”³¹⁸. In the case of nature, however, Marx focuses on the coevolution between humanity and nature, but that humanity’s dictated interactions with nature resulted in the exclusion of both humanity and nature³¹⁹. To Marx, humanity’s improvements have been to the detriment of natural space, but also that nature has shaped the “True natural history” of humanity³²⁰. However, despite the advancement made by humanity, Marx also revealed the empirical nature of humanity’s improvements, that nature is fragile to human production, and cannot reproduce the same as humanity³²¹. To Marx, humanity has chosen to be alienated from nature, and that capitalism has polarized limitless from limited wealth, while also exploiting natural resources to create an exploited force of social labor³²².

In fact, I would go one step further by saying that needing to research the means of production is what allows infestations role in environmental change to gain ground. Since humanity imposes its own idea of production, served as a means to improve its condition, how does institutions like a factory, or restaurant, or school, provide both the conditions, and the impetus, for an infestation to interact? How then can the experience of these urban areas matter, both similarly and differently, from the rural areas such as farms? What then separates the role of infestations between the amounts of production in

³¹⁸ John Bellamy Foster, *Marx and Ecology: Materialism and Nature* New York: Monthly Review Press, 2000 2

³¹⁹ Ibid 75

³²⁰ Ibid 77

³²¹ Ibid 143

³²² Ibid 174

rural space when compared to urban space? Both areas are high susceptible to infestations in their own respect, but what makes the experience of infestations different is the effect on humanity. Humanity can experience the impact of measles, but the experience out in the English countryside will be different than on the college campus, which has a high probability of infection. Rural areas and urban areas both can see an influx of non-native species of insects, however the experience in rural areas will be different, because those invasive insects can consume crops grown in this area, which will damper improvements to the human condition.

To understand how production has dictated the human condition, Kohei Saito's work on Marx's critiques on production. In Saito's analysis, Marx determines that production loses a sense of human self, because the objects being produced do not hold connections to the worker, losing their subjectivity in the process³²³. Following the same trend with Foster's work, Saito discusses how Marx argues humanity's alienation has been replaced with complete commitment to wage labor and capital growth³²⁴. Further, humanity's continued production aggravates the metabolism of nature, that nature's inability to regrow plants or repopulate animal species, is because of increasing capitalist ideas of technological advancement³²⁵. To drive the posthuman analysis I propose for environmental history forward, studying infestations from a Marxist perspective would aid the environmental historian immensely.

³²³ Kohei Saito *Karl Marx's Ecosocialism: Capital, Nature, and the Unfinished Critique of Political Economy* New York: Monthly Review Press 2017 29

³²⁴ Ibid 49

³²⁵ Ibid 133

Natural Disasters

With natural disasters, this concept of environmental change reflects a theoretical and practical, but more practical than theoretical, reflection of the human condition. I would say that, in a hypothetical situation, if humanity were to eliminate all natural space, and still survive, humanity would still have a hurricane or an earthquake imposing any disruption to the human condition. While that example is an extreme one, that can be given a great deal of discussion about, the reality is that natural disasters will *always* exist. They are, and remain as, natural responses that, in today's society, are more destructive and more frequent, then before. Because climate's natural changes, and its normal functions of change, have been thrown into a state of disarray by humanity, natural disasters reflect the drastic changes that have occurred to climate. What is, in fact, most striking about natural disasters, are the degree of destruction that these disasters have delivered towards the human condition, because humanity's success at globalization, at global markets, at a more connected society, has also reflected its shortcomings. While humanity praises the idea for a better tomorrow, for the local and the world populations to grow with more technology and better conditions of sustainability, humanity has also been poorly equipped to deal with natural disasters.

Within the globalization period of the 1990s, Hurricanes Katrina and Sandy have shown how America's ability to technologically progress forward, were still unable to address the reality of the world it lives in. Ultimately, America has chosen to ignore the harsh reality of nature's power, in favor of capitalist gain, and that parts of America have been abandoned in favor of this economic gain. However, America is not the only region where natural disasters have had an effect on humanity, because the events of Typhoon

Soulik in 2013 not only reflect economic gain of South and Southeast Asia, but also emphasize the fragility of the natural space in this region.

While capitalism has impacted global economies, an even greater issue is not just capitalism's global perspective, but that this economic model has been to the benefit of Western countries. Further, the global markets, that are existent in today's society, use the natural space in the region to further those market interests, but it is the same cycle of disregard for the power of natural disasters. The need for economic prosperity under a capitalist model, I argue, has provided the most conditions to allow natural disasters their own agency towards environmental change. The issue at hand is that humanity's concerns with their survival, when faced with disasters, have little to no idea about the power disasters hold towards the human condition. Natural disasters displace populations, yet humanity's choice to focus on how to live better, instead of replacing previously held ideas about disasters, is the perpetual cycle that exists with the human condition.

A shortcoming that came with discussing natural disasters was the lack of information from non-American works. The heaviest concentration of sources came from America, which averages a grand majority of the natural disasters around the world. However, the historian needs to understand how susceptible major cities like London and Sierra Leone are still just as exposed to natural disasters the same as Louisiana or Newark. In fact, I argue that discussing natural disasters across the world must be a new focus for environmental historians, not just theorizing about the conditions that *could* allow natural disasters to interact with non-American regions, but judging scientific data to determine the trends that have allowed natural disasters to interact. How could the melting of the Caucasus Mountain region produce a natural disaster such as a haboob in

the Middle East? How does the retreat of the Aral Sea provide the conditions for an earthquake in Uzbekistan?

Posthuman or Nonhuman Environmental Change

While I have spent this work discussing the concept of posthuman environmental change, I specifically chose to focus on this because of the conditions that exist within natural and human space. While all the examples provided showcase a nonhuman agent, in this case nature, of environmental change, and direct agent at that, I focus on the posthuman because the decisions of humanity to abandon nature, to favor the ideas of their improvement over the natural world that humanity lives in, are directing this posthuman perspective. Further, the direction of nonhuman environmental change may be a new step in the right direction for environmental history, but the posthuman perspective takes the nonhuman perspective one step further, both placing nature as its own agent, but also emphasizes how nature, given its current condition of interaction with human space and natural space, can be studied without having to concern themselves with the direct role. This lets the historian theorize, and reassess, the agency of humanity towards environmental change.

However, while I first writing this work, at first analysis, the sources I found were directing me towards nonhuman environmental change, especially with contemporary works, when I was discussing the historiography of environmental history. However, while historians like Ted Steinberg and Paul Sutter discussed the power of nature, with regard to environmental change, but I was critical that this still included humanity. While Chakrabarty discussed the anthropocene, I felt that this was the crux that earlier historians

were missing, because of how the anthropocene is, essentially, the analysis of the limitless interactions humans have made with the world. In fact, the direction of historiography has been to emphasize the role of the anthropocene, but the historian will always put the events of humanity first.

What makes studying this posthuman perspective a lucrative approach is that the historian does not need to theorize humanity's agency if they already know the role of humanity towards environmental change. Since humanity will always improve their condition, the historian can now focus on nature, remove nature's status as the other of environmental history, thereby giving nature the agency it deserves. In the process, the historian is able to focus on how environmental change has been dictated by nature.

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