ECOLOGY OUT OF BOUNDS: ENVIRONMENTAL HUMANITIES SCHOLARSHIP FOR
MULTI-SPECIES AND TRANSDISCIPLINARY CONTEXTS

Justin Derry

A DISSERTATION SUBMITTED TO THE FACULTY OF GRADUATE STUDIES IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR
OF PHILOSOPHY

GRADUATE PROGRAM IN HUMANITIES
YORK UNIVERSITY
TORONTO, ONTARIO

Defense Date: January 27, 2017

Abstract

This dissertation argues that the critical, political and ethical resources shaping popular and scholarly forms of Anglo-North American environmentalism lack the theoretical and imaginative tools to address the challenges of the Anthropocene (that is, the notion that the human species, enabled by a globally expansive petro-industrial apparatus, has become a dominant geological force). Unsettling notions of progress, agency, nature and the individual in novel ways, the Anthropocene changes the way humanists understand what it means to be human and what environmentalists have understood nature to be. As a result, I argue that the anthropogenic landscapes of the Anthropocene challenge writers, theorists, storytellers, artists, scientists and activists to open different kinds of intellectual and imaginative space. Therefore, drawing on feminist science and technology studies, multi-species anthropology and posthumanism, this dissertation contributes to the emerging field of the Environmental Humanities by contextualizing forms of environmental mediation responsive to Anthropocene environments.

Making a mess of strict disciplinary and species divisions, my work addresses the way that different kinds of knowledge practice show up in and make a difference in the way bodies and multi-species assemblages materialize and function. Moreover, I distinguish my contribution to environmental thought by avoiding knowledge practices predicated on 'into the wild' narratives and 'return to nature' tropes. Problematically, these kinds of narratives are at risk of advocating masculine imaginaries of control and conquest, and moral superiority complexes about self-sufficiency that delimit boundaries between the natural and the unnatural, the pure from artificial, and thus close off knowledge making work from play, experimentation, wonder and curiosity. More than a question of accurately representing what the Anthropocene is or is not, my research amounts to a pragmatic challenge about how to craft theoretical and textual practices that foster non-anthropocentric, multi-species and transdisciplinary media, publics and futures.

Acknowledgements

The help and support I have received while putting this project together have been immense and humbling. Being given the time, space, support and encouragement to complete this project has been a profound privilege. That many people have given me this (underserved) privilege is a gift and a responsibility I take very seriously. I have been given more than I can give back.

In particular, my sincere gratitude goes to my committee members, Steve Bailey and Markus Reisenleitner, for their thoughtful feedback, productive questions, and for providing intellectually formative environments. I am deeply grateful to my amazing advisor Susan Ingram for being a true model of a Humanities professor, for knowing the right questions to ask, and for pushing my thinking in ways I did not know were possible. I also want to thank the community of inspiring teachers, fellow students, staff and librarians that helped me get through my time at York University. In particular, I am grateful to my Master's supervisor Joan Steigerwald, Prof. John Dwyer, and the elevating friendships I formed attending the meetings of the Humanities Graduate Student Association and the Canadian Comparative Literature Association streams at Congress.

Finally, this project would not have seen completion without the support provided by my family, in particular, my parents (Mary Ellen and Paul), sister (Kendra) and brother (Cameron). Most importantly, my debts of gratitude and respect can never be repaid to Laura, my best friend and inspiration, and our two young daughters, Lola and Emily.

Table of Contents

v

Introduction – Knowledge Making Practices for the Anthropocene

> It matters what stories make worlds, what
> worlds make stories.
> (Haraway "'SF': Science Fiction, Speculative
> Fabulation, String Figures, So Far")

The nonhuman environment first materialized for me as a wild, free space situated outside the suburban neighbourhoods of my youth, and early on became a place of wonder, interest and curiosity. Conflating rugged notions of the wild outdoors with freedom and individuality (both human and nonhuman), the notion that 'real' nature was 'out-there', past the artificial confines of my suburban neighbourhoods, provided a conceptual infrastructure and moral universe that rendered nonhuman environments as authentic, pure places increasingly steamrolled by a corrupt capitalist modernity. This early consciousness of the nonhuman environment was shaped by the politics of environmentalism as acid rain, ozone holes, and genetically modified crops came to populate the Canadian cultural media-scape of the 1990's. The cultures, politics, aesthetics and embodiments specific to a form of environmentalism that opposed the subjugation and appropriation of organic, green space offered a space for my adolescent idealism to inhabit.

From there, I moved into the archives, conceptual machinery and discursive apparatuses contextualizing the Environmental Studies program at the University of Waterloo (UW). Emphasizing social science methods and quantitative models of

analysis that focused on translating environmental problems into policy frameworks, this disciplinary space gave substance to a discursive, affective and political space mapped around questions of sustainable land-use, ecological foot-prints and rationally determined limits to growth. Although I became increasingly detached from the environmental idealism contained in the 'tree-hugging' environmental discourses and imaginaries of my adolescence, I found the discursive and theoretical infrastructures rendering the disciplinary spaces of UW's Environmental Studies program too rational, quantitative and logically clean. In the end, I found neither of these forms of environmental mediation to be a good fit, as neither were built methodologically and conceptually to articulate the kinds of transdisciplinary, critically informed multi-species imaginaries, discourses, aesthetics and embodiments that I later found in the Environmental Humanities.

Recognizing implicitly that stories make worlds and worlds make stories, as I later read in Haraway, I was content with neither the knowledge making nor the world making literacies, narratives, and apparatuses contained within the idealist environmental mediums of my youth or the liberal, policy driven mediums taught at the University of Waterloo. Missing the methodologically reflective, experimentally playful and conceptually rigorous focus of humanities critical theory, I came to realize while doing my graduate work in the Environmental Humanities at York University's Department of Humanities, that the tropes, figures, narratives, imaginaries and thinking-practices contained in late 20th-century environmentalism aiming to save nature and preserve rugged frontier spaces, and the policy driven conservation frameworks formed at UW, limited the scope of environmental

communication, connection and collaboration. Without being able to articulate it then, I wanted to inhabit and contribute to transdisciplinary environmental knowledge infrastructures mediated by forms of communication, connection and collaboration that avoided idealism and materialism, anthropocentrism and nature-centrism, methodological individualism and human exceptionalism – a transdisciplinary environmental knowledge infrastructure of method and theory that was distinct from the environmental mediums and imaginaries of my past.

The Environmental Humanities: Transdisciplinary Forms of Environmental Mediation

Discovering Environmental Humanities scholarship as a graduate student, I found politically and intellectually rich forms of environmental mediation and scholarship that were politically inventive, ecologically imaginative, and historically situated – forms of environmental mediation that pushed environmental thinking in directions that the environmental discourses and knowledge practices I learned in my youth and at UW were not able to go.

Two things distinguish Environmental Humanities scholarship from other forms of environmental and humanistic scholarship. The first is that the knowledge practices of the Environmental Humanities are situated historically, politically and environmentally by the notion that earth history has exited the Holocene and entered a new geological epoch geologists and earth system scientists have recommended be called the Anthropocene; and second, the Environmental Humanities are characterized methodologically and theoretically by transdisciplinary forms of scholarship that works across and through the

3

humanities, social sciences, and natural sciences.[1]

Less a coherent discipline or archive of texts, the Environmental Humanities have emerged as a transdisciplinary intellectual movement contextualized historically by the challenges of responding to the differences that living and dying in the Anthropocene make to forms of communication, connection and collaboration. As such, the situated environmental, political and scientific challenges of the Anthropocene have necessitated the production of collaborative, transdisciplinary environmental knowledge practices as a means of rendering unique and compelling forms of multi-species imaginaries, histories, cultures and publics specific to the Anthropocene.

As I show in detail in Chapter Two, the notion that earth history is now in the Anthropocene is a game-changer. Currently being investigated by the International Union of Geological Sciences to determine its exact place in the Geological Time Scale[2], the Anthropocene is a geological epoch predicated on scientific evidence showing that the human species (enabled by a globally expansive petro-industrial apparatus) has become a geological agent inscribing a permanent industrial signature into the earth's strata (Zalasiewicz "What is the 'Anthropocene'?"). The environmental, scientific and political implications of the Anthropocene interrupt and disrupt a large number of epistemological and ontological presuppositions grounding humanistic and environmental methodologies and archives. Unsettling

---

[1] Ursula Heise makes a similar claim in her State of the Discipline report to the ACLA, "Comparative Literature and the Environmental Humanities" (2014).

[2] The most likely marker distinguishing the beginning of the Anthropocene is 1950 when radioactive elements from nuclear bomb tests were dispersed across the planet. See Carrington "The Anthropocene epoch: Scientists declare dawn of human-influenced age" & Voosen "Atomic bombs and oil addiction herald Earth's new epoch: The Anthropocene".

notions such as 'progress', 'agency', 'nature' and 'the individual' in novel ways, the Anthropocene changes the way humanists understand what it means to be human and what environmentalists have understood nature to be. Moreover, the scope and scale of the ongoing extinction events and anthropogenic climate changes, coupled with the growing human population, consumption patterns and entrenched fossil fuel dependencies distinctive of the Anthropocene, mean that moralist pleas to 'save or care for a holistic, self-balancing wilderness' and rationalist frameworks desiring to sync ecological sustainability with economic growth come off more than ever as both anachronistic and fanciful. The Anthropocene requires new scientific and imaginative, conceptual and aesthetic tools.

The Environmental Humanities, therefore, have emerged not to get at and access the 'reality' of nature, but to address the fact that the Anthropocene requires new grounds for making meaning, new kinds of transdisciplinary discourses, new kinds of multi-species imaginaries, and non-anthropocentric maps that engender livable Anthropocene territories, publics and landscapes. By re-figuring and re-contextualizing many of the discourses and methods found in various literary, cultural, STS, historical, and anthropological contexts and sites, as well as many of the environmental discourses and imaginaries located in environmental studies and eco-critical archives, the Environmental Humanities have emerged as a consequential transdisciplinary knowledge platform situated by and responding to the contaminated and messy environments of the Anthropocene. By working to make connections and conceptual networks spanning the sciences and arts, scholars

and artists who are working in the "shadow of the extinction events"[3] of the Anthropocene have been generating historically distinct forms of environmental discourse that are changing the way that humanists and scientists are engaging with multi-species worlds.

Situated conceptually and environmentally in the Anthropocene, this dissertation demonstrates that work in the Environmental Humanities has been producing knowledge making and relation making practices that have generated environmental imaginaries for Anthropocene contexts that undo traditional forms of environmental mediation predicated on nature/culture dualisms, liberal individualism and human exceptionalism. In this sense, I want to distinguish my contribution to environmental thought by avoiding knowledge practices predicated on 'into the wild' narratives and 'return to nature' tropes. Problematically, these kinds of narratives are at risk of advocating masculine imaginaries of control and conquest, and moral superiority complexes about self-sufficiency that delimit boundaries between the natural and the unnatural, pure from artificial, thus closing off knowledge making work from play, uncertainty, wonder and curiosity. The point of this project is not new representations of nature, the production of a definitive environmental text or the articulation of a coherent referential logic, but the proliferation of a plurality of knowledge practices and methodological techniques that materially, discursively and affectively render ongoing ecological and multi-

---

[3] The notion of working in the shadow of Anthropocene extinction events comes from van Dooren's *Flight Ways,* 2014.

species entanglements that foster non-anthropocentric and transdisciplinary forms of communication, connection and collaboration.

Going beyond environmental mediums rendering nature as a wild frontier, a reverential place to be saved, or a space to be efficiently/productively managed, the environmental frames of reference characterizing the Environmental Humanities approach the more-than-human agencies, planetary histories, and the strange encounters of ecological co-existence in ways that re-do how subjects and objects in multi-species contexts meet and get on together. Re-figuring anthropocentric and human exceptionalist subject and knowledge making positions, I show in this dissertation how the Environmental Humanities are contributing to a broader cultural and intellectual impulse challenging both disciplinary enclosures as well as the privileges accorded to particular kinds of subject positions, embodiments and citation practices - privileges historically accorded to those inhabiting positions marked white, straight and male; privileges that have disproportionately shaped many kinds of knowledge and world making practice. Responding, therefore, to an academic and environmental context characterized by accelerated forms of disciplinary and ecological enclosure, a primary goal of this dissertation is to show that the Environmental Humanities provide resources for politically informed scholarship that contribute to innovative forms of academic and environmental communication, connection and collaboration that avoid (gender/racial/natural) essentialism, human exceptionalism and anthropocentrism.

Working across and through a variety of methodological, theoretical, and conceptual spaces and contexts, an Environmental Humanities focus has been

crafted by work in multi-species anthropology/ethnography,[4] feminist STS and

science studies,[5] Indigenous cosmopolitics,[6] eco-criticism, [7] eco-cinema and eco-

media,[8] material-semiotic actor-network theory,[9] agential realisms,[10] post-

humanisms,[11] new materialisms & material feminisms,[12] the Energy Humanities,[13]

critical animal studies,[14] and waste and discard studies,[15] - transdisciplinary

knowledge practices that have been providing unique resources to cognitively map

and render sensible what it means to live and produce knowledge in contexts that

thwart human exceptionalist pretenses, anthropocentric frameworks, narrowly

---

[4] For example, see Vinciane Despret "Responding Bodies and Partial Affinities in Human–Animal Worlds." *Theory, Culture & Society* 30.7/8 (2013): 51–76; Eduardo Kohn *How Forests Think* (2013); Tim Ingold *Being Alive* (2011); Eben Kirksey *The Multispecies Salon*. (Durham: Duke University Press, 2014)*;* Nicholas Malone et al. "Ethnoprimatology: Critical Interdisciplinarity and Multispecies Approaches in Anthropology." *Critique of Anthropology* 34.1 (2014): 8–29; Deborah Bird Rose "Multispecies Knots of Ethical Time." *Environmental Philosophy* 9.1 (2012): 127–140.

[5] Paul Edwards *A Vast Machine* (2013); Donna Haraway *Simians, Cyborgs and Women: The Reinvention of Nature* (1991), *When Species Meet* (2008), "Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin" (2015); Natasha Myers *Rendering Life Molecular* (2015); Stengers "Gaia, The Urgency to Think (and Feel)" (2014);

[6] See Marisol De La Cadena. *Earth Beings: Ecologies of Practice Across Andean Worlds*. (Durham: Duke University Press, 2015).

[7] See Stacy Alaimo. *Bodily Natures: Science, Environment and the Material Self* (2013); Tom Bristow "Ecocritics have never been Green" (2012); Buell "Ecocriticism: Some Emerging Trends" (2011); Cohen *Prismatic Ecology* (2014); Claire Colebrook *Death of the PostHuman: Essays on Extinction, Vol. 1* (2014); Harold Fromm *The Ecocriticism Reader* (1996); Ursula Heise *Sense of Place and Sense of Planet* (2008); Catriona Mortimer-Sandilands & Bruce Erickson *Queer Ecologies* (2010); Morton *Ecology without Nature* (2007).

[8] See Adrian Ivakhiv *Ecologies of the Moving Image* (2013); Stephen Rust et al. *Ecomedia: Key Issues* (2016).

[9] See Bruno Latour *We Have Never Been Modern* (1993), "An Attempt at a 'Compositionist Manifesto'" (2010); Annemarie Mol *The Body Multiple* (2002).

[10] See Karen Barad. *Meeting The Universe Halfway: Quantum Physics and the Entanglment of Matter and Meaning*. (Durham: Duke University Press, 2007).

[11] See Rosi Braidotti *The Posthuman* (Cambridge: Polity Press, 2013); Cary Wolfe. *What Is Posthumanism?*. (Minneapolis: University of Minnesota Press, 2009).

[12] See Diana Coole and Samantha Frost. *New Materialisms: Ontology, Agency, and Politics*. (Durham: Duke University Press, 2011). See also, Alaimo & Hekman ed. *Material Feminisms* (2008); Jane Bennett *Vibrant Matter* (2010); Serenella Iovino & Serpil Oppermann *Material Ecocriticism* (2014).

[13] See the work of Stephanie LeMenager, Dominic Boyer, Imre Szeman, Timothy Mitchell, Jennifer Wenzel, and Kathryn Yusoff,

[14] Cary Wolfe *Animal Rites* (2003).

[15] For example, see the work of Myra Hird and Max Liboiron

8

defined disciplinary enclosures, and nature/culture dualisms.

This expansive list of theoretically informed criticism and knowledge practice responding to environmental questions is exemplary of UCLA Comparative Literature scholar Ursula Heise's point that the "current recognition that the environmental crisis [of the Anthropocene], and more broadly, humans' use of nature, have to be a primary concern for humanistic research, opens up wider possibilities for redefining environmental scholarship beyond, in between, or outside of disciplinary conventions" ("Comparative Literature and the Environmental Humanities"). Moreover, this list of work is indicative of Heise's point that scholarship in the Environmental Humanities, compared to knowledge practices in Comparative Literature, eco-criticism and disciplinary focused literature departments, "seek[s] to respond to the call for new institutional formations [of knowledge production that] correspond to innovative kinds of knowledge", method and discourse ("Comparative Literature and the Environmental Humanities"). Therefore, not only are the Environmental Humanities opening new ways of seeing or understanding nature, but this dissertation shows how Environmental Humanities scholarship is drawing new maps, producing new literacies, and archiving new ways of noticing situated multi-species entanglements, worlds and histories that do not sort into nature/culture, subject/object distinctions.

A Brief Sketch of this Dissertation

Arguing that work in the Environmental Humanities fosters different forms of scholarly, environmental and political communication and attention, this

9

dissertation works through ways that a variety of authors and practitioners are re-doing and re-figuring how species, disciplines, publics and worlds meet and interact in the Anthropocene. More specifically, this dissertation shows how environmental work being done across the sciences and humanities, and work in post-humanist ecological theory, feminist STS and in multi-species anthropology (knowledge formations that literary eco-criticism and environmental studies programs haven't historically turned to), are opening innovative knowledge making positions, spaces and infrastructures for multi-species collaborations and imaginaries in the Anthropocene. My readings of post-humanist ecological theory, feminist STS and multi-species anthropology in Chapter One, the Anthropocene/Capitalocene/ Chthulucene in Chapter Two, practices of multi-species story-telling in a time of mass extinction in Chapter Three, rewilding in Chapter Four, Natalie Jerimejenko's art/science practices in Chapter Five, J.M. Ledgard's microbial deep-sea imaginaries in Chapter Six and Jeff Vandermeer's weird ecological fiction in Chapter Seven, bring attention to the ways that transdisciplinary environmental knowledge practices across the arts, sciences and humanities are entangled and intra-act with particular multi-species publics and contexts.

A key area of focus throughout this dissertation emphasizes how the practices and methods used to produce knowledge and discourse are as important as the actual knowledge or text produced. That is, the contexts, archives, infrastructures and disciplines situating practices of knowledge production shape particular kinds of communication, connection and collaboration. For example, early in my graduate work I was intrigued by the way that intellectual labour is an

embodied practice, carried out by people who are situated and work at particular

universities, in particular departments, draw on specific archives, and are

geographically located across the globe; and depend on and are entangled with an

institutional apparatus influencing pedagogical styles, citation practices, curriculum

decisions, and hiring decisions.

Chapter One and Two, therefore, set the terms of debate and outline the

intellectual context that situates the Environmental Humanities scholarship this

dissertation draws on and seeks to contribute to, and thus, these two opening

chapters lay down the key discourses, imaginaries, and knowledge practices that

situate and orient the subsequent chapters of this dissertation. In Chapter One, I

emphasize how knowledge production requires globally expansive infrastructures,

scholarly networks and disciplinary arrangements that sustain publishing

platforms, shape archives, and facilitate symposia and scholarly gatherings.

Discourses, disciplines and knowledge practices are historical, are able to perform

different kinds of work, and are shaped by located gatherings of people, bodies,

media, publics, politics, and culture. That is, intellectual practices and modes of

embodiment foster different forms of disciplinary connection and collaboration, and

draw on and contribute to different archival, media, periodical and knowledge

ecologies that shape and influence pedagogical, hiring, and other institutional

practices. For example, I began this introduction discussing how disciplinary

specific programs like the Environmental Studies program at the University of

Waterloo I attended as an undergraduate weren't/aren't built and maintained to

allow for the kinds of transdisciplinary connections between the arts, sciences and

humanities that I was able to foster working on the Environmental Humanities at York's interdisciplinary Department of Humanities. Therefore, a key aspect of this dissertation emphasizes that languages, discourses, and knowledge practices require speakers, bodies and users, who influence and are influenced by particular intellectual contexts, imaginaries, spaces, archives, stories, histories and technologies that make communication and connection hold-together and persist in some ways and not others.

Chapter One shows how work in post-humanist ecological theory, feminist STS and multi-species anthropology contain knowledge, subject and relation making practices that foster politically inventive knowledge work conducive for transdisciplinary learning and collaboration. Positioning post-humanist ecological theory, feminist STS and multi-species anthropology as the privileged, transdisciplinary launching pad for the work this dissertation will perform, Chapter One argues that scholars like Donna Haraway, Stacy Alaimo, Karen Barad, Anna Tsing and Timothy Morton productively trouble disciplinary and anthropocentric knowledge practices, and provide methodological and conceptual handrails to foster robust, multi-species publics and imaginaries amidst the blasted environments of the Anthropocene.

To this end, Chapter Two is devoted to the geological notion that the environmental conditions used to classify the Holocene no longer reflect current anthropogenic environmental conditions – in the Anthropocene, 'we' are somewhere else, materially and discursively, and so require new kinds of stories and forms of criticism to map this space. My argument here is that the different

archival investments, disciplinary modes of seeing and discursive contexts

contained in the 'good Anthropocene', the Capitalocene and the Chthulucene foster

and create different worldly configurations, arrangements and publics. At stake in

the discourses on the Anthropocene, Capitalocene and Chthulucene are different

ways that Environmental Humanities scholarship will be able to position itself, and

thus respond methodologically and politically, to the environmental messes of the

Anthropocene. Therefore, reading the Anthropocene as a historical validation of the

human's sovereign transcendence over the earth, a reading generated by the 'good

Anthropocene' narrative, blocks attention from noticing other worldly kinds of

multi-species configurations that Haraway's Chthulucene works to evoke.

These considerations set the stage for the work that comes in Chapter Three

and Four, where I turn to specific forms of environmental knowledge and practice

situated in and responding to the messy, contaminated environments of the

Anthropocene. I begin with extinction in Chapter Three, rather than ending this

dissertation with the topic, because inhabiting and working in the Anthropocene

means that extinction is not 'out-there', a looming threat that can be avoided

through rational planning and foresight, but an unavoidable characteristic situating

contemporary multi-species living and dying in the Anthropocene.

Chapter Three works through historically situated material/semiotic

apparatuses addressing the topic of extinction in the Anthropocene. I begin by

working through the narrative templates, cultural imaginaries and political

attachments that inform eco-modernist projects of de-extinction, and specifically a

de-extinction project currently underway called the "Great Passenger Pigeon

Comeback" to revive and restore extinct passenger pigeons in the eastern US.

Arguing that these eco-modernist knowledge practices of de-extinction are framed

by 'good Anthropocene' imaginaries, human exceptionalism and anthropocentric

subject positions, I end Chapter Three by working through the multi-species

anthropological work of Ann Tsing and Thom van Dooren in detail as a means of

showing alternative, non-anthropocentric story, knowledge and relation making

practices for a time of mass extinction.

Following the topic of extinction, I turn in Chapter Four to the newly emergent

environmental practice of rewilding, another contemporary environmental

apparatus built to work, respond and refigure Anthropocene environments

irreducible to nature/culture, pure/artificial, innate/introduced species

distinctions. Using a Dutch rewilding project called the Oostvaardersplassen (OVP)

as a case study, Chapter Four critically unpacks, but also weaves into rewilding

thought and practice, conceptual and discursive mediums contained in the

Environmental Humanities as a means of articulating a more theoretically and

methodologically, politically and ethically robust form of rewilding.

My goal in these two chapters is to demonstrate how the historical novelty of

the human-induced disruptions that characterize the Anthropocene are creating

new forms of environmental discourse and practice, and that by contextualizing

these environmental issues and practices (de-extinction and rewilding) with work

in the Environmental Humanities, I am working to foster transdisciplinary forms of

discourse that re-figure and re-mediate the imaginaries, tropes, temporalities,

politics and ethics informing work on extinction and messy, Anthropocene

environments. While acknowledging the alarm and irreversible loss that come with living in the shadow of the Anthropocene extinction events, I want to interrupt the anthropocentric, techno-blissed-out knowledge practices of de-extinction and trouble narrowly imagined forms of environmental re-wilding by putting forward a kind of post-human, post-nature, uncanny, cyborg environmentalism that works on contemporary environmental upheavals in ways that avoid crisis rhetoric, redemption story-templates, nature/culture dualisms, utopian imageries and dystopian dread - features that are at risk of inviting xenophobic enclosures built on pure/impure, contaminated/natural distinctions.

A key challenge orienting the work in this dissertation is the way that the environmental issues of the Anthropocene are (among many things) a problem of communicating and visualizing scales and patterns, rhythms and agencies that exceed human space/time configurations. The question becomes how to make the messy problems of the Anthropocene intelligible and sensible in ways that promote re-mediated forms of political and eco-social communication, connection and collaboration.[16] As noted by Davis and Turpin in the introduction to their book on art in the Anthropocene, "finding new approaches to posing problems is the work of both making art and making theory in the Anthropocene" (*Art in the Anthropocene* 7). These considerations lead to my framing of Chapter Five, which transitions this dissertation into more aesthetic considerations. Turning to Paul Edward's "fuzzy" and "shimmering" global climate knowledge infrastructures, and Natalie

---

[16] I take the wording of this question from Joseph Masco's lecture "The Six Extinctions" delivered at the University of Madison-Wisconsin's "After Extinction Conference" held in 2014. For a video of the lecture, see: http://www.c21uwm.com/afterextinction/?page_id=175.

Jeremijenko's community located art/science practices I show how Edwards' and Jerimejenko's work translate and make intelligible complex, networked and distributed ecological situations in ways that challenge traditional science/politics, subjective/objective distinctions.

Beginning at the scale of the globe and planet, I draw specifically on Paul Edwards' book A *Vast Machine* (2013) to work through the achievement of climate and earth system scientists to produce computer models that reliably simulate global climate changes. From there, I examine the art/science practices of Natalie Jeremijenko that enroll ecological knowledge technologies, like air quality sensors, to build ecological structures of participation that draw people, technologies and nonhumans together into situated encounters that activate open source, user-generated ecological interpretations and entanglements. My reason for this comparison is to show differently positioned environmental knowledge practices contributing to a shift in the way artists and scientists perceive, feel and connect to complex ecological phenomena. In this, my goal is to show that the Anthropocene requires scientific and aesthetic work that embraces forms of creativity and play when confronted with complex ecological data and patchy environments as a means of resisting disciplinary and capitalist enclosure. Irreducible to hierarchical distinctions separating experts from non-experts, science from politics, and public from academic spaces, the knowledge and modelling infrastructures I discuss in Chapter Five render humans and nonhumans into particular structures of participation that lead to collaborative, non-anthropocentric relation making and world making imaginaries and publics.

In Chapter Six and Seven, I turn to fictional texts that contain uncanny ecological discourses and weird ecological spaces that provide conceptual and imaginative resources to notice real-life Anthropocene contexts. As Anthropocene literature, J.M. Ledgard's 2011 novel *Submergence* (Chapter Six) and Jeff Vandermeer's 2014 *Southern Reach Trilogy* (Chapter Seven) take readers outside the techno-optimism and apocalyptic dread underpinning the 'good Anthropocene', and place readers in a context akin to Haraway's Chthulucene. That is, avoiding dystopian/utopian narrative templates, and going beyond mourning and nostalgia, these texts articulate a form of realism and myth, knowledge and kin making practice suitable for Anthropocene subjects.

I begin Chapter Six by comparing Caspar David Friedrich's 1818 Romantic painting "The Wanderer Above the Sea of Fog" with J.M. Ledgard's 2011 novel *Submergence*, a novel ending with a deep sea dive to the Atlantic's Hadal zones to study microbial, chemosynthetic life forms that are changing the way scientists see and understand life on earth. Whereas Friedrich's painting removes the human from the earth, Ledgard's novel is about the earth-bound subject. Placing Friedrich's male-European Wanderer and Ledgard's cosmopolitan female protagonist Danielle in a shared cultural, historical and epistemological archive and tradition, Chapter Six narrates a history of the human subject moving from anthropocentrism to non-anthropocentrism, from the Anthropocene to the 'Chthulucene' – that is, a narrative moving from a historical situation defined by nature/culture, subject/object distinctions to one defined by ecological coexistence and multi-species muddles. Opposed to Friedrich, who orients the Wanderer towards the heights and the

17

heavens, positioning him both at the center and beyond the edge of the world, Ledgard's characters are earth-bound, they are of the mud and earth rather than the light and heavens. Positioning Danielle (a lead character in the novel studying chemosynthetic life) amidst Haraway's relation making context of the Chthulucene, I use *Submergence* to evoke an earth-bound scene that undoes anthropocentric readings of the Anthropocene.

In Chapter Seven, I offer a final case study on Vandermeer's weird ecological fiction as referencing a strange, non-anthropocentric realism compatible with what scholars in the Environmental Humanities are saying about ecological co-existence and microbial symbiosis beyond nature/culture, subject/object distinctions. Drawing on Freud's notion of the uncanny, Timothy Morton's idea of hyperobjects, writing practices in the tradition of weird literary fiction, and work in the life sciences on microbial symbiosis, I work through Vandermeer's strange non-anthropocentric realism that interrupts humanist scripts and anthropocentric narratives presupposing that nature is metaphysically present to and correlational with human consciousness, methodological individualism and human exceptionalist frameworks.

In the *Southern Reach Trilogy*, Vandermeer's focuses on Area X, an eco-material site that is neither natural nor unnatural, and the strange material and discursive effects the site has on those who come in contact with it. Although aspects of the *Trilogy* are written in a style that is reminiscent of canonical first-person nature writing, a genre of writing whereby knowledge producers inhabit subject positions that enable them to give sense and coherence to wild, untamed

18

natural landscapes that are 'out-there', Vandermeer's Trilogy evokes the failure or absurdity of attempts to put the complexity and heterogeneity of nonhuman worlds into first person narrative accounts.

What the last two chapters show is how Ledgard's planetary-writing and Vandermeer's ecological fiction contribute to the production of an Environmental Humanities archive by telling stories and producing discursive apparatuses that push readers outside human exceptionalist and socio-centric enclosures as a means to imagine and articulate real-life stories about ecological co-existence. What connects Ledgard and Vandermeer to work in the Environmental Humanities is the way they challenge readers to see beyond the conventions of knowledge and relation making practice archived in globalized state-craft and science, and evoke other forms multi-species relations might take when contextualized by different subject, relation and world making practice. In an academic, aesthetic and political environment where much writing in response to ecological disruptions is situated within knowledge infrastructures predicated around anthropocentric narratives of humanist return and redemption, dystopia and utopia, progress and transcendence, stories and knowledge practices are needed that open thinking to possibilities of becoming and translation beyond humanist enclosure and the 'Man' of the Anthropocene. And in this sense, both novels open readers onto an earth that looks and feels more like Haraway's cyborg-ian, uncanny Chthulucene, than a benevolent, holistic, mother earth or a rugged frontier wilderness to be subdued and tamed.

Conclusion

Knowledge practices situated in the context of the Anthropocene require more than authoritarian science and top-down scenario planning to make intelligible the complex future dangers precipitated by human-induced climate change. Novel forms of communication, visualization and conceptualization are needed to promote a re-thinking of human and nonhuman agency, and to promote novel changes across heterogeneous political, economic, cultural arenas (Masco "The Six Extinctions"). That is, the Anthropocene adds specific environmental, intellectual, political and aesthetic differences to the way that environmental and humanistic thought works.

Therefore, the contribution of this dissertation is to ecological discourse in the humanities. Being in the humanities, the work in this dissertation is out of bounds compared to environmental archives, canons and traditions narrowly defined and imagined from Eurocentric and Anglo-American contexts. As such, the work in this dissertation brings different analytic registers and reading practices to ecological questions by drawing on diverse disciplines, knowledge practices and theoretical orientations from across posthumanism, feminist STS and multi-species anthropology. However, connected to a heritage that contains work in feminist, STS, eco-feminism and eco-justice, this dissertation is also out of bounds in relation to a human-centric, anti-science focus that has tended to orient knowledge practices in the humanities and social sciences.

As the epigraph to this chapter notes, it matters what stories make worlds and what worlds make stories, and as I show in the chapters to come, Environmental Humanities scholarship comprises thinking and relation making

work indebted to critically informed, ethically response-able knowledge practices friendly to both worldly and scholarly ongoing-ness. As such, I am not interested in stories and knowledge practices oriented by a desire to heroically save nature, because these stories make worlds built on notions of a transcendental sovereignty, methodological individualism, competition, denouncing ignorance and eliminating of enemies – traits not friendly to transdisciplinary, multi-species publics. Rather, my focus is on knowledge practices and stories built on experimentation, play, co-learning, uncertainty, creativity, multiplicity and being put at risk.

This project stems from a deep connection and respect for traditions, archives and disciplines across the humanities and environmentalism that have been intellectually, politically and personally nourishing. As such, I am deeply committed to their ongoingness, and this dissertation seeks to contribute to their ability to thrive amidst insidious forms of academic and public enclosure. In this commitment, I seek to add labour and value to these traditions and archives by adding new and different ways that ecological discourse works and matters across humanistic and environmental contexts. That is, by making connections across, for example, anthropology and posthumanism, feminist STS and literature, my work adds different layers to the way that ecological discourse matters and is produced across both humanistic and environmental contexts, and fosters a multiplicity of discursive and theoretical contexts from which to produce ecological knowledge.

In the end, deeply informed by a critical tradition of feminist, anti-colonial, oppositional critical theory and philosophies of difference, my goal is to allow for more ways of communicating, connecting and collaborating across species and

disciplinary lines. I do not begin from a position that seeks to reverse the socio-

ecological damages of the Anthropocene, or to 'get things right'. Rather I work to

multiply forms of discourse, publics, citation practices, embodiments, ways of seeing

and imagining in order to hold open a multiplicity of ways of getting-on-together-

differently. The challenges of the Anthropocene need more contexts for being and

working as an ecological and academic subject, opening new ways for stories to

make worlds and worlds to make stories, and my wager is that the knowledge

practices in feminist STS, multi-species anthropology and posthumanist ecological

theory are consequential tools to respond to this challenge.

Chapter One – When Theories Meet: Locating the Environmental Humanities Across Post-Humanism, Feminist STS and Multi-Species Anthropology

In this chapter, I explore the intellectual, conceptual and methodological currents and archives characterizing the work in the Environmental Humanities that this dissertation builds on and contributes to. Work in post-humanism, feminist STS and multi-species anthropology that addresses questions of the Anthropocene, multi-species entanglements and nonhuman environments has been particularly consequential for this dissertation, and importantly, for my thinking about the practice of academic knowledge production more broadly. By describing the Environmental Humanities across post-humanism, feminist STS and multi-species anthropology, this chapter provides a clear sense of what the Environmental Humanities entail, outlines the intellectual and methodological inheritances that the Environmental Humanities draw on, and details the specific knowledge practices, discourses, literacies and methods that I see this dissertation contributing to and building on.

Presupposing that knowledge practices are always embodied practices, bound up with a particular kind of politics, that render subjects and objects into some situated worldly entanglements (and not others), my argument is that the knowledge making positions and conceptual apparatuses contained in post-humanist ecological theory, feminist STS and multi-species anthropology offer environmentally and politically constructive forms of communication, connection

and collaboration that re-boot environmental archives and humanistic vocabularies to address and help make recognizable the complex, contested nature of Anthropocene contexts.

Collectively, the knowledge ecologies I discuss here all begin from the point that human worlds (materially and discursively) can't be addressed in separation from the constitutive role that multi-species entanglements and histories play in the production and maintenance of human life-scapes and landscapes. Moreover, each knowledge ecology or discursive apparatus allows for different kinds of worldly and scholarly connections and collaborations that aren't possible from a more narrowly defined disciplinary and species position. In the end, the theoretical formations I discuss here allow for expansive citation practices, disciplinary engagements, aesthetic registers, structures of feeling, and multi-species imaginaries that the environmental discourses I encountered in my youth and at UW lacked, and therefore, contain critically informed, conceptually inventive methods that push humanistic scholarship in non-anthropocentric directions.

As a means of evoking the key intellectual currents and lines of flight giving form to the Environmental Humanities, section one tracks the movement and re-mediations connecting anti-humanist and post-structuralist theory to post-humanist ecological theory (Alaimo, Morton, Colebrook); and section two tracks critical interventions and entanglements across work in science studies, the life sciences and the social sciences that enable the work in feminist STS and multi-species anthropology (Haraway, Tsing) that this dissertation draws on. More specifically, this chapter begins by positioning the post-68, post-structuralist

literary, cultural and historical criticism of natural essence, universality, Euro-

centrism and the anti-humanist 'hermeneutics of suspicion' as key intellectual

contexts that shaped the post-humanist ecological theory I contribute to throughout

this dissertation. Turning to address environmental discourse, I examine the

intellectual and conceptual work that took place as anti-humanist and post-

structuralist scholarship transformed into post-humanist scholarship, and then

distinguish and contrast this post-humanist ecological scholarship from other forms

of eco-critical discourse and environmental thought. What distinguishes post-

humanist ecological theory as a form of environmental discourse is its connection to

an intellectual and political archive of anti-humanism and post-structuralism that

unsettles deeply entrenched humanist subject and knowledge making positions,

thereby generating historically, environmentally and intellectually specific

ecological knowledge practices, positions and discourses.

From there, section two begins by historicizing the methodologies that

science and technology studies (STS) scholars, such as Bruno Latour and Donna

Haraway, devised to intervene in debates and discourses about nature in the late

1990's. My goal here is to show how 1990's STS interrupted (scientific and

humanistic) knowledge practices built on nature/culture dualism, methodological

individualism and human exceptionalism, thereby producing an archive of work

productively connecting humanist criticism with the sciences. The feminist STS and

multi-species anthropology that came out of this mixture of humanist criticism,

theory, politics and the (life and social) sciences is foundational for the

Environmental Humanities due to the articulation of politically informed

environmental discourses, multi-species imaginaries and aesthetic registers that could not have been built from either a continental tradition of critical theory or an Anglo-North American tradition of environmentalism. As such, I end this chapter by discussing the way that work in feminist STS, multi-species anthropology and indigenous ethnographies has built unique and innovative methodological tools to engage with nonhuman and more-than-human actors outside colonial settler, patriarchal, anthropocentric and human exceptionalist knowledge making, subject making and relation making frameworks.

Re-Mediating Humanism: Connecting Anti-Humanism to Post-Humanism and Post-Nature Ecological Theory

Like many of the texts and discourses comprising Humanities critical theory, a significant portion of the methodological and theoretical machinery giving substance to the Environmental Humanities derives from the anti-humanist 'hermeneutics of suspicion' characterizing the post-68 context of (specifically French) continental critical theory and post-structuralism. Work in deconstruction, phenomenology, feminism and psychoanalysis that, for different reasons and in different ways, worked against the self-enclosed, self-present humanist subject contributed to an archive of anti-humanist critical theory and method that created space for the post-humanist ecological theory articulated by scholars such as Stacy Alaimo, Jane Bennett, Rosi Bradotti, Clare Colebrook, and Timothy Morton, among others. Environmental Humanities scholarship has ties to the French post-68 theoretical infrastructures built by people such as Foucault, Derrida, Deleuze, Lyotard and Baudrillard, who were responding to the felt limits of the subject

positions and historical narratives mediated by the binary oppositions and essentialisms characterizing Enlightenment humanism.

Inhabiting the tension between deterministic power relations and freedom and autonomy, critical theorists working in this post-68, post-structuralist academic climate aimed to rewrite the humanist tendencies lodged within Enlightenment historiography. For example, inspired by Nietzsche's genealogy of morals, Foucault's anti-humanist genealogies of identity and cultural formations worked methodologically:

> "not to discover the roots of identity, but to commit [identity] to its dissipation. [Genealogy] does not seek to define our unique threshold of emergence [as self-contained, essentialized subjects], [but] to make visible all of those discontinuities that cross us. [Genealogy] will not discover a forgotten identity, eager to be reborn, but a complex system of distinct and multiple elements, unable to be mastered by the powers of [a transcendental] synthesis" (Foucault, "Nietzsche, Genealogy, History" 94-95).

Built in a globalizing context shaped by newly consolidated forms of capitalist cultural fluidity, anti-humanist and post-structuralist criticism challenged the colonial and teleological underpinnings of historical narratives that clung to clearly defined (Eurocentric) origins, as well as the binaries and essentialisms that rigidly enforced forms of political collectivity and subjectivity, gender and race. Undercutting the ability of a self-present, rational subject position to reflect unmediated universal truths of nature, while historicizing oppositional binaries that structurally enforced gender, colonial, racial and class essentialisms, post-68 anti-humanist critical theory showed how social formations and historical narratives built on these essentialisms and binaries contain multiple non-linear contingencies, and are thus capable of being otherwise.

27

Foregrounding the discontinuous, contingent and heterogeneous events that contributed to the production of historical narratives and forms of identity as a means of accounting for the contemporary networked and fluid forms of being, identity and autonomy, post-68 anti-humanist approaches deconstructed the claims of mastery granted to a universal, transcendental signifier or meta-narrative that acted to consolidate the natural, essential and rational order of things. Creating negative space in the 'natural order of things' for autonomous modes of being, these forms of anti-humanism worked to show the subtle (and not so subtle) ways that cultural and historical contexts structure and police particular political imaginaries, cultural attitudes, and gender formations.

Significantly, this anti-humanist and post-structuralist theory created an intellectual, methodological and conceptual archive that started from the premise that 'we' don't have access to the world in an immediate, non-reflexive way, and therefore, knowledge of self and other are always rendered through situated forms of cultural and historical mediation and translation. Therefore, if language, discourse and historical contexts are consequential mediums through which people render inter-personal identities, forms of embodiment and experiences of the world, then the political and historical configurations contained in particular ecological languages and discourses also deserve critical attention. Trained to notice how historical, political and cultural texts and contexts mediate experiences of self and the world (that is, how textual mediation and translation factor into formations of 'self' and 'other'), the post-humanist ecological theorists I discuss below draw on anti-humanist and post-structuralist archives in order to embrace non-essentialist

28

knowledge practices and subject positions that embrace multiplicity and

historical/cultural specificity as a means to address the post-human and post-

natural landscapes of the Anthropocene.[1]

Crucially, this post-humanist environmental turn in anti-humanist theory

isn't a leap into a disembodied, post-human virtual matrix space of semiotic free

play, but indicates a kind of environmental knowledge practice working to foster a

form of discourse operating outside self-intentional humanist subject positions,

innate and natural essences, universalisms, and dualisms.[2] That is, the goal isn't the

production of new and improved representations of nature, but to connect and re-

mediate discourses, texts, aesthetic registers, conceptual arrangements and

theoretical configurations embedded across various literary, cultural and political

contexts as a means of multiplying and re-contextualizing disciplinary and

environmental, epistemological and ontological knowledge making, subject making

and relation making practice. Not accessing universally true experiences of the

world, the post-humanist ecological theory I'm interested in and discuss below

produces theoretical and methodological mediums that render sensible the

challenges of the Anthropocene in ways that resist disciplinary, species, masculinist,

and Eurocentric exclusions and foreclosures.[3]

---

[1] And therefore, this work has been published in institutional spaces like the critical theory journals *Critical Inquiry* or *Theory, Culture & Society*, journals steeped in the critical methodologies and literacies of post-68, anti-humanist critical theory.

[2] This idea of distinguishing 'post-humanism' from 'the post-human' and 'trans-humanism) (as something that comes after and is better than 'the human') connects with Hayles critique of virtual, post-human imaginaries in *How we Became Posthuman* (1999).

[3] A key project publishing post-humanist ecological theory is Cary Wolfe's edited series of books and translations in the "Posthumanities" series published by the University of Minnesota Press since 2007 (see, https://www.upress.umn.edu/book-division/series/posthumanities).

Intellectually situated within the tradition of continental critical theory and post-structuralism, Jeffery Jerome Cohen's edited book *Prismatic Ecology: Ecotheory beyond Green* (2013) helpfully contextualizes the conceptual and theoretical, ethical and political currents framing post-humanist ecological theory in contrast to 20th-century environmental and eco-critical discourse. Arguing for a post-humanist and post-naturalist, multi-hued "prismatic ecology" in opposition to more disciplinary and conceptually limited 'green' readings of nature,[4] Cohen shows how 20th-century environmental discourses and environmental studies disciplines more generally are methodologically and conceptually framed to see humans as either conquerors taming a passive nature, or as enlightened subjects moved by the romantic 'otherness' of a fecund nature (12).

20th-century environmental thinkers have tended to focus on how humans have damaged nature and how humans should fix or properly care for wild spaces of pristine nature that are 'out-there' beyond human worlds, discourse, and infrastructures. Privilege rural and wild frontier landscapes over urban spaces, environmental discourse articulated in the later part of the 20th century tended to elevate nature as a privileged 'other', or a lost wholeness to be nostalgically yearned for as a means to overcome modern alienation, by returning 'us' to fullness and equilibrium. The subtext mediating these kinds of environmental discourse, and the

---

[4] For more work on the intellectual histories of this thread of 'green' environmental discourse, see Lawrence Buell "Ecocriticism: Some Emerging Trends." *Qui Parle: Critical Humanities and Social Sciences* 19.2 (2011): 87–115; Tom Bristow "Ecocritics Have Never Been Green." *AJE: Australasian Journal of Ecocriticism and Cultural Ecology* 2 (2012): i–iv; Ursula Heise *Sense of Place and Sense of Planet: The Environmental Imagination of the Global*. London: Oxford University Press, 2008; Nicole Seymour *Strange Natures: Futurity, Empathy, and the Queer Ecological Imagination*. (Chicago: University of Illinois Press, 2013).

subtext mediating the environmental mediums I inhabited in my suburban youth, is

of heroic individuals oriented to save a fragile nature from destruction and

contamination - a subtext at risk of fostering eco-catastrophic imaginaries, tropes of

liberal individualism, and colonial story templates based on problematic gendered,

racial, Eurocentric and anthropocentric imaginaries. Moreover, Ursula Heise has

also shown how discourses representing nature as a pure space of equilibrium, and

a redemptive, restorative outside to modern alienation, are informed by narrative

templates oriented by an immanent sense of collapse and doom. That is, contrasting

the utopian investment in an organic, pure nature is an apocalyptic and catastrophic

imaginary that is at risk of being captured by xenophobic, apolitical rhetorical

enclosures. For Heise, the late 20th century North American environmentalist

rhetoric motivated to restore an 'individuals' 'sense of place' "becomes a visionary

dead end if it is understood as a founding ideological principle or a principle of

didactic means of guiding individuals and communities back to nature" ("Lost

Doges" 8). In contrast, Cohen's prismatic ecology is about multiplying the kinds of

theoretical, disciplinary and critical apparatuses that generate ecological

imaginaries and subject positions, and shows how ecological discourse informed by

anti-humanist, post-structuralist critiques of essence, presence and dualism provide

a productive platform to articulate critically informed, conceptually expansive and

methodologically diverse forms of environmental thought and discourse.

Intersecting with Cohen's multi-hued 'prismatic-ecology', post-humanist and

eco-material feminists such as Stacy Alaimo, Jane Bennett, and Rosie Braidotti have

published work unpacking historically situated bio-technical assemblages of human

31

and nonhuman actants, and have helped articulate a critically informed environmental discourse that avoids nature/culture dualism, natural essentialisms and human exceptionalism. According to Diana Cole and Samantha Frost, this environmental turn in anti-humanist theory is contributing to an emerging post-humanist intellectual context that marks "nothing less than a challenge to some of the most basic assumptions that have underpinned the modern world, including its normative sense of the human and its beliefs about human agency, but also regarding its material practices, such as the ways we labor on, exploit, and interact with nature" (*New Materialisms* 4). In agreement, Susan Hekman succinctly articulates a guiding trope orienting post-humanist ecological theory, namely, that "the social is not separated from the natural [...] but rather they continually interpenetrate each other. Bodies, texts, machines, human and nonhuman entities continually interact in complex relationships" (*Material Feminisms* 15).

A key figure giving form to this post-humanist ecological theory is Stacy Alaimo, whose award winning *Bodily Natures: Science, Environment, and the Material Self* (2010) has fostered transdisciplinary eco-political topographies, visualization technologies and relation making assemblages that trouble discourses about a nature that exists 'out-there' beyond a self-present humanist subject. By emphasizing the movement across variously located bodies, Alaimo emphasizes a 'trans-corporeal' approach to knowledge production that "reveals the interchanges and interconnections between various Bodily Natures. But by underscoring that trans indicates movement across different sites, trans-corporeality opens up a mobile 'space' that acknowledges the often unpredictable and unwanted actions of

human bodies, non-human creatures, ecological systems, chemical agents and other [human and nonhuman] actors" (*Bodily Natures* 2).

Undercutting human exceptionalism and methodological individualism, Alaimo's feminist project in *Bodily Natures* challenges the conceptual infrastructures orienting many of the organic 'green' discourses produced by and for an earlier iteration of environmentalism, and builds on anti-humanist and post-structuralist insights critical of humanist subject positions and imaginaries. Investigating the material/semiotic composition of situated naturecultures (rather than Natures separate from or opposed to Cultures), Alaimo works to communicate a sense that forms of embodiment are entangled and shaped by a plurality of material/semiotic actors and apparatuses, thereby alerting readers to the immanent translations and heterogeneous processes of exchange between the biological and the technical, the natural and cultural.

Intersecting with Alaimo's cultural, feminist and literary theory is Claire Colebrook's Deleuzian-inspired literary criticism. Opposed to the canonical 20th-century environmental rhetoric discussed above, Colebrook argues that the "usual figures of the bounded earth, the ideally self-balancing cosmos, the interconnectedness of this great organic home of 'ours' are modes of narrative self-enclosure that have shielded us from confronting the ex-centric forces of the present [in the Anthropocene]" ("A Globe of One's Own" 35). Contributing to a post-humanist imaginary built to de-center human sovereignty and autonomy, Colebrook's post-naturalist readings of film (*28 Days Later* and *120 Hours*) and literature (Atwood's *The Year of the Flood*) challenge environmental theorists to

think "non-environmentally" (see "A Globe of One's Own").

That is, re-figuring Deleuzian rhetoric for the Anthropocene, Colebrook argues that the scientific literature on climate change presents readers with fractured forces beyond life, a machinic power of the human that cannot be referred back to the self-furthering, self-maintaining and self-regarding human organism. As long as environmental theory and humanist historiographies consider the earth as 'our' lived world, as an organic and meaningful place that is the milieu of 'our' being and vitality, then 'our' approach to the future, argues Colebrook, will fail to confront the post-natural, non-human, geophysical forces and contexts of the Anthropocene. In opposition to the romantic organicism of much eco-critical literary theory, Colebrook's post-natural and post-humanist ecological position argues that rather "than continue a late Romantic project of re-enchanting [a depleted natural] world [for a redeemed human subject], what is required is a more intensified evacuation of 'our' meaning [of nature and the human subject], or what Timothy Morton has referred to as an ecology without Nature" (*Death of the PostHuman*, 55).

With that, I will end this section by highlighting Timothy Morton's contribution to the Environmental Humanities with his work on "ecology without nature" (2007). In three of his recent books, *Ecology without Nature* (2007), *The Ecological Thought* (2010) and *Hyperobjects: Philosophy and Ecology after the End of the World* (2013), Morton has argued that 'Nature' can't be thought of as an outside, bounded or background context on which is projected human social life, because, drawing on Derrida, there is no outside, stabilizing text. For Morton, massively distributed 'hyperobjects' of the Anthropocene, like climate change, end the idea

34

that notions like time and space, nature and world, self and other are stable,

coherent or bounded containers in which 'we' humans are enclosed within and

surrounded by. In short, the Anthropocene requires ecological discourses that work

outside a self-present humanist subject contemplating a metaphysically present,

stable world of nature.

Morton's ecology without nature fosters discourses, literacies and methods

positioned by de-centered and non-anthropocentric narratives. In his unique

rhetorical style, Morton asserts that:

> "the ecological thought, the thinking of interconnectedness [outside
> essentialism and nature/culture dualism], has a dark side embodied not in a
> hippie aesthetic of life over death, or a sadistic-sentimental Bambification of
> sentient beings, but in a 'Goth' assertion of the contingent and necessarily queer
> idea that we want to stay with a dying world; dark ecology. To truly love nature
> would be to love what is non-identical with us" (*Ecology Without Nature*, 55).

From here, Morton's post-humanist, speculative and object-oriented theories

attempt to make space for the difference between the nonhuman world as it is

reflected in humanist logics, knowledge and language, and the material "thing-

power"[5] or dynamic material agency of nonhuman phenomena that exist and act in

ways irreducible to the way nonhumans materialize in humanist and rationalist

systems of meaning and sense.

Highlighting recent moves that literary and cultural theorists have made in

response to nonhuman and emerging Anthropocene environments, my goal here

has been to flag post-humanist ecological theory and discourse that helped give

shape to this dissertation. Working across literary texts, historical contexts and

---

[5] This notion of thing-power comes from Jane Bennett's work on the materiality of nonhuman things
in her book *Vibrant Matter: A Political Ecology of Things* (2010).

cultural narratives, contemporary environmental scholarship in the humanities isn't only providing 'green' readings of established literary texts, or creating an archive of world environmental literature,[6] but working to build conceptual and aesthetic tools to make visible multi-species contexts that contain times and spaces, patterns and forces that loop through yet exceed intra-human contexts. The goal of this post-humanist ecological scholarship is to situate meaning and knowledge making practice within a context that troubles and exceeds humanist enclosure and human signifying practices, entangling ideas of 'the social' and 'the historical' with more-than-human and nonhuman contexts, agencies and contexts, thereby pushing environmental thought in politically and historically novel directions that are conducive to address Anthropocene environments.

Re-mediating the Sciences: Science Studies, Feminist STS, Multi-Species Anthropology & Indigenous Ethnography

Having outlined the way that theorists such as Stacy Alaimo, Timothy Morton and Claire Colebrook go out of bounds in relation to work in the humanities and environmentalism, I now show how environmental scholarship working across the human, social and life sciences, particularly work in feminist STS and multi-species anthropology, has provided intellectual and institutional resources that re-train anthropocentric and human exceptionalist modes of seeing, thinking and imagining multi-species entanglements. Just as the post-68, anti-humanist critical

---

[6] For example, Ursula Heise contrasts the 'becoming-World Literature' that has been the focus of recent eco-critical work with the transdisciplinary and conceptually novel work in the Environmental Humanities situated by the Anthropocene in her report "Comparative Literature and the Environmental Humanities" (2014).

methodologies that challenged humanist subject positions and historiographies are a key component in the Environmental Humanities, another consequential archive contributing to this dissertation has roots in STS, anthropological and ethnographic scholarship that critically re-figured discourses of nature in the human, social and life sciences.

Contextualized by a theoretical climate shaped by anti-humanism and postmodernism, arguments about the social construction of knowledge, the 1990's Science and Culture Wars, and the post-modern bio-technological re-territorialiations of nature, the critically informed work of canonical STS scholars such as Bruno Latour, Donna Haraway, Sandra Harding, Ian Hacking and Andrew Pickering challenged nature/culture dualisms; contextualized techno-scientific research in relation to broader social, political and historical tendencies; and importantly, articulated democratic, socially-just forms of knowledge production that account for situated human and nonhuman agencies, networks and histories. As such, a key methodological contribution that critically and theoretically informed STS scholarship has had on the Environmental Humanities is the production of a transdisciplinary archive of scholarship that begins from the notion, following Haraway's insights on the production of situated knowledge, that "reality is not a naked stockpile for human manipulation, but a negotiating partner. [Importantly, the] world encountered in knowledge projects is an active entity" ("Situated Knowledges" 593).

Within this scope, work in STS is very broad and diverse, but a canonical figure of the theoretically reflective STS work that this dissertation builds on is Bruno

Latour, whose focus has increasingly turned to address environmental issues of the Anthropocene. Therefore, before addressing the specific contributions made by feminist STS, I want to highlight how Latour's early canon-building work in the 1990's contributed to the production of a critically informed STS archive that shaped Environmental Humanities scholarship. Refusing to resort to a world of nature to explain society, or society to explain nature, Latour's early methodological approach to show science-in-the-making demonstrates how there is no rupture or disconnect between the domains of nature and society, rather, there is what he calls a "pluriverse" of human and nonhuman actants and technoscientific hybrids whose networked mediations delimit located modes of existence that scientific knowledge seeks to account for or pay attention to.

Building on his work in *Science in Action* (1988) and *We Have Never Been Modern* (1991), Latour's famous example of "science in action" comes in his book *The Pasteurization of France* (1993). Here, Latour examines Pasteur's 19th-century discovery of the relationship between microbes, fermentation and infection. Arguing that the telling of Pasteur's scientific practice cannot be told as a conquest story about a lone scientist breaching subjective illusions to discover the objective truths of nature, Latour shows the complex mediating networks of scientific institutions, biological processes, fermentation practices, medical discourses, histories of microbiology, farming practice, health standards, disease, and commercial interests that Pasteur had to translate and mediate to make his discovery in the 19th century. That is, in *The Pasteurization of France*, Latour follows 'science in action' to map the located but vast networks of human and nonhuman forces and mediations that

Pasteur had to enroll, gather and navigate in the construction of reliable knowledge linking disease, microbes, fermentation and vaccination. Pasteur does not gain access to some hidden truth or recover concrete experiences that had previously been falsely interpreted, rather, by forging political allies, knotting together heterogeneous scientific institutions and linking disparate medical networks, Pasteur was able to add consequential variations to the way that microbes matter, both discursively and materially, politically and scientifically. 'Science in action' doesn't show how an ahistorical nature is accessed by 'scientist kings' who pierce the fog of social illusions and ideology to 'see' the objectively true, hard facts of reality, but shows the mixtures, networks and hybrids of humans and nonhumans that scientists (and other knowledge producers) must mediate, negotiate and translate in the practice of producing reliable knowledge about the world.

Bringing theoretically informed humanities approaches and literacies into the sciences, and the sciences into the humanities, Latour's mediations and translations of continental theory, science, anthropology and sociology have fostered distinct approaches to knowledge production that brought questions of nonhuman agency into humanities scholarship in new, consequential ways. However, feminist STS scholars such as Haraway and Sandra Harding have challenged Latour for not fully attending to the way that intersectional identity markers like race, gender, class, and sexuality contribute to situated forms of subject, knowledge, and world making practice.[7] Feminist and post-colonial scholars working in STS have continually

---

[7] For example, also see Sandra Harding's critique of Latour in *The Science Question in Feminism* (Ithaca NY: Cornell University Press, 1986) and *Sciences from Below: Feminisms, Postcolonialities, and*

shown that by holding 'oppositional' critical theorists and activists at a distance,

Latour's rush to form a common world of humans and nonhumans outside

nature/culture divisions does not adequately address and respond to the exclusions

and cuts that are made in this reformed democratic composition. For example,

Haraway has noted how Latour's (early) work fails to address "the understandings

of semiotics, visual culture and narrative practice coming specifically from feminist,

post-colonial and multicultural oppositional theory" (*Modest_Witness* 35). In

agreement, post-colonial STS scholar Matthew Watson has argued that Latour's

project to democratize knowledge production

> "requires something beyond breaking down the walls of Plato's Cave [Latour's
> recent argument in *Politics of Nature*] to allow more than a handful of experts to
> relay between the former inside and the outside, society and nature. [Rather, it]
> entails innovating practices of situated representation [and scientific
> knowledge practice attentive to] the standpoints of externalized, marginalized
> actors (human and nonhuman)" ("Cosmopolitics and the Subaltern" 66).

Whereas Latour's work provides important methodological and theoretical

resources to discuss how situated historical and cultural contexts shape located

forms of natural and social scientific knowledge production, and has produced new,

consequential discourses about nonhuman agency by generating distinct

methodological approaches, his position is limited by not incorporating critically

and politically engaged scholarship. In this sense, Latour's contributions seem less

as an intervention or interruption of the discursive apparatuses (and corresponding

enclosures) that have defined the archive of Enlightenment rationality and science,

---

Modernities (Durham: Duke University Press, 2008); Donna Haraway
Modest_Witness@Second_Millennium.FemaleMan©_Meets_Oncomouse™ (New York: Routledge,
1997); and Matthew Watson. "Cosmopolitics and the Subaltern Problematizing Latour's Idea of the
Commons." *Theory, Culture & Society* 28.3 (2011): 55–79; and "Derrida, Stengers, Latour, and
Subalternist Cosmopolitics." *Theory, Culture & Society* 31.1 (2014): 75–98.

and more focused on reforming or correcting the anachronisms of modern European Enlightenment science in order to more efficiently address (postmodern) technoscientific networks and hybrids. Therefore, opposed to charges that he is a post-modern iconoclast,[8] Latour's knowledge practices are firmly rooted in the Enlightenment imaginaries of rationalist science, truth and progress.[9]

In contrast, more critically and politically informed STS scholars, such as Haraway, Stengers and Barad, have positioned knowledge and subject making practice in much riskier, non-linear and challenging spaces. As such, the critical and methodological approaches contained in feminist STS[10] not only reform existing bodies of thought, but work to actively create interstices for a plurality of diverging critical orientations, modes of embodiment, arts of noticing and regimes of visibility. Just as Haraway's cyborg was part of a critically engaged feminist practice of "materialized refiguration" working to articulate critical literacies opening postmodern technoscientific enclosures, embodiments and exclusions to becoming-otherwise, work in feminist STS provides the "obligatory multi-species story-telling scripts" needed to inhabit and respond to the blasted environments and extinctions characterizing contemporary life in the Anthropocene ("SF: Science Fiction,

---

[8] Latour addresses this critique and the critique he is 'anti-science' in Chapter One of *Pandora's Hope* (1999).
[9] For an interesting reading of Latour as a theorist contributing to notions of linear temporality, progress and oriented by a linear "arrow of time", Astrid Schrader "Haunted Measurements" (2012).
[10] Informed by the early feminist STS work of Evelyn Fox Keller, Sarah Franklin, and others, some key contemporary theorists working in feminist STS include Eva Hayward. "Fingeryeyes: Impressions of Cup Corals." *Cultural Anthropology* 25.4 (2010): 577–599; Myra Hird "Coevolution, Symbiosis and Sociology." *Ecological Economics* 69 (2010b): 737 – 742; Annemarie Mol *The Body Multiple: Ontology in Medical Practice* (Durham: Duke University Press Books, 2002); Natasha Myers. *Rendering Life Molecular: Models, Modelers, and Excitable Matter* (Durham: Duke University Press, 2015); Natasha Myers and Carla Hustak "Involutionary Momentum: Affective Ecologies and the Sciences of Plant/Insect Encounters." *differences: A Journal of Feminist Cultural Studies* 25.3 (2012): 74–118.

Speculative Fabulation, String Figures, So Far").

Employing diverse and transdisciplinary citation practices, critically informed feminist STS work changes the terms and narrative patterns structuring the rationalist adventure of humanism and scientific rationality (and the corresponding forms of embodiment and politics that this rationalist adventure contain). Not content to critique the sciences from above, work informed by feminist STS methodologies and criticism, notes Haraway, "provide a working knowledge of the way that humans and nonhumans confront and confuse each other" ("Situated Knowledges" 576) as a means of "understanding and intervening in the patterns of objectification in the world. That is, the patterns of reality for which we must be accountable" ("Situated Knowledges" 589). A key contribution feminist STS has made to current Environmental Humanities scholarship is the insight, following Haraway, that knowledge production is "about particular and specific embodiment, and definitely not about the false vision promising transcendence of all limits and responsibility. [...] Feminist objectivity is about limited location and situated knowledge, not about transcendence and splitting of subjects and objects. It allows us to become answerable for what we learn how to see" ("Situated Knowledges" 582-583).

A key trope situating this kind of knowledge practice is Karen Barad's notion of intra-action outlined most prominently in *Meeting the Universe Halfway* (2007). Challenging the sciences by positioning knowledge production outside analytical frameworks that presuppose independent, self-contained subjects and objects, natures and cultures, Barad provides a conceptual apparatus with her notion of

42

intra-action to notice the looping, re-configuring mediation that entangle situated

humans and nonhumans. Describing intra-action Barad notes:

> "To be entangled is not simply to be intertwined with another, as in the joining
> of separate entities, but to lack an independent, self-contained existence.
> Existence is not an individual affair. Individuals do not preexist their
> interactions; rather, individuals emerge through and as part of their entangled
> intra-relating. Which is not to say that emergence happens once and for all, as
> an event or as a process that takes place according to some external measure or
> space and of time, but rather that time and space, like matter and meaning,
> come into existence, are iteratively reconfigured through each intra-action,
> thereby making it impossible to differentiate in any absolute sense between
> creation and renewal, beginning and returning, continuity and discontinuity,
> here and there, past and future" (*Meeting the Universe Halfway* ix).

Bringing into relief the way that legacies of colonialism and imperialism structure

various forms of disciplinary practice and attention, theorists such as Haraway and

Barad have opened socially progressive ways for scientists and humanists to

communicate, connect and collaborate in ways that prevent one kind of privileged

(disciplinary, gendered, cultural, etc.) methodological approach, form of

embodiment or subject position from having the final say, or being the transcendent

measure against which other kinds of thinking-practices or forms of embodiment

must be reduced to or translated into. Not driven to produce an enlightened or

objective claim that silences dispute, Haraway and Barad gather publics, archives,

knowledge, media, species, bodies, histories together as a means of "transform[ing]

systems of knowledge and ways of seeing" (Haraway, "Situated Knowledges" 589).

In addition to this work of critical re-mediation, another consequential

contribution feminist STS scholarship has made to Environmental Humanities

scholarship that I want to highlight is the creation of intellectual, imaginative and

institutional spaces that foster co-learning opportunities and collaborations across

the life sciences, social sciences and the humanities. Moving away from an aversion

to science that has historically distinguished many humanistic and eco-critical

archives (for fear of science's alienating, subjugating and reifying tendencies tied to

patriarchal, imperial techno-capitalist apparatuses),[11] humanists and social

scientists addressing the messes of the Anthropocene are seeing scientific

knowledge as a collaborative partner. Bringing methodological attention to

nonhuman materiality, scientific practices provide a working knowledge of the

numerous atmospheric, geological and biophysical rifts marking Anthropocene

worlds and contexts. As a result, thinking and collaborating with scientific work,

while challenging authoritarian, colonizing, mechanistic, and reductionist

approaches to scientific knowledge production, allow for the articulation of methods

and paradigms promoting more publicly engaged, democratic forms of

environmental knowledge rooted in feminist, de-colonial and social justice

frameworks.

Natural scientists studying distributed and damaged Anthropocene

environments also require input from humanists and social scientists to understand

how situated techno-industrial histories have shaped and modified particular

landscapes and environments. For example, in a 2015 interview, Anna Tsing (whose

---

[11] For example, in the continental tradition of critical theory, philosophy and phenomenology, theorists like Heidegger ("The Question Concerning Technology"), Adorno (*Dialectic of Enlightenment*), and Marcuse (*One Dimensional Man*) have positioned their work in opposition to an instrumentalizing modernity predicated on scientific rationality. Moreover, eco-critics and environmentalists have distrusted science in part because writers from Thoreau to Carolyn Merchant "The Scientific Revolution and the Death of Nature") have argued that the death of nature is connected to particular kinds of scientific practice. Yet, with Haraway, "[f]rom One Dimensional Man (Marcuse 1964) [...] the analytic resources developed by progressives have insisted on the necessary domination of technics and recalled us to an imagined organic body to integrate our resistance [...] But a slightly perverse shift of perspective might better enable us to contest for meanings, as well as for other forms of power and pleasure in technologically mediated societies" (*Simians, Cyborgs, and Woman* 154, quoted in Wark *Molecular Red* 43)

work will be discussed in detail below) tells the story of how a microbiologist was not able to make the connection between the modified gut flora being found in people living in Eastern European communities and their abnormal immune responses until she learned from a social historian how techno-industrial activities from previous decades introduced very specific synthetic compounds into the landscapes that ended up modifying people's intestinal dynamics. With this insight from the social historian, the microbiologist was able to identify ways of modifying the gut flora in specific ways that improved community health (New Books Network Podcast "Anna Tsing").

This example highlights how ecological scientists are learning that it is not possible to study contaminated Anthropocene landscapes in isolation from the effects that situated social, cultural, and technological histories have had on these landscapes. Anthropologists, historians, cultural theorists, feminists, and indigenous scholars oriented by social, gender, racial and environmental justice issues understand the ways that histories of colonialism, race, religion, class and the state play pivotal roles in the construction of Anthropocene environments and bodies, and that the bio-physical dynamics of these Anthropocene environments cannot be modelled, analyzed or understood without paying attention to these entangled eco-historical and eco-political narratives and histories. Humanistic and scientific collaborations open space for the conceptualization of acute planetary disturbances defining the Anthropocene in ways that do not obscure global inequalities, heterogeneities of place, and forms of (cultural, gendered, and technological) privilege that often get blocked from attention in the rush to fix contaminated

landscapes and return them to 'normal'.

A key knowledge infrastructure shaped by feminist STS insights and indicative of transdisciplinary communication, connection and collaboration entangling the humanities and sciences is the conference "Arts of Living on a Damaged Planet" hosted at UC Davis in 2014. Panels had feminist STS scholars (Haraway) thinking-with evolutionary and developmental biologists (Margaret McFall-Ngai), and speculative fiction authors (Ursula Le Guin) thinking-with anthropologists (James Clifford) as a means of undermining the academic division of labour separating the arts from the sciences, thereby opening theoretical and discursive space to reflect on collaborative forms of multi-species and scholarly liveability amidst the ruins and enclosures of the Anthropocene ("Anthropocene: Arts of Living on a Damaged Planet").

Another example focused on humanistic and scientific co-learning and collaboration is the influential "The Anthropocene Project" hosted by Haus der Kulturen der Welt (HKW), a Berlin art institution, throughout 2013/2014. Delivered through a variety of academic and creative platforms and media (such as museum exhibitions, film festivals, symposia, working groups, an Anthropocene Observatory, and an "Anthropocene Curriculum & Campus"), the aim of the Project was to "model [innovative] projects [that] will explore forms and methods of knowledge transfer [across the sciences and arts], and pursue questions of how we acquire and deal with knowledge in the age of global change" ("The Anthropocene Project"). As a significant event marking Environmental Humanities scholarship, the Project put together a unique program of panels and talks that brought scientists, critical

theorists, architects, engineers, designers and artists together to explore methodological and imaginative means of making sense of the Anthropocene ("The Anthropocene Project").

Due to the recent proliferation of work in the life sciences and evolutionary biology made possible by genetic sequencing and storage technologies, work in the life sciences on symbiosis has become a fruitful site for promoting transdisciplinary, multi-species co-learning opportunities. Producing analytical frameworks friendly to humanities insights, evolutionary biologists such as Margaret McFall-Ngai and Scott Gilbert are showing that individual organisms (human and nonhuman) are always-already the fruit of deep but situated relational entanglements and cross-species collaborations. Showing the complex, symbiotic and intra-active nature of multi-cellular life, microbiologists like McFall-Ngai, Gilbert, Jan Sapp, and Alfred Tauber have been developing scientific frameworks that trouble post-WWII analytical frameworks built from notions of individualized, self-contained organisms and their environments. For example, 90% of the cells composing human bodies are nonhuman bacteria whose metabolic interplay sustains a radically diverse nested ecosystem (referred to in the scientific literature as a "microbiome" or "holobiont") of more-than-human critters that "belie any simple anatomical understanding of individual identity" (Gilbert et al. "A Symbiotic View of Life: We Have Never Been Individuals" 327). This newly formalized "symbiotic perspective", notes Gilbert, "opens important areas of research [that entangle the human, social and natural sciences] and offers fundamentally new conceptions of the organism" that has profound implications for the practice of "biology, medicine [and work on]

biodiversity" (327).

This work highlights another crucial point connecting work in the humanities and sciences. Stories are not the property of humanists, they are not absent from scientific practice, and they are not the made-up and fictitious in contrast to the factually and objectively true. For example, Haraway has shown how certain story and narrative archetypes about competition, race, gender, progress, individuality and universality have profoundly shaped and situated genetic research (*Modest_Witness* 131-173). The stories that influence practices of knowledge production across both the sciences and humanities act as performative apparatuses rendering bodies, subjectivities, and temporal orientations in some ways, and not others. Therefore, stories about methodological individualism and linear progress timelines contextualizing archives of scientific curiosity are being challenged by new analytical frameworks in microbiology that re-contextualize the way scientists narrate and connect with bodies and environments.

As I show throughout this dissertation, environmental scholarship in the Anthropocene needs new narrative templates, thinking practices and knowledge projects, and feminist STS scholarship opens key intellectual, conceptual and methodological tools to situate environmental knowledge production within different, transdisciplinary, multi-species, non-linear, natureculture contexts and publics.

Contributing to the feminist STS practice of reworking anthropocentric and human exceptionalist knowledge practices, the environmental discourses produced by multi-species anthropologists such as Anna Tsing and Thom van Dooren have

48

deep roots in 20th-century critical theory and critical anthropology, but also work

with and across a range of environmentalisms, feminisms, critical materialisms,

post-humanisms and STS frameworks. Informed by a critical anthropological[12] and

anti-humanist tradition that aimed to de-colonize and displace the linear histories,

progressive time-scapes and civilizational imaginaries constitutive of early

anthropological and humanistic work built in settler colonial contexts to study Man

and his others (that is, thinking practices that blocked attention from noticing the

specificity, diversity and heterogeneity of human worlds and cultures), work in

multi-species anthropology and ethnography is re-doing anthropocentric

frameworks in order to bring critical attention to our more-than-human

companions. That is, similar to the way that Man was fractured and opened by

critical anthropologists and anti-humanists in order to bring attention to other

kinds of people, bodies and embodiments constitutive of human worlds and

cultures, multi-species anthropology displaces anthropocentrism and human

exceptionalism in order to study the diverse kinds of things, materials and

nonhumans that come to matter (discursively and materially) in the making (and

unmaking) of multi-species worlds.

Bringing anthropological and close ethnographic attention to the diversity of

relational entanglements that humans have with nonhumans allows Tsing to notice

co-species accommodations and liveable multi-species landscapes amidst the ruins

of the Anthropocene. "In this time of diminished expectations", when linear progress

---

[12] For example, in an anthropological context, see Akhil Gupta and James Ferguson *Culture, Power, Place: Explorations in Critical Anthropology* (1997).

narratives increasingly lose analytical traction, and social and ecological precarity

has become a common state of affairs, Anna Tsing's multi-species anthropological

work, in particular, looks "for disturbance-based ecologies in which many species

sometimes live together without either harmony or conquest" - the very stuff, she

says, necessary collaborative survival in the Anthropocene (*The Mushroom at the

End of the World* 5). That is, working in and situated by the disturbed multi-species

landscapes of the Anthropocene, the work of Tsing that this dissertation connects

with aims to articulate discursive mediums and textual apparatuses that notice

patches of multi-species liveability situated outside anthropocentric registers and

human exceptionalist histories.

An important transdisciplinary knowledge platform in the Environmental

Humanities that publishes critically informed multi-species anthropology is the

academic journal *Environmental Humanities.* Published since 2012, and emerging

from University of New South Wales in Australia in collaboration with leading

Environmental Humanities research centres at Concordia University, the Sydney

Environment Institute, University of Sydney, University of California, Los Angeles,

and the KTH Royal Institute of Technology in Sweden, the journal "draws

humanities disciplines into conversation with each other, and with the natural and

social sciences" to produce environmental theory for the 21st century

("Environmental Humanities: About"). Initially part of an ongoing series of special

editions on the Environmental Humanities and multi-species relationality published

in the cultural theory journal *Australian Humanities Review, Environmental*

Humanities is a canonical Environmental Humanities peer-reviewed journal that is

transdisciplinary in scope, and publishes transdisciplinary environmental scholarship in multi-species anthropology, feminist STS, eco-cinema and media, cultural studies, critical theory, eco-feminisms, ethnography, philosophy, post-colonialism, environmental history and indigenous politics.[13]

Also emerging from anthropological contexts is environmental scholarship oriented by ethnographies situated by indigenous histories, cultures and contexts. Addressing modes of human/nonhuman relationality outside modern/traditional, nature/culture distinctions, important interventions or displacements to humanistic and environmental thought are coming from Marisol de la Cadena's work on indigenous cosmopolitics, Philippe Descola's anthropology beyond nature and culture, Eduardo Kohn's anthropology beyond the human, and Eduardo Viveiros de Castro's multi-naturalist work on Amerindian perspectivism. Working across STS, critical and multi-species anthropology, semiotics, indigenous studies, post-colonial theory, feminism and environmentalism, these ethnographic investigations are informed and situated by issues tied to settler colonialism, indigenous politics and the nonhuman world, and work to produce innovative scholarship that is in dialogue with issues related to the Anthropocene, human exceptionalism and anthropocentrism.. For example, Eduardo Kohn's anthropological and ethnographic work in the Quichua-speaking Runa village, Avila, located in Ecuador's upper Amazon region, does not separate humans from nonhumans, and argues that those

---

[13] Another example of an institutional apparatus creating space for multi-species anthropology and Environmental Humanities scholarship is the "Lexicon for an Anthropocene Yet Unseen" published by the journal *Cultural Anthropology*; see, https://culanth.org/fieldsights/803-lexicon-for-an-anthropocene-yet-unseen.

in the global north are "colonized by certain ways of thinking about [multi-species] relationality" that blocks attention from noticing other kinds of multi-species entanglements and literacies (9).

Another consequential example of this work is a series of lectures organized by Marisol de la Cadena at UC Davis throughout 2013/2014 called "Indigenous Cosmopolitics: Dialogues about the Reconstitution of Worlds". With invited participants Arturo Escobar, Elizabeth A. Povinelli, Mary Louise Pratt, Marilyn Strathern, Eduardo Viveiros de Castro, Helen Verran, and others, this event discussed and addressed the ontological plurality of human and nonhuman worlds not distributed around or in correlation to the Euro-modern epistemic and ontological notions of Nature and the Human. Stemming from Isabelle Stengers' notion of cosmopolitics, Marisol de la Cadena's indigenous cosmopolitics intervenes in Kant's universalizing and homogenizing cosmopolitanism. Therefore, going beyond Euro-centric, modern-epistemic and anthropocentric divisions between (many) Cultures and (one) Nature, the idea for the lectures was to ask: "What happens to the notion of 'environmental crisis' if we do not assume a singular shared world constituted by the division between nature and culture? [And] how do notions like political ecology and political economy change when we introduce the notion of ontological politics - a politics across different worlds?" ("Indigenous Cosmopolitics"). The resulting lectures explored the diversity of ways that multi-species relationality and more-than-human worlds communicate, connect and collaborate outside anthropocentric, settler colonial and imperial contexts, archives and imaginaries – anthropocentric contexts, archives and imaginaries that are

52

increasingly and problematically, as I will show in Chapter Two, coming to shape discourses on the Anthropocene.

Conclusion

As a means of situating and characterizing the Environmental Humanities scholarship that this dissertation builds on, this chapter has shown how post-humanist ecological theory, feminist STS and multi-species anthropology work to de-familiarize multi-species imaginaries enclosed by settler colonial, Eurocentric and human exceptionalist thinking practices, thereby destabilizing what is taken to be natural and immutable modes of multi-species being. By describing the critical translations across recent humanist, scientific and environmental discourse that opened space for the Environmental Humanities, this chapter has historicized key literacies, frameworks and conceptual imaginaries that situate this dissertation in relation to other forms of environmental, humanistic and scientific thought and discourse. With an eye towards creating more robust, democratic, and, anti-racist, feminist frameworks rooted in social justice, the knowledge practices I discussed in this chapter have created a productive critical apparatus to conceptualize and contextualize subject/object, human/nonhuman relations in ways that avoid the colonizing tendencies woven into human exceptionalist knowledge and world making practice.

Whereas the next chapter will outline the broader intellectual currents and complexities contained in the notion of the Anthropocene (as a means of showing how work in the Environmental Humanities connects with work on the Anthropocene), this chapter outlined the conceptual and methodological, political

and ethical, knowledge making and relation making machinery that is contained in this dissertation. As a result, the scholarship I draw on allows for worldly encounters and entanglements across disciplines, cultures, species, archives, and publics; and importantly, worldly encounters that sit adjacent to anthropocentric, human exceptionalist, gender, racial and class enclosures and exclusions.

Chapter Two – Multiple Anthropo-Scenes: Knowledge Production in the Anthropocene, Capitalocene and Chthulucene

Exerting an immense pull across contemporary humanistic, artistic and scientific knowledge practices, the Anthropocene has emerged as a key category driving diverse kinds of academic, cultural, aesthetic and political work. Just as novel political, cultural and historical shifts occurring in the late 20th century opened space for new intellectual lines of flight addressing the global, the geological notion that earth history has entered an Anthropocene has fostered new kinds of knowledge, discourse and relation making practice. More than that, the geological proposal that the current chapter of earth history should be identified as the "Age of Man" or "Human Age" (Monastersky "Anthropocene: The Human Age") has become a highly contentious issue, drawing attention from diverse scientific, artistic and humanistic domains. In a 2009 article immediately recognized as canonical in Environmental Humanities contexts, postcolonial historian Dipesh Chakrabarty argued in *Critical Inquiry* that the historically specific and environmentally situated challenges of the Anthropocene constitute an unavoidable horizon for humanistic, political, scientific and historical research ("The Climate of History"). In agreement, Ursula Heise reported that the Anthropocene constitutes an emergent challenge that will add new inflections, discourses and lines of flight into the humanities, sciences and public sphere ("Comparative Literature and the Environmental Humanities").

That the delineated disciplinary questions and debates characterizing geology have expanded to become a global, transdisciplinary topic of interest is, notes STS

theorist Joseph Masco, a monumental and impressive achievement that eludes most disciplinary knowledge projects (Masco "The Six Extinctions").[1] Being the cumulative, unintended consequence of 20th-century industrialism, petrochemical regimes of production, consumption, militarism and petro-cultural innovation (Masco "The Six Extinctions"), the Anthropocene is much more than a geological issue, enabling forms of communication and visualization that work across distinct domains of knowledge and discourse that cannot be contained in one over-arching narrative, logic or disciplinary formation. This chapter, therefore, demonstrates how the Anthropocene has become a diverse work object, exceeding any single disciplinary frame of reference or field of vision, thereby opening up diverse lines of flight and interstices for a plurality of research and knowledge projects in, across and beyond the Environmental Humanities.

As I show in this chapter, this transnational, transdisciplinary translation of geological research across discursive mediums and modes of evaluation has had immense political, cultural, and environmental implications, and has led to competing and contrasting Anthropocene discourses, narratives and imaginaries. That is, diverse and competing Anthropocene discourses privilege particular arrangements of politics and history, knowledge making and world making practice that require critical scrutiny and evaluation. In short, contrasting Anthropocene discourses provide different political and ethical platforms to respond to the

---

[1] Numerous news media outlets have been enticed by the headline grabbing rhetoric about a human-made geological epoch. For example, numerous articles about the Anthropocene have been published in the 'Globe and Mail' and 'New York Times', as well as in 'Nature', 'National Geographic' and 'Scientific American'.

Anthropocene.

Therefore, working through the 'good Anthropocene', the Capitalocene and the Chthulucene, three discourses increasingly discussed, cited and addressed across various academic and cultural media and mediums, this chapter will highlight and contextualize the discourses and knowledge practices giving form to work on the Anthropocene and the Environmental Humanities. Other ways of re-telling and re-framing the Anthropocene story have been with proposed. For example, "planthropologist" and anthropologist Natasha Myers put forward the notion of the "Planthropocene", which in contrast to doom and gloom environmental and scientific rhetoric is an "aspirational era [and] a time for a radical solidarity project that insists that *we are of the plants*" ("Photosynthesis"). Another example would be Heather Davis' "Plastisphere" that aims to account for the fact that "the human age" is marked by a global geological stratification of carbon-based plastics ("The Plastisphere and Other Queer Futures"). However, taking the cue of Haraway in a 2015 interview "Anthropocene, Capitalocene, Chthulhocene", I focus on the 'good Anthropocene', the Capitalocene and the Chthulucene because of their striking contrast in terms of discourse, politics, aesthetics and ecology.

The point separating the 'good Anthropocene', the Capitalocene and the Chthulucene is not that one discourse better reflects the objectively true underlying conditions of the Anthropocene, or that one is a more accurate translation of the scientific research into a political register. Rather, my point is to show how the different discourse, stories, imaginaries, disciplinary investments and citation practices contained in these contrasting responses to the Anthropocene

contextualize different forms of environmental communication, connection and

collaboration - that is, the stories, figures, narrative patterns and political

arrangements used to archive the histories of the Anthropocene open some

knowledge making and world making positions, possibilities and futures, and close

others. As such, my rationale for presenting these Anthropocene discourses is to

differentiate conceptual arrangements and political attachments informing

knowledge practice in the Environmental Humanities from other forms of

environmental knowledge, and to highlight contrasting intellectual currents that

situate and contextualize the remaining chapters in this dissertation.

The Anthropocene and the 'Good Anthropocene'

The commonly told (origin) story of the Anthropocene begins in 2000 when Nobel

prize winning atmospheric chemist Paul Crutzen and marine biologist Eugene

Stoermer proposed at a geological gathering that the scope and scale of

anthropogenic influences on the earth's atmosphere, lithosphere and hydrosphere

have been occurring at a geologically unprecedented rate ("Geology of Mankind"

23). Sixteen (short) years later, on August 29, 2016, an Anthropocene Working

Group of international geologists and earth scientists formally recommended to the

International Union of Geological Sciences (the disciplinary assemblage overseeing

the geological sciences) that the Anthropocene officially become recognized as a

distinct unit of Earth time (Carrington "The Anthropocene epoch: scientists declare dawn of human-influenced age").[2]

Based on this recommendation, the International Commission on Stratigraphy (the academic body overseeing on the Geological Time Scale) is now working to determine and identify the 'geological marker' distinguishing the Anthropocene from the Holocene. This work is expected to take two to three years, but the likely geological marker distinguishing the on-set of the Anthropocene is the globally distributed layer of radioactive materials resulting from nuclear bomb tests around 1950 (Carrington "The Anthropocene epoch: scientists declare dawn of human-influenced age"). However, other geological events are being investigated as possible boundaries distinguishing the Holocene from the Anthropocene. For example, the International Commission on Stratigraphy will also be looking at the geological sediments created by plastic pollution, soot from power stations, and the bones left by the global proliferation of domestic chickens grown for human consumption by the industrial-agricultural complex as possible markers of a new geological epoch. Jan Zalasiewicz, chair of the Anthropocene Working Group, noted that the "radionuclides are probably the sharpest [candidate to mark the Anthropocene]. But we are spoiled for choice. There are so many signals" that humans have become the driving force in determining the geophysical form of the planet (quoted in Voosen "Atomic bombs and oil addiction herald Earth's new epoch: The Anthropocene").

---

[2] There were 35 scientists on the Anthropocene Working Group. 30 members voted in favour of formally designating the Anthropocene as a distinct geological epoch, three voted against formal designation, and two abstained from voting.

As an epistemological category, the Anthropocene stems from historically and disciplinary specific work in geology and argues that the geological markers and environmental conditions used to periodize the Holocene as an epoch of earth history no longer reflect current earth system arrangements -- earth system arrangements that have changed due to the unintended, cumulative effect of human industrial activities. More specifically, the notion of the Anthropocene resulted from geological evidence showing that the extent of erosion, sediment transport and carbon emissions associated with anthropogenic processes like industrial agriculture and urbanization, and recently emergent anthropogenic environmental conditions such as climate change, ocean acidification and the spread of oceanic "dead zones", reflect a geologically and environmentally distinct phase of earth history (Zalasiewicz "What is the 'Anthropocene'"). In the words of Zalasiewicz, the "scarring of the landscape associated with [the] industrialization [of the past 250 years is] changing the Earth on a scale comparable with some of the major [geological] events in the past, [such as] meteorite strikes, extraordinary volcanic outbursts, colliding continents, and disappearing oceans" ("The New World of the Anthropocene" 2228).[3]

The Anthropocene disrupts environmental discourses predicated on sustaining, monitoring and properly managing a pristine world of 'Nature' that

[3] For more work on the geology of the Anthropocene, see Nigel Clark "Geo-Politics and the Disaster of the Anthropocene." *The Sociological Review* 62.1 (2014): 19–37; Paul Crutzen and C. Schwagerl "Living in the Anthropocene: Towards a New Global Ethos." *Environment 360* (2011); Paul Crutzen and E.F. Stoermer "The 'Anthropocene.'" *Global Change Newsletter* 41 (2000): 17–18; Kathryn Yusoff "Geologic Life: Prehistory, Climate, Futures in the Anthropocene." *Environment and Planning D: Society and Space* 31 (2013): 779–795; and J. Zalasiewicz and Mark Williams "Are We Now Living in the Anthropocene?" *Geological Society of America (GSA) Today* 18.2 (2008): 4–8.

exists 'over-there', beyond human culture and society. These kinds of political and ethical coordinates enclose and limit the kinds of questions that can be generated about the complex ecological entanglements contained in the Anthropocene, and require that ecological discourse go out of bounds. However, although the Anthropocene challenges traditional environmental imaginaries and archives, the idea that humans have become a geological agent does not mean humans possess a form of sovereignty over the earth that allows us to produce anthropogenic, terra-formed environments that will result in a 'new and improved', good Anthropocene.

As such, a highly problematic but consequential discourse responding to the Anthropocene is organized around the notion of the 'good Anthropocene'. Proponents of the 'good Anthropocene' narrative, such as those at the Silicon Valley based think-tank The Breakthrough Institute, argue that if globally distributed techno-industrial apparatuses have developed a commanding geo-physical agency to shape earth system processes in negative ways, this dominant geo-physical agency should be harnessed or steered to leverage a positive 'good Anthropocene' imaginary. Building on their controversial "The Death of Environmentalism" (2004), The Breakthrough Institute argued in "The EcoModernist Manifesto" that the 'good Anthropocene' is characterized by planetary stewardship and geo-engineering initiatives built with the modernizing logics of progress, technological expansion and universalization (see The Breakthrough Institute "The EcoModernist Manifesto"). On this reading, the eco-modernizing techno-fixes of the 'good Anthropocene' see the becoming-geological of human agency as an opportunity for the STEM disciplines, in cahoots with financial capitalists and Bill Gates' funded geo-

61

engineering start-ups, to (heroically) manage precarious earth system processes in ways conducive for the teleological progress and the advancement of the human condition (Hamilton, "The Theodicy of the 'Good Anthropocene'").

The managerial rhetoric and neoliberal hubris framing this neo-Promethean imaginary have been widely challenged. Critics of the 'good Anthropocene', such as Eileen Crist, Mark Lynas, and Kate Rigby, have pointed out that the 'good Anthropocene' risks placing 'the human anthropos' or 'the human species' at the center of the story of the Anthropocene, thereby overlooking the diverse histories, heterogeneities and inequalities tied to the globalized production of industrial toxicities that precipitated the geological condition in the first place. Moreover, Elieen Crist argues that that naming an epoch of earth history after Man, the human or the human anthropos reinforces the narcissistic desire to see humans as the God species.[4] In agreement, Clive Hamilton has argued that granting humans a geological status and planetary agency risks re-booting and upgrading the human exceptionalism, anthropocentric hubris and humanist parochialism that the ecological challenges of the Anthropocene (such as mass species extinction) seem to place in question (Hamilton, "The Theodicy of the 'Good Anthropocene'").

The danger of the 'good Anthropocene' discourse is that naming a geological time-scale after 'the human anthropos' universalizes, de-historicizes and de-politicizes the human species as an undifferentiated figure. As such, the 'good

---

[4] For example, see Elieen Crist "On the Poverty of Our Nomenclature." *Environmental Humanities* 3 (2013): 129–147; Mark Lynas *The God Species: How the Planet Can Survive the Age of Humans* (London: Fourth Estate Books, 2011); Kate Rigby "Writing in the Anthropocene: Idle Chatter or Ecoprophetic Witness?" *Australian Humanities Review* 47.1 (2009): 1–12.

Anthropocene' overlooks the fact that it is not our species biology or a collective species level agency that precipitated damaged Anthropocene environments, but historically and culturally specific petro-cultural regimes of inequality, consumption, and wealth extraction.[5] The 'good Anthropocene' discourse risks formulating a meta-human agency that too easily morphs into a non-scientific claim of human sovereignty over the earth, rather than highlighting the unintended yet destructive effects that historically specific petro-cultural arrangements of existence have had on the earth. There are so many kinds of human and nonhuman agencies bound-up in the production of contaminated Anthropocene environments that the 'good Anthropocene' risks creating the sense that (modern-western, technologically minded) neo-liberal STEM disciplines are the only actors in systems (ecological, social, political, economic) - thereby, reinforcing an anthropocentric, human exceptionalist, and Eurocentric view that culturally and scientifically specific humans have agency while nature (and those people viewed as culturally 'other') react. Translating the Anthropocene into an expanded claim for (certain kinds of) human sovereignty over earth system processes blocks critical attention, and thus de-politicizes, the many social, cultural, class, race and gender issues bound up with the environmental crises of the Anthropocene and climate change. Thereby, it is at risk, notes Neimanis, of reinvigorating the neo-colonial logics and capitalist patterns that originally engineered the ecological crises of the Anthropocene in the first place (Neimanis, et al. "Four Problems, Four Directions for Environmental Humanities" 11).

---

[5] This insight will be explored in more detail in the next section.

The Capitalocene

Despite its many problems, one thing the 'good Anthropocene' has done is to create space for a contrasting discourse gathered under the heading of the Capitalocene. A growing number of critical theorists and ecological critics (most notably political geographer Jason Moore) are arguing that a more accurate description of the current confluence of financial networks, extraction practices, wealth creations, and industrial infrastructures that are creating the climate changes, geological re-organizations and mass species extinction events is the Capitalocene rather than the Anthropocene.[6] In an attempt to pre-empt and short-circuit the risk that the Anthropocene be read as an eco-modernizing opportunity for upgraded techno-humanist innovation and managerial hubris, the notion of the Capitalocene makes visible the fact that the ecological crises of the Anthropocene are symptomatic of historically specific capitalist and petrochemical modes of extraction and exploitation shaped by an inherited archive of settler colonialism, Eurocentrism and militarized techno-science.

In opposition to the Promethium hubris and neoliberal imaginaries constructing the 'good Anthropocene' discourse, Capitalocene discourse works to capture the point that the "devastation that characterizes the Anthropocene is not simply the result of activities undertaken by the species Homo Sapiens; instead, these effects derive from a particular nexus of epistemic, technological, social, and

---

[6] For work on the Capitalocene, see Jason Moore *Anthropocene or Capitalocene? Nature, History, and the Crisis of Capitalism* (New York: PM Press, 2016); *Capitalism in the Web of Life: Ecology and the Accumulation of Capital* (New York: Verso Press, 2015); Donna Haraway "Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin." *Environmental Humanities* 6 (2015A): 159–165.

political economic coalescences figured in the contemporary reality of petrocapitalism" (Davis & Turpin *Art in the Anthropocene* 7). Whereas the eco-modernizing discourses of the 'good Anthropocene' render the environmental problems of the Anthropocene as technological and managerial issues to be handled within the logics of supply-and-demand, or through the good governance and responsible stewardship of neoliberal ecological service provision, the discourses of the Capitalocene represent the environmental issues signified by the geological positing of the Anthropocene as an intra-human affair of class politics, colonialism, imperialism, racism, sexism and neoliberal economics. Therefore, the analytic models and critical framing mechanisms developed to address global capitalism are immensely useful and necessary knowledge practices to address Anthropocene histories and disruptions. In short, the notion of the Capitalocene brings into focus the way that capitalism, as a globally expansive, historically situated infrastructure predicated on extraction and wealth-creation, has created the socio-ecological messes that the Anthropocene signify. Moreover, the point is that the Anthropocene cannot be understood, imagined or responded to without a deep understanding of the way that capitalism has leveraged new climatic systems, as well as new forms of social expropriation, migration and displacement.

Historian and post-colonial scholar Dipesh Chakrabarty, in particular, has addressed the importance of keeping critiques of capital bound up with work on the Anthropocene. However, Chakrabarty has also argued that the analytical frameworks built to critically address the exploitations and inequalities bound up with capitalism "need to be stretched to adjust […] to the reality of global warming"

65

and the Anthropocene ("Postcolonial Studies and the Challenge of Climate Change"

1). It is this work of readjusting critical frameworks focusing on capital to address

the more-than-human complexities of the Anthropocene that work on the

Capitalocene seeks to address. That is, while contributing to work on the (neo-

colonial) logics and practices of globalization, industrialization and petro-capitalism

(narratives and patterns that inarguably factor as powerful assemblages over-

determining the production of anthropogenic climate change), Chakrabarty has

argued that the critiques of capital are not built to address or notice the more-than-

human time-scales, patterns, and trajectories that exceed intra-human histories and

contexts and so need to be methodologically adjusted. For example, Chakrabarty

points out the environmental, social and historical problems of the Anthropocene

"could not have been predicted from within the usual frameworks deployed to study

the logics of capital" on their own (21) because the "methods of political economic

investigation […] do not usually entail digging up 8,000,000-year old ice-core

samples or making satellite observations of changes in the mean temperature of the

planet's surface" (2). Chakrabarty's point, and by extension the point of work

emerging around the notion of the Capitalocene, is that the knowledge practices and

methodologies used to understand the atmospheric and geological re-organizations

of the Anthropocene bring new temporalities, histories, forms of (human and

nonhuman) agency and technological apparatuses to attention that require

differently articulated analytic frameworks and theoretical orientations.

Institutionally recognizing, archiving and signifying the current planetary

displacements, exterminations and contaminations as the Capitalocene, rather than

66

the Anthropocene, makes considering the role of capitalism in the current mess non-optional. That is, institutionalizing the current epoch the Capitalocene makes it impossible for academic and non-academic publics to not consider the role that the extraction practices and systems of inequality at the heart of capitalist logic and practice play in what is referred to as the Anthropocene. The Anthropocene, the 'good Anthropocene' and the Capitalocene tell different histories and stories about current planetary conditions, contain and call into question different kinds of subject positions, and are informed by different critical and analytical frameworks that allow for specific kinds of socio-ecological mediations and re-mediations. Whereas the Anthropocene is at risk of letting capitalist logic and practice off the hook, work leveraged by the notion of the Capitalocene forces attention to remain on the capitalist systems of inequality and exploitation, and therefore tempers the articulation of stories about heroic techno-capitalists re-engineering climate systems, foregrounding political and ethical practices of de-colonization and socio-ecological equality and justice.

The Chthulucene

Haraway's challenge to mobilize knowledge practice around the category of the Chthulucene, rather than the Anthropocene or Capitalocene, provides a provocative and instructive non-anthropocentric space for Environmental Humanities scholarship to inhabit. In tight collaborative solidarity with the critical work opposed to the 'good Anthropocene', and thinking-with discourses on the Capitalocene, Haraway has increasingly put forward the notion of the Chthulucene as a relation making and knowledge making apparatus that provides a

methodological and conceptual, ontological and epistemological context to compose

knowledge that avoids human exceptionalism, methodological individualism and

anthropocentrism.[7] In addition to her oppositional, ironic cyborg and her work on

companion species, Haraway's Chthulucene is a material/semiotic figure for co-

species decomposition and recomposition, re-weaving the narrative and material

patterns entangling humans and nonhumans, technologies and biologies.

Therefore, similar to the way that Haraway appropriated and re-purposed the

figure of the cyborg from systems theory and (patriarchal, imperial) cyber-cultural

imaginaries as a means to provide resources to inhabit and work critically in post-

modern techno-scientific contexts, Haraway's Chthulucene is a critical

appropriation of the science fiction author H.P. Lovecraft's misogynist fictional

Cthulhu monster. Aiming to provide a "tentacular", feminist, multi-species figurative

apparatus, Haraway's Chthulucene provides sensorial and affective tools to inhabit

and work in contaminated Anthropocene worlds irreducible to linear temporalities

of progress and decline, and beyond the conceptual geographies built around

notions of the modern and traditional, the center and margin, nature and culture. If

Haraway's oppositional cyborg was a critical apparatus built to pay attention to the

kinds of translations, stories and contaminations specific to living and dying in

postmodern techno-scientific contexts, the Chthulucene provides figurative and

affective registers that draw attention to the messy multi-species frictions and

---

[7] See Donna Haraway "Anthropocene, Capitalocene, Chthulhocene: Donna Haraway in Conversation with Martha Kenney." *Art in the Anthropocene: Encounters Among Aesthetics, Politics, Environments and Epistemologies.* London: Open Humanities Press, 2015. 255–270; "Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin." *Environmental Humanities* 6 (2015A): 159–165.

fictions specific to living and dying in the contaminated environments of the Anthropocene.

Beyond techno-humanist orientations toward return and redemption, and narrative patterns built to achieve a restorative balance and equilibrium with nature, Haraway argues that the possibility of remediation, healing and rebuilding multi-species worlds now are of a different order of signification as "we begin to get a feel for the stories of the earth-bound [collaborations not] oriented to the heavens […] but of the mud and earth" ("Anthropocene, Capitalocene, Chthulhocene: Donna Haraway in Conversation with Martha Kenney" 267). Contextualized by the social and ecological displacements and extinction events connected to living and dying on a warming, acidified, anthropogenic planet, Haraway argues for the need to "join forces to reconstitute refuges, to make possible partial and robust biological-cultural-political-technological recuperation and recomposition [not conservation, preservation and restoration of Nature] which must include mourning irreversible losses" ("Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin" 160). Haraway notes that:

> "Outside the techno-hero story, [of clear origins and final endings] there are
> many other stories […]. When we tell the parabolic and spiked tales of tragic
> detumescence, tales of the Modern and the Traditional, [Progress and
> Universality] we get off easy. […] We are not urged to action, we aren't urged to
> caring, we aren't urged to decomposition and recomposition. [Rather, in order
> to] learn to repair, and maybe even flourish without denial, […] the abyssal and
> elemental ones are the figures that we need to inhabit in these moments of
> urgency [tied to the Anthropocene], this living in a time of excess mass death,
> much of it human-induced" ("Anthropocene, Capitalocene, Chthulhocene:
> Donna Haraway in Conversation with Martha Kenney" 268).

Haraway's Chthulucene is a challenge to build and inhabit figurative, affective, scientific and conceptual spaces where other kinds of situated, earth-bound stories,

futures, histories and relational arrangements of co-species becoming-with have a chance to matter (discursively and materially) – stories whose narrative patterns and relational subtexts can avoid being contained by imperial logics, anthropocentric patterns, and auto-poetic imaginaries.

By generating productive frictions, attachment sites, and transdisciplinary ways of noticing, the Chthulucene situates knowledge production textually and affectively in spaces that displace cynicism, myopia, and (disciplinary and ecological) parochialism, thereby re-doing how species and scholars meet to create conditions of ongoing-ness in the Anthropocene – it provides a different kind of language and imaginary to notice the multi-species muddles and messes of the Anthropocene. Undercutting stories contained in the smooth plot space situating tales of humans conquering and/or heroically saving Nature by producing a 'good Anthropocene', the Chthulucene provides a figurative apparatus for producing transdisciplinary non-anthropocentric literacies, tropes and imaginaries that will be explored in more depth in the chapters below.

Conclusion

This chapter showed how the concept of the Anthropocene emerged and fostered diverging lines of flight that helped anchor the conceptual and methodological coordinates orienting work in the Environmental Humanities. As a fuzzy category, the Anthropocene invites diverse articulations. As we have seen, at stake in these debates and contrasting discourses responding to the Anthropocene are ways of reading and seeing, historicizing and archiving the Anthropocene as a unique historical condition. Since knowledge and text are always situated in historical,

cultural, disciplinary, gendered, and environmental contexts, the 'good

Anthropocene', Capitalocene and Chthulucene foster different intellectual contexts

that shape particular kinds of environmental communication, connection and

collaboration. As the broader historical and environmental context in which

Environmental Humanities scholarship is embedded, my goal here was to outline

the analytic frameworks that shape and contextualize the conceptual archives and

political terms informing the chapters to come.

Chapter Three – Knowledge Production in a Time of Mass Extinction: The Great Passenger Pigeon Comeback Project vs. Multi-Species Story-Telling Practices

Extinction is an unavoidable topic of concern in the Anthropocene. Scaled up to what scientists are calling the "Holocene Extinction Event" or the "Sixth Mass Species Extinction Event", the issue of extinction in the Anthropocene adds new lines of inflection and patterns of significance to concerns about planet-wide human-induced species loss and non-livability.[1] As pointed out by Elizabeth Kolbert in her Pulitzer-prize winning book *The Sixth Extinction*, concerned evolutionary biologists, ecologists and zoologists are worried that the Anthropocene may contain a mass species extinction event comparable in scale to the extinction event that wiped out the dinosaurs 65 million years ago (*The Sixth Extinction*). Yet this time, the planetary extinction events that some fear will define the Anthropocene are human-induced, not the result of a rogue comet or an untimely volcano.

The historically specific petro-cultural arrangements of existence and globally sedimented toxicities bound-up with (among other things) an all-too-human desire for linear progress, global human security and predictability are unintentionally unravelling complex intra-generational multi-species entanglements, producing a planet-wide environmental condition of precarity, indeterminacy and vulnerability.

---

[1] For more on the extinction crisis in the Anthropocene, see Anthony Barnosky et al. "Has the Earth's Sixth Mass Extinction Already Arrived?" *Nature* 471.51-57 (2011); Gerardo Ceballos et al. "Accelerated Modern Human–induced Species Losses: Entering the Sixth Mass Extinction." *Science Advances* 1.5 (2015): 1–5; Will Steffen "The Trajectory of the Anthropocene: The Great Acceleration." *The Anthropocene Review* 2.1 (2015): 81–98.

Extinction is now. As a result, the ecological futures opened in the Anthropocene may not be what people in the global-north imagined and anticipated from within anthropocentric and petro-cultural arrangements of existence predicated on "cheap nature", linear progress, accelerating technological revolutions and inclining rates of everyday comfort and well-being (Masco "The Six Extinctions"). As noted by Anna Tsing, the "direction of the future was well known, but is it now?" (*The Mushroom at the End of the World* 3).

My argument in this chapter, and what situates this chapter as part of the Environmental Humanities, is that responding to the topic of extinction in the Anthropocene requires the cultivation and composition of different kinds of disciplinary, methodological and creative knowledge making arrangements in order to situate the topic of extinction outside anthropocentric disciplinary enclosures. That is, a necessary means of confronting the enclosures, precarity and contaminations of the Anthropocene is to re-make the disciplinary enclosures and segregations de-limiting knowledge making work. The Anthropocene, therefore, is not only an ecological challenge, but also a disciplinary, creative and imaginative challenge because the human exceptionalist thinking-practices defining many knowledge-making environments require transdisciplinary research and imaginative practices to notice, map and survive contaminated disciplinary and ecological conditions.

Even though older imaginaries, methods, discourses, and story-templates continue to inform how extinction is perceived, felt and experienced in the Anthropocene, I am interested in situated forms of visualization, apparatuses of

noticing, and multi-species imaginaries currently giving texture to work on extinction in the Anthropocene. Beyond sentimental elegies for lost charismatic mega-fauna, moralist pleas that 'the future is now in our hands', post-apocalyptic cynicism, and the self-congratulatory hubris of eco-modernizing agendas of planetary stewardship, this "time of extinctions", notes van Dooren, draws scientists and artists, humanists and activist into an "awareness of the immensity of our geological moment" (*Flight Ways* 82).

To this end, I will focus on two contrasting knowledge projects responding to Anthropocene extinction events. Focusing first on the eco-modernist practice of de-extinction and then on the multi-species story-telling practices crafted in Environmental Humanities contexts, this chapter maps the way that extinction in the Anthropocene re-organizes knowledge production practices and re-frames the tools of critical analysis. Not interested in the epistemological conditions from which we can/should properly know extinction as an object of knowledge, this chapter examines how these two forms of knowledge contribute in very specific and located ways to the materialization of extinction as a matter of concern (epistemologically and ontologically, aesthetically and politically, materially and discursively).

I will first examine the eco-modernist narratives, imaginaries and cultures informing the multi-national, eco-modernist de-extinction project called "The Great Passenger Pigeon Comeback Project". Situated by the new environmentalism of the 'good Anthropocene', the Passenger Pigeon Project utilizes genetic mapping and engineering technology to tweak genetic and biophysical patterns as a means to manufacture bio-abundant ecological futures that offset accelerating rates of species

74

extinctions. In short, by genetically re-engineering the base molecular proteins of extinct species (such as the passenger pigeon), de-extinction works to revive, resurrect and restore extinct animals to the wild.

The problem with the particular forms of re-worlding fostered by eco-modernist projects of de-extinction is that they are articulated according to exhausted disciplinary divisions between the sciences and arts, nature and culture, and situated by categories like the Human, Nature, Progress, and Capital that remain informed by narratives about the individual and the social, return and redemption, fate and ownership - "in short", notes Anna Tsing, "the adequate categories of standard liberal and non-feminist political economy" and ecology (*The Mushroom at the End of the World*, 20).

Therefore, outside the salvation and redemption narratives situating de-extinction projects, I turn next to the multi-species story-telling practices of Anna Tsing and Thom van Dooren. Opposed to the 'good Anthropocene', eco-modernism of de-extinction, Tsing's work with the "Matsutake Worlds Research Group" and van Dooren's ethnographic work on the situated, multi-temporal "flight ways" of birds threatened with extinction, provide a critical and conceptual infrastructure that situates damaged Anthropocene environments outside nature/culture and human exceptionalist distinctions.

The scholarly, multi-species story-telling practices of Tsing and van Dooren require long-term, intimately engaged, deeply theorized multi-species ethnographies, science and art that engage with the heterogeneity, complexity and messiness of multi-species worlds at stake in the Anthropocene. Pushing against the

parochialism of our species myopia, as well as pushing against the petro-cultural imaginary of the eco-modernist 'good Anthropocene', I show how this form of multi-species story-telling fosters "arts of noticing" situated multi-species entanglements as well as articulating creative, imaginative and practical "bridges between where we are, and another place that is different and not 'this'" (Tsing "'Auto-ReWilding' Landscapes and the Anthropocene").

This inquiry is timely due to the fact that huge amounts of intellectual and financial capital are currently being directed into a variety of knowledge projects addressing the topic of extinction in the Anthropocene as a means of holding open and constructing particular kinds of Anthropocene-futures. These different knowledge projects do not merely represent extinction, but are world making and re-worlding apparatus that enact and secure very particular kinds of embodied relations, agencies, imaginaries and temporalities.

Examining the kinds of knowledge projects working at the edge of extinction directs critical attention to the kinds of (multi-species) embodiments, political imaginaries, methods of governance, forms of creativity and disciplinary arrangements that are situating, knotting and composing some kinds of Anthropocene futures and not others. Examining who theses futures are for, whose (human and nonhuman) labour reproduces these futures, and who these futures continue to exclude (human and nonhuman, biological and technological, ontological and epistemological), are key matters of concern shaping contemporary ecological thinking in the Anthropocene.

The Challenge of Extinction and Knowledge Production in the Anthropocene

Extinction is an ongoing, natural and fundamental component of life on earth. Based in part on Darwin's early work on extinction that he developed on his Beagle expeditions, the idea of species extinction was formalized in the 19th century following the discovery of fossilized remains that had no living correlate in the archive of life.[2] This early work on extinction, in tight dialogue with Darwin's broader work on evolution and natural selection, deeply challenged prevailing ideas of species and nature that were bound-up with Christian teleological views of divine purpose by foregrounding historical contingency and accidence as key components of life and death. As pointed out by van Dooren, early work on extinction in the 19th century challenged the idea that species were a fixed and eternal kind, forcing a re-articulation and re-imagination of a species as a "historical lineage stretched between a beginning (speciation) and an inevitable end (extinction)" (*Flight Ways* 74).

As an evolutionary process that has taken place for millions of years, biological scientists have set the normal background level or rate at which species extinctions occur, and which balances the rate at which new species emerge, at roughly one species going extinct every four years.[3] However, due to the accelerated accumulation and planetary sedimentation of industrial toxicities that are increasingly metabolizing biophysical systems, these normal background rates of species extinctions have increased, notes van Dooren, to "somewhere between 100

---

[2] For an insightful account of Darwin's role and place in the history of work on extinction, see Gillian Beer "Darwin and the Uses of Extinction" (2009).
[3] See Ursula Heise "Lost Dogs, Last Birds, and Listed Species: Cultures of Extinction" 51.

and 1000 times the normal background levels" (*Flight Ways* 21). This accelerating production and sedimentation of toxicities is generating concerns that a holocene extinction event, and the corresponding planetary conditions of the Anthropocene (defined by warmer climates, acidified oceans, etc.), "may eliminate", notes Heise "up to 50 percent of currently existing animal and plant species" ("Lost Dogs" 51). Even though not all humans are equally responsible for the biophysical changes that are bringing about Anthropocene worlds and environments, the Anthropocene-extinction events signify a "pattern of loss that is (1) temporally brief in terms of geological time, (2) broad in terms of taxonomic diversity of the species affected, and (3) occurring at a much higher rate than that normally found in the fossil record" (van Dooren *Flight Ways* 271).

Unlike other planetary extinction threats, whether that be the nuclear extinction threat that characterized the Cold War period or the actual extinction event of the Cretaceous period, the petro-culturally and petro-industrially leveraged extinction threats in the Anthropocene are not reducible to a single, terminal end-point, a white-hot nuclear mushroom cloud instantly snuffing out the fragility of life. Thom van Dooren has written about extinction in the Anthropocene as a slow un-raveling violence, an undoing of entangled "flight ways" or "delicately interwoven" multi-species relationships, cutting across and confusing simplistic categorical oppositions separating nature from culture, life from death, the organic from the inorganic, the biological and technical (*Flight Ways* 81). Never a sharp, singular event - something that begins, rapidly takes place, and then is over and done with - extinction is a slow unraveling of complex and historically specific "flight ways",

ways of life that have been co-produced and delicately knotted through patterns of sequential and synchronous multi-species relationships (113). Extinction in the Anthropocene, therefore, is not only about the disappearance of an individual species, but is "a slow unraveling of intimately entangled ways of life that begins long before the death of the last individual" and effects "vast intergenerational lineages, interwoven in rich patterns of [multi-species] co-becoming with others", both human and nonhuman (34).

In this sense, extinction in the Anthropocene is what ecological theorist Timothy Morton calls a "hyper-object" (2013). Distributed over temporal and physical scales that exceed human lifespans and capacities for perception, representation and control, extinction in the Anthropocene often occurs unseen and unnoticed, not registering at a level of specificity that our typical aesthetic, technological and political regimes of visibility can translate into images.[4] Enrolling vastly different time scales than the human time-scales we are used to, extinction in the Anthropocene challenges perception and action, ethics and politics, as many of the petro-cultural approaches to world making and human exceptionalist methods of knowledge production need to be re-thought to address the challenges of "living [and dying] on a damaged planet" (Tsing "'Auto-ReWilding' Landscapes and the Anthropocene"). Therefore, despite having anthropogenic and petro-cultural roots, a key challenge posed by extinction in the Anthropocene is that it resists being reduced to a human scale, and so requires thinking practices, writing technologies,

---

[4] For a discussion of Morton's work on hyperobjects in relation to extinction, see Audra Mitchell "Gendering Extinction".

archives, infrastructures, imaginaries and "arts of noticing" that entangle wide intellectual, political, creative, and ecological networks and agencies.

From this perspective, the topic of extinction in the Anthropocene is as much an intellectual and imaginative challenge as it is a biophysical challenge, and below I turn to different kinds of knowledge practice, method and theory responding to the topic of extinction in the Anthropocene. I approach the knowledge practices of de-extinction and multi-species story-telling not as empty conceptual frameworks used to passively know or represent the object world, nor relativistic social constructions floating above a mute world of objects. Rather, I approach them as situated material/discursive apparatuses that, using the language of Haraway, "link stories, desire, reasons, and material worlds" in very particular and historically specific ways (*Modest Witness* 64). The eco-modernist de-extinction project known as "The Great Passenger Pigeon Project" and Environmental Humanities forms of multi-species story-telling are two differently located knowledge projects that map and contain very particular arrangements of history, agency and knowledge, and engender different forms of multi-species communication, connection and collaboration.

De-Extinction and Eco-Modernism

A consequential knowledge apparatus increasingly coming to dominate discussions about extinction in the Anthropocene is de-extinction. Characterized by *Time* magazine as one of the "big-deal" technologies of 2013, de-extinction, according to eco-modernist Stuart Brand, uses "genome editing [technology] to revive extinct species" or to "tweak wildlife gene pools" to survive Anthropocene environments

("Rethinking Extinction"). As a form of "precision conservation" or "applied evolutionary biology", de-extinction uses synthetic biology, pluripotent stem cell technology, interspecies somatic cell transfer technology and allele replacement techniques (cloning/genetic engineering) to transfer the genes of an extinct species "into the genome of a related species, effectively converting [the related species] into a living version of the extinct creature" (The Long New Foundation "Revive and Restore; What 'Genetic Rescue' Means").

In addition to this bio-technical practice of reviving extinct species, de-extinction is a historically and culturally specific form of knowledge work situated within very particular kinds of culture, history, politics, power and world making practice. As a historically specific knowledge practice designed to terra-form thriving Anthropocene environments, de-extinction is an assemblage containing conservation impulses, eco-modernism, Jurassic Park fantasies, and redemption story-templates. And as a situated knowledge and world making practice, de-extinction needs to be viewed contextually as part of the emerging material and discursive infrastructure of eco-modernism and the 'good Anthropocene'.

In contrast to the typical environmental conservation goal of preserving already established spaces of wild, pristine nature from human-induced contamination and interference, the eco-modernist practices of de-extinction promote 'enlightened' human interventions into genetic, evolutionary and biophysical processes and bodies as a means to actively take-over and direct the reproduction of desired Anthropocene futures and bodies. Not lacking a sense of self-importance, eco-modernist Erle Ellis noted that the ""good Anthropocene' is

81

ripe with human-directed opportunity. […] We will be proud of the planet we create" ("The Anthropocene: A Man-Made World").

Turning canonical 20th-century environmental perspectives on their head, the "EcoModernist Manifesto", co-authored by de-extinction proponent Stuart Brand, argues that "technological innovation" and "improvements in [socio-economic] productivity" are "more important to reducing environmental impact over the long run than conservation [and preservation] efforts are" (The Breakthrough Institute). Connected to and collaborating with the 'good Anthropocene' discourse discussed in the previous chapter, eco-modernism is predicated on the seemingly counter-intuitive claim that "protecting remaining wilderness in the face of escalating demand for food, resources and energy will require accelerating [or] speeding up urbanization and intensifying modern [techno-scientific interventions]" (The Breakthrough Institute).

Drawing on 'good Anthropocene' rhetoric (discussed in Chapter Two), knowledge production situated in this eco-modernist context is oriented by a desire to put "humankind's extraordinary powers in the service of creating a good Anthropocene" that is informed by and contributes to the "broader [historical, cultural, technological, and I would add, gendered and racial] framework for global modernization and development" (The Breakthrough Institute). Situating a universal, industrialized humankind as the core agent of earth system processes, the 'good Anthropocene' is viewed here as the dawn of a new phase of human enlightenment where technocratic innovation and industrial modernization couple with global environmental stewardship to not only stabilize precarious climatic and

biophysical systems, but to actively engineer a planetary Eden. Since, from this perspective, nature in its entirety is now "regularly altered by human influences", enlightened and rational "humans [should] use their growing social, economic, and technological powers to make life better for people, stabilize the climate, and protect the natural world" (The Breakthrough Institute). Ultimately, this eco-modernism is situated as part of a new and 'good' era of universal progress and human enlightenment that "means […] people can increase their standard of living while doing less damage to the environment" (The Breakthrough Institute). And, as a National Geographic article celebrating de-extinction articulates, "the prospect of de-extinction is profound news. That something as irreversible and final as extinction might be reversed is a stunning realization. The imagination soars" (Brand "Opinion: The Case for Reviving Extinct Species").

Contributing to and informed by this context, de-extinction is a knowledge practice oriented by a desire to produce "evolution machines" that, as noted by de-extinction NGO "The Long Now Foundation", are species specific "genetic assistance" and "genetic rescue" technologies that intervene and direct the "facilitated adaptation" of endangered and extinct species to "stay ahead of novel diseases [and] to keep up with climate change" ("Revive & Restore; Revival Criteria").

Acknowledging that it is "relatively easy to adjust a living genome", de-extinction is a practice that penetrates evolutionary patterns, planting seeds for a human-directed 'good Anthropocene' ("Revive & Restore; Revival Criteria"). Characterizing this "new environmentalist" landscape situating the knowledge practices of de-extinction, Brand observes that "[w]hat we might be seeing in

response to climate change [and species extinctions] is starting to look very much like a global [human-directed] acceleration of evolutionary rates" ("Opinion: The Case for Reviving Extinct Species"). For Brand and other eco-modernists, de-extinction is one component in a globally distributed, human-directed network designed to manage, oversee and advance evolutionary and biophysical systems to keep ahead of accelerating rates of species extinctions and off-set the increased ecological precarity leveraged by globalized petro-cultural and petro-industrial modes of life.

Eco-modernism and de-extinction, therefore, are anthropocentric and human exceptionalist knowledge practices predicated on the modernist, colonial and patriarchal imaginary of the self-contained rational subject who is separated from (seemingly) passive objects of nature that are in need of enlightened guidance and direction. In this sense, the eco-modernism of de-extinction indexes particular forms of established privilege (colonial, gendered, species) and configurations of power/knowledge that situate extinction and ecological precarity in a linear, universal progress narrative, and as a challenge to be overcome by human ingenuity and self-determination. Extinction in the Anthropocene becomes translated as a trial that tests the strength, power and courage of the human anthropos, and as a battle to be overcome in the great, universal mission of human history to colonize and take possession of the auto-poietic functioning of globe. "In the service of the inherent dynamic of Progress", notes environmental ethicist and vocal critic of eco-modernism Clive Hamilton "the negativity of ecological damage is sublated or assimilated into a positive force for change" ("The Technofix Is In: A Critique of 'An

84

Ecomodernist Manifesto'").

The flagship initiative characterizing de-extinction is "The Great Passenger Pigeon Comeback" project. The "Passenger Pigeon" project is overseen by the de-extinction not-for-profit "Revive and Restore", but is institutionally situated as a collaborative partnership between Toronto's Royal Ontario Museum (the public institution containing the largest depository of extinct passenger pigeon specimens) and UC Davis' Department of Evolutionary Biology. A once iconic North American bird numbering in the billions, the passenger pigeon went extinct in the 19th century due to hunting and habitat destruction, but is viewed as a prime candidate to be the first extinct species brought back to life due to the recent revival of the North American boreal forest and recent hunting by-laws that would protect the bird and its habitat.

The "Passenger Pigeon" project uses genetic sequencing technologies to map passenger pigeon DNA procured from museum specimens, and then transfers passenger pigeon DNA into band-tailed pigeons, a close living relative of the passenger pigeon. The goal of the project is "not to recreate identical copies of historic passenger pigeons [since that is impossible] but [to] map the sequence of genes and [to] regulate [the genetic] regions that are most important to creating passenger pigeon traits" ("Revive & Restore; De-Extinction Defined"). Beyond replication and discovery, therefore, "passenger pigeon de-extinction creates a new lineage of life", a passenger/band-tailed pigeon that is supposed to adopt, perform, and inhabit the evolutionary and environmental role the bird once had as an environmental actant in eastern North America ("Revive & Restore; De-Extinction

85

Defined").

Since gene crossing and hybridization is "what happens in normal [cross-species genetic] hybridization anyway", the de-extinction of the passenger pigeon is presented as a form of "synthetic hybridization of the genome of an extinct species with the genome of its closed living relative […] effectively bringing the extinct species back to life" ("Revive & Restore; De-Extinction Defined"). As of early 2015, the project successfully mapped the genetic material supplied by the ROM, and hopes to carry out a successful gene transplant and breeding program over the coming years. At that point, the de-extinct species would be subject of forced breeding practices[5] and training regimens that would hone and reactivate their dormant migratory and roosting patterns so that the cloned birds would mimic the historical patterns of behaviour specific to passenger pigeons. If successful, the de-extinct bird would work as an ecological actant in coastal boreal forests as a consequential ecosystem provider, promoting regional ecological "richness and bio-abundance", and in effect, provide ecological and evolutionary stability for damaged Anthropocene futures ("Revive & Restore; De-Extinction Defined").

Inhabiting the culture, stories and practices of eco-modernism, a key aspect situating the knowledge practices of the "Passenger Pigeon" project is adopting positive, optimistic language to frame "good news" stories about 'good Anthropocene' futures, rather than using fear, guilt and negativity to intimidate public support (Brand "Rethinking Extinction"). Although the number of actual

---

[5] Forced breeding practices are highly contentious, and the focus of much critical work in animal studies and multi-species studies. For example, see Haraway *When Species Meet*; and Thom van Dooren *Flight Ways.*

living and breathing critters that de-extinction has resurrected is incredibly limited,

the "Passenger Pigeon" project has intentionally generated an atmosphere of hype,

promise and enthusiasm that bio-tech start-up's seem to need in a world of

entrepreneurial, enterprise capitalism.[6] For example, Stuart Brand notes:

> "[there is] no end of specific wildlife problems [that] remain to be solved, but
> describing them too often as extinction 'crises' has led to a general panic that
> nature is extremely fragile or already hopelessly broken. That is not remotely
> the case. Nature as a whole is exactly as robust as it ever was - maybe more so,
> with humans around to head off ice ages and killer asteroids. Working with that
> robustness is how conservation's goals get reached. [In this way,]
> conservationists [promoting de-extinction] are learning the benefits of building
> hope and building on hope. Species brought back from extinction will be
> beacons of hope. [At] the same time, conservation biologists are realizing that
> bad news bums people out [and therefore, not productive.] [...] So basically,
> [we're] learning how to build on good news [and] see reviving extinct species as
> the kind of good news you might be able to build on." ("Rethinking Extinction").

Yet this attachment to hope and progress might be an example of what Lauren

Berlant calls "cruel optimism" (2011). Following Berlant, the cruel optimism of de-

extinction maintains "a relation of attachment to compromised conditions of

possibility" (7). Although de-extinction remains firmly attached to the eco-

modernist notion of the 'good Anthropocene', the planetary, biophysical and climatic

re-configurations and un-doings resulting from the toxicities produced by globalized

petro-cultural arrangements of existence seem to signify a world that is with-

holding or not-holding-together in a way that maintains the hegemonic foothold of

human exceptionalism, linear progress narratives and epistemologies predicated on

ontological access to the 'other'. With STS scholar Isabelle Stengers, the earth in an

era of climate change and accelerated rates of species extinction seems "capable of

---

[6] For example, see Melinda Cooler *Life as Surplus: Biotechnology and Capitalism in the Neoliberal Era* (Washington D.C: University of Washington Press, 2008); and, Sunder Kaushik Rajan *Biocapital: The Constitution of Postgenomic Life*. Durham: Duke University Press, 2002.

assemblages that are very different [geologically, biophysically, etc.] from the ones on which" things like human exceptionalism, anthropocentrism, and the civilizational/colonial world making practices built with and from these perspectives, "depend on" ("Gaia, the Urgency to Think (and Feel)"). That is, the earth seems capable of making human exceptionalism lose its foothold as one of the default operating systems contextualizing and organizing Euro-North American knowledge practices across the sciences and humanities.

Moreover, this attachment to positive 'good-news' stories that fix the problem once and for all have led the "Passenger Pigeon" project to gloss over and not pay attention to the messy ecological and political questions of how to re-naturalize or re-wild the revived birds into complex eco-social environments and histories. As conservation biologist Stuart Pimm notes, the "history of putting species back after they've gone extinct in the wild is fraught with difficulty. […] Having the species solves only a tiny, tiny part of the problem" (quoted in Zimmer "Bringing Them Back to Life"). For example, some conservation biologists have pointed out that many human and nonhuman communities may not welcome the new birds, and questions have emerged regarding what bodies or forms of life will be cut or lost by re-naturalizing de-extinct birds into ongoing multi-species environments. In addition, as a genetically modified organism, there are potential unknown biophysical and bio-social effects de-extinct passenger pigeons might create. For example, van Dooren and Rose wonder whether revived species would create a reservoir for new viruses that would threaten other bird species? Or, would they be attractive sport for (illegal) poachers and hunters ("Unloved Others: Death of the Disregarded in the

Time of Extinctions" 2-3)?

De-extinction's techno-optimism and anxious focus on translating the problem of species extinction into progress narratives obstructs knowledge producers from attending to the inherent patriarchy and hetero-normativity internal to what, Thom van Dooren calls, practices of "violent care" ("Ethics From the Field"). The violent methods employed by captive and forced breeding practices, violence largely felt by female bodies reduced to their reproductive function (as a means to perpetuate and 'save' the future of the species) are "often rendered ethically unproblematic" and written-off as a necessary consequence of reproducing life ("Ethics From the Field"). Violent care, for van Dooren, occurs when "birds [typically female] are subject to captivity and to stressful procedures like artificial insemination, while the freedom and in some cases the lives of members of other species are sacrificed to safeguard or prepare the way for the endangered birds [meaning, the intentional extermination or re-location of potential predators]. [Perhaps ironically,] all of this happens inside what is, in many important ways, a deeply caring project carried out by people who are committed to the well-being and continuation of the species" ("Ethics From the Field"). The ethically and politically compromised means justify the ends of linear species production and reproduction.

Focusing on extinction from a security studies perspective, Audra Mitchell argues that despite having good intentions, captive and forced breeding "programmes [like the ones the 'Passenger Pigeon' project would operate] highlight an important way in which extinction is gendered in dominant scientific and policy frameworks. Specifically, strategic breeding programmes [...] are directly related to

Western norms of the reproductive imperative for women" (Mitchell "Gendering Extinction"). And following Haraway, captive breeding practices are a situated example of the patriarchal idea that "'woman's putative self-defining responsibility [is] to 'the species' as this singular and typological female is reduced to her reproductive function" ("Speculative Fabulations").

Focusing primarily on hype and optimism, de-extinction projects like the "Passenger Pigeon" project avoid what Haraway has called "staying with the trouble" ("Anthropocene, Capitalocene, Chthulhocene: Donna Haraway in Conversation with Martha Kenney"). For Haraway, a commitment to staying with the trouble in multi-species worlds requires knowledge producers to slow-down the rush to certainty and celebration, and acknowledge that "there is rarely a situation in which everyone wins" ("Anthropocene, Capitalocene, Chthulhocene"). Staying-with-the-trouble is about paying attention to the situated ways that suffering and flourishing are always unevenly distributed and built into particular kinds of knowledge practice. Rather than rushing to fix the problem of extinction in the Anthropocene once and for all, turning it into a cause for celebrating human exceptionalism and meta-narratives of a progressing human-kind towards a future enlightenment, Haraway's staying-with-the-trouble asks about inheriting and working with a thick, tangled mess of living and dying "[w]ithout the mad solace of yet another extermination, another fix, perhaps in the tempting form of another right-to-life discourse, another return to amnesia, another disavowal of multi species mortality" ("Speculative Fabulations"). Staying with the trouble is about non-innocent, "vulnerable and irreducible responsibility [in knowledge making

work] not only for living and dying, but also for killing and breeding" ("Speculative Fabulations").

Contained within the patriarchal progress narratives of de-extinction's eco-modernism are redemption and salvation story-templates that situate the knowledge practices of de-extinction in a barely secularized Christian-realist world-view. As such, the institutional arrangements situating de-extinction as part of a secular Christian-realist world-view position knowledge practice within redemption and salvation story-templates where 'Man' atones for past sins by resurrecting a fallen nature. Stuart Brand articulated this point unequivocally when he made the stunningly immodest claim that in the Anthropocene "[w]e are as gods, so we may as well get good at it" ("Opinion: The Case for Reviving Extinct Species"). Yet for Clive Hamilton, "the eco-modern's commitment to the good Anthropocene is a secular manifestation of the religious idea of Providence, with Man rather than God guiding human destiny" ("The Technofix Is In: A Critique of 'An Ecomodernist Manifesto'").

A primary and canonical text in the de-extinction archive, for example, is George Church's *Regenesis.* The book self-consciously riffs on the Biblical story about the creation of life, but re-tells the genesis story by positioning the modern-western 'Man' of science in the transcendent god position, majestically breathing life in to a dead and dying earth, creating a new, 'good Anthropocene' in the image of a techno-scientific humanism. Moreover, the two leading knowledge ecologies gathering and institutionalizing the technologies, cultures, sciences, discourses, and imaginaries that characterize de-extinction as an eco-modernist practice are Stuart

Brand's already mentioned "Revive and Restore" and the Australian "The Lazarus Project" - Lazarus being an explicit reference to the biblical character "Lazarus of Bethany" brought back to life by Jesus. In a 2011 TEDx Talk viewed nearly two million times, Stuart Brand justifies de-extinction by noting that "humans killed off a lot of species over the last 10, 000 years. Some resurrection [of nature] is in order. A bit of redemption [for us] might come with it" ("TED2013: The Dawn of De-Extinction. Are You Ready?"). Relatedly, Michael Archer of "The Lazarus Project" stated in an interview that "we played God when we exterminated these animals", and now realizing the ecological damage we caused by these exterminations, "we have an obligation [to use our god-like status for good and] to try to do this [i.e. fix the problem of extinction once and for all]" (Branco). Finally, in response to criticism that de-extinction overlooks the situated consequences resurrected species would potentially face in actually existing eco-social life-worlds, George Church, author of *Regenesis*, argues that it is "hard in advance to say what's distraction and what's salvation" (10).

By highlighting the connections between de-extinction and eco-modernism, my point is to show that de-extinction is a multi-faceted interaction of method and theory, power and knowledge, humans and nonhumans, race and gender, embodiment and affect, entangled in historically contingent, practical knowledge making work that does not merely explain or represent the world, but is a powerful apparatus that organizes and builds worlds, forms of embodiment and regimes of visibility in some ways and not others. De-extinction is as much about the institutional production of a historically specific knowledge practice as it is about

normalizing and archiving specific kinds of world-building practice that non-innocently privilege some kinds of subject and object, kin and kind, and relation making practices over others. That is, drawing on Haraway's work exploring cyborg environments that make up late 20th-century techno-science, the crucial question emerging with the implosion of de-extinction and eco-modernism is not only about ideology or the way extinction will be represented, but of situated "modes of practice among humans and nonhumans that configure the world materially and semiotically in terms of some objects and boundaries and not others" (*Modest_Witness* 99).

Knowledge practices are not, notes McKenzie Wark, only "a powerful [set] of metaphor extended via substitution into an explanatory causality for the world, or even the cosmos. [But become] a powerful means of organizing worlds" (*Molecular Red: Theory for the Anthropocene*). Therefore, in this eco-modernist arrangement of knowledge and practice, nonhumans matter in so far as they fit into and contribute to the historical unfolding of the linear, universal, homogenizing progress narratives and power/knowledge infrastructures that continue to keep space open for particular kinds of patriarchal, colonial and racial subject positions, embodiments and regimes of visibility. That is, the conceptual and embodied infrastructure holding-together de-extinction are built and configured on the narrative/story patterns foregrounding the "second birthing of Man through the homogenizing of all the world's body into resource for his perverse projects" ("Situated Knowledges" 592).

Embedded within predictably privileged (white, male, western) networks and

arrangements of existence in the developed world, de-extinction perpetuates

visions of elite forms of scientific culture and embodiment far removed from messy

political questions knotted into complex landscapes and embodiments. If the

context (disciplinary, cultural, geographic), or range of agencies and embodiments

internal to the practice of de-extinction included other kinds of bodies, cyborg

critters, agencies (human and more-than-human), forms of embodiment,

transdisciplinary collaborations, and gendered/racial imaginaries, then other kinds

of stories, arts of noticing, and technologies of vision might render extinction in the

Anthropocene otherwise. Since, following Wark, "more symbiotic – dare we say

comradely? – kinds of life hardly figure in such metaphors" and knowledge projects

"it is time for other stories" (*Molecular Red*) – stories that gather other kinds of 'we',

pasts and futures, bodies and embodiments, and enact different kinds of response-

abilities and arts of noticing human-induced planetary disturbance.

Multi-Species Story-Telling for a Damaged Planet

Having worked through the restricted collection of imaginaries and figures, tropes

and thinking-practice that compose the knowledge making work of de-extinction, I

want to end this chapter by exploring a key methodological approach to knowledge

production in the Environmental Humanities that responds differently to extinction

in the Anthropocene. Scholarly multi-species story-telling is emerging as a

particular approach to knowledge production in the Environmental Humanities that

responds to conditions of human-made non-livability by situating knowledge

production within epistemological arrangements and semiotic technologies that

address ecological matters of concern outside anthropocentric and human

exceptionalist world-views.

For people such as Anna Tsing, Donna Haraway, Thom van Dooren, and Vinciane Despret, multi-species story-telling works across disciplinary arrangements such as anthropology, multi-species ethnography, feminist STS, critical theory, evolutionary biology, and developmental biology to devise arts of noticing the divergent, weedy multi-species configurations of the Anthropocene that don't fit universal, progress narratives. In this sense, the multi-species story-telling practices of Anna Tsing challenge forms of knowledge production enclosed or contaminated by "the modern human conceit, [and those that] conspired against our ability to notice the divergent, layered and conjoined projects that make up worlds. Entranced by the expansion of certain ways of life over others, scholars ignored questions of what else was going on. As progress tales lose traction, it becomes possible to look differently" (*The Mushroom at the End of the World* 22).

Unlike de-extinction, scholarly multi-species story-telling is a form of transdisciplinary knowledge making work that asks how else the story of the Anthropocene might be told, imagined or lived beyond heroic narratives, conquest stories, colonial/frontier configurations, redemption templates and salvation/damnation timelines. Whereas de-extinction is a particular form of knowledge making work that gathers extinction into particular (eco-modernist) worlding apparatuses, multi-species story-telling gathers thinking practices like Haraway's work on situated knowledge and work in decolonizing ethics[7] to map

---

[7] For example, see Mamdani Mahmood "Settler Colonialism: Then and Now." *Critical Inquiry* 41 (2015): 1–19; and Deborah Bird Rose *Nourishing Terrains: Australian Aboriginal Views of Landscape*

"'naturaltechnical' worlds at stake, worlds needy for care and response, worlds full of unsettling but oddly familiar critters who turn out to be simultaneously near kin and alien colonists" ("Speculative Fabulations").

By tinkering with the Western epistemological imperatives and embodiments that oppose human and nonhuman worlds, objects from subjects, writing from realism, knowledge making from world making, multi-species story-telling is committed to renewing arts of description that don't place 'us' at the center of the Anthropocene, and recognize that too much of the world goes absent in the story-templates framing de-extinction and eco-modernism. As noted by SF author Ursula Le Guin at the "Arts of Living on a Damaged Planet" conference, humans constitute a particularly lively node of inter-connection, but humans are not at the center of the Anthropocene.

The result of this form of knowledge production is a proliferation of situated, real-life accounts modelling what happens when species meet on a damaged planet. Showing how species meet on a fragile, damaged planet outside human exceptionalist world-views and anthropocentric histories creates space for questions and narratives to emerge about practices of living-well with-others across difference beyond innocence and guilt, salvation and damnation, universal progress and final ends. With Barad, "ethical work should not be about [proposing the] right response to a radically exterior/ized other, but about responsibility and accountability for the lively relationalities of becoming of which we are a part" ("On

and Wilderness (Canberra: Australian Heritage Commission, 1996); and, Vanessa Watts "Indigenous Place-Thought & Agency amongst Humans and Non-Humans (First Woman and Sky Woman Go on a European World Tour!)." *Decolonization: Indigeneity, Education & Society* 2.1 (2013): 20–34.

Touching" 210). Informed, therefore, by Haraway's work on the material/semiotic

aspects of situated knowledge production, multi-species story-telling is built from

the notion that:

> "there is no way to rationality - to actually existing worlds - outside stories, not
> for our species anyway. [...] We exist in a sea of powerful stories; they are the
> condition of finite rationality and personal and collective life histories. There is
> no way out of stories; but no matter what the one-eyed father says, there are
> many possible structures, not to mention contents of narration. Changing the
> stories, in both material and semiotic senses, is a modest intervention worth
> making" (*Modest_Witness* 45).

As a "device for considering how to make the end swerve" (*Modest_Witness* 14), the

scholarly practice of multi-species story-telling works outside and otherwise than

the classic nature-storytelling apparatus or genre of writing crafted to allow

(usually) lone, male, white, western writers escape the reifying, artificial and

alienating tendencies of academic and scientific writing conventions to re-connect in

a more un-mediated way to the natural world. Whereas this form of story-telling has

traditionally been privileged as a knowledge practice that is more authentic and

direct because it is imagined to allow unmediated access to an object of knowledge,

scholarly multi-species story-telling understands there is no way to get outside

artifice, mediation and story in (both humanistic and scientific) knowledge making

work.

In this sense, knowledge practices work to render some aspects and

associations of the world visible and others invisible, while privileging some subject

positions and embodiments over others. Therefore, the point is not to get free of

mediation and artifice, but to tinker and play with the terms and technologies of

mediation as a means to make a difference in material/semiotic apparatuses of

knowledge production "so that we get more promising interference patterns on the recording films of our lives and bodies" (14). Not working to get the right solution or perspective, this knowledge position presupposes that changing situated technologies of vision and proliferating the agencies of visualization remind us, notes Tsing, "we are surrounded by many world-making projects, human and not human. World-making projects emerge from practical activities of making lives; in the process these projects alter our planet" (*The Mushroom at the End of the World* 21-22).

Opposed, moreover, to the popular genre of extinction writing[8] that produces a linear who-done-it narrative where heroic subjects travel the world to identify and condemn the root causes of the extinction crisis, or work to produce elegies of loss and guilt, mourning and melancholia,[9] this transdisciplinary form of multi-species story-telling works to materially/semiotically thicken situated relationships of co-evolution and ecological co-dependency occurring at the edge of extinction. For Thom van Dooren, "at the same time as [stories] may offer an account of existing [multi-species] relationships, stories can also connect us to others in new ways. [...] Quoting Haraway, the 'world is a verb', and so stories are 'of' the world, not 'in' the world. Worlds are not containers [or mirrors], they're patternings, risky co-makings, 'speculative fabulations'. [...] Telling stories has consequences: one of which is that we will inevitably be drawn into new connections, and with them, new

---

8 Exemplified by Elizabeth Kolbert's 2014 nonfiction book *The Sixth Extinction: An Unnatural History*
9 For example, see Melanie Challenger *On Extinction: How We Became Estranged from Nature*. New York: Counterpoint, 2013; Greenberg *A Feathered River Across the Sky: The Passenger Pigeon's Flight to Extinction*. New York: Bloomsbury USA, 2014; and, Quammen *The Song of the Dodo: Island Biogeography in an Age of Extinction*. New York: Scribner, 1997.

accountabilities and obligations" (*Flight Ways* 29).

A prerequisite to this form of knowledge making work is an openness to transdisciplinary collaboration as a means to learn and notice what privileged disciplinary conventions typically overlook. Working to productively contaminate disciplinary thinking practices, and fudge the existing visualization practices and subject positions privileged in humanistic and scientific knowledge making environments, a handful of recent transdisciplinary conferences have been gathering artists, humanists and natural scientists in the open, outside the disciplinary divides imposed by scholarly training. Creating transdisciplinary space for artists and scientists to talk in the open, these conferences nudge participants from their settled grooves of disciplinary thinking, putting them slightly off balance, in order to force participants to collaboratively compose ways of making meaning across heterogeneous regimes of knowledge and discourse. Preventing participants from relying on a single conceptual or disciplinary archive to mediate and direct knowledge making work, these conferences mix-up and proliferate the kinds of thinking-practices, narratives, conceptual infrastructures and histories that knowledge producers inhabit and inherit.

In December of 2014, Thom van Dooren and Michelle Bastian organized a symposium called "Im/mortality and In/finitude in the Anthropocene" that stimulated the cross-disciplinary construction of conceptual apparatuses and "new approaches to creativity, imagination and responsibility" situated by the ongoing "patterns of [multi-species] living and dying" in the Anthropocene ("Symposium Description"). And secondly, the innovative Center for 21st Century Studies at the

University of Wisconsin-Milwaukee held a conference in April-May 2015 called "After Extinction", that among other things, asked about the kinds of semiotic technologies and aesthetic mediations necessary to imagine living and dying amidst Anthropocene extinction events.

Important for these considerations is Anna Tsing's 2015 *The Mushroom at the End of the World* that tells true-tales about mushrooms, science, biology, culture, economy, capital, life and death, and works to re-calibrate and re-situate sense and desire, action and expectations as human exceptionalist assumptions are replaced by competing visions of precarity, depletion and loss. Focusing on the strange connections, ecological collaborations and global assemblages entangled around matsutake mushrooms, Tsing's text does not tell stories of heroic knowledge producers laying bare wild, untamed frontiers to be penetrated or turned into intellectual capital, but is about learning how to take care of contaminated ecological spaces and patchy environments.

Practicing what anthropologist Deborah Bird Rose calls "responsive attentiveness" ("Storied-Places in a Multispecies City"), Tsing produces regimes for noticing damaged landscapes other than as challenges to be conquered or colonized, fixed or saved. "As long as authoritative analysis requires assumptions of growth, experts don't see the heterogeneity of space and time, even where it is obvious to ordinary participants and observers. In a global state of [ecological and social] precarity, we don't have choices other than looking for life in this ruin - our first step is to bring back curiosity" (*The Mushroom at the End of the World* 4).

Dismissing cynicism and pessimism, nostalgia and melancholia, as well as

idealism and optimism, Tsing has crafted an innovative and collaborative research platform that cultivates imaginaries, story-telling patterns, theoretical configurations, affective registers and aesthetic templates that thicken and texture multi-species ongoing-ness within diminished, depleted environments. The contaminated environments Tsing visits are not situated in salvation or redemption narratives or within progress narratives that project forward a harmonious resolution where things get better. Rather, contaminated environments are confronted as matters of concern that challenge many of our disciplinary, political, embodied and ecological modes of thinking and acting. Cultivating curiosity and modes of attention within the contaminated environments specific to the Anthropocene, Tsing's goal is to help re-populate and re-sensitize thinking-practices and imaginations that are themselves contaminated by an academic environment increasingly damaged by demands to conform to academic commodification, public/private synergies, and market signals.

Paying attention to mushroom picking helps attune Tsing to the noise and signals blocked by regimes of visibility situated within human exceptionalist progress narratives, leading her to ask: What kinds of multi-species collaborations emerge in blasted environments, and how can these collaborations be told outside linear narratives of progress and situated within developmental time-lines foregrounding incremental and forward moving improvement? Asking these questions, Tsing's work as a knowledge producer and story-teller of damaged Anthropocene environments works to de-colonize disciplinary thinking practices as a means to help foster methods of noticing what else is going on, spark curiosity and

pay attention to other ways of living-well with others on a damaged and depleted planet. Tsing notes that "neither tales of progress nor ruin tell us how to think about collaborative survival [in the Anthropocene]. It is time to pay attention to mushroom picking. Not that this will save us - but it might open our imaginations" (*The Mushroom at the End of the World* 5)

In an academic environment where transdisciplinary research seems increasingly difficult to foster and fund, *The Mushroom at the End of the World* is an articulation of a cross-cultural, multi-lingual, globally distributed collaborative research project called the "Matsutake Worlds Research Group". Using mushrooms as a tool to figure and narrate Anthropocene worlds, this research project gathers anthropologists, ethnographers, STS scholars, natural scientists, as well as globally distributed mushroom pickers and sellers, to map the scientific, ecological and commercial frictions and worldings entangled with matsutake mushrooms.

Another consequential knowledge apparatus Tsing is devising, resulting from receiving the Niels Bohr Professorship from the Danish National Research Foundation, is the transdisciplinary research institute "Living in the Anthropocene: Discovering the Potential of Unintended Design on Anthropogenic Landscapes". Like her projects of figuring and examining ways of living-well in the contaminated landscapes of the Anthropocene, this project provides space and funding for international conferences, courses, visiting scholars and collaborations across the sciences, social sciences, humanities and arts, to "open up a novel and truly transdisciplinary field of research into the Anthropocene which is needed to understand the kinds of lives that are made and the futures that are possible in the

ruined, re-wilded, and unintended landscapes of the Anthropocene" (Living in the Anthropocene; Profile).

Another example of work situated in the context of Anthropocene extinction events is Thom van Dooren's *Flight Ways*, which tells "'extinction stories that implicate people" (18). Arguing that typical extinction stories are produced according to the genre conventions of mystery or detective narratives where investigators work to neatly piece together the clues to a single, bounded mystery of why and how a species was killed off, van Dooren situates his research on "avian entanglements" at the "edge of extinction" in a different kind of conceptual and embodied framework (18). Tracking the entangled "flight ways" of specific birds as they become implicated in extinction events, van Dooren draws on evolutionary biology, animal ethnography and the ecological sciences to evoke the knotted, heterogeneous and complex tapestry of technologies, histories, cultures, temporalities, discourses and embodiments implicated and impacted by the disappearance of a species. Presupposing that an extinction is always multiple, diverse and stretched over long stretches of time, each chapter gathers many agencies, actors and time-lines to tell or map a different extinction story. "In each case there is a distinct unraveling of ways of life, a distinctive loss and set of changes and challenges that require situated and case-specific attention. In delving into the lives and deaths of particular bird species, this book attempts to draw out their 'entangled significance' [… and] explores some of the ways in which diverse living beings - humans and not - are drawn into the extinctions of others" (25).

Focusing on vultures, penguins, cranes and crows, van Dooren asks: What

kinds of flight-ways or multi-species forms of life are being re-made and undone, and with consequences for whom, in this time of accelerated extinctions and exterminations? "It is clear that much more than is often appreciated is at stake in the disappearance of birds. And so we are able to understand in new ways the diverse significances of extinction: What is lost when a species, an evolutionary lineage, a way of life, passes [or is cut] from the world? What does this loss mean within the particular multi-species community in which it occurs" (19).

The multi-species stories offered by van Dooren are not linear, teleological narratives with clear beginnings that converge toward neat resolutions. Rather, each chapter weaves or holds together disparate cultures, embodiments, narratives and multi-species flight ways to produce entangled, material/semiotic plot-spaces situated at the edge of extinction. Each chapter gathers heterogeneous human and nonhuman timelines, embodiments, technologies, toxins, cultures, histories, animals and landscapes to evoke multi-species worlds at stake in this time of extinction. At stake in the stories van Dooren weaves is more than "biodiversity", but "human and more-than-human ways of life, languages, ways of mourning and being with others, even livelihoods an diverse cultural and religious worlds are often drawn into the fray as species move toward, and then beyond, the edge of extinction" (25).

Two ideas orient and shape the methodological approach directing van Dooren's book. First, "[p]aying attention to avian entanglements unsettles human exceptionalist frameworks, promoting new kinds of questions about what extinction teaches us, how it remakes us, and what it requires of us" (20). And second, living on an increasingly diminished and toxic planet requires knowledge producers, political

agents, and vulnerable earth-dwellers "make a stand for some possible worlds and not others; we are required to begin to take responsibility for the ways in which we help to tie and retie our knotted multi-species worlds" (118). In short, each chapter evokes assemblages where forms of multi-species living and dying are (re)formed at the edge of extinction, and how situated encounters shape the way multi-species flight ways emerge and disappear, endure and perish, thus evoking the entangled complexity of learning and unlearning taking place in these multi-species assemblages. In telling stories that stay with the trouble, van Dooren is building and locating complex multi-species, multi-temporal worlds that share Haraway's approach of training "the mind and imagination to go visiting, to venture off the beaten path to meet unexpected, non-natal kin, and to strike up conversations, to pose and respond to interesting questions, to propose together something unanticipated, to take up the unasked-for obligations of having met. [...] Opening up versions so stories can be ongoing is so mundane, so earth-bound" ("A Curious Practice" 8).

Presuming that multi-species belonging, kinships and lineages are never settled, van Dooren's project is motivated by a desire to articulate ways to inherit and live-with the patterns of human-induced non-livability that the Anthropocene has left in a way that moves 'our' stories, imaginaries and practices toward multi-species ongoing-ness and collaboration. De-colonizing self-certain and ego-boosting knowledge practices that rush to situate humans at the center of the story, van Dooren's practice is about telling true tales (stories that are rigorously factual and objective), while also exploring and experimenting with the settled authoritative

105

distribution of the possible and the impossible, the acceptable and the unacceptable.

Conclusion

Producing material and discursive differences that matter, de-extinction and multi-species story-telling iteratively (re)configure patterns and associations (possibilities and impossibilities) of multi-species becoming, political relationships, and agency. As globally funded, high-stakes players in ecological discourse and practice, de-extinction projects are consequential platforms producing, normalizing and institutionalizing material/semiotic practices built from 'good Anthropocene', eco-modernist imaginaries of planetary stewardship, entrepreneurial logics, linear progress narratives, disciplinary segregations, colonial imaginaries, and salvation/redemption templates that re-iterate and sustain particular kinds of political, ecological and scientific arrangements and associations.

Therefore, my approach to work on extinction in the Anthropocene asks not what extinction means or what it means to go extinct, but about the way situated knowledge projects both intentionally and inadvertently foster some kinds of multi-species living and dying, while foreclosing others. De-extinction and scholarly multi-species story-telling are different knowledge projects that do more than protect endangered species, they naturalize, rationalize, archive and institutionalize very particular relation making practices, imaginaries, embodiments and technologies, and make very real and material differences regarding what kinds of human and more-than-human arrangements of existence flourish and perish. In this sense, these knowledge projects are setting the terms for how Anthropocene futures are going to be inhabited and emerge, by who and at what cost.

As Haraway and others have shown, knowledge work is never innocent, a-political, and void of interests (economic, political, institutional, ontological and epistemological etc.), so knowing how these worlds of knowledge and practice are made, by who and for whom, matters (*Modest Witness*). There may be no easy fix to the ongoing human-induced planetary dithering of the Anthropocene, but it remains possible to cast our lot with some kinds of living and dying, and not others.

Chapter Four – Where the Wild Things Are Now: Rewilding Blasted Anthropocene Environments

> Ruins are now our gardens. Degraded
> ("blasted") landscapes produce our livelihoods.
> (Tsing "Blasted Landscapes" 87)

Amidst the myriad of approaches and values that have defined North American environmentalism and conservation ecology, the protection of the natural world, and keeping nature safe from the toxic byproducts of modern industrial societies has been paramount. Whether protecting green spaces from urban development or conserving wildlife habitat areas from social encroachment, the environmental movement is marked by campaigns to protect the world of nature as a means to enable biophysical, genetic and evolutionary diversity and health. Yet the scope and scale of damaged, anthropogenic environments that mark the Anthropocene challenge this ecological imaginary. For Clive Hamilton, "the task of environmentalism [in the Anthropocene] can no longer be to save the planet, for the planet we wanted to save has become something else, not the kind of thing that can be 'preserved' and 'conserved'" ("Can Humans Survive the Anthropocene?" 8).

Whereas the preceding chapter addressed de-extinction as one emerging practice attempting to produce an environmental science and discourse for the Anthropocene, this chapter will work through another emerging ecological practice responding to the Anthropocene called rewilding ecology. In particular, I examine a specific example of rewilding currently taking place in the Netherlands called the Oostvaardersplassen (henceforth OVP). This chapter focuses on rewilding and the

OVP not because they are the solution to the problems of the Anthropocene and should be viewed as privileged forms of environmental discourse and practice, but because rewilding is being presented as a key form of environmental mediation methodologically and politically capable of responding to the blasted[1] landscapes characterizing the Anthropocene. Like de-extinction, rewilding is presented as a form of environmental mediation for the Anthropocene, but unlike de-extinction, I argue that rewilding is better able to stay-with-the-trouble of critically and creatively responding to diverse multi-species publics, science and politics.

Starting from the premise that historically and culturally situated practices differently shape human/nonhuman relationships or how species meet, this chapter will situate rewilding and the OVP methodologically and conceptually in relation to work on the Anthropocene, and in relation to discipline-specific debates about the changing focus of conservation biology and restoration ecology in response to the Anthropocene. Conservation biology and restoration ecology are tied to and emerge historically from a particular period of environmentalism and environmental thought, and this history and archive are working to adjust (methodologically and conceptually) to the differences made by the Anthropocene. That is, rewilding and the OVP need to be contextualized in relation to the history of mid to late 20th century environmentalism and conservation biology, and the translations this history is undergoing in response to the ecological challenges brought about by the

---

[1] I take this notion of 'blasted landscapes' from Anna Tsing's title in her paper "Blasted Landscapes (And The Gentle Arts of Mushroom Picking)". 'Blasted landscapes' as a phrase is used in contrast to the notion of pure environments. It implies that environmental thought and practice don't start or end with notions of authentic/inauthentic nature, but damaged, disrupted, cyborg, 'trashy' landscapes are sites for noticing multi-species livability.

rise of climate change and the Anthropocene. The Anthropocene interrupts nature/alien, real/constructed, native/introduced distinctions that have methodologically shaped conservation biology, but as an environmental practice for the Anthropocene, the methodological and conceptual focus of rewilding contributes to these debates in productive ways.

Building on the work of political geographers James Lorimer and Driessen Clemens, who present the OVP as an important ecological site for the Anthropocene, this chapter adds conceptual, imaginative and methodological resources that help situate the material/semiotic practices of rewilding in relation to histories of environmentalism and conservation biology by entangling rewilding discourse with Haraway's notion of companion species (*When Species Meet*) and other work in the Environmental Humanities.

Located on the out-skirts of Amsterdam's city-center, the OVP has historically been marginalized as a post-industrial trash landscape, but is now celebrated as an experimental site for Anthropocene re-worlding where introduced cattle, raves, wolves, bird-watchers, scientists, animal welfare advocates and hunters are redoing how and what happens when species meet. As situated tangles of knowledge and practice, humans and nonhumans, politics and science, rewilding and the OVP are historically embedded apparatuses built materially and discursively to shape and facilitate particular kinds of multi-species meetings and entanglements that other environmental apparatuses, such as nature conservation and de-extinction, foreclose.

The re-worlding of rewilding begins and ends in blasted, Anthropocene environments scarred by multiple forms of species extinctions, displacements and killings, and shaped by techno-industrial legacies and histories. Fostering situated multi-species relation making practices amidst blasted, depleted and trash landscapes, rewilding sites can be seen as re-worlding, multi-species assemblages that make claims on and interrupt diverse environmental imaginaries, forms of politics and scientific practice. Therefore, fostering ways of noticing and responding to the situated claims and interruptions that rewilding provoke is a consequential and important environmental practice that this chapter works towards.

The first section of this chapter will focus on conservation and restoration ecology as historically and culturally specific arrangements of method and theory, epistemology and ontology that have shaped and informed the production of particular kinds of multi-species relationships. From there, I will discuss how the positing of the Anthropocene disrupts this multi-species relation making apparatus that too often presuppose and depend on the great divide separating a world of nature from a world of human society. From there, I will work through the emergent environmental re-worlding and rewilding practices at the OVP.

20th Century Environmentalism, the Great Divide and Conserving Nature

Environmentalism has many origin stories. For some, it began with British Romanticism and their artwork on the sublime beauty and power of nature.[2] For others, environmentalism began in 1854 with Thoreau's meditations on nature in

---

[2] For example, see Timothy Morton *Ecology without Nature: Rethinking Environmental Aesthetics* (Cambridge, Massachusetts: Harvard University Press, 2007).

Walden. Yet others posit Aldo Leopold's 1949 book of nature writing *A Sand County Almanac* and Rachel Carson's 1962 critique of pesticide use in *Silent Spring* as foundational texts of the North American environmentalist movement.[3] Despite significant differences, what binds many of the cultures, texts and imaginaries that make-up the environmental movement is the view that nature is not a resource to be used for human need and want, but a unique domain that must be conserved and preserved in its original state – a state of self-balancing, self-ordering equilibrium that is increasingly being thrown out-of-joint by modern-western technology and society. To this end, Leopold's land ethic was proposed as a moral imperative intending to guide responsible and reasonable citizens toward a deeper appreciation and reverence for the natural world that exists in-itself (rather than for-us), which for Emma Marris (former staff writer for the science periodical *Nature)* continues to be "the gospel of [nature] conservation" ("Interview with Emma Marris").

Rooted textually and thematically in the work of Thoreau, Leopold and Carson (among others), the spread of an environmental consciousness throughout late-industrial societies, in the words of environmental historian Peter Alagona, can be characterized by "activists, scholars, and practitioners [who] regularly invoke images of historical abundance and subsequent decline in their pleas to preserve what is left of wild nature, and [that uses] these images to promote programs that aim to return ecosystems to their natural, or 'original' conditions" ("Past Imperfect" 49). In effect, a consequential narrative template and textual infrastructure shaping

---

[3] See Peter Alagona "Past Imperfect"; Emma Marria "Interview with Emma Marris"

20th century North American environmentalism works to identify, save and conserve the unblemished historical baseline conditions of wilderness before they are lost or polluted by a globalizing industrial society (Alagona "Past Imperfect" 49).

Mediated by narratives of purity and contamination, original holism and modern alienation, frontier imaginaries and rugged individualism, nature became imagined, notes political geographer James Lorimer, as "a pure and timeless collection of objects, [and] removed from Society" to be conserved and preserved in nature parks, reserves and refuges ("Multinatural Geographies for the Anthropocene" 594). Through the guided use of reason and empirical observation, this historically, culturally and gender specific formation of environmentalism worked to articulate policy recommendations aiming to preserve and conserve scientifically established historical baseline conditions of nature; policy recommendations that an informed and rational citizenry should in theory recognize as being in their best interest to uphold and enforce as a greater good.

From this context, the tropes of 'putting nature back together' and 'making nature look like it did in the past' emerged, notes plant biologist Richard Hobbs, to orient the disciplinary practice of conservation and restoration ecology ("Intervention Ecology" 442). "Underlying much conservation and restoration ecology", notes Hobbs, "and indeed society's overall relationship with nature, is [the notion] that some past ecosystem states had characteristics more desirable than those of the present ones" (443). Moreover, Emma Marris has pointed out that 20th century environmentalism works with the "expectation that ecosystems that look the most like they did in the past [particularly prior to the invention of modern

113

industry] will be the most wild" and therefore the most natural, good, authentic, pure and original ("Interview with Emma Marris"). Marris goes on to argue that even with the current realization that "all ecosystems are dynamic and, by now, at least somewhat anthropogenic, conservationists and the public at large still cling to the comforting vision of the single historically correct timeless wilderness paradise" ("Perspective: Is Everything a Novel Ecosystem?" 346).

Although conservation biology, restoration ecology and environmental preservation are "rigorous and significant in every regard", political geographers Paul Robbins and Sarah Moore argue that they "share a tacit epistemological commitment to evaluating ecological relationships explicitly with regard to an a priori baseline – a condition before the Columbian encounter, or a time or place before human contact, or a place of expulsion or return – one Before the Fall [of Man from Nature]" (4). Acting for conservation ecology as windows onto the "rightful historical states" of nature (5), the identification of the original baseline conditions of nature are "predicated on the discovery of a true world of realities lying behind a veil of [human, subjective] appearances" (Latour, "An Attempt at a 'Compositionist Manifesto'"474-475). For example, Hobbs demonstrates how "current US National Park Service (2006) policy [vows] that 'the Service will seek to return disturbed areas to the natural conditions and processes characteristic of the ecological zone in which the damaged resources are situated'" ("Intervention Ecology" 444).

On the surface, this 'nature knows best' and 'put it back to the way it used to be' logic seems entirely reasonable in response to a global industrial complex increasingly turning nature into Heidegger's "standing-reserve" ("The Question

Concerning Technology"). Yet many have pointed out that the methodologies, narratives, and thinking-practices that mediate this environmental apparatus have deep roots in Eurocentric and gender specific frontier and conquest imaginaries. For example, environmentalists, political ecologists, and ecological scientists are increasingly pointing out that practices aiming to conserve and restore original baselines of nature are at risk of being constructed or mediated by nostalgic and idealized imaginaries of a wild, free and untouched nature (an untouched nature that exists in an a-historical, mythic time 'before the fall of Man'), and narrative templates oriented by a desire to return or recreate authentic states of nature free of exotic, non-native species.[4]

Working in the name of returning ecosystems to their original unadulterated form, conservationists have been criticized for hierarchically imposing multi-species arrangements based on native/exotic, natural/introduced, and original/alien species distinctions (Davis "Don't Judge Species on Their Origins"). More specifically, many cultural and ecological theorists have argued that conservation initiatives embodying these kinds of distinctions, narratives and imaginaries have played into chauvinistic, xenophobic, misogynist and Eurocentric imaginaries and narratives.[5] For example, Haraway has pointed out how the effort "to preserve 'nature' in parks [continues to be] fatally troubled by the ineradicable mark of the founding expulsion of those who used to live there, not as innocents in a garden, but

[4] For example, see Mark Davis et al. "Don't Judge Species on Their Origins." *Nature* 474 (2011): 153–154.
[5] For Example, see Christine Biermann and Becky Mansfield. "Biodiversity, Purity, and Death: Conservation Biology as Biopolitics." *Environment and Planning D: Society and Space* 32 (2014): 257–273; and Catriona Mortimer-Sandilands and Bruce Erickson. *Queer Ecologies: Sex, Nature, Politics, Desire* (Indianapolis: Indiana University Press, 2010).

as people for whom the categories of nature and culture were not the salient ones"

("The Promises of Monsters" 296).

The Environmental Humanities work of Thom van Dooren and Debora Bird

Rose[6] in Australia is exemplary on this point. Their historically situated

environmental work has productively shown how natural/alien and

native/introduced species distinctions structuring some nature conservation

practices have led to the killing of 'non-native', introduced and alien species. In an

article discussing the culling of foxes in the name of biodiversity conservation, van

Dooren highlights how biodiversity conservation "on the surface seems to offer a

very inclusive approach to conservation, in reality [however] the way in which this

discourse has been taken up in legislation and management has often reproduced

[human exceptionalist, Eurocentric, and colonial imaginaries and] exclusions"

("Invasive Species in Penguin Worlds" 289).

Thom van Dooren's work demonstrates how the planned extermination of

foxes from a suburb near Sydney Australia was justified because the foxes were

viewed as alien species (not native to Australia), and were thus disrupting and

contaminating the 'original' historical baseline functioning of the (pre-European)

environment. Introduced to the region at the time European colonial settlement, the

entanglement of the foxes with the Australian landscape has over time reshaped

multi-species arrangements, and more significantly for local residents, the foxes are

---

[6] Rose has collaborated with van Dooren on numerous articles, but her anthropological and ethnographic work in texts like *Wild Dog Dreaming* (2011) and "Multispecies knots of Ethical Time" (2012), and her work as co-editor for the academic journal *Environmental Humanities* have been fostered discursive and institutional space for work in the Environmental Humanities to flourish.

now attacking domestic dogs as Sydney's urban sprawl has encroached on the 'alien'

fox's new habitat. The public viewed the extermination of the foxes as a necessary

ecological imperative because the killing was done in the name of an ethic to

conserve and restore the original, and therefore 'proper', multi-species

arrangements that existed prior to European settlement. For van Dooren:

> "Exclusive ecological imaginaries [based on natural/introduced, native/alien
> distinctions] do a strange kind of 'ethical' work in this approach to biodiversity
> conservation. Not only do these imaginaries remake possibilities for life and death,
> but they also play an important role in providing *justification*, and hence a sense of
> moral comfort, about killing those that don't 'belong'. There is a wholesale
> declaration that these lives are not *legitimate* lives within the context of
> contemporary ecologies, and as such that their deaths are not only *condoned* (as
> they often are in legislation), but also in an important sense *demanded* for the sake
> of any genuine conservation" ("Invasive Species in Penguin Worlds" 290, italics in
> original).

Positioning the foxes as exotic and alien, people were not required to notice and

respond to the foxes as situated critters or companion species entangled in rich,

contingent naturalcultural histories and lineages. In such examples, instructed by

Haraway, "thick, contingent, relational, naturalcultural history disappears once

again in the dream of natural wilderness, a frontier category of the first rank in the

lineage of settler societies" ("Speculative Fabulations"). Avoiding the trouble and

responsibilities that emerge in situated multi-species encounters, the killing and

eradication of the foxes was justified as a means to maintain a particular

arrangement of nature and society grounded in a colonial, conquest heritage tightly

bound up with notions of authentic wilderness, frontier imaginaries and human

exceptionalism. Not taking situated naturalcultural complexities seriously, the

conservation practices discussed by van Dooren failed to be drawn into multi-

species worlds, and thus refused to contemplate forms of care and response, politics

117

and science not rendered according to human exceptionalist and colonial/settler worldviews.

Rewilding and Re-Worlding in the Anthropocene

If the cultural and scientific focus of environmentalism has been to save, conserve and restore original baseline conditions of nature, then the situated challenges bound-up with the Anthropocene have increasingly forced ecological thinkers to consider an "ecology without nature."[7] As the unintended consequences of industrial toxicity increasingly metabolize earth system processes, it becomes harder to sustain the comforting idea that our environmental impacts are inconsequential compared to the relative immensity of nature, and that contaminated landscapes will eventually revert back to pre-contaminated arrangements with proper time, oversight and management (Chakrabarty, "Postcolonial Studies and the Challenge of Climate Change" 9).

The Anthropocene, therefore, is being characterized environmentally as a precarious assemblage of novel ecologies, non-analogue environments, and emergent species arrangements brought about by accelerated and expanded anthropogenic land-use alterations and climatic changes.[8] For Lorimer and Driessen, this geological and environmental awareness cancels the idea that "there is [...] a singular Nature to which we can return or against which we can dispute the authenticity of a purported [ecological] reconstruction" ("Wild Experiments at the

---

[7] The phrase 'ecology without nature' comes from Morton's book *Ecology without Nature* (2007).
[8] For example, R Hobbs et al. "Novel Ecosystems: Implications for Conservation and Restoration" *Trends in Ecology and Evolution* 24.11 (2009): 599–605; and Mark Davis et al. "Don't Judge Species on Their Origins." *Nature* 474 (2011): 153–154.

Oostvaardersplassen" 10). And as Lorimer notes elsewhere, this "demands fresh approaches to biodiversity conservation that need not make recourse to [a-historical, authentic notions of] Nature" ("Multinatural Geographies" 594).

Working from this insight, environmental geographers and political ecologists such as Robbins argue that the "Anthropocene's murder of a clear, desirable, and 'good' ecological condition to which to return" challenges the disciplinary subject positions, imaginaries and methodological presuppositions informing the ecological sciences of conservation biology and restoration ecology (9). Moreover, biologists like Hobbs note how "traditional notions of conserving and restoring biodiversity by direct appeal to historical conditions are being reconsidered in the light of rapid environmental change. When retention or restoration of historical ecosystems is no longer possible, or at least no longer feasible given anything short of heroic action […], what other options are there that could be considered as valid conservation and/or restoration goals?" ("Novel Ecosystems" 602).

It is from this context that the theories and practices defining ecological rewilding first emerged, particularly in Europe and North America, as a novel form of environmental practice designed specifically for an era of novel ecosystems and anthropogenic environments.[9] Spurred by increased public media visibility, academic institutionalization and by successfully tapping into government and inter-government funding sources, rewilding has grown into a consequential environmental apparatus in relation to the once institutionally dominant discourses

---

[9] For an early, if limited, articulation of re-wilding, see Soule & Noss "Rewildig and Biodiversity: Complementary Goals for Continental Conservation." *Wild Earth* (1998): 1–11.

of conservation biology and restoration ecology. Predicated on the view that "the world has changed a lot in the past (through human and non-human processes) and will probably change even more in the future, [rewilding] moves on from the notion that we can restore nature to a previous static state" (Hobbs et al., Novel Ecosystems" 443).

Drawing on Latour's insight that political ecology must "let go of [an a-historical, authentic notion of] nature" (*Politics of Nature* 9), rewilding can be seen as an ecological method and knowledge practice working to "compose [a] common world from disjointed pieces instead of taking for granted that the unity, continuity, agreement is already there, embedded in the idea that 'the same nature fits all'" ("An Attempt at a 'Compositionist Manifesto'" 485). Working with human and nonhuman actants (rather than already formed human subjects and nonhuman objects), rewilding works to compose multi-species arrangements without presupposing an underlying universality or holism. The point of rewilding is not to fix environments by returning them to what they looked like in the past, or restore ecosystem relations to their proper, idealized form, but to foreground emergent arrangements of multispecies co-habitation outside narratives of home and foreigner, original and introduced, organic and artificial.

As a relatively recent ecological practice, rewilding is characterized by a multiplicity of site-specific practices, theories and methods, and so it cannot be reduced to one theory or method of practice. However, rewilding does revolve around a handful of key principles, practices and orientations. Most prominently, rewilding initiatives are characterized by the planned introduction of proxy species

120

into depleted, anthropogenic landscapes. The point is not that the proxy or

introduced species would mimic and therefore return landscapes to an authentic,

prior state. Rather, introduced ecological collaborations would open spaces for the

possibility of ecosystem recuperation and emergent multi-species futures. The

point, therefore, is that introducing novel ecological actors to damaged landscapes

would catalyze emergent "ecological processes and create diverse and resilient

landscapes", but that these multispecies compositions would not be a "true"

representation of a pure, timeless and authentic nonhuman nature ("Multinatural

Geographies" 601).

Focusing on abandoned sites once used for industrial agriculture in Europe[10]

or isolated tropical island ecosystems damaged by ocean acidification,[11] the

emphasis in "rewilding is on species interactions rather than on species diversity

per se" (Griffith et al. "Resurrecting Extinct Interactions" 762). That is, the focus is

not on already determined subjects and objects, but the kinds of multi-species

entanglements that particular nonhuman critters intra-actively produce. By

interacting with the environment, changing biomass composition, by eating and

being eaten, the agency of the introduced species will produce and entangle new

forms of multispecies living and dying, and in the process catalyzing different

ecological relations, futures and attachment sites.

---

[10] For example, see Navarro & Pereira "Rewilding Abandoned Landscapes in Europe." *Ecosystems* 15 (2012): 900–912.
[11] Christine Griffiths et al. "Resurrecting Extinct Interactions with Extant Substitutes." *Current Biology* 21 (2011): 762–765.

As a situated re-worlding practice for damaged landscapes, rewilding is a material/semiotic practice that adds new forms of multi-species kin and kind making practices, and proliferates the ways that species meet and get-on-together in damaged landscapes. The goal here is that through fostering novel grazing patterns, habitat (re)construction or by impacting predator/prey relationships, the planned introduction of proxy species into damaged landscapes would have a wider effect on the ecosystem processes characterizing the area.

One example of an introduced species successfully rewilding damaged landscapes is a rewilding project located on a small, 25-hectare island called Ile aux Aigrettes near Mauritius.[12] Rather than fence off areas of nature, or expel humans from the area (even though the people in the area contributed to create the ecologically depleted conditions), Christine Griffiths of the University of Bristol and her team introduced "exotic Aldabra giant tortoises" into complex nature/culture environments "to disperse ebony seeds", a key ecological function sustaining regional environmental health and diversity. Griffiths' study found that introduced tortoises not only recuperated the seed-dispersal processes that were cut when the original tortoises went extinct (because of human-induced habitat and landscape alterations), but due to the specific gut ecology of the introduced tortoises, the

---

[12] Other large-scale re-wilding projects include "Rewilding Europe" which spans regions in Slovakia, Poland, Romania, and Croatia; "The Yellowstone to Yukon Conservation Initiative" in North America; and the, "Wild Nephin" initiative in Ireland. Other rewilding projects are taking place in Costa Rica, Namibia, Kenya, Australia, and Spain.

tortoises "significantly enhanced the percentage [and island distribution] of seed germination" (763).[13]

It is important to acknowledge that the re-worlding and recuperative practice of introducing non-native, exotic species into environments flies in the face of the hands-off approach orienting traditional conservation practices. Therefore, it needs to be stressed that rewilding is situated outside pure/impure distinctions, and as part of a context that not only works to prevent extinctions from happening, but works to find ways to cultivate forms of lively multi-species on-going-ness and hold open space for co-species accommodations amidst the ruins we have already got without expelling humans or separating nature behind fences (Tsing "Auto-ReWilding"). Therefore, while honouring complex and contingent multi-species and nature/culture histories woven into landscapes, the question becomes about the cultivation of multi-species knots and assemblages amidst the degraded, blasted environments of the Anthropocene irreducible to narratives of return and imaginaries of pure wilderness.

Not every rewilding project, however, is embedded or contained within these methodological frameworks, as there are iterations of rewilding appropriated by conservative, colonial and capitalist tendencies and orientations. For example, a problematic iteration of rewilding is Josh Donlan's call for a "Pleistocene rewilding" project in North America that he outlined in a 2005 article in *Nature*. Donlan's

---

[13] For another example of an ongoing rewilding project, see Chrulew "Reversing Extinction: Restoration and Resurrection in the Pleistocene Rewilding Projects." *Humanimalia: a journal of human/animal interface studies* 2.2 (2011): 4–27.

argument for a "Pleistocene rewilding" initiative has been highly a contentious proposal across scientific and ecological communities.

A faculty member in the Department of Ecology and Evolutionary Biology at Cornell University, Donlan's 2005 article proposes the rewilding and reintroduction of "free-roaming megafauna" to the North American plains in an effort to catalyze ecosystem and evolutionary processes lost in North America about 13 000 years ago, when humans first arrived to the America's from Eurasia (913). To this end, Donlan would like to see a series of Pleistocene preserves created throughout the south-western United States and the grassland regions of North America allowing introduced African and Asian animals (camels, horses, tortoises, cheetahs and lions) to rewild the degraded evolutionary and ecological landscapes. His argument is that the descendants of these African and Asian animals were once key ecological agents in the region, and that reintroducing these proxy species could have significant ecological and evolutionary benefits for a region now plagued by drought, biomass depletions and biodiversity losses (913-914).

Despite his concerted effort to sell his proposal on what he argues are its economic, ecological, political, ethical and aesthetic benefits, Donlan's Pleistocene rewilding proposal has been met with considerable criticism due to the project's speculative nature and its *Jurassic Park* aesthetic.[14] In addition to overlooking issues related to the transmission of disease by introducing African and Asian animals to

---

[14] Critical responses to Donlan's work have come from Elizabeth Kolbert "Recall of the Wild." *The New Yorker* 24 Dec. 2012: 50–59; and Dustin Rubenstein "Pleistocene Park: Does Re-Wilding North America Represent Sound Conservation for the 21st Century?" *Biological Conservation* 132 (2006): 232 – 238.

North America, Donlan's proposal remains bound to the ontologies and epistemologies established by the Great Divide separating a world of nature from a world of human society. Rather than paying attention to historical complexities of situated naturecultures, Donlan's proposal seeks to recreate and impose past (idealized) archetypes of nature onto ongoing multi-species topographies and arrangements. For Donlan, this notion of pure, wild, untamed nature cut off from human contamination constitutes the proper, objective baseline from which to measure and direct ecological practice.

Finally, a significant challenge confronting rewilding practice in general is addressing the risk of having rewilding discourse and research appropriated by neoliberal apparatuses that claim multi-species arrangements don't need to be considered by private industry because emergent ecologies can flourish in abandoned industrial sites. For example, rather than planning and investing resources into costly environmental assessments and environmental remediation plans, industrial advocates argue that they should be allowed to turn their backs on their industrial fall-out, since allowing former industrial sites to rewild themselves has been shown to have numerous ecological and economic benefits (Yusoff, "The Valuation of Nature").

Finally, by emphasizing and focusing on emergent futures, novel systems and dynamic structures, rewilding dangerously flirts with neoliberal ideologies that uncritically promote increased productivity, efficiency, growth and progress everywhere and in everything. Picking up on this issue, Lorimer and Driessen have pointed out the threat neoliberal discourse poses to rewilding by showing how

125

discourses on emergence and dynamic flows are at risk of sliding into the "tentacles of a nascent [and growing] neoliberal environmentalism" friendly to economic valuations of nature and the redistribution of natural resources according to logics of supply and demand that are rigged to favour economic maximization, hierarchical decision-making, land grabs and resource hoarding ("Wild Experiments at the Oostvaardersplassen" 4). It is important to acknowledge there is a real risk that rewilding (with its purported open-ended ecology of surprises) could inadvertently play into the hands of those who would like to see hard fought legislative gains and territorial rights created to protect damaged ecologies be removed. Lorimer and Driessen note that given "the current climate of [economic] austerity, rewilding could offer a convenient gloss for cutting expensive subsidies, waiving restrictive conservation legislation and even the accelerated implementation of markets in ecosystem services" ("Wild Experiments at the Oostvaardersplassen" 11). Rewilding discourse, therefore, is dangerously exposed to a growing green neo-liberalism that conflates the natural good of unregulated, unfettered markets with the natural good of unregulated, unfettered ecologies.[15]

Yet informed by the work of multi-species ethnologist Eben Kirksy on (productive and problematic) emergent ecologies, the point is to illuminate the way that disasters are unfolding in multi-spices worlds all around us, but in a compositional gesture, also highlight the surprising, unexpected emergences and

---

[15] For example, see Michael Soule, "The 'New Conservation.'" *Conservation Biology* 27.5 (2013): 895–897; Bowker "Time, Money and Biodiversity." *In: Ong, A., Collier, S. (Eds.), Global Assemblages: Technology, Politics, and Ethics as Anthropological Problems.* Oxford: Blackwell Publishers Ltd, 2005. 107–123; and Kathryn Yusoff "The Valuation of Nature: The Natural Choice White Paper." *Radical Philosophy* 170 (2011): 2–7.

lines of flight thriving in post-industrial, blasted landscapes (*Emergent Ecologies*).

Opposed to the colonial-settler mindset that landscapes are there 'for-us' to

properly order, discipline and settle, rewilding (at its best) focuses on unexpected

multi-species arrangements inhabited by a multitude of others, arrangements that

exceed the ability to unilaterally manage, direct and order. I will take these issues up

in more detail in the final section, where I will address the re-wilding taking place at

the OVP, and how the site invites unexpected collaborations and multi-species

exchanges as a means to open livable futures amidst the ruins of the Anthropocene.

Multispecies Rewilding at the Oostvaardersplassen (OVP)

The OVP, located a short train ride from Amsterdam, is a state-owned polder with

richly dynamic bio-techno-cultural histories. As Lorimer and Driessen have pointed

out in their work on the site, the OVP "is a nature reserve for the Anthropocene in

the sense that it is willingly presented as a made site for knowing and

experimenting with an uncertain future. It is uninhabited [by humans], but it is not

purified. It is hybrid, in the sense that it is a knowing co-production of multispecies

agencies" ("Wild Experiments at the Oostvaardersplassen" 10). Moreover, the OVP is

what science and technology theorist Andrew Pickering would call a "mangle of

practice" (1995), where politics and science, humans and nonhumans, facts and

values, and forms of living and dying are thoroughly mixed so that, with Latour,

multispecies relations have "to be slowly composed instead of being taken for

granted and imposed on all" ("An Attempt at a 'Compositionist Manifesto'" 488).

Figure One: Map of the OVP in relation to Amsterdam

The 15,000 acre site where the OVP is now situated (see figure one) is the result of an immense engineering initiative that reclaimed land from the sea in 1968 to serve as space for Amsterdam's expanding industrial infrastructure. Yet for a variety of political and economic reasons the needed zoning provisions for this newly dredged region were never procured. Therefore, during the 1970's the techno-engineered environment sculpted by dikes, pumps and diggers was largely left abandoned, and viewed by the government and regional community as junk or trash space ("Wild Experiments at the Oostvaardersplassen" 5).

During this period, flocks of migrating greylag geese unexpectedly took up residence and thrived on the abandoned site, and through years of grazing, breeding and habitat (re)construction this non-native colony of geese maintained the site as a wetlands marsh area, thus preventing larger plants and trees from turning the marsh into a forested area (4). The continued work of the geese to keep the site a wetlands marsh suited a surprising number of other rare and migratory bird species

128

to take up residence with the geese. The abandoned junk site unexpectedly became a thriving multispecies community of birds, foxes and other small animals, reclaiming the engineered space and drawing the attention of bird-watchers, ecologists and conservationists who lobbied the regional government to turn the area into a nature preserve, or in Dutch, a Staatsnatuurmonument (a State Natural Monument), which occurred in 1980 ("Wild Experiments at the Oostvaardersplassen" 4).

At that point, a government appointed conservation team, led by noted conservationist Frans Vera, began to experimentally rewild herds of horses, back-bred cattle, ponies and deer to the site allowing the animals to diversify and shape the novel ecological relations initiated by the birds. The experimental premise of the site was to see what kinds of novel ecological relations specific nonhuman actors could compose by rewilding the former junk site outside of human discipline, influence and control. Based on the accidental, novel and emergent ecologies created by the wildlife, Vera's environmental practice focused on "new natures" and "non-linear" ecologies irreducible to authentic historical baselines of nature ("Wild Experiments at the Oostvaardersplassen" 7). To this extent, the OVP shifts ecological practice away from conserving fixed and timeless species compositions, and fosters unexpected multi-species intra-actions and lines of flight. The ecological, multi-species relations composed at the site are not predetermined in advance, and are not required to reflect past normative baselines of nature, but emerge when situated species meet, and unfold through multispecies intra-actions. By allowing introduced and foreign herds of back-bred cattle, horses and deer to rewild themselves and the

129

landscape, the OVP embraces the re-materializing and reclaiming agency of ecological actants to foster novel forms of multi-species flourishing and perishing.

Drawing on Haraway's work on companion species, the OVP can be read as "enter[ing] the world of becoming-with, where *who and what are* is precisely what is at stake" (*When Species Meet* 19, italics in original). When species meet under such circumstances, notes Haraway, a "great deal is at stake […], and outcomes are not [g]uaranteed. There is no teleological warrant here, no assured happy or unhappy ending, socially, ecologically, or scientifically. There is only the chance for getting on together with some grace" (*When Species Meet* 15). And drawing on Latour's re-working of political ecology, the ecological relations formed at the OVP can be seen to result from "the slow process of composition and compromise, not by the revelation of the world of beyond" ("An Attempt at a 'Compositionist Manifesto'" 478). The specific shape that the multispecies relations take hinge on situated encounters that iteratively materialize subjects and objects in some ways and not others.

Putting accepted ecological knowledge, theory and method at risk, the OVP is a speculative wild thing that, for Lorimer and Driessen, "has generated a range of surprising ecological events and new ecological knowledge that challenge the existing paradigm" of nature conservation ("Wild Experiments at the Oostvaardersplassen" 7-8). For example, the herds of cattle and horses rewilding the site are displaying unexpected herd dynamics and multi-species coping mechanisms that have surprised experts on the domestic kin (7). Furthermore, the encounters taking place at the OVP are composing novel kinds of ecological relations

and structures that have opened space for the flourishing of a number of rare invertebrates, foxes, beavers and deer. More surprisingly for ecologists, the OVP has opened space for Holland's first black vultures and a pair of breeding white-tailed eagles ("Bovine Biopolitics" 254).

Justifiably, advocates of the OVP are enthusiastic about these unexpected multispecies dynamics and view these successful lines of flight as reasons for validating rewilding as an ecological model conducive for the Anthropocene. However, as an experimental project, and thus not abiding by the rules traditionally dictating proper conservation practice, the effort to rewild formerly domesticated species (cattle, horses, ponies) at the OVP site has garnered criticism.

In particular, the experimental approach of the OVP has been criticized for intentionally bypassing the standardized conservation methods and protocols dictated by European nature conservation groups - methods and protocols that aim to preserve and restore "a natural order founded on the compositional ideal of a premodern [Dutch] ecology" ("Wild Experiments" 7). A key point on which much of this criticism hinges is premised on the argument that the heck cattle rewilding the site are not part of what is considered the baseline, pre-modern ecology of the region (7-8). In short, the cattle rewilding the site are not authentic or original to the area, and being the result of domestic/artificial/unnatural breeding practices, the Heck cattle are neither natural nor wild (see figure two), but socially produced and human reliant. In response to such criticism, Frans Vera has stated he was less concerned about the anatomical authenticity of the cattle to reflect original, pre-modern environmental baselines of an authentically Dutch nature, and more

131

interested in the way these animals work to translate, invite or refigure a once

degraded landscape into an ecologically diverse space inhabited by multiple kinds of

species ("Bovine Biopolitics" 255). For Vera, the

> "aim was to 'de-domesticate' the Heck cattle and a herd of Konik ponies [...]
> allowing them to create new social dynamics, population structures, feeding
> strategies and physical forms with minimal management intervention. The
> introduced herds were to expand and contract by 'natural selection', as dictated
> by the food supply available within the 5600 ha fenced reserve. When food was
> short, the animals would die of starvation and their bodies would be left as
> carrion" (Vera quoted in "Bovine Biopolitics" 254).

Figure Two: Image of Heck Cattle Rewilding at the OVP

Nevertheless, serious and important questions continue to revolve around

the attempt to de-domesticate Heck cattle into the wild. In the 1990's, animal

welfare groups argued that the OVP was cruelly treating cows by de-domesticating

them and placing them in a foreign, alien environment not fit for their survival.

From the animal welfare perspective, the cattle are domestic, and therefore, not

natural, and so the OVP was responsible for managing their welfare. The debate

came to a head in the late 1990s when images circulated on Dutch public media

showing starving cows dying due to a particularly hard winter of scarce food

sources. Following the release of the images, public outcry pressured the OVP to

recognize the cows as domestic animals, and thus subject them to the same animal welfare regulations that other domestic and agricultural cattle would be subject to (i.e. regular feeding, shelter, health interventions, protection from pry species) (Lorimer and Driessen "Bovine Biopolitics" 256).

Required to respond to and notice the cattle, the welfare of the cattle during the winters became a matter of concern in Latour's sense, and generated two public commissions focusing on the ecological practices of the OVP. The issue of their welfare gathered public officials, scientists, farmers, animal welfare activists, back-breed Heck cattle, national media, park rangers, animal ethics, domestic cattle, farm regulations, veterinary practice, bio-engineering practice, food sources, and much else, around a common issue to be debated, mediated and worked on. In response to these gatherings it was agreed that a "wildlife ranger, armed with a rifle and silencer, [would] patrol the OVP, identifying and killing those animals whose bodily condition and behaviour indicate that they would not survive the winter" (Lorimer and Driessen "Wild Experiments" 6).

Popularly termed population control with the "eye of the wolf", rangers would use ethological knowledge and animal science to adopt a "wolf's point of view" to decide which cows would most likely be the target of a hungry wolf (6). Staying with the trouble in Haraway's sense, and thus situated inside earthly complexity where not everyone wins and there are no clean answers, the introduced cows were situated as one actor amid a motley crowd of differently situated species, landscapes, people, technologies, perspectives, sciences, values, plants and animals where "no easy unity is to be found [...] and no answers will

133

make one feel good for long" (*When Species Meet* 41). Staying with the trouble of living and dying well in emergent, techno-industrially shaped ecologies situates rewilding beyond notions of innocence, purity, and neat holisms, and in a situation where no solution will "leave practitioners in moral comfort, sure of their righteousness" (Haraway, *When Species Meet* 72).

Working outside baselines of nature that justify how and what multi-species landscapes and relationships should look like, the OVP stays-with-the-trouble of responding to and engaging with situated and unexpected naturecultures where forms of living and dying are at stake, and in question. Working to tell multi-species narratives methodologically and theoretically different from the multi-species narratives situating work in conservation biology and restoration ecology, rewilding works as a historically specific method of multi-species relation building in the Anthropocene. Without the aid of taxonomic hierarchies and teleological guiderails, the OVP is a multi-species site oriented by ongoing learning, response and multi-species collaboration. Not a space of comfort and surety, the OVP works to take seriously situated naturecultures, and as a result, humans and nonhumans are drawn into the worlds of living and dying, the only place where care, response, and respect are possible, and the only place that opens up and recalibrates multi-species imaginations and commitments.

Conclusion

Read as a project of companion species**,** where forms of living and dying are at stake, I showed how the rewilding at the OVP can be read as a practice recognizing and fostering multiple modes of multispecies co-existence and co-becoming. The

narratives and knowledge practices shaping Haraway's work on companion species and becoming-with, narratives and knowledge practices that informed my reading of rewilding, invite humans and nonhumans into other kinds of multi-species worlding practices, worlding practices that might spark new kinds of ongoing-ness amidst degraded, Anthropocene environments. Not aiming to save or fix the world, rewilding is about living with loss and about what is actually possible amidst damaged landscapes.

Fostering matters of concern (rather than matters of fact), ecological recuperation rather than the conservation of a-historical baselines of nature, this chapter has shown that the OVP entangles heterogeneous human and nonhuman actors and assemblages together into a diverse, fragile and sensitive multi-species gathering. Rewilding is a non-innocent practice, and therefore, is not beyond critique and is at risk of neo-liberal take-over. However, rewilding holds some promise as a method of re-worlding in the Anthropocene by embracing open-ended relations with nonhumans, and by generating non-analogue events, behaviours and ecologies that cannot be reduced to nature/culture or pure/impure dualisms.

Chapter Five – Ecological Structures of Participation for the Anthropocene: Paul Edwards' "Shimmering" Climate Data and Natalie Jeremijenko's Multi-Species Publics

The alarming eco-social displacements and exterminations characterizing the Anthropocene have emerged as two of the defining problems (re)organizing and (re)orienting contemporary knowledge projects across the arts and sciences. In response, artists and theorists are increasingly working to find ways to transform their practices and methods in order to account for the problems of scale and complexity that characterize the challenges of the Anthropocene and anthropogenic climate change. Therefore, whereas the preceding two chapters addressed how practices bound-up with the history of environmentalism and the environmental sciences are materially and discursively re-focusing and re-tooling to address the Anthropocene, this chapter turns to political-aesthetic sense-making work of scientists and artists working to produce globally and locally situated ecological structures of participation for the Anthropocene. In so doing, this chapter marks this dissertation's turn to address more explicitly aesthetic and cultural productions responding to the Anthropocene, but continues to focus on the production of intellectual and sense-making contexts creating space for transdisciplinary ecological discourses and knowledge making positions mediated by feminist STS and post-humanist ecological theory.

This chapter, therefore, will explore two differently situated sense-making apparatuses that are helping to map and model Anthropocene environments. Two

considerations orient this chapter: first, leaving behind knowledge practices situated by strong subject/object distinctions, I am interested in scientific and artistic practices working to model ecological phenomena situated in Anthropocene contexts; and second, I am interested in the kinds of subject positions, historical narratives and kinds of ecological collaborations and multi-species publics that these sense-making technologies and apparatuses contain and foster. The way that ecological phenomena are being modelled and made sensible in the Anthropocene matters because the kinds of sense-making technologies, aesthetic templates, and knowledge archives that are used to model and make these environments sensible shape particular forms of participation, contextualize multi-species publics and evoke specific ways of noticing ecological entanglements. That is, situated modelling practices (like knowledge practices more generally) work as infrastructures or structures of participation that draw attention towards particular kinds of logics, entanglements, publics and ways of becoming-with.

I will begin this chapter at the scale of the planet by discussing the achievement of climate and earth system scientists to produce computer models that simulate aspects of anthropogenic climate change. Climate models produce relevant and reliable knowledge about the changing climate, but in the words of science studies scholar Paul Edwards, their data "shimmers", and thus challenges eco-political practices built from subject/object, nature/culture distinctions (Edwards xviii). Accounting for and responding to gigantic ecological phenomena, like climate change, or in Timothy Morton's words, "hyperobjects", challenge human

exceptionalist subject positions and thinking practices, and open space for new methods of sensing complex ecological entanglements.

From there, I will examine the art/science practices of Natalie Jeremijenko. Working out of the Art Department at NYU, Jeremijenko's intra-active ecological structures of participation draw people, technologies, science, art, publics and nonhumans together into situated encounters that activate open source, user-generated ecological interpretations and entanglements. I am addressing Jeremijenk's work because, working across the sciences and arts, it is an example of an ecological practice that invites improvisational, playful and creative ways of becoming involved in the lives of other humans and nonhumans. By having people play with re-programmed robotic toy dogs that sniff out air borne pollution, or by modelling environmental health issues by growing cloned trees, Jeremijenko re-scripts ecological practice by composing situated ecological structures of participation that produce new ways of thinking, feeling and responding to urban ecological entanglements. Similar to the way that rewilding focuses on urban trash landscapes irreducible to pure/impure distinctions, Jeremijenko's structures of participation invite forms of public improvisation, multi-species connections and unexpected collaborations outside moral certainties, and therefore avoids enclosing thinking-practices within top-down disciplinary formations and logics.

Modelling Shimmering Climate Data

Along with being characterized by environmental dead zones, the accelerated destruction of human and nonhuman habitat, and by changes to the chemical composition of the atmosphere, the Anthropocene, as mentioned earlier in this

dissertation, implies the emergence of a geologically novel and environmentally distinct phase of earth history shaped by human industrial agency (Subcommission on Quaternary Stratigraphy, "What is the 'Anthropocene'"). As a result, a particularly pressing question animating diverse social, political, environmental and scientific publics is how to model the earth's warming climate – a warming climate leveraged by elevated atmospheric carbon deposits resulting from fossil fuel combustion, and a warming climate that is at the center of many environmental disruptions and un-doings that characterize the Anthropocene.

Science studies scholar and historian Paul Edwards addresses these issues in his book *A Vast Machine: Computer Models, Climate Data and the Politics of Global Warming* (2013). Edwards' book is a history of what he calls the "global climate knowledge infrastructure", the knowledge infrastructure that inter-governmental and trans-national agencies (such as the UN and the IPCC) rely on to understand climate change, and the knowledge infrastructure that has rendered anthropogenic climate change as a matter of scientific, political and popular concern. As Edwards notes, the climate simulation models that comprise this knowledge infrastructure are the product of a vast "sociotechnical system that collects data, models physical processes, tests theories, and ultimately generates a widely shared understanding of climate and climate change" (8). That is, through negotiations and collaboration, actors from diverse scientific and political institutions have been able to weave together particular scientific networks, epistemic communities, weather monitoring stations and technological systems into a sturdy tapestry of humans and nonhumans, knowledge and materials, science and politics, that reliably attest to an

139

ongoing state of affairs that is global (i.e. anthropogenic climate change). In so doing, the achievement of this historically specific knowledge infrastructure is its ability to render the changing aspects of the climate at a global and planetary scale, while at the same time mediating the global climate into particular kinds of structures of eco-political participation and action.

While the climate models contained in the global climate knowledge infrastructure have positioned anthropogenic climate change as a matter of concern in trans-national policy and geo-political contexts (for example, with the UN's IPCC), Edwards' work emphasizes the friction and noise generated between the climate models and the sense and meaning-making coordinates built into the trans-national infrastructures working to understand and respond to climate change. Being highly mediated compositions fabricated from specific kinds of data sets, collected according to specific methods, by specific scientists, in specific institutions, the climate knowledge infrastructure, notes Edwards, "is constantly opening itself up, reexamining every datum and data set, [and] adding to its metadata. Over time, countless iterations of that process have brought us shimmering data, an ever-expanding collection of global data images that will keep on growing, but never resolve into a single definitive record" (xviii). Edwards' point is that this shimmering data produced or elicited by climate models is difficult to translate into the thinking-practices, logics and disciplinary forms of attention contained within infrastructures like the IPCC that are programmed to provide clear prescriptions and representations. That is, responding to and becoming involved with climate models is difficult for ecological structures of participation and infrastructures, like

the IPCC and other modern governmental institutions, that contain subject positions and disciplinary formations mediated by human exceptionalist imaginaries and nature/culture dualisms.

Climate models reliably give sense to the changing climate, but they do not provide a definitive, unifying view on the climate as a thing-in-itself, a view that authorizes clear political prescriptions and mediations because no amount of data collection and data input will be enough to get the global climate simulations total or right.[1] That is, knowledge infrastructures are able to register aspects of climate change, but not the whole thing. For example, the models built by the IPCC are able to authoritatively claim that climate change is real, but these kinds of knowledge infrastructures aren't able to reduce or contain the complex human and nonhumans systems connected or contained in climate change in a single, unified representation. In short, although climate change is anthropogenic and is deeply entangled with human history and agency, it remains profoundly other to our anthropocentric sense-making practices. The scope and scale of climate change is too vast to be enclosed within the disciplinary practices and logics of objectification. That is, although many of the effects and consequences connected to the warming

---

[1] For example, Latour argues that: "[If] climate scientists have been able to obtain a 'global' view, it is because they managed to build more and more powerful models able to recalibrate data points elicited from more and more stations or documents – satellites, tree rings, logbooks of navigators dead long ago, ice cores, and so on. Interestingly enough, this is exactly what leads the climate-deniers to their denials: they find this knowledge too indirect, too mediated, too far from immediate access […]. They are incensed to see that no data point in itself has any sense, that those data all need to be recalculated and reformatted (Latour, "Waiting for Gaia" 6). Moreover, Amanda Machin, a political geographer and social theorists in the U.K., has pointed out that "science cannot accurately forecast the future regarding climate change; there are too many variables, too many unknowns, too many 'ifs', for it to do that. Scientists themselves tell us that they cannot tell us this. They readily acknowledge that they cannot give us exact figures and precise scenarios. [It's] inherently uncertain" (9).

climate are empirically evident (for example, increased wild fires, sea levels, and concentrations of atmospheric carbon), anthropogenic climate changes exemplify the point that ecological phenomena have lives and histories outside the ways that they impinge on and become involved in our anthropocentric forms of knowledge and world-building practice.

Climate change withdraws[2] from or exceeds analytical frameworks, aesthetic registers and knowledge archives predicated on a transcendental and authorial perspective that accesses hard factual truths beyond a shadow of a doubt. The default human exceptionalist ontology mediating the rationalist and positivist post-enlightenment capitalist tradition is not very good at working with and responding to phenomena that cannot be made clear and distinct, definitive and objective (and thus ordered, disciplined and managed). There is an asymmetry between the sense rendering work performed by the climate models documented by Edwards, and the subject positions and sensorial registers positioned within inter-governmental agencies, like the UN, attempting to mediate with climate models. Climate simulation models, therefore, will always be haunted by the noise of uncertainty and "shimmering data" - an uncertainty that bristles with the expectation that ecological

---

[2] These issues speak to Timothy Morton's notion of 'hyperobject' (2013) that helpfully lays out some of the conceptual and aesthetic challenges that confront attempts to model and notice the changing climate as an object of knowledge. Using climate change as a vivid example of a hyperobject, Morton describes hyperobjects as "massive objects that show up on our radar screen", and thus can be statistically calculated and measured, but are totally "incapable of objectification" (9). Characterized by "their towering temporality, their phasing in and out of human time and space, [and] their massive distribution," hyperobjects like climate change remain asymmetrical to the sensorial capabilities of humans and our sense making prosthetics (9). Hyperobjects contribute to Morton's larger ecological and philosophical project of object-oriented ontology to show that things (both human and nonhuman, living and nonliving) do not coincide with the way that they appear (to other humans and nonhumans). For more work on Morton's OOO, see Morton *Realist Magic* (2013); or OOO in general see Harman *The Quadruple Object* (2011).

phenomena conform to clear predictions, orderly processes of objectification, and linear progress time-lines (xii). Therefore, a key achievement of Edwards' book is to show that there is no such thing as a "pure climate simulation" if what is meant by pure are simulation models free of mediation, interpretation and politics (xiii).

With this in mind, there are many ways of reading Edwards' informative book about the shimmering, fuzzy quality of climate models. For example, it can be read as a document that speaks to current debates about climate denialism,[3] and situated in relation to discussions about the extent people choose to believe in climate science. Yet in a more speculative mode, I read Edwards' book as attesting to a specific constellation of climate knowledge that will be, for future readers, quite different. That is, the book can be read as a document attesting to a specific arrangement of global climate knowledge prior to being enclosed by structures of participation that position climate change as a top-down policy issue, a bureaucratic problem of sustainable eco-stewardship, or in terms that conform to socio-economic parameters of reason and progress (with recourse to geo-engineering being the logical and inevitable next step).

My speculative reading of Edwards' book is informed by and intersects with Isabelle Stengers' work on climate modelling practices and the political frames of reference built into the climate models developed by the IPCC. In a lecture delivered in Brazil at the "The Thousand Names of Gaia" (Os Mil Nomes De Gaia) conference, Stengers documents how this future history of eco-modernism, geo-engineering and planetary stewardship is already being written into and orienting climate research

---

[3] Latour makes this connection in his article "Waiting for Gaia" (2011).

expected to conform with analytical categories and policy frameworks shaped by liberal, Eurocentric modes of rationality, progress and logic. For example, Stengers has noted how the knowledge infrastructures of the IPCC are working to translate the problem of climate change into "a problem formulated for policy makers, that is, in terms that conform to the socio-economic parameters they consider relevant" ("Gaia, the Urgency to Think (and Feel)" (3).

The danger that both Edwards and Stengers point to is that the fuzzy, shimmering quality of climate knowledge risks and already is being disciplined and coded by anthropocentric narrative templates and policy infrastructures informed by liberal individualism, sovereignty and law. In this sense, the shimmering, fuzzy quality of climate knowledge is being captured and enclosed by a polemical power of Truth that directs attention to the way that technologies and economic platforms can efficiently capture, tax or limit the amount of carbon in the atmosphere in ways that maximize economic growth and progress. Here, the question of ecological involvement and entanglement is given sense by a context shaped by anthropocentric registers, capitalist regimes of participation, and liberal structures of order, and problematically, more creative, improvisational and playful ways of noticing and becoming involved with ecological phenomena are being blocked from attention. Stengers, a trained chemist and science scholar, notes that "[s]ince the nineteenth century, the sciences have become 'fast' sciences, with researchers regarding whatever concerns that do not directly contribute to 'the advancement of knowledge' as a sinful waste of time. […] The apotheosis of this paradigm is geo-engineering, the mobilization of technology against the Earth", a mobilization that

both preserves and presupposes a human exceptionalist and anthropocentric imaginary ("Deleuze and Guattari's Last Enigmatic Message" 153).

Therefore, in addition to critiquing these instrumentalist logics and infrastructures mediating environmental problems, spaces are required that cultivate play, improvisation and creativity as a means of collaboratively learning how to get involved in the lives of other human and nonhuman organisms.[4] Responses to the Anthropocene require structures of participation that activate leaps of the imagination, leaps that trigger or activate new modes of thinking, feeling, hoping and wondering about how to practically relate and respond to situated nonhuman actants and entanglements. As a result, I am interested in ecological work that fights to reclaim the capacity to invent new possibilities for action and passion, new response-abilities that work to create new kinds of ecological literacy and competencies. Ecological awareness and discourse in the Anthropocene are not about referencing or knowing a silent, passive nature, but constructing and fabricating multi-sensory infrastructures that notice different kinds of entanglements and contain different kinds of story-ing practices and aesthetic registers. In short, the point is to emphasize the relational composition of structures of ecological participation that evoke, in Isabelle Stengers words, "a world where we, our ideas and power relations, are not alone, were never alone, will never be alone" ("Wondering about Materialism" 371).

---

[4] I take the phrase "getting involved in the lives of other organisms" from Natasha Myers' work in "Conversations on Plant Sensing" (2015). In this article, Myers discusses work of what she calls 'vegetal epistemologists' who are "people who invest their efforts in figuring out what a plant can do, what a plant can know, and how plants get themselves involves in the lives of other organisms" (42).

The question then becomes about the cultivation of structures of

participation and literacies that gather humans and nonhumans together around a

situation that demands thought, care, and what Haraway calls response-abilities, but

is irreducible to hard distinctions between experts and non-experts, science and

politics, subjects and objects, human and nonhuman. In order to address this

question, I will end this chapter by turning to the art/science practices built by

Natalie Jeremijenko.

Fuzzy Structures of Ecological Participation

Natalie Jeremijenko foregrounds fuzziness, noise and instability as a means to

gather wider non-expert communities and nonhuman actants into situated meaning

and relation making practices. Trained in neuroscience, engineering and

biochemistry, and coupled with her work as an artist and environmental health

activist, Jeremijenko describes herself as a "thingker" ("Thingker"). Combining

things with thinking, her focus as a thingker is to think-with and through things in a

mode that activates curiosity and creativity. To this extent, Jeremijenko challenges

traditional humanist distinction separating thinking and things, subjects and

objects, that positions thought and knowledge as disconnected mediums that

represent natural objects 'out-there'. Thingking, therefore, can be seen as a

collaborative and de-centering practice that works to dislodge knowledge producers

from an elevated, commanding position, thus giving to situations and nonhuman

actants a power or agency to challenge well-defined categories and structures of

participation.

By working to activate ways for people to figure out how to respond to situated ecological processes and nonhuman actors, Jeremijenko's projects foreground improvisation and creativity as key relation and knowledge making practices. Her knowledge production practices are built around structures of participation that avoid positioning isolated individuals producing factually or objectively true accounts of the way the world actually is whether we like it or not, and knowledge production is not about a linear transmission of already identified and established ideas to a passive and receptive audience. Meeting the universe halfway, as Barad notes, is much messier and riskier than that. The point (as shown by Edwards) is to evoke the fact that information visualization technologies working to model and simulate ecological situations, like the changing climate, "throw up a lot of data and suggest that the sense is self-evident! It's not!" ("Suspicious Images, Latent Interfaces" 50). Jeremijenko goes on to note that the point of her projects are to promote "pleasure and wonder and environmental health—to help people think of themselves as agents of creativity and positive change, neither removed from the environment nor a burden upon it" ("Robot Dogs and Other Weird Creatures" 2013).

The Environmental Health Clinic

I want to turn now to a few examples of Jeremijenko's work. Perhaps most enigmatic of her approach to democratic and open-source knowledge production is the creation of the Environmental Health Clinic located at New York University. Jeremijenko's Environmental Health Clinic is modelled on other institutional health clinics, and so attempts to retain the disciplinary feel of other institutional establishments, but re-scripts the patient/expert, subject/object relationship

defining most traditional health institutions. Her goal was to create a situation

where environmental health knowledge isn't distributed from a distanced medical

expert to passive patients, but where "impatients" are active in both the diagnostic

and remediation processes. Jeremijenko notes that the mandate of the Clinic is to re-

script and transfigure health issues as environmental issues, and health issues as

environmental issues, rather than seeing health as an internal or genetic issue that

needs to be addressed exclusively with pharmaceuticals. As a result, Jeremijenko's

Clinic is a response to the fact that the "top five things" pediatricians spend their

time dealing with is "asthma, developmental issues and delays, childhood cancers

which have amplified in the last 15-20 years, childhood diabetes, and other issues

associated with obesity" ("Suspicious Images, Latent Interfaces" 23). What connects

each of these health issues is that they go beyond internal and pharmaceutical

medicine, and are influenced by environmental and social factors.

> The clinic works like this: you make an appointment, just like you would at a traditional health clinic, to talk about your particular environmental health concerns. What differs is that you walk out with a prescription not for pharmaceuticals but for actions; local data collection and urban interventions directed at understanding and improving your environmental health; plus referrals, not to medical specialists but to specific art, design and participatory projects, local environmental organizations and local government or civil society groups; organizations that can use the data and actions prescribed as legitimate forms of participation to promote social change ("Environmental Health Clinic Introduction")

By having visitors walk out with a prescription not for pharmaceuticals but for

actions directed at understanding and improving environmental health, the clinic

can be seen to tailoring encounters between humans and nonhumans in the hope

that these unexpected encounters will provoke or activate different modes of

thinking, wondering, questioning, and feeling connections to the nonhuman world.

148

And by referring visitors to "specific art, design and participator projects, local environmental organizations and local government or civil society groups the clinic works to activate discussion, argument, interest, passion, feeling and wonder by putting people in contact with groups and organizations they otherwise would not interact with ("Environmental Health Clinic Introduction"). By working to stage interactions that entangle people with their nonhuman and human/social environment in ways that might active or open lines of flight or leaps of the imagination, the Clinic activates situated relation-building practices. Jeremijenko's prescriptions and referrals are experimental, playful recipes that provoke encounters requiring the creation of situated response-abilities.

Feral Robotic Dogs

Beyond the Environmental Health Clinic, another of Jeremijenko's projects aiming to transfigure people and their urban environment in unexpected ways is a project called "Feral Robotic Dogs". In this project, Jeremikenko worked with Yale robotics engineering students to build easy-to-use open-source software upgrades to re-program the glut of robotic toy dogs sold as toys. The point of "Feral Robotic Dogs" was to have people download software that re-scripts and recuperates consumer objects as environmental actants. Rather than performing inane spectacles for human observers, the reprogrammed toys are outfitted with ecological sensors that 'sniff' out unseen local pollutants (such as volatile organics and polycyclic aromatic hydrocarbons). Once a particular pollutant is detected by a pollution sniffing robotic dog, "further geometeric sampling or 'wondering' will seek to move the dog and the

senor closer to the source of the material" ("Feral Robotic Dogs: Mission Statement").

Coordinated feral robotic dog release events in 2005 occurred in San Diego, Orlando, Texas, the Bronx, and Dublin, and have been attended by environmental activists, FOX News and other news outlets, students, Public Safety officials, health policy activists, robotics engineers, politicians, local residents and representatives of regional power companies. As noted on the projects mission statement, the "dogs paths [seeking and identifying pollutants] provide an immediate imagery to sustain discussion and interpretation of an otherwise imperceptible environmental condition of interest" ("Feral Robotic Dogs: Mission Statement").

By providing fuzzy data (robotic dogs converging in a particular area), the point is to activate the production of matters of concern which people feel licensed to interpret and respond to. "Because of the dog's space-filling logic [...] participants can watch and try to make sense of this data without the technical or scientific training required to be comfortable interpreting an EPA [Environmental Protection Agency] document on the same material" ("Feral Robotic Dogs: Mission Statement"). To this extent, the project activates situations that require participants enter into or inhabit structures of participation not reducible to nature/culture, expert/non-expert, or subject/object distinctions.

OneTree(s): An Information Environment

Perhaps most enigmatic of Jeremijenko's work of producing ecological structures of participation for the Anthropocene is the project called "OneTree(s): An Information Environment - Replicating Paradox Trees and Simulating A-trees". The "OneTree(s)"

project is an exhibition and public art installation composed of 1000 genetically identical cloned trees that were planted throughout the San Francisco Bay area in 2004 (planting sites include Golden Gate Park, 220 private residences, public schools, etc.). The point of the project was and remains to evoke the different environmental conditions or micro-ecologies that are impacting the growth of genetically identical trees. Because the trees are genetically identical, the growth of the trees over subsequent years evokes the situated ecological differences that the trees are subjected to, and by extension challenges simplistic neo-darwining genetic determinist models of growth and progress. "The biological sameness of the trees," notes Jeremijenko, "will render both the environmental and social differences to which they are exposed. The trees will become evidence, witness, and mediator of these differences" ("Sites and Ecosystems"). To this end, the genetically identical trees act as ecological diplomats bearing witness to the diverse socio-environmental topographies populating the San Francisco Bay area, allowing residents to witness and ask questions about the environmental health of particular neighborhoods, and the presence of the contaminated trees challenges participants by opening space to re-think and re-imagine forms of solidarity and companionship with organic life.

> "Because the trees are genetically identical, in the subsequent years they will render the social and environmental differences to which they are exposed. The tree(s) slow and consistent growth will record the experiences and contingencies that each public site provides. They will become a networked instrument that maps the micro climates of the Bay Area, connected not through the Internet, but through their biological material" ('Introduction to the Project').

By evoking the impact that widely different socio-ecological contexts have on environmental health, and how genetically identical trees respond differently to the

151

same socio-ecological contexts, Jeremijenko presents abstract and global environmental problems in immediately observable and situated ways. The wager is that if "we have trees with precipitation sensors and soil moisture sensors and particulate matter sensors making explicit some of the environmental variables to which they are exposed, we would therefore somehow be able to make better sense of those trees" ("Suspicious Images, Latent Interfaces" 12).

Image: Cloned biological trees used in OneTree(s) project

Image: Two planted biological cloned trees used in OneTree(s) project

Jeremijenko's structures of participation exemplify Stengers' point about

collaborative knowledge projects that "do not dictate, but [rather] 'call', and the call

always requires the elucidation of the concrete meaning of the situation for the

person exploring it" (Stengers, *Thinking With Whitehead* 249). That is, OneTree(s) is

an example of a knowledge practice designed to give nonhuman actants "the power

to cause us to think, feel and wonder, the power to have us wondering how

practically to relate to [them], how to pose relevant questions about [them]"

(Stengers "Wondering about Materialism" 374). Like all of Jeremijenko's projects,

OneTree(s) is about responding to and transfiguring concrete situations that the

trees evoke or activate. It is about responding, relating and connecting to situations,

configurations and agencies that the trees bring to bear on the experience of

situated human participants.

Doubling the cloned biological trees discussed above is a collection of online

virtual e-trees created using the same computer algorithms and programming

software used by climate change scientists to model climate change. People can download from the OneTree(s) website open-source software to grow a virtual graft of the cloned biological tree planted around San Francisco. Therefore, not only is the OneTree(s) project composed of 1000 cloned trees planted in San Francisco, but also contains an indefinite number of virtual e-trees grown in online virtual environments around the globe. A key aspect to the e-trees is the injection of real-world contingency into the virtual models. By doing so, Jeremijenko aims to compose knowledge production practices built around human/nonhuman interaction that provides a more situated and collaborative way of conceiving and interpreting ecological information. To inject contingency into the virtual growth of the e-trees, Jeremijenko provided participants with carbon dioxide sensors that can be attached to the serial port of personal computers to measure real-time carbon dioxide concentrations. These situated carbon dioxide readings are then fed into the algorithms modelling the growth of the virtual trees ("Artificial Trees & Artificial Life).

> "The OneTree(s) instrument however, captures a different way of conceiving of information with respect to the trees. Not information packets produced as simplified data product to be passively consumed, rather, it privileges a conception of information that requires interpretation. It demonstrates that this complex multi-parameter phenomena [sic] of [virtual and actual tree] growth can be understood in many ways, can sustain many interpretations and can be 'read' from the material phenomena itself, not as a pre-interpreted digested data packet, not delivered by an expert, not wrapped in the incontestable authority of science. It facilitates and instruments a more active understanding of information, not as complete, accurate and factual, but interpretable, partial and incomplete. The evidence being more persuasive and somehow more precise for this understanding of its partiality" ("OneTrees: The FAQ's" 12).

Discussing the OneTree(s) project with media theorist Benjamin Bratton, Jeremijenko argues that "with the collision in the public imagination of the environmental climate destabilization and environmental concerns more generally, there is suddenly a utopian idea that we can use these new [environmental] technologies and sensors and visualization techniques to address pervasive environmental issues with pervasive computation" ("Suspicious Images, Latent Interfaces" 10). She is quick to point out the valuable and important work these modelling practices perform by helping to provide an understanding the changing climate, but argues that producing a "nice diagram is not all that is required in making sense of something" (12). "My intuition," she notes, "is that there is a better sense to be made, one that is more robust, one that can be challenged. Not just better sensors but better sense-making" (49).

On the issue of climate knowledge production, Natalie Jeremijenko points out that in response to administrative, electoral and policy demands requiring clear and definitive predictions on the future of global climate change, state and inter-governmental agencies are enclosing and containing climate knowledge production within heavily regulated compliance protocols dictating what data is to be collected, how it is to be collected, and by whom ("Suspicious Images, Latent Interfaces" 12). Specifically referencing the U.S. Environmental Protection Agency, Jeremijenko goes on to point out that many state run environmental institutions too often attempt to mechanically eliminate the shimmering and fuzzy contingencies in climate knowledge (16-17). For Jeremijenko, it is important "to understand that environmental data is mainly collected in response to regulatory compliance issues.

This means that data is being collected by hired engineering firms or staff, not by people who have a professional reputation invested in what that data means or why it is being collected [as do academic climate scientists, for example]" (17).

The problem here is not the climate models and the work they can do, but the theory of knowledge and structure of participation contextualizing how these models are too often interpreted and read. In agreement with Edwards' argument above and with many practicing climate scientists, virtual modelling and information visualization projects should not be read as part of a progressive narrative where expert subjects (i.e. scientists) acquire more and more of the right data from nature allowing models to eventually become full, self-evident representations of the thing being modelled.

In the words of Bratton, Jeremijenko aims to "take a step back and look again at the promise suggested by ubiquitous computing in relation to the climate crisis and other environmental concerns, [and] the assumption that these [issues] can be solved by blanketing the world with sensors, and that we would somehow address environmental issues at the largest scale directly and effectively" (34). Jeremijenko's work on the OneTree(s) explicitly aims to overcome this felt distance between situated individuals and global ecological issues by creating ecological structures of participation that craft connections and relations between humans and nonhumans in ways that activate practice, questions, thinking and wondering. Her ecological structures of participation lure into being situated connections, entanglements and configurations that are not imposed by expert knowledge communities. The following passage is key to understand what Jeremijenko is after: "[W]hat I see and

in many senses try to instantiate in particular examples is the capacity to change the structure of participation: who is producing the data, who is interpreting that data, and who can do something with that data" (21).

To this extent, Jeremijenko's use of carbon sensors, virtual information modelling programs and other forms of ecological technology create alternative data collection practices that activate a "diverse [ecological] citizenry" and multi-species publics (21). The goal, therefore, is to have nonhuman actants, like carbon dioxide and the different growth patterns of cloned trees, come alive with information in new ways, giving these ecological actants very situated voices that require the demanding work of interpretation, response, improvisation and relation-building. The climate sensors in the OneTree(s) project evoke connections between carbon dioxide (the stuff contributing to climate change) and people's situated online experience. Jeremijenko is "trying to imagine the possibility of extrapolating new forms of political institutionalization on the basis of computational technologies that we both discover and invent, including computers that look like trees" (16).

To this extent, a good way of evaluating and approaching Jeremijenko's work is not whether it will fix our ecological problems, but by asking, with Haraway (commenting on the work of Katie King), "how well it learns and models *how to be affected* or moved, how well it *opens up* unexpected elements of one's own embodiments in lively and re-sensitizing worlds" (Haraway, "SF: Science Fiction, Speculative Fabulation"). Going beyond structures of participation aiming to fix nature or save nature, Jeremijenko's strength, as pointed out by Bratton, is to ask

157

"how it is that we may sense the world, or how *the sensibility of the world might be distributed* […] and activated to become part of the way the commons understands and narrates itself. It is not only an image, like a propaganda poster, it is a tool for a politics that doesn't yet exist" ("Suspicious Images, Latent Interfaces" 37, italics in original).

Therefore, one of the things that can be learnt from the uncertainty and shimmering quality of climate change models is that there is always shimmering uncertainty in our relationship to the nonhuman world, and that this uncertainty is not necessarily a deficiency that we need to rush to fill or overcome. Working to activate these kinds of openings, and playing with this shimmering undecidability, may mediate different ways to respond, notice and care for the ecological entanglements being undone in the Anthropocene, ways of responding, noticing and caring that work outside eco-catastrophic panic and capitalist logics of order and containment.

Conclusion

This chapter contributes to this dissertation by discussing knowledge practices containing methods that archive different logics of knowledge and ways of making multi-species publics – different ways of noticing and becoming involved with ongoing ecological entanglements. That is, rather than (only) critiquing the way things like science and technology threaten a world of nature that is 'out-there' beyond the human, and rather than perpetuating the redemptive myth that human entrepreneurial ingenuity will save a threatened earth, this chapter helps situate and archive a different context, language and imaginary for making knowledge in

the Anthropocene. As I showed in the previous two chapters, the Anthropocene requires different ecological languages and practices, and the work of Edwards and Jeremijenko help contextualize a literacy and mode of sensing complex ecological entanglements that thwart nature/culture, pure/impure, real/artificial distinctions.

Like the rewilding and multi-species story-telling practices I discussed earlier, the knowledge, thinking, relation and sense-making practices I discussed in this chapter help inform and frame an intellectual and imaginative context for ecological knowledge production that deflects anthropocentric narratives and works to complicate the heroic tales situating a universal 'we' of all humanity. Overall, the knowledge practices discussed so far in this dissertation lure thinking and sense-making practices into a place not of self-certainty or cynical detachment, but of wonder and creativity, play and curiosity. In the end, these knowledge practices are a pragmatic challenge, entailing no fairy tales about an idealized past nature, but, paraphrasing Stengers ("Matters of Cosmopolitics: On the Provocations of Gaia"), are about an ongoing care and concern for the fragility of the assemblage, and for the maintenance of what is always a more than human interdependence. I will carry these insights and considerations into the next chapters as I turn to address examples of planetary writing for the Anthropocene, a form of literature and discourse that is helping craft an ecological imaginary for the Anthropocene.

Chapter Six – *Submergence* and Earth-Bound Resurgence: Planetary Writing for Livable Anthropocene Futures

> "Now those of us who were told stories since birth that there is something really special in being 'human' are at a bifurcation point: either we furiously keep to that narrative, or we accept that if there is a post-Anthropocene worth living in, those who will live in it will need different stories, with no entity at the center of the stage" (Stengers, "Matters of Cosmopolitics" 178).

The Anthropocene needs new stories, and lots of them. The stories that artists, humanists and scientists tell about the Anthropocene matter because stories position speakers, listeners and practices of knowledge production within situated political, historical, affective, scientific and environmental landscapes and traditions that are both ongoing and at stake in the Anthropocene. This claim rests on the larger argument of this project that the knowledge practices, methodologies and subject positions contained in environmental and humanities archives and contexts need to be remediated to notice and respond to the ecological un-doings and re-doings that characterize life and death in the Anthropocene.

Showing that knowledge practices, stories and narratives across the arts and sciences are both performative and pedagogical, this dissertation has shown that disciplinary practices inform and direct particular ways of becoming involved with the world and with others. Presupposing that the Anthropocene needs new (disciplinary and subject making) stories and knowledge practices, I have highlighted work across environmental, scientific, technological and political

contexts leveraging new knowledge making positions that could not have emerged

in more narrowly defined environmental and humanistic contexts. To this end, I

began by showing how work in multi-species story-telling (Chapter 3), rewilding

(Chapter 4), climate change research and art/science practices (Chapter 5)

contextualized by work in feminist STS and post-humanist ecological theory are

producing non-anthropocentric multi-species narratives and imaginaries, and thus

affording new ways of noticing and becoming involved with the world. In this

chapter and the following one, I continue this impulse to highlight ecological

discourse out of bounds, but I turn more explicitly to Anthropocene literature

focusing on the subject and knowledge making re-mediations effected by the

Anthropocene – that is, I turn to literary practices that reframe anthropocentric

stories, subject positions and disciplinary modes of attention in order to tell non-

anthropocentric stories for livable Anthropocene futures.

In the next chapter I will work through the weird ecological fiction in Jeff

Vandermeer's *Southern Reach Trilogy* (2014), but first, this chapter focuses on J. M.

Ledgard's 2011 novel *Submergence*. Described in *The New Yorker* as an "exploration

of conditions far larger than individual destinies [and as] a meditation on our

species and our planet at a time heavily shadowed by the prospect of extinction",

Submergence is an attempt at what Ledgard calls "planetary writing" for the

Anthropocene (Gourevitch 2009). The plot of *Submergence* tracks the loosely inter-

connected worlds of Danielle, a celebrated bio-chemist and bio-mathematician

studying chemosynthetic life in the deepest part of the Atlantic (non-photosynthetic

life that functions without the energy of the sun); and James More, a British spy and

intelligence agent more suited for a Terrance Malick film than a Captain America

blockbuster, who is stationed in Somalia posing as a water engineer, but taken

hostage by al-Qaeda Jihadis fighters.

Avoiding eco-catastrophic imaginaries and dystopian tropes, *Submergence* has

something to say about what it means to be a modern human in the Anthropocene/

Capitalocene, and about the interruption and displacement of this tradition's human

exceptionalist stories by a planet that in the words of Isabelle Stengers, is "no longer

'ours' to protect or to exploit, but gifted with daunting powers to dislodge 'us' from

our commanding position" ("Matters of Cosmopolitics" 177). Distinct from stories

about the 'good Anthropocene', stories built from a modern archive of aesthetic,

cultural and scientific knowledge practice working to construct a meta-narrative

about the human's incremental lift-off and escape from 'his' messy and earthly-

attachments (gender specificity intended), Ledgard's planetary writing asks readers

to feel and imagine what it means to be earth-bound in an era where nature can no

longer be figured as the saving-grace of the alienated subject of modernity, nor a

screen reflecting back to us the inner-workings of a transcendent, sovereign human

power. Therefore, more suited for Haraway's Chthulucene than the eco-modernist

'good Anthropocene', *Submergence* reminds readers that we are not the only world-

making agency, and, as stated by Danielle, "there are other worlds in our world"

(*Submergence* 147).

More specifically, I show how *Submergence* focuses on the confrontation

between two kinds of stories that position and contextualize different forms of

relation, knowledge and world making practice. Positioning James (the warrior

statesman) and Danielle (the scientist) as two archetypal post-enlightenment, post-romantic subjects of the anthropocentric "Human Age"[1], I show how James and Danielle are descendants of and situated by a tradition of stories, subject positions and world making practice exemplified by Caspar David Friedrich's 1818 Romantic painting of the natural sublime, *Wanderer Above the Sea of Fog*. Frontier stories of rugged individualism and untamed landscapes work to elevate the human subject as the privileged, transcendental world and form-making agent, and these stories, figured in the Wanderer's sovereign position above a sublime scene of unruly nature, provide the contexture and tradition rendering Danielle's and James' worlds of being and doing, thinking and seeing. Yet as a form of planetary writing for livable Anthropocene futures, *Submergence* challenges the traditions, stories and lines of descent connecting James and Danielle to the *Wanderer.*

Producing an ecological discourse outside the environmental and humanistic boundaries mediated by the painting, and outside the stories connecting the painting to the knowledge practices informing notions of the "Human Age" and the 'good Anthropocene' (Monastersky 2015), Ledgard situates Danielle and James in an ecological, planetary context reminiscent of Haraway's Chthulucene (which I introduced in Chapter 2) – a story (and thus a relation, knowledge and world

[1] Throughout this chapter, when the "Human Age" is taken from Monastersky's 2015 article in *Nature* called "The Anthropocene: The Human Age", and is evoked to reference the knowledge and world making practices of eco-modernists who, as has been discussed at other points in this dissertation, are working to archive and tell the story of the Anthropocene as the 'Good Anthropocene', one of human sovereignty and transcendence over the earth. The narrative thrust of this anthropocentric reading, problematically, is oriented towards ends that justify geo-engineering initiatives and climatic engineering that re-script histories of human exceptionalism, frontier landscapes, and settler-colonial imaginaries that I've challenged earlier in this dissertation. For more on this eco-modernist reading of the Anthropocene, see *The EcoModernist Manifesto* (2015) and Clive Hamilton's critical response in *The Theodicy of the Good Anthropocene* (2015).

making context) where modern/traditional, center/margin, progressive/regressive, progress/ruin, and nature/culture distinctions (literally and figuratively) do not make (or produce) sense. Therefore, whereas for Friedrich's wanderer, the de-centering force of nature and the existence of other worlds in our world work to recuperate and redeem a higher order transcendental consciousness abstracted from the earth, Danielle (in particular) confronts multi-species, chemosynthetic landscapes in her deep sea dives that do not fit into the stories and histories mediated by the painting or the "Human Age". Finding herself outside the subject positions and stories mediated by the painting and the "Human Age", Danielle works to tell materially grounded, real-life earth-bound stories that fail to compute notions of anthropocentrism, universalism, methodological individualism and human exceptionalism.

In the end, Ledgard's planetary writing re-narrates the stories characterizing the Anthropocene as a "Human Age", moving from stories about transcendence to submergence, elevation to resurgence, anthropocentrism to multi-species muddles, the romantic *Wanderer* to Haraway's Chthulucene. In this sense, Ledgard's planetary writing is intentionally intervening in and re-writing a particular (post-enlightenment) tradition and archive by providing subject positions, orientations and visions that help render planetary stories of ongoingness, rather than feeding dystopian cynicism ('we're doomed') or humanist parochialism ('human ingenuity and progress will fix the problems').

Transcendence: Contextualizing Submergence in Relation to Friedrich's Romantic Wanderer

Born on Scotland's Shetland Islands, J. M. Ledgard is a freelance fiction and non-fiction writer who has worked as a reporter in East Africa covering the war in Somalia, and reported on a marine expedition where biochemists and bio-mathematicians went to the North Pole to study climate change (Gourevitch 2013). In both of these positions, Ledgard gained first hand experiences that he wove together to form his second novel *Submergence* (2013).[2] Taking readers into war zones and science labs, colonially inflected Ethiopian landscapes and cosmopolitan first-world resorts, *Submergence* depicts the subject, relation and world making practices (in short, the situated worlds of doing and thinking) that situate and make-up Danielle (the scientist) and James (the warrior-statesman), two archetypal moderns and inhabitants of Global Empire. In this sense, the book is less about the individual narratives of Danielle and James, but about the relation making, knowledge making and world making apparatuses, inheritances and stories that they inhabit - traditions, stories and inheritances rooted by a particular history of "man [that for Danielle] had hardly taken breath from the Stone Age and yet was altering the flow of rivers, cutting up hills, and discarding the materials that would be easily identifiable to future geologists. The Anthropocene; a geological age marked by plastic" (Ledgard 167).

    Beyond a three-day love affair that neither character is able to disentangle

---

[2] Ledgard's first novel *Giraffe* (2012), written from the perspective of a giraffe, is about the planned extermination of a herd of giraffes in a Czechoslovakian zoo in 1975. His most recent novel *Terra Firma Triptych* (2015) is triptych of stories about Africa, hunting and technological futures.

themselves from, what connects James and Danielle is that they are both subjects of the "Human Age"; a civilizational apparatus characterized by progress-as-expansion and transcendence, and a civilizational apparatus struggling for coherence, ongoingness and stability as "mankind", notes Danielle, is "becoming a swarm, […] setting off in ever more artfully constructed but smaller and more mindless circles" (10). Whereas both James and Danielle inhabit cosmopolitan worlds of culture, wealth, liberalism and privilege, James inhabits the disciplinary maps, archives and canons of political state-craft and military intelligence, while Danielle navigates the worlds of academic science and technology; disciplinary traditions historically built on subject/object, nature/culture, progress/collapse distinctions that Ledagrd's planetary writing interrupts.

Ledgard portrays James as well-intended and cosmopolitan, but as a self declared enlightened agent of the British empire, he works the material and semiotic machinery of Global Empire, and thus foregrounds enlightened statecraft, liberal education and an appreciation for the arts as crucial to his project of bringing (i.e. disciplining) the world's others into prosperous futures. Although James is a proud agent of the British Empire, he is no James Bond; described as a "sympathetic protagonist" (Schultz), he is more an enlightened diplomat than military chauvinist. Moreover, James is a direct descendent and deep admirer of Sir Thomas More (author of *Utopia*), and imagines himself in many ways as "old-fashioned. He envied Victorian explorers for having such obvious goals and for the contrast they experienced between the world they discovered and the world they returned to. Nothing was that clearly defined any more" (Ledgard 123).

166

Thinking that the "greatest service he could offer in the complicated present was to help people catch-up emotionally with where they stood historically" (123), James sees differences in culture as only subjective differences in perception; humans are essentially the same, and this universality needs to be illuminated to allow for progressive futures to grow out of backward ideological and irrational beliefs. Yet not surprisingly, being an agent of the British Empire, James situates his tradition's civilizational project as the first principle of progress, expansion and universality. Relinquishing local attachments and becoming a citizen of the universal, humanity becomes a project to be established worldwide.[3] Able to glimpse an Ideal universal through the actual chaos of the world, James believes he is helping the rest of the world achieve lift-off and become fellow inhabitants of the human universal (that his Eurocentric tradition exemplifies).

Yet the tragedy of James' narrative thread does not center primarily on the violence he endures while imprisoned or the violence his tradition imposes in the name of civilizational progress (albeit both are awful and senseless). Rather, the central tragedy of James' narrative is the inability of his tradition (predicated on the ongoingness of the British Empire and a transcendental humanism) to respond to or notice others outside colonial templates and progress time-lines built to ascend above an unruly nature and inhabit the universal Ideal human form (enlightened liberalism, liberal jurisprudence, democratic freedoms).

In this sense, the humanism of Sir Thomas More, and his work in *Utopia,* are

---

[3] My reading of James here is informed by Marie-Eve Morion's work on universalism, globalism and cosmopolitans in "Cohabiting in the Globalised World" (2009).

powerful influences making James who he is. Yet one thing James never

contemplates is that utopia (universalism, justice, etc.) is literally translated as

nowhere or non-place. Imagining the British Empire as a progressively expanding

civilizational project, James finds himself figuratively 'nowhere' and in no-place - his

universalism is out of joint with the situated histories, politics and contexts woven

into the places he works. Thus, the claustrophobic and precarious enclosures of

James' cell and imprisonment (enclosures where readers first encounter James)

evoke or double for the claustrophobic and parochial enclosure of the civilizational

stories that gave James coherence, stability, and a sense of belonging. Ledgard is not

exposing the false reality underlying the civilizational apparatuses situating James,

but evokes their 'non-place-ness' and their myopic enclosure. In short, inhabiting

and made by a tradition fostering a liberal universalism and idealism, James is

situated by and made by a parochial archive of discourse and practice that do not

contain the kinds of tropes, figures, thinking and relation making practices that

foster other ways of becoming involved with the world. The tragedy of James'

narrative thread is his inability to get out of the civilizational stories and Eurocentric

apparatuses archiving the traditions and narratives that tell of Man's transcendence

and universality. For James:

> "Every man was a loyalist for what he knew. Even tramps fought for the
> tramping life. Life was too short for him to renounce the English parish church,
> once Catholic, with its knights' tombs, prayer cushions, flower arrangements,
> the brass lectern in the shape of an eagle. No, the quiet of those places - the
> ancient front door, the graveyard, the meadow, the damp - gave him a sense of
> belonging. He was loyal to them. It was too late to abandon the English canon,
> from Chaucer to Dickens, the First World War poets, Graham Green typing
> through the smog and drizzle [...] He had said it before; he was an intelligence
> officer who reached out, spoke Arabic, read widely, but if the Crusades were
> invoked - and Saif [his captor] was invoking them - then he was a Crusader. If he

had to die at the hands of fanatics, he wished to remain familiar and coherent to those whom he loved and who loved him." (185-186).

In the end, James is reflective and thoughtful, but ultimately, he is attached to old-world identities, and inhabits the subject positions of human exceptionalism, universality and transcendence that connect to readings of the Anthropocene as a "Human Age" of expanded human sovereignty over earth system processes. For these reasons, the critically minded Danielle is a more interesting protagonist to follow on her deep-sea dive to the Atlantic's Hadal zone 10 000 meters below sea level to study the "chemosynthetic life forms swarming in the cracks of rock on the seafloor [and] which exceed the mass of all life on land" (174).
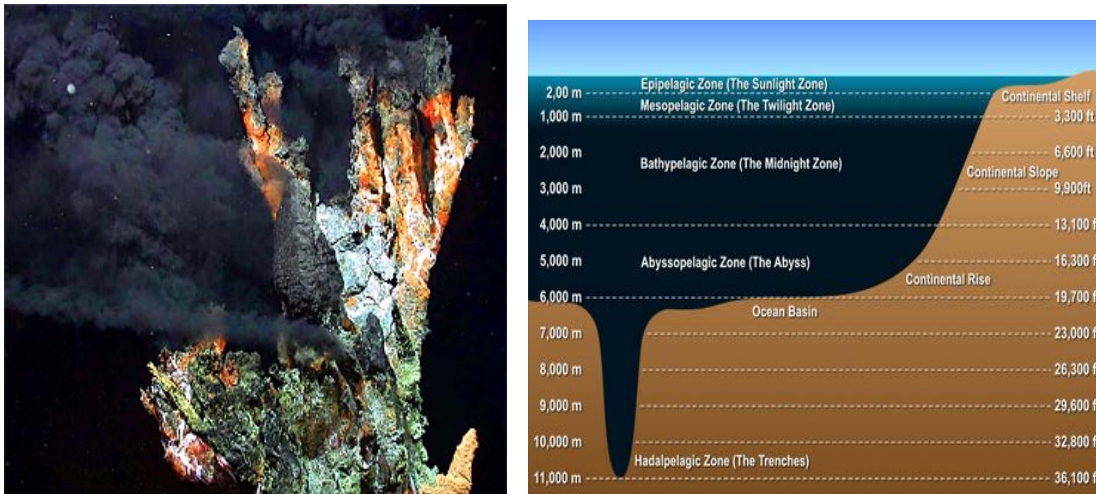
Image 1 on the left shows an example of the hydrothermal vents and the chemosynthetic, microbial ecosystems Danielle is studying. Image II on the right shows a map of the various depths of the Atlantic; the Hadal Trenches (the Hadalpelagic Zone) Danielle submerges to are at the bottom of the graph, 36 100 feet below the surface.

Danielle is an academically celebrated bio-mathematician, and compared to James, she is much more detached and independent from her tradition, and therefore is in many ways more open than James; she is described as being difficult

to pin-down, and she continually pushes out from under the weight of her tradition's social/gender/class expectations (43). She is taken to be standoffish, prickly, and once removed, yet at the same time she is tightly contained, rigid and explicit in her intentions. Whereas James is concerned with the repetition and reproduction of civilizational stories about progress, universality and transcendence, Danielle is made by the archives, canons and worlds of microbial science that, working at the scale of the planet, dramatically undo the kinds of universalism, anthropocentrism and progress that give coherence to James' humanism. In this different subject, political and world making position, Danielle is drawn to "question a reboot of mankind, [because her work focuses attention] where the genetic distinctiveness of human beings breaks down" (193)

Whereas James is anxious to perpetuate the traditions and archives contextualizing the "Human Age", Danielle's work in the Hadal zones make a mess of the institutionalized stories about human exceptionalism and sovereignty over nonhuman landscapes, and therefore, her work challenges anthropocentric attempts to see the Anthropocene as a continuation of the civilizational histories of progress-as-expansion, transcendence and omniscience. Importantly, Danielle points out that Hadal is etymologically derived from Hades, the ancient Greek chthonic god of the underworld referred to as the 'unseen one' (65). Interestingly, this perspective contrasts with James' utopian 'non-place', which for Danielle is oriented by a "faulty sense of perspective. The looking up, the looking out, through difficulty to the stars, never to the deep" (106). Challenging the idea that submerged places underground and underwater are places of non-livability, Danielle tells true

170

stories about human entanglement and kinship with 'unseen' places in the Atlantic that, for Danielle, "change the way we see ourselves" (174). In a pivotal discussion with James, Danielle attempts to give a sense to the perspective and scale she is working at:

> "Until the discovery of hydrothermal vents, scientists assumed that life on Earth was photosynthetic and belonged to the surface. It was the other way around; photosynthetic life came later, when cells strayed to the top where they were cooked for millions of years before evolving a way to absorb the light. [...] Less than one percent of them have been identified, [yet] they are a part of you. You carry a weight of them in your belly and on your skin." (174).

And elsewhere:

> "The biosphere is the dermis. All life and regeneration in our world belongs to it. Thick as it seems to us, with our histories of evolution and extinction, exploration and colonization, the abiotic mantle [she studies in the Hadal zone] is several hundred times thicker. We exist only as a film on the water. Of course, this goes against the religion of the Garden of Eden and the canon of political documents [contextualizing James' civilizational projects] which promote the primacy of Man on the planet. [...] We're nature's brief experiment with self-awareness. Any study of the ocean and what lies beneath it should serve notice of how easily the planet might shrug us off. [Therefore,] there could be no serious work on climate change without understanding marine living systems." (65 - 67).

Even though *Submergence* evokes the end of a world, particularly, the inhabitability of stories about the "Human Age" to contextualize the planetary conditions of the Anthropocene, the novel is irreducible to post-apocalyptic genre pieces and climate change fiction that too often employ ecological crises as a plot device to foreground a heroic story that all but reproduces the gender, class, racial, and geo-political constellations composing liberal humanism (I am thinking here of work like McCarthy's *The Road* (2006), James Cameron's *Avatar* (2009) or films like *The Day After Tomorrow* (2004)). Moreover, *Submergence* is also distinct from dystopian, post-human imaginaries characterizing, for example, Margret Atwood's *Oryx and*

171

Crake (2003) trilogy or Cuaron's 2006 film *Children of Men*. Moreover, Ledgard's

Africa is not Joseph Conrad's *Heart of Darkness* (1899). Disrupting the colonial

tropes and imperial imaginaries situating Africa as Europe's other, or as one

reviewer put it, "a place of indistinguishable hordes of black people (hello, *Black

Hawk Down* (2001))" (Cheney), *Submergence* situates James in complex, uneven and

patchy worlds of varied people, histories, and influences that are as rich and diverse

as his European home – in this sense, Ledgard is not reducing James' Europe to

culture and Africa to a world of nature. Finally, disrupting civilizational stories

about the human's heroic ascent within the order of things, stories situating the

human world in a disconnected realm of Ideas above an unruly nature that is 'out-

there', *Submergence* speaks to the speculative fiction story-telling practices outlined

by Ursula Le Guin in "The Carrier Bag Theory of Fiction" – story-telling practices

that make a mess of the frontier imaginaries and patriarchy/paternalism pervading

heroic tales of conquest as progress (1996 [1986]). Finally, Danielle's stories of life

in the Hadal zones of the Atlantic are informed by the factually true stories of

microbial symbiosis and horizontal gene transfer devised in the life sciences by

people like Lynn Margulis, non-anthropocentric stories that challenge neo-

Darwinian stories of genetic reductionism, competition and self-interest (1987).

Ledgard, therefore, is working to build an archive and context that works to

tell earth-bound stories, stories that re-connect the post-enlightenment, post-

romantic subjects to an earth that for historically, culturally and politically specific

reasons was once a place that limited human freedom and possibility, and so needed

to be escaped from and transcended in order to build better, prosperous futures.

Yet, in an era of unpredictable climate changes and human-induced dead-zones, the planet is becoming a place post-enlightenment, post-romantic humans are going to need to learn how to live-with outside stories of transcendence and exceptionalism.

The once solid and foundational stories of civilizational progress are confronting new conditions of precarity and indeterminacy in the Anthropocene.[4] In short, *Submergence* connects to work in the Environmental Humanities by archiving resources that notice multi-species, multi-cultural lines of descent and connection that do not begin with Man confronting a world of Nature 'out-there', but evoke muddled multi-species inheritances and attachments. Contextualized with work in the Environmental Humanities, *Submergence* is part of a practice/tradition of knowledge production working to build resources to tell stories of ecological ongoingness amidst the contaminations and exterminations marking the "Human Age".

The Wanderer and the "Human Age"

Having outlined many tensions and orientations in the novel, I want to focus on a particular subject position exemplified in the novel that acts to render James and Danielle (differently) as part a particular world of doing and thinking that contextualizes readings of the Anthropocene as the "Human Age". That is, Danielle and James differently inhabit the subject positions, stories and conceptual topographies evoked by Friedrich's 1818 painting *Wanderer Above the Sea of Fog.* Providing much of the context informing the worlds of doing and thinking that

[4] For an interesting discussion of 'precarity' in relation to human exceptionalism and the Anthropocene, see Tsing *The Mushroom at the End of the World* 2 – 5.

situate Danielle in particular, I show how the knowledge, relation and world making stories mediated by the painting are being challenged and interrupted by Ledgard's planetary writing.

Caspar David Friedrich's *Wanderer Above the Sea of Fog* (1818)

The reason I am drawing on this particular painting is because of its canonical position in the archive of European humanism, the humanities and also because of its archival ties to European Romantic environmental aesthetics, and therefore, the way it exemplifies many of the stories, subject positions, politics and imaginaries I am working to translate for Anthropocene contexts. That is, my goal in this dissertation is to archive knowledge practices working outside the environmental aesthetics and humanistic archives mediated by the painting, and *Submergence* provides an insightful pivot between this tradition or archive and an non-anthropocentric archive for the Anthropocene.

The canonical status of Caspar David Friedrich's 1818 oil painting *Wanderer*

Above the Sea of Fog is beyond dispute. The painting is paramount in the creation

and formalization of the European and German Romantic movement, and therefore,

is a product of a very particular period in European history and aesthetics. Hung in

Hamburg, Germany at the Kunsthalle Hamburg, the painting is centered by an

upper-middle class man with a walking stick firmly rooted on top of a rock crevice

facing away from the viewer, taking-in a rugged expanse of fog, rock, mountain and

sky. As a canonical image of European Romanticism, and thus both contributing to

and critiquing the tradition of European Enlightenment in specific ways, the

painting is part of a critical tradition opposed to an expanding modernity predicated

on industrialization, political economy and instrumental science. However, even

though the painting is critical of numerous aspects of a life-denying and reifying

modernity and works to situate human freedom against blind determinism, the

painting (by foregrounding the heroic, male European individual perched at the

precipice of a rugged, untamed frontier) contributes to an anthropocentric and

Eurocentric archive consolidating the figure of the male, European human as the

transcendental author and anchor of meaning and authenticity. In short, the

wanderer (inhabiting gender, racial and class specific positions) arrogates to

himself a world making agency that is denied to other human and nonhuman others,

and it is the repetition and inheritance of this anthropocentric and Eurocentric

tradition that has made possible readings of the Anthropocene as the "Human Age".

Situated in relation to literary critic Claire Colebrook's general discussion of

Romanticism, *Wanderer Above the Sea of Fog* can be seen to be posing for viewers "a

world beyond Man as man's better other" (*Sex After Life* 19; the gender specificity of

Colebrook's language is intended). To this extent, the inhuman world of nature

signifies a negative power only accessible through the revelatory work of symbols,

allegories and suggestive representations - a negative power triggering a dialectical

movement of elevation and transcendence above the deadening logics of modernity

on the one hand, and the deterministic patterns of a brute, mindless nature on the

other. Here, nature as other becomes a fecund site of return and redemption, and

imagined as the metaphorical or allegorical flipside to the de-humanizing logics

defining modern politics, economy and science.

Enter Immanuel Kant, and the connection between his conceptualization of the

sublime to Friedrich's painting. For Kant, the sublime correlates to an emotional and

intellectual response in the human subject brought on paradigmatically by a

confrontation between the powers of nature and the resulting free-play of the

imagination and reason that trigger a self-knowledge of the sovereign power of the

human mind to transcend nature (Shapshay "The Sublime in Modern Philosophy").

As noted by Sandra Shapshay, Kant's notion of the sublime holds contradictory

tendencies in tension; pain and exaltation, pleasure and fear, power and

powerlessness, sense and the supersensical, and amidst this tension can be intuited

a respect for the power of human reason and morality "which is felt to be

nonetheless indomitable in the face of even the most vast and fearsome phenomena

in nature" ("Contemporary Environmental Aesthetics" 188-189). In agreement, eco-

critic Paul Outka notes that the initial disorientation of the "sublime results in [the]

recovery of the subject; the assertion of absolute difference from both nature and

embodiment, from the material/phenomenal itself. [...] The meaning of the natural

landscape is transformed in this process from an overwhelming powerful other that threatens the subject's physical existence, to a symbol of the [...] radically empowered [...] subject's metaphysical difference and fundamentally greater immaterial essence" (35-36). The following passage is Kant discussing human/nonhuman relation in the context of the sublime:

> "The irresistibility of [nature's] power certainly makes us, considered as natural beings, recognize our physical powerlessness, but at the same time it reveals a capacity for judging ourselves as independent of it and a superiority over nature on which is grounded a self-preservation of quite another kind [i.e. than providing the basic conditions of life, food and health]. [...] In this way, in our aesthetic judgment nature is judged as sublime not insofar as it arouses fear, but rather because it calls forth our power (which is not part of nature) [...], and hence to regard [nature's] power [...] as not the sort of dominion [...] to which we would have to bow [down to]. Therefore nature is here called sublime merely because it raises the imagination to the point of presenting those cases in which the mind can make palpable to itself the sublimity of its vocation even over nature." (*Critique of the Power of Judgment* 145).

To be fair, Kant and Friedrich need to be appreciated as part of a very particular historical, cultural and economic context working, among other things, to build an archive of knowledge that directs attention towards an elevated horizon of human liberty, equality and increased well-being. Yet the investment made by this tradition's stories in notions of methodological individualism, transcendence and human exceptionalism, investments made as a means to see returns in the form of universal human well-being, blocked attention from noticing other kinds of earth-bound, multi-species connections and collaborations.

A key project driving this canon and tradition was/is to make subject positions and knowledge making positions armed with epistemological infrastructures and a conceptual architecture, in short a disciplinary archive that provided enlightened, free-thinking, worldly humans the necessary tools to progressively build a better

world.[5] However, by evoking a disembodied, disconnected, abstracted conceptual architecture of Ideas, distinct from material, earthly embodiment, Friedrich can be seen to be asking viewers to intuit 'in-here' a super-sensical, transcendental and cognitive hyper-space, a symbolically structured world of Ideas, predicated on the separation of word and world, nature and culture.

It is no accident the wanderer in the painting is situated at the center of things, transcending and looking out over the world. Following Dominic Pettman's work of anthropocentrism, the wanderer's subject position above and outside nature consolidates the anthropocentric pretense that enlightened humans are not "irrelevant bystanders but significant eyewitnesses to the universe" (18). For the wanderer, the universe is illiterate, a-historical, and without meaning, while he becomes 'the' world-historical actor. Friedrich's canvas, and by extension the unformed chaos of the world the wandering subject takes in, becomes indexed to a higher human power to render sense and meaning where there seems to be none. Critiquing this all-too-human anthropocentric gaze, Pettman goes on to note that:

> "We are conceived as part of the world, but we also transcend it. The [...] assumption is that the universe only achieves actualization through our apprehension and comprehension of it, no matter how limited. [This male, enlightened subject] is fully aware of the objective insignificance of his own individuality, when measured at the scale of the universe, but his coping mechanism is to inflate the subjective to cosmic proportions. [...] We may only constitute a tiny fraction of the intergalactic show but we are its sole attentive audience, and for that, we are its match – even its co-creator." (20)

---

[5] For example, whereas James sees the nation-state and diplomacy as the proper apparatuses to build prosperous futures, Kant and Friedrich used an abstracted realm of Ideas and morality (among other things) as resources to tell stories of the human's elevation and transcendence from the senseless and random patterns of the earth.

Although this post-enlightenment tradition has been an extremely powerful

apparatus and worked to resist modernity's instrumentalist and hierarchal

enclosures by fostering human autonomy, freedom, imagination and equality, Donna

Haraway, in particular, has shown how this tradition is also bound-up with

anthropocentric, masculinist and colonial "tropes of the 'self-birthing of man', and

the 'optics of self-origination'" (*Modest_Witness* 35). In this sense, the painting is

part of a technology of vision used to signify a leap out of historically situated

material entanglements and gendered/racial embodiments into the disembodied

gaze of the transcendental subject of human exceptionalism, which for Haraway, is

"a conquering gaze from no-where" ("Situated Knowledges" 581).

The painting is foundational in the construction of the Romantic canon, but it

is also part of a tradition of subject, knowledge and world making practice that, by

elevating the secular, post-enlightenment human to transcendental heights over the

earth, cannot tell the kinds of earth-bound stories that Ledgard's planetary writing

aims to tell in *Submergence*. Therefore, by making a connection between Friedrich's

painting and *Submergence*, my point is to show how the stories, archives, subject

positions or regimes of visibility that mediate the wanderer's encounter with the

earth also shape the traditions and narratives situating Danielle and James. As an

enlightened intelligence agent and scientist, James and Danielle inhabit a shared

historical and cultural tradition working to construct emancipatory, sovereign

futures divorced from earthy constraints. That is, confronting 'other worlds beyond

their world', Danielle, James and the 'wanderer' are kin because they are part of a

tradition built on stories of human exceptionalism, anthropocentrism, universalism,

179

sovereignty and methodological individualism, and all three inhabit (differently) a forward-looking, progressively expanding civilizational project predicated on the construction of emancipatory futures that elevate human history and reason above earthly constraints and limitations.

To be clear, my argument is not that the painting and the specific subject position of the wanderer are directly responsible for the environmental contaminations and exterminations marking the Anthropocene. Rather, my argument is that the painting is an example of a historical text that evokes the stories and imaginaries, epistemologies and ontologies that have consolidated to form an archive that makes possible a reading of the Anthropocene as a "Human Age" of human sovereignty over the earth and techno-enhanced well-being. That is, attempts to tell the story of the Anthropocene as the "Human Age", a historical era where human sovereignty is imagined to transcend and outstrip the earth, have roots in and draw from a diverse archive (spanning many kinds of art, politics and science) that the painting is a key component of. In the end, Danielle, James and the wanderer are part of the "Human Age" because they inhabit and are rendered as part of a particular subject, relation and world making apparatus that elevates and separates 'their' worlds over and above other worlds, an apparatus that Ledgard's planetary writing (along with work in the Environmental Humanities) interrupts to allow for more earth-bound, resurgent modes of multi-species ongoingness.

Resurgence: Submergence in the Chthulucene

Making a mess of the stories that give coherence and stability to the notion of a sovereign, transcendental "Human Age", Danielle re-examines the stories we

thought we know and the traditions we thought got us to where we are. In this sense, Danielle is not trying to unlock nature's secrets, or heroically save humanity from the cataclysms of climate change. Rather, her scientific work is opening space to tell factually true stories about multi-species world making practices that fudge anthropocentric inheritances and human exceptionalist subject positions. Danielle's materially grounded descriptions of feral ecologies in the Hadal zone bring to attention the lines of descent connecting the "Human Age" of sovereignty and universality, science and state-craft, to muddled multi-species worlds that stories of progress and transcendence aimed to exceed and ignore. Turning anthropocentric stories of the "Human Age" on their head, Danielle's stories help readers think about the problems and possibilities of livability despite the environmental mess characterizing the Anthropocene. "Understanding microbial life in the deep", notes Danielle, "was necessary for human survival on the planet. Without that knowledge we will not be able to comprehend the scale of life on Earth, or its ability to regenerate. The fact that life can exist in the darkness on chemicals, changes our understanding about life everywhere else in the universe" (Ledgard 153).

What makes *Submergence* and Ledgard's planetary writing effective, therefore, is how it reflects back to readers a post-enlightenment, post-romantic, cosmopolitan world that readers recognize, but by evoking real life stories of strange ecological entanglements, Ledgard is rendering humanist enclosures and anthropocentric orientations uncanny. For example, in an interview, Ledgard notes that "we have, in Western Civilization, an intellectual inheritance […] that we kind of need in order to know what we stand for – not in a rah-rah way, but in an internal way. And for me,

181

James More [and Danielle are characters] who really draw out what it means to be able to examine your beliefs, what it means to have the freedom to really challenge your beliefs" (Gourevitch).

Importantly, therefore, Ledgard's planetary writing evokes many aspects of Haraway's multi-species Chthulucene discussed in Chapter 2. Whereas Kant's universalism, progress and transcendence provided a context to situate Friedrich's Wanderer as part of the "Human Age", Haraway's earth-bound, sym-poietic multi-species Chthulucene helps provide a context to situate Ledgard's planetary writing amidst "myriad temporalities and spatialities and myriad intra-active entities-in-assemblages - including the more-than-human, other-than-human, inhuman and human-as-humus" ("Anthropocene, Capitalocene, Plantationocene, Chthulucene" 160). As outlined in Chapter 2, Haraway's Chthulucene generates figurative and conceptual, disciplinary and methodological equipment to pay attention to the multi-species scales, temporalities and agencies that exceed techno-humanist conquest stories of return and redemption, progress and expansion. Whereas the stories and imaginaries mediating Friedrich's painting archive historically particular forms of subject, relation and world making practice that contribute to tell stories of human exceptionalism, anthropocentrism and methodological individualism, Haraway's Chthulucene and Ledgard's planetary writing archive non-anthropocentric forms of subject, relation and world making practice. As noted by Haraway:

> "When we enslave ourselves to the heroic-tragic man-makes-himself story.
> When we cut ourselves off from our collective, our becoming-with, including
> dying and becoming compost again. When we cut ourselves off from morality
> and fear death, we become our own worst enemy in this relentless story of

making ourselves in the image of death. These are the lived stories of the Anthropocene as Capitalocene. But there's a third story, or actually myriad stories. [...] What if we had started instead by renaming our epoch, even - especially - in the Geophysical Union, with sym-poietic power, to signal the ongoing and non-Euclidean net bag of the Chthulhucene [...]. This unfinished Chthulhocene must collect up the trash of the Anthropocene, the exterminism of the Capitalocene, and make a much hotter compost pile for still possible pasts, presents, and futures" ("Anthropocene, Capitalocene, Chthulhocene" 269).

Following Anna Tsing, universal, progress timelines of transcendence and elevation, the most common reading of the Anthropocene, are not enough to know the uneven histories of human-made non-livability ("A Feminist Approach to the Anthropocene"); but looking to strange, feral landscapes of livability might provide some resources to tell stories of ongoingness differently. That is, Ledgard's planetary writing and Haraway's Chthulucene challenge the ontological and epistemological, institutional and historical contexts across the sciences and humanities built to tell stories of human exceptionalism, and therefore both intentionally intervene in the ongoing political and scientific attempts to read the Anthropocene as the "Human Age". Re-contextualizing Kant's transcendental a priori, not only in the twisting and turning historical a priori of infinitely complex intra-human worlds, Ledgard's planetary writing and Haraway's Chthulucene embed subject and knowledge making practice amidst an earthly, ecological, multi-species a priori (see Robbert "The Ecological In Foucault and Deleuze" on the movement of the transcendental to the ecological a priori).

Although the subject, relation and world making practices contained in James' civilizational stories of Empire and Danielle's scientific archives built on subject/object, nature/culture distinctions have been inherited from the stories and contexts rendered in Friedrich's painting and Kant's universalism (among others),

Ledgard and Haraway make a mess of these lines of inheritance, opening space to consider other forms of descent, entanglement, and kin-ship that lead to other kinds of pasts, presents and futures. Talking to James, Danielle notes that: "We're made of water, it's the most obvious thing, still we don't get it, we think we're solid, we're not, we're pockets of moisture. [...] It's a shock to be a jelly" (*Submergence* 128) - from here, she concludes "there is another world in our world [...]. Jellies we are, washed up on the shore" (*Submergence* 147). This notion connects to Haraway's argument kin-making and relation making practices that "are about keeping the lineages going, even while defamiliarizing their members [...]. Who and whatever we are, we need to make-with - become-with, compose-with - the earth-bound" ("Anthropocene, Capitalocene, Plantationocene, Chthulucene" 161). That is, as jellies washed up on the shore, "[a]ncestors turn out to be very interesting strangers; kin are unfamiliar (outside what we thought was family or gens), uncanny, haunting, active" (162).

Interested in contributing to an archive that contains conceptual tools and discursive equipment that "stretch the imagination and [...] change the story" ("Anthropocene, Capitalocene, Plantationocene, Chthulucene" 161), the Chthulucene and Ledgard's planetary writing undo the heliocentric stories about universal progress and the seminal power of Man to ascend to a sovereign position above the earth. So unlike Friedrich's wanderer, whose confrontation with a unruly scene of sublime nature works to re-lodge and recuperate the human subject into a higher-order phase-space of inner-freedom and Ideas, *Submergence* resists the urge to re-inscribe the self or human in a familiar oikos, home-land or boundedness.

184

The earth Danielle encounters cannot be imagined using organic tropes of a self-bounded, self-reproductive interconnected whole, but rather inorganic tropes of divergence, dispersal and disorientation. Danielle's work on chemosynthetic life in the Hadal zone connects to Haraway's insight, grounding her work on the Chthulucene, that "no species, not even our own arrogant one pretending to be good [self-contained] individuals in so-called modern Western scripts, acts alone" (159). Echoing this insight, Danielle comments how "if Man had a sense of proportion, he would die of shame" (*Submergence* 198). That is, while revealing the alarming scales at which particular kinds of human agency and history have become implicated in the ongoingness of earth system processes, the Anthropocene, as noted by geographer Nigel Clark, leads thinking and knowledge practices "back to epochs before humans emerged, take us deep into micro-ecologies too tiny to imagine, drag us down to the molten and lifeless interior of the earth" (*Inhuman Nature* xvi).

Submergence, read with Haraway's Chthulucene, is an important document contributing to the needed transdisciplinary work of re-training the imagination to respond to multi-species muddles, entanglements and inheritances. Here, with Haraway, "we're no longer looking at the apocalyptic, dreadful others [that stories of human exceptionalism and anthropocentrism] fear and need to slay; we're looking at the earth that's made of concatenated differences" ("Anthropocene, Capitalocene, Chthulucene" 268). In the end, the main achievement of *Submergence* is to tell earth-bound stories that intervene in the attempts being made across the global-north to tell and materialize the story of Anthropocene as an "Age of Man" or "Human Age", thus evoking the need for new kinds of stories and traditions to inherit the complex

185

messes and muddles of the Anthropocene/Capitalocene.

Conclusion

Ledgard's planetary writing contributes to ecological discourse out of bounds by remediating environmental and humanistic knowledge making practices and archives to tell stories about multi-species ongoingness. In this sense, Ledgard's planetary writing, and knowledge practices in the Environmental Humanities like Haraway's Chthulucene, work to remediate scientific and humanistic inheritances to tell real-life stories that re-ground the post-enlightenment subject from the 'no-place' of transcendental heights onto the 'unseen' earth.

Opening stories up across the sciences and arts, and going out of bounds, as theorists like Anna Tsing and Donna Haraway have productively done,[6] and making these stories work differently, is a political and history-making act. Stories about strange but real landscapes and ecologies that are not human made, but contribute to make conditions of livability for humans, interrupt the stories that have made the "Human Age", and work to build ongoing stories amidst the ruins of the Anthropocene/Capitalocene. Ledgard's planetary writing and Haraway's notion of the Chthulucene do not begin and end with Man and Nature (as does the *Wanderer*), but show how strange and feral chemosynthetic ecologies and landscapes of livability (might) re-figure resurgent pasts, presents and futures.

As a document contributing to an Environmental Humanities archive, *Submergence* speaks to the importance of keeping the sciences and stories together.

---

[6] For example, see Tsing *The Mushroom at the End of the World* (2015); and Haraway *Modest_Witness* (1997) & *When Species Meet* (2008).

Whereas Friedrich's painting comes to tell a story of human exceptionalism, transcendence and humanist lift-off, *Submergence* tells a story of ecological intimacy and coexistence that bypasses nature/culture, transcendent/immanent, word/world, subject/object distinctions. Unlike Friedrich's painting of the "Wanderer" and the Kantian Sublime, *Submergence* dissolves the human exceptionalist operating systems built by anthropocentric architects like Friedrich and Kant as a means to submerge readers in a vivid mesh of microbial, climatological, geological and biospheric rhythms that press down on and enfold intra-human narratives and worlds. For Ledgard's characters, unlike Friedrich's wanderer, there is no emancipation, no redemption, no better world beyond 'this' world, only the possibility of rendering ourselves response-able to the multi-species, multi-cultural muddles defining earth-bound modes of existence

Chapter Seven – Jeff Vandermeer's Weird Ecological Fiction: Stories for a Strange Ecology

> Somehow we need to be humble enough to finally admit to the true complexity of and importance of [multi-species] life—not just some anthropomorphic and patronizing sympathy—and in the process continue the necessary step of de-centralizing the human experience within a universe that clearly sees us as simple atoms like everything else (Vandermeer "The Slow Apocalypse and Fiction")

> Perhaps our hopes for accountability, for politics, for ecofeminism, turn on revisioning the world as coding trickster with whom we must learn to converse (Haraway "Situated Knowledges" 596)

Jeff Vandermeer's 2014 fictional *Southern Reach Trilogy* (*Annihilation*, *Authority* and *Acceptance*), winner of the 2015 Nebula Award for best Science Fiction Novel and finalist for the Hugo Award, is a work of speculative fiction and weird ecology that opens a unique non-anthropocentric trajectory for ecological thought and theory in the Anthropocene.[1] The three novels revolve around Area X, the site of a ecological event that occurred 30 years before that is neither natural nor unnatural (readers and the *Trilogy's* characters are never quite sure what it actually is), and the stumbling Southern Reach, an equally elusive government agency charged with the task of understanding and containing whatever is going on inside Area X. Area X emerged with a translucent border that has only one entry point through which the

---

[1] David Tompkins' (2014) excellent review in the *Los Angeles Review of Books* also uses the term 'weird ecology' to describe Vandermeer's trilogy.

Southern Reach has sent numerous expeditions made up of highly vetted civilian volunteers to ascertain knowledge about the uncanny, alien features of Area X with the hope of figuring out how to control, manage and discipline the weird ecological space.

Expeditions have not gone well. Inside Area X, expedition members find a natural environment that appears normal and even pristine, but they perceive something strange about Area X that they just cannot pin down with their technological and epistemological tools of classification. The kind of media, technology and disciplinary training that expedition members bring into Area X operate on a channel not conducive for communicating with or knowing the weird ecological features of Area X.[2] Moreover, the characters find themselves contaminated and infected by the uncanny ecological agency of Area X, an agency that renders ineffective humanist notions of intentionality, self-contained individualism and rationality. In short, characters (and readers of the *Trilogy*) enter an ecological context that destabilizes and undoes the narratives and subject positions bound-up with knowledge making practices predicated on rationalist notions that reality abides by logical principles that can be deductively accessed, and naturalist notions that the principles of nature can be accurately represented or mirrored in language

---

[2] For example, the expedition members in the first novel of the trilogy were selected because of their disciplinary backgrounds in psychology, anthropology, surveying, and linguistics.

With a film adaptation slated for a 2017 release,[3] the weird ecology of

Vandermeer's *Trilogy* has gained wide recognition for the way it renders humanist,

rationalist and naturalist perspectives of nature uncanny and strange (Carroll 2015;

Rothman 2015; Tompkins 2014). However, the *Trilogy* is not a disconnected,

apolitical aesthetic. Rather, as Vandermeer describes his work, the *Trilogy* is a

historically informed attempt to provide a discourse derived from a consideration of

the ecological conditions "characterizing global warming" and climate change

(Vandermeer, "The Nature of Reading"), and a discourse that "attempt[s] to wrench

our thinking [about ecology and the nonhuman world] out of the same tired old

tracks ("The Slow Apocalypse and Fiction"), so that "we no longer think in terms of

being stewards or despoilers but some other philosophy altogether" (Slattery "End

of the Line"). That is, as an ecological discourse out of bounds in relation to

fetishized notions of a pristine, pure, a-historical nature to be monitored, protected

and managed by rational, self-contained individuals, Vandermeer's ecological fiction

provides an aesthetic context that, in his words, "erodes our human gaze. [Thereby

allowing] the ghosts of living things [to] stare back at us from the page, [and] rise up

to destabilize both our fictional and real-life narratives" ("The Slow Apocalypse and

Fiction").

Vandermeer's ecological discourse contributes to this dissertation by

providing an ecological discourse spanning the sciences and arts that exceeds

humanist or naturalist space/time coordinates, providing an intellectual and

---

[3] The film adaptation is directed by Alex Garland, director of Ex Machina (2015), and stars Natalie Portman, Oscar Isaac and Jennifer Jason Leigh.

political context to consider the multi-temporal, multi-spatial ecological aspects of the Anthropocene and climate change. In relation to multi-species story-telling practices, rewilding, the aesthetic practices of Natalie Jeremijenko and Ledgard's planetary writing, Vandermeer's work is another example of a knowledge making, story-ing, and narrative practice for Anthropocene contexts that thwart naturalist and humanist, artificial and organic, and real and constructed distinctions. Contextualized by and working to contribute to an Environmental Humanities archive, Vandermeer's ecological fiction is a sensibility-shaping discursive and aesthetic practice that provides an innovative contrast to the naturalist and humanist writing and knowledge practices that methodologically avoid confronting the weird, strange and uncanny aspects of ecological co-existence.

What connects this chapter to the rest of this dissertation is the way that Vandermeer's fiction creates an opening for the articulation of stories and histories beyond those situated in the enclosed matrix space defining the Man of the Anthropocene, and an opening to articulate stories that do not reference or refer back to 'the human' or a pristine, redemptive nature to be protected or preserved in its original, pure form. However, what this chapter brings into focus in ways that the other chapters do not is how notions like the uncanny, the weird, and the strange specifically help to configure an non-anthropocentric discourse for the Anthropocene. This chapter, therefore, argues that the *Trilogy* provides intellectual, conceptual and methodological handrails that help guide the imagination to examine and take in ecological processes that are weird, uncanny and strange.

I begin this chapter by introducing the weird ecology that drives Vandermeer's *Trilogy*, and then contextualize or read Vandermeer's fiction in relation to a weird, non-anthropocentric facet of work in the life sciences and the Environmental Humanities - work that, in the words of feminist STS scholar Myria Hird, focuses on multi-species collaborations and agencies that "vigorous[ly] refuse to be absorbed within human formulations of world making" ("Indifferent Globality" 56). Therefore, after introducing Vandermeer's ecological writing, I show how Vandermeer's fiction intersects with Timothy Morton's theoretical work on "hyperobjects" (2013), notions of an ecological uncanny, and with work in the life sciences addressing the contaminations and horizontal entanglements that make-up what is referred to in these contexts as the ecological, multi-species microbiome and holobiont[4].

Together, these discourses focus on multi-species collaborations that do not hew to the ontologies and epistemologies predicated on a commanding, authoritative human subject representing, classifying or managing a world of nature that is 'out-there' beyond the human, and foreground analytic registers that figure the human as a multi-species affair containing numerous kinds of ecological dependencies, world making agencies and multi-species relations that break notions of methodological individualism and human exceptionalism. Therefore, situating knowledge production in relation to notions of the weird and uncanny, as I do in this chapter, is a productive intervention to make into ecological thinking and writing

---

[4] For example, see Gilbert et al. "A symbiotic View of Life"; and McFall-Ngai "The secret languages of coevolved symbioses".

because writing practices friendly to notions of a weird and uncanny ecology are able to train the imagination to notice the confounding and disorienting features of multi-species life.

Vandermeer's Weird Ecological Fiction

The *Trilogy* is Vandermeer's first work to explicitly address ecological considerations, but prior to writing the *Trilogy*, Vandermeer published numerous essays, novels, short stories and canon defining anthologies contributing to the genre of weird and speculative fiction.[5] As such, Vandermeer's writing and aesthetic practices have roots in diverse traditions that span many kinds of literature, genre and style. For example, Vandermeer's aesthetic draws heavily on the spooky, uncanny and speculative aesthetic of Stanley Kubrick, Kafka, Philip K Dick and aspects of Ursula le Guin, and less from the hard science fiction and techno-humanist imaginaries developed by writers such as Kim Stanley Robinson or Margaret Atwood (although Vandermeer's work intersects with Robinson and Atwood on questions of ecology and nature). Yet Vandermeer also draws heavily from the looping, uncanny noir aesthetic found in films such as *Blade Runner* (1982), *Mulholland Drive* (2001). Not surprisingly, Freud's notion of the uncanny intersects with Vandermeer's SF imaginary, but he has also stated that the cultural and semiotic theories of Baudrillard were influential (in Vandermeer "The Nature of Reading"). Importantly for this dissertation, Vandermeer has expressed curiosity

---

[5] For example, notable edited anthologies Vandermeer put together with Hugo-Award-Winning editor Ann Vandermeer include *New Weird* (2013) and *Sisters of the Revolution: A Feminist Speculative Fiction Anthology* (2015).

and appreciation for the theoretical work of Timothy Morton and has documented how Morton's notion of hyperobjects derives from a shared focus to articulate a discourse that speaks to uncanny ecological forces and formations (for Vandermeer's discussion of Morton, see "The Slow Apocalypse and Fiction"). Finally, as part of the weird tradition of SF, Vandermeer's work connects to the canon defining aesthetic of H.P. Lovecraft. Yet being part of the contemporary 'new weird' movement, a movement opposed to the racially chauvinistic and xenophobic tendencies woven into Lovecraft's work, Vandermeer tends to use complex real-world situations, contexts and imaginaries as settings from which to explore the uncanny and strange currents pervading everyday life. Therefore, like other 'new weird' writers like China Mieville, Vandermeer emphasizes the strange aspects of 'this' world, rather than working in fully imagined 'other' worlds.

Yet Vandermeer's original turn to weird ecological fiction and ecological questions more generally connects his work with different canons, genres and traditions of writing. Even though ecological questions are not new in the canon of SF (for example, environmental issues have shaped the fiction of Ursula Le Guin, Margret Atwood and Kim Stanley Robinson), Vandermeer's weird ecological fiction is unique. Set in the present world, Vandermeer avoids dystopian (Atwood) and utopian (Le Guin) narrative tropes, and also is aesthetically and politically distinct from the contemporary genre of climate change fiction (cli-fi) - a genre, notes literary critic Ursula Heise, that too often remains "conventional in [its] narrative strategies" by relying on "apocalyptic narrative" tropes, and "simplistic story lines predicated on elegies of nature and nostalgia for an uncontaminated world" (Heise

Sense of Place, quoted in Weik von Mossner "Science Fiction and the Risks of the

Anthropocene" 205).[6]

The three novels of the *Southern Reach Trilogy* are each written from a

different character's perspective, and over the course of each novel, the human

centered perspectives become destabilized as human characters become immersed

and entangled within strange nonhuman environments that exceed human/space

time coordinates -- environments where humanist notions of intentionality,

rationality and exceptionality are ineffective, and naturalist notions of a passive

nature to be protect and preserve. *Annihilation*, book one, is written from the

perspective of an unnamed female Biologist as she and her fellow female expedition

members enter and ultimately become undone by the strange features of Area X.[7]

Authority, book two is written from the perspective of a male character known as

Control, the reluctant new director of the Southern Reach, a governmental agency

that turns out to be a noir, uncanny assemblage that seems suited for a Kafka novel

or a David Lynch movie. And book three, *Acceptance*, begins from the perspective of

Control, but ultimately becomes written from the perspective of Ghost Bird, the

uncanny doppelganger of the Biologist that (strangely) materializes after the

Biologist disappears inside Area X at the end of *Annihilation*. *Acceptance* gives

readers an non-anthropocentric, earth-magnitude perspective of the story and Area

X, and follows Control and Ghost Bird as they re-enter Area X and try to re-orient

---

[6] Notable texts from the genre of 'cli-fi' include: Kingsolver, *Flight Behaviour* (2012); John Atcheson, *A Being Darkly Wise* (2012); and Ian McEwan, *Solar* (2010).
[7] Very few proper names are used in the *Trilogy*; rather, characters are typically referred to as the function they perform, a method contributing to the de-personalization and de-stabilization of the text. For example, in book one, the lead characters on the expedition are referred to and refer to each other as the Biologist, the Linguist, the Anthropologist and the Surveyor.

themselves amidst the weird, uncanny ecological landscapes of Area X, landscapes that require Ghost Bird and Control to struggle without the handrails of humanist and naturalist epistemologies, imaginaries and world-views.

Not much is known about Area X. Readers learn that it used to be the site of a coastal fishing village, and nearby there was a military base conducting classified experiments. After the 'event', a translucent, impenetrable border formed around the area with one entry point. The Southern Reach has learned that inside Area X there is a lighthouse and what is referred to as an inverted tower receding into the ground that becomes an uncanny focal point of Area X.

As a result of these strange features, the Biologist has trouble reading and writing about Area X because nature is out of joint and does not align with the normally expected patterns, flows and formations that an academically trained biologist would expect to find in nature. Nature inside Area X seems overly vibrant, contains plant and animal species that were thought to be extinct, flocks of birds seem to fly in unnatural flight formations and made up of more than one bird species, a dolphin seems to recognize the Biologist, and the stars at night do not seem to be aligned in their expected constellations. There is "nothing unnatural" in Area X, notes the Biologist, "except for hyper-real aspects to the landscape, these processes working beneath the surface" (*Acceptance* 54). Things are never quite what they are perceived to be; and the Biologist continually has trouble identifying and situating the natural organisms she finds inside Area X within the disciplinary categories and maps she uses to guide her understanding of the site. For example, examining a star fish, the Biologist notes that the:

"longer I stared at it the less comprehensible the creature became. The more it became something alien to me, and the more I had a sense that I knew nothing at all - about nature, about ecosystems. There was something about my mood and its dark glow that eclipsed sense, that made me see this creature, which had indeed been assigned a place in the taxonomy - catalogued, studied and described - irreducible down to any of that. And if I kept looking, I knew that ultimately I would have to admit I knew less than nothing about myself as well, whether that was a lie or the truth" (*Annihilation* 85).

Importantly, a key aspect of *Annihilation* is the annihilation of the distance (and the authority and control this distance affords) that the reading and writing practices characterizing the genre of first person nature writing presuppose between an active writer (and their language/discourse/knowledge) and the passive materiality of nature. That is, Vandermeer is rendering uncanny and strange the genre of first person nature writing in *Annihilation*, a genre of writing that has been foundational for a tradition of environmentalism built to see nature as pure, uncorrupted spaces that are being lost to human encroachment. Typically situated by pastoral and frontier imaginaries of rugged wilderness, the genre of first person nature writing tends to be characterized by white, male writers who write about their lone treks into wild, authentic natural spaces, and is a genre oriented by a nostalgia for the loss of true spaces of nature that writing works to archive, preserve and memorialize.[8] In a style reminiscent of Thoreau in *Walden* or Aldo Leopold in *A Sand County Almanac*, the Biologist spends large portions of the journal/novel meticulously documenting and describing the (un)natural landscapes of Area X. For example, she notes that "[t]ransformations were taking place here and as much as I had felt part of a

---

[8] For example, writers contributing to the genre of first person nature writing include Henry David Thoreau, Aldo Leopold, John Muir and Bill Bryson, Robert MacFarlane, Barry Lopez and more recently Elizabeth Kolbert (the nonfiction nature writer for the *New Yorker* and best selling nonfiction writer of *The Sixth Extinction* (2015) and *Field Notes from a Catastrophe* (2006).

'natural' landscape on my trek to the lighthouse, I could not deny that these habitats were transitional in a deeply unnatural way" (*Annihilation* 180). However, unlike the natural world that is imagined to be metaphysically present in much non-fiction, first person nature writing, Vandermeer is beginning to immerse and entangle readers into another kind of ecological genre, aesthetic and imaginary. Nature writing is made strange and uncanny.

Readers learn that book one is the field journal the Biologist wrote on her expedition, a field journal that she left inside Area X (readers are left to speculate how the journal got out of Area X, and who its intended audience was). In this sense, *Annihilation* is a first person narrative documenting personal reflections and encounters the author (the Biologist) is having with the natural environment, and employs a writing practice whereby the reflections mediated through the author are intended to provide a sense of coherence and stability to the complexity of the nonhuman world experienced. Yet Vandermeer's ecological fiction disrupts these uni-directional writing practices whereby an intentional and grounded first person author possesses an authority to inscribe and validate the order of things into a coherent image, narrative or representation. For example, the Biologist "was convinced that when [she] wasn't looking at [cell samples of plants from Area X in her microscope], the cells became something else, that the very act of observation changed everything" (*Annihilation* 80).

If first person nature writing is a method of writing that tries to avoid (as much as possible) discursive mediations and cultural artifice in order to directly interface with the nonhuman world as a means of producing a pure, direct and

immediate form of ecological discourse, this method and approach fails in relation to the immersive, weird and uncanny aspects of Area X. That is, a writing practice whereby intentional subjects produce discourse that reflects clear images of nature as object 'out-there' is not built to respond to the strange features of Area X. Moreover, a confounded Southern Reach scientists asks: "What do you do when you run up against something that you cannot describe through comparisons to what you know, and, when you try, it sends you off in the wrong direction?" (*Authority* 98). The scientist's question highlights the lack of available methods and narratives, metaphors and analogies, stories and histories to contextualize and situate Area X into any kind of coherent image, bounded figure, smooth narrative or progressive history that recuperates a human-centered experience of space and time, epistemology and ontology. In this sense, like Haraway's Chthulucene, the multi-species story-telling practices of Anna Tsing, rewilding, Jeremijenko's art practices, and Ledgard's novel, Vandermeer works to provide a perspective onto messy ecological entanglements that are increasingly destabilizing anthropocentric narratives and histories in an era of climate change and the Anthropocene.

Therefore, mimicking yet subverting the classic 'return to nature' trope that characterizes the genre of first person nature writing, the Biologist strikes out into Area X at the end of *Annihilation* as a means to recuperate a future beyond anthropocentric imaginaries of frontier space, rugged individualism, nostalgia and mourning pure spaces of nature. Rather than expecting Area X to fit into her histories of classification, or conform to the perspective offered by her subject position (as a biologist) and narrowly defined disciplinary knowledge practices, she

199

allows her co-existence with Area X to undo and re-do her thinking and imagining practices. Area X un-does the authority and control of the Biologist's rationalist inscription systems to coordinate and order the world into a recognizable and manageable form that elevates her to an authoritative, commanding position. The Biologist is a smart, observant, independent thinker who readers sympathize with, but the book's point is that the scientific and rationalist, naturalist and anthropomorphic archives she draws on to know, understand and imagine Area X are ineffective as she finds herself co-existing with rhythms, flows and formations that remain asymmetric to the histories, imaginaries and narratives that, as a North American scientist, she has been made to inhabit. The Biologist's experiences with Area X materially and discursively re-shape the maps and narratives the Biologist uses to orient her self as a subject living on earth. While in Area X, the Biologist "was becoming estranged from the expedition and its purpose" (*Annihilation* 17), and she notes how her entanglement with Area X "has quelled the last ashes of the burning compulsion [she] had to know everything. [And reflects that] the thought of continually doing harm to [herself] to remain human seems somehow pathetic" (*Annihilation* 98). Moreover, the Biologist reflects that "if [we don't] have real answers it is because we [at the Southern Reach] still don't know what questions to ask. Our instruments are useless, our methodology broken, our motivations selfish" (*Annihilation* 97).

The destabilization of the Biologist's anthropocentric perspective occurs most powerfully when she confronts the alien "the crawler" in the inverted tower. Moving from first person nature writing into the genre conventions of the weird and

speculative, the crawler is a Lovecraft-ian, cthulhu anomaly that is writing living, bioluminescent words on the organic stone walls of the tower, words "written among tiny communities of creatures of unknown origin" (*Annihilation* 57). The Biologist begins to slowly transform and become-with Area X when she becomes "infected" or "contaminated" by inhaling spores inside the topological anomaly (the inverted tower/tunnel) where she finds the crawler, a becoming-with that ends up producing a new person Ghost Bird, the Biologists doppelganger, the main subject of book three, *Acceptance*. After her exploration of the tower/tunnel she begins to feel herself changing, and feels Area X's interference "communicating" with her. These interference patterns manifest gradually as a feverish "green brightness" in her chest, and she feels the biological, fungal materiality of Area X slowly spreading throughout her body. Employing the genre conventions defining Lovecraft's cthulhu monsters, but also intersecting with the destabilizing perspective opened by Ledgard's writing on the chemosynthetic landscapes found in the Atlantic's Hadal zones and Haraway's Cthulhucene, the crawler signifies the weird nucleus or distillation of Area X and evokes many key themes contextualizing Vandermeer's ecological aesthetic about the inability to translate or reduce the planet's alterity into human terms and narratives. For example, the frustrated, spooked Biologist notes that the crawler "was a figure within a series of refracted panes of glass. [And that even thought it was right in front of her, she] still couldn't truly see it, any more than [she could see] it under the microscope" (*Annihilation* 89). The crawler is not a focal point of the *Trilogy*, but acts as a literary device addressing many of the themes

about translation and transmutation that define the book, and hovers in the margins

of the *Trilogy* as a lurking enigma or specter.

Having set out the broad parameters of Area X and beginning to open space

for the possibility of a weird ecological fiction in book one, the second book,

Authority, turns back to the intra-human world, and focuses on the Southern Reach

and its (failed) attempts to understand and contain Area X. *Authority* follows Control

as he attempts to navigate the eerie aesthetic of the Southern Reach and its Kafka-

esque bureaucratic weirdness. If book one is about the Biologist's first person

narrative encounter with the alien asymmetry of Area X from naturalist

perspectives, *Authority* mimics the genre conventions and tropes defining third-

person noir crime fiction and detective thrillers. Vandermeer sets up *Authority* as a

mystery, and introduces Control as the detective tasked with the job of figuring out

why the Southern Reach continually fails to gain access to Area X.

However, the Southern Reach turns out to be an uncanny noir nightmare, and

like Decker in *Blade Runner*, Control learns that who he is, what his connection to

the Southern Reach is, and why he is the newly appointed director, turn out to be

the real (unsolvable) mysteries of the novel. In true Kafkae-sque, Kubrickian or

Hitchcock-ian fashion, Control is not in control, and he is haunted by paranoia and a

claustrophobic sense that he is being watched, recorded, followed and subliminally

controlled by his superiors who he cannot identify, and who are not being

transparent in what they know about Area X. "The Southern Reach had been set up

to investigate and contain Area X", notes the anonymous, unidentified third person

narrator of *Authority*, "and yet despite all the signs and symbols of that mission - all

the talk and files and briefs and analysis - some other emotion or attitude also existed within the agency. It frustrated him [Control] that he could not quite put his finger on it, as if he needed another sense, or a sensitivity, that he lacked" (*Authority* 43). Analogous to the way that the expeditions are supposed to gain control (epistemologically) over Area X, Control's mandate is to regain control and authority over the crumbing, unwieldy government institution of the Southern Reach that itself is failing in its mandate to control and manage the threads entangling the intra-human world with the inhuman world of Area X.

The goal of the Southern Reach is to read Area X for meaning or intentionality, but the methods and approaches the Southern Reach employ to interface with Area X are fruitless. "You'd expect", notes Control, "Area X to cooperate at least a little bit, right? I'd've staked my reputation on it cooperating with us enough to get some accurate readings at least, an abnormal heat signature or something" (*Authority* 35). In the end, "placing trust in a word like 'border'" reflects Control, "had been a mistake, a trap. A slow unraveling of terms unrecognized until too late" (*Authority* 86). Similar to the way the crawler is working with a script and inscribing signs the Biologist cannot interface with, the data and information scientists have of Area X fail to be interpreted or translated into the codes and programs contained in the Southern Reach, nor can they be inserted into any kind of meaningful order or sequence. "Control knew" for example, "that [...] nothing about language, about communication, could bridge the divide between human beings and Area X" (*Acceptance* 91). The point is that Area X pulls discursive, reading and writing apparatuses out of their anthropocentric and

rationalist orbit. Furthermore, a linguist at the Southern Reach notes that "[w]e keep saying 'it' and [if] 'it' […] is like this thing or like that thing. But it isn't - it is only itself. Whatever it is. Because our minds process information almost solely through analogy and categorization, we are often defeated when presented with something that fits no category and lies outside of the realm of our analogies" (*Authority* 33). Finally, reflecting on the inability of the Southern Reach to advance in its mission to manage Area X, Control reflects that "[in] college, what had always stuck with [him] in Astronomy 101 was that the first astronomers to think of [the stars] not as part of a celestial tapestry revolving around the earth but as individual planets had had to wrench their imaginations - and thus their analogies and metaphors - out of a grooved track that had been running through everyone's minds for hundreds and hundreds of years" (*Authority* 33-34). In this sense, Vandermeer's work can be seen as an example of an attempt to wrench environmental and humanistic imaginations out their grooved tracks in order to produce an ecological discourse and imaginary response-able to the strange disorienting features of multi-species entanglements.

 Authority ends by introducing a new character, Ghost Bird, who is a version of the Biologist who strangely emerges outside Area X in a contaminated but vibrant and rewilded landscape that the Biologist would visit before going into Area X because she was attracted to its unique ecological features. That is, Ghost Bird mysteriously emerges at the end of *Authority* in an urban landscape the Biologist was fascinated by, and is detained, questioned and interrogated throughout the final book *Acceptance* in the hope she can provide clues to help Control piece together the mystery of Area X and the Southern Reach. Ghost Bird shares many of the Biologist's

memories and features, but is unique in her own right, and so cannot provide the kind of narrative account of what happened to the Biologist in Area X that the Southern Reach and Control expect. Confronting a confounded Control, Ghost Bird says, "I am a copy [of the Biologist]. But not a perfect one. I'm not her. She's not me" (*Acceptance* 25).

Being separate from the anthropocentric, rationalistic and naturalistic practices and imaginaries that the other human characters inhabit, Ghost Bird is out of joint and cannot be pinned down. In this sense, Ghost Bird can be seen to be materially embodying the conceptual and imaginative coordinates articulated by post-humanist ecological theory, because the Southern Reach cannot place Ghost Bird in any of the narrative templates that define anthropocentric and human exceptionalist thinking and knowledge practices. Control continually notes how he cannot get a "read" on her, situate her in a history with a clear origin and conclusion, or define who essentially she is - he wants to place her in his all-too-human world. Control keeps asking her "[w]hat scripts are you running off of", but she is continually and non-intentionally giving Control's mission the slip (*Acceptance* 43). Ghost Bird notes how Control was "having to reach for such banal answers because of a lack of imagination, because human beings couldn't even put themselves in the mind of a cormorant or an owl or a whale or a bumblebee " (*Acceptance* 55). Responding to Control's interrogation, Ghost Bird says "a kind of alien regard has twinned itself to me. [Control] was still holding on to the idea of causality, of purpose as that word might be recognizable to the Southern Reach. But what if you

205

discover that the price of 'purpose' is to render invisible so many other things?"

(*Acceptance* 47).

If the Anthropocene is regarded as the "Age of Man" (Kolbert "Enter the

Anthropocene – Age of Man"), eliciting the 'good Anthropocene' pretense that

humans are a god-like species able to (sustainablly and progressively) read, manage

and rationally oversee the functioning of earth system processes and translate the

flux and flow of earthly events into humanist and rationalist enclosures, Ghost Bird

connects to the kin and kind making practices contextualizing Haraway's

Chthulucene, and functions as a de-centering, disorienting intrusion into rationalist

scripts and naturalist enclosures. With the complex, multi-temporal, multi-spatial,

non-natural, uncontainable presence of Ghost Bird, "the hegemony of what was real

[within anthropocentric and humanist histories] had been altered, or broken

forever. [...] Something had *changed* beyond the climate" (*Acceptance* 183). Within

intra-human scales of space and time, culture and history, Ghost Bird, like Danielle's

work on chemosynthetic ecosystems in *Submergence*, attunes readers to inhuman

planetary scales - scales that are not imagined as a pure outside or negativity, but a

de-centering, symbiotic mesh of flows and formations looping through, but never

reducible to, intra-human scales and contexts.

Weird Ecology and the Environmental Humanities: Hyperobjects, The Ecological Uncanny and Ecological Microbiomes

This chapter, so far, has emphasized the features that characterize Vandermeer's

work, but the rest of the chapter opens up Vandermeer's literature to highlight the

methodological connections and political collaborations that exist between the

Trilogy and work in the Environmental Humanities. Situated in relation to Timothy

Morton's work on hyperobjects, notions of an ecological uncanny, and work in the

life sciences on symbiotic microbioms published by Scott Gilbert and Margaret

McFall-Ngai, the point I want to make is that Vandermeer's weird ecology

contributes to an archive of knowledge that methodologically challenges

disciplinary work across the human, social and natural sciences predicated on the

idea, with Karen Barad, that the world is made up of "little bits of nature" awaiting

the mark of an external force like culture or human history for their completion

(Barad *Meeting the Universe Halfway*, quoted in Ingold "Toward an Ecology of

Materials" 434). In an intellectual and ecological context where intentionality,

rational planning and the "impulse toward necessary autonomous action" are

continually and differently being humbled and destabilized by newly understood

macro and micro earth-system processes, the intellectual and creative resources I

turn to discuss here are friendly to weird ecological phenomena, that for

Vandermeer, "allow us to dream better, to create a world that has less of us in it, and

more of something else" ("The Slow Apocalypse and Fiction"). In this sense,

situating Vandermeer's fiction in relation to work across the humanities and

sciences helps clarify forms of ecological thinking and writing that start from the

notion humans are not in a position of command and control, and that to recuperate

a future of ecological co-existence and intimacy amidst the multiplying ecological

and disciplinary enclosures of the Anthropocene requires aesthetic and discursive

practices recognizing our uncanny and strange entanglement with earthly spaces

and inhuman scales.

Area X as Hyperobject

There are many productive overlaps between Area X and Timothy Morton's notion of hyperobjects.[9] In a review of Morton's work, Vandermeer has himself noted that hyperobjects (Morton uses climate change, species extinction events and nuclear waste as examples of hyperobjects), like Area X, "have a unique temporality that renders them invisible to human beings for stretches of time and they exhibit effects through the interrelationship of objects that may not seem to be connected at first" ("The Slow Apocalypse and Fiction"). In Area X, Vandermeer's characters find themselves caught up in a hyperobject that refuses to be correlated to human scale thinking and being, history and narrative. As a hyperobject, Area X is not reducible to an objective matter of fact that can be delineated by consciousness, and human characters cannot gain the proper distance or perspective to see Area X as a single, self-contained thing 'out-there' in nature.

Hyperobjects and Area X resist being translated into rationalist discourse. In a discussion with Control, a distressed scientist tries to describe the weird agency of Area X as something that recedes from rationalist knowledge infrastructures and "peers through what we [in rationalist and naturalist contexts] think of as reality" (*Acceptance* 210). Moreover, Area X, notes Vandermeer, works as "an anchor for something that would be otherwise hard to picture in its entirety" ("The Slow Apocalypse and Fiction"). Reminiscent in this sense of Paul Edwards' discussion of shimmering climate data, a frustrated Southern Reach scientist operating rationalist

---

[9] Other reviews of the trilogy have also noted this connection. For example, see David Tompkins' review "Weird Ecology: On the Southern Reach Trilogy" (2014).

machinery claims that "we just don't have the language" to make clear the elusive qualities of Area X (*Authority* 224), and that Area X is "part of an equation […] too complex for anyone to see the whole of" (*Acceptance* 120). Destabilizing and undoing the anthropocentric subject positions that rationalist and naturalist knowledge practices afford, another confounded Southern Reach scientist asks, "what do you do when you're faced by something that doesn't care what you do and isn't affected by your actions?" (*Authority* 267). The point is that Area X, like climate change, sits hyper to rationalist and naturalist epistemologies, and that a transdisciplinary, trans-genre discourse containing notions of the uncanny and weird provides discursive coordinates to help make sensible the non-anthropocentric scales of ecological co-existence.

As a hyperobject, Area X infiltrates the characters' sensory and material environment, flickering within the knowledge ecologies of humanism, realism and naturalism, knowledge ecologies employed in the production of narratives about anthropocentric control and authority, but the human gaze cannot get an adequate resolution on the asymmetric alterity and inhuman otherness permeating Area X. "Data" notes the Southern Reach's lead scientist, "pulled out of Area X duplicates itself and declines, or 'declines to be interpreted', […] and theories proliferate but nothing can be proven. We lack the analogies, the linguists keep saying" (*Acceptance* 267-268). And elsewhere, the same scientist comments that "it's [i.e. Area X] operating off of such refined and intricate senses that the tools we've bound ourselves with, the ways we record the universe, are probably evidence of our own primate nature" (*Acceptance* 268).

As such, a predominant theme running through the *Trilogy* is the fact that characters are not able to enclose the inhuman strangeness of Area X into knowledge, recuperate it into a totalizing human history, or enclose the eco-material intrusion of Area X into a coherent or meaningful narrative of humanist redemption and return. While revealing the alarming scales at which particular kinds of human agency and history have become implicated in the ongoingness of earth system processes, hyperobjects speak to our entanglement and asymmetrical relation with unbounded material flows and formations that humans have trouble interfacing or negotiating with. In the end, Control learns that responding to Area X as a hyperobject means responding to an ecological awareness telling 'us' that 'we' are not in final control (*Hyperobjects* 16). Finally, watching the Southern Reach buckle and crumble under the stress of not being able to contain or comprehend Area X, Ghost Bird reflects that "words like collateral damage and containment and counterattacks, were blossoming like old spells, incantations that worked in other, far distant lands, but not here. [Control] was back in control, but control was meaningless" (*Acceptance* 310). In this sense, Control and the scientists at the Southern Reach do not have the needed conceptual and methodological handrails to orient themselves in relation to the kind of agency exhibited by Area X.

The Ecological Uncanny and the Return of the Nonhuman Repressed

Another aspect distinguishing Vandermeer's ecological fiction is the notion of an ecological uncanny. By using repetitions, doubles, and doppelgangers, Vandermeer is evoking an ecological uncanny that the rationalist methodologies of the Southern Reach attempt to smooth over and repress. For example, Area X, the crawler and

Ghost Bird can be seen as examples that evoke Freud's idea of the uncanny return of the repressed. Strangely emerging within the all-too-human systems of rationality and identity construction, Area X, the crawler and Ghost Bird are uncanny returns of the repressed that trouble and haunt human exceptionalist and anthropocentric knowledge, identity and world making practices. Whereas Freud's famous essay on the uncanny showed how repressed aspects of individual psychological development and consciousness were repeatedly interrupted by subconscious forces and unconscious formations, Vandermeer's ecological uncanny, in the form of the crawler and the Biologist's doppelganger Ghost Bird, show that repressed aspects of the nonhuman and inhuman in the human subject and discourse return to interrupt and disrupt human social and psychic space. For example, while reading Southern Reach documents describing the Biologist, Ghost Bird notes how "she [Ghost Bird] might be observing an incarnation of herself she could not quite comprehend, and yet [...] there was connection, there was recognition" (*Acceptance* 142*).* Moreover, mocking the attempts of the Southern Reach to repress and suppress Area X, Ghost Bird notes that the idea of "containment is a joke - you can hardly contain yourself" (*Acceptance* 43).

If for Freud, consciousness and intentionality are bound up with, infected by or contaminated by subconscious/unconscious desires, patterns and formations that are untranslatable or non-representable in consciousness or rational discourse, and if unconscious forces and agencies trouble, double and trip-up the smooth functioning of consciousness, Vandermeer's weird ecology can be seen to be about the return of the nonhuman repressed to trouble, double and trip-up rationalist

211

contexts and archives. Area X, the crawler and Ghost Bird, as returns of the nonhuman repressed, are tricksters and evoke the point that humans are entangled with alien, uncanny and strange planetary processes that do not fit into the all-too-human world of reason and rationality. In this sense, I agree with Siobhan Carroll's review of the *Trilogy* when she argues that "it is no longer just one's psychological depths that are being repressed, but one's knowledge of oneself as nonhuman [...]. Rather than just tackling the psychological framework of the adult, it is the category of 'the human' that these novels gleefully tear at, dissect, and absorb. [...] As such, they make for appropriately spooky reading in the age of the Anthropocene, at our own moment of environmental crisis and uncomfortable self-recognition" (Carroll 2015).

In an article called "The Uncanny Power of Weird Fiction", Vandermeer makes a compelling case for the need for a form of ecological reading and writing situated by a weird, uncanny ecological context. Here, notes Vandermeer:

> "in what is actually our infancy of understanding the world—this era in which we think we are older than we are—it is cathartic to seek out and tell stories that do not seek to reconcile the illogical, the contradictory, and often instinctual way in which human beings perceive the world. [...] Such a reading experience is humbling; it humbles you as a human being, but also as a writer. It tends to strip from you any impulse that does not lead to what seems essential. It makes you not want to aspire to be good or to be great, but to be true in some small way—to be true to the underpinnings of the world, and the struggle to understand that world. This impulse is tempered by the recognition that we can never know all of it, or even most of it—and that this seeming lack is not a failing but a strength" ("The Uncanny Power of Weird Fiction").

In this sense, Vandermeer's weird ecology provides a platform to understand Haraway's point that to be one is always to become-with, and be re-made by many (Haraway *When Species Meet*). And Vandermeer's ecological uncanny connects with Morton's idea that:

212

"encounter[s] [with] all kinds of beings that are not strictly 'natural'. This isn't surprising either, since what we call 'nature' is a 'denatured', unnatural, uncanny sequence of mutations and catastrophic events; just read Darwin. The ecological view to come isn't a picture of some bounded object or 'restrictive economy', a closed system. It is a vast, sprawling mesh of interconnection without a definite center or edge. It is radical intimacy, coexistence with other beings, sentient and otherwise [...]. The ecological thought fans out into questions concerning cyborgs, artificial intelligence, and the irreducible uncertainty over what counts as a person. Being a person means never being sure that you're one" (*The Ecological Thought* 8).

After being infected or contaminated by the trickster agent that is Area X, an infection that leads to the emergence or trans-mediation of the Biologist into Ghost Bird, the Biologist feels the human exceptionalist and anthropocentric, rationalist and naturalist scripts imposed by the Southern Reach coming undone. The biological, cultural and personal mediums and imaginaries that produce and sustain the Biologist as the subject she knows she is, and the mediums and imaginaries situating the knowledge ecologies she uses to mediate between self and other, human and nonhuman, become jammed or disrupted by returns of the nonhuman repressed that her infection provokes. There is a non-linear, looping form of communication and exchange taking place between the Biologist and Area X, an exchange of information and material that is becoming inscribed in the Biologist, yet she lacks the conceptual repertoire to register and contextualize these marks because they do not fit within the anthropocentric thinking and worlding practices she has access to.

The uncanny foregrounds uncertainty, ambiguity and wonder into ecological discourse, and therefore deflects rationalist modes of environmentalism predicated on objective, definitive and authoritative conclusions, and a green, idealist environmentalism that foregrounds a clean, coherent nature that, in Timothy

Morton's words, "rises up to judge, monitor and discipline, [chastising those who] don't love nature properly. [Humans and nonhumans] should act natural [in this context], unnaturalness will be noted and punished" (*The Ecological Thought* 81). In short, environmentalism and ecological thinking resist and repress the ambiguity and noise of the uncanny because these notions require knowledge producers to forfeit self-righteous positions of moral superiority, hierarchical positions of unilateral authority, and clean distinctions between natural and unnatural modes of conduct. For example, Control and the Southern Reach are continually disoriented because they inhabit worlds of doing and thinking predicated on the rationalist idea that represses all forms of communication not predicated on the idea that subjects should mean what they say and say what the mean. "If we edit out ambiguity", Morton goes on to note, "we achieve nothing but aggression", repression and suppression (*The Ecological Thought* 82).

In this sense, Vandermeer's ecological uncanny brings back the noise of uncertainty into human and human/nonhuman communication, thereby opening space for wonder, vulnerability and curiosity to engender different worlds of thinking and doing that edit-out moral superiority, authoritative declarations and draconian discipline. The uncanny disruptions and deflections created by the crawler, Area X and Ghost Bird are devices that make rationalism and naturalism pause and trouble environmentalist notions that see nature as a mirrored reflection of the rationalist self, a nature easily loved but subject to over-bearing, constant supervision. In the end, Vandermeer's ecological uncanny re-populates ecological discourse with the sense that ecological spaces and multi-species processes are

214

much wider, stranger and weirder than delimited modes of environmental thinking expect, thus opening ecological discourse to the diversity and multiplicity of multi-species communication, connection and collaboration that continually go out of bounds.

<div align="center">**Multi-Species Microbiomes**</div>

This brings Vandermeer's ecological discourse into discussion with work in the life sciences on the strange worlds of ecological microbiomes and holobionts. For example, evolutionary biologist Scott Gilbert (et al.) recently published an article called "A Symbiotic View of Life: We Have Never Been Individuals" in the top ranked peer-reviewed life science journal *The Quarterly Review of Biology*. Growing out of the microbiology of Lynn Margulis and based on research into the complex symbiotic exchanges and translations that take place across and through multi-cellular life, Gilbert et al show how complex organisms are not self-contained, self-sufficient nodes with an inside and outside, but nested, fuzzy ecosystems of diverse critters. Gilbert and others use the terms microbiome and holobiont to express the unsettling notion that from an evolutionary and multi-cellular perspective, "we are all lichens" (336). That such a claim can be published in a peer-reviewed life science journal, a journal that has historically operated according to neo-Darwinian paradigms and methods built on notions of methodological individualism, competition and self-sufficiency, is significant for the way it brings to the surface repressed ideas about our planetary inheritances and more-than-human kin.

With a title that seems to riff on Latour's book *We Have Never Been Modern*, Gilbert, as well as other leading evolutionary biologists such Margaret McFall-Ngai,

are speaking to many of the idioms and tropes composing Vandermeer's uncanny ecology when they say, for example, that "the discovery of symbiosis throughout the animal kingdom is fundamentally transforming the classical [neo-Darwinian] conception of an insular individuality into one in which interactive relationships among species blur the boundaries of the organism and obscure the notion of essential identity" (326). The notion that complex multi-cellular life is better understood as a fuzzy ecosystem or symbiotic holobiont, rather than self-sufficient, insular individuals, "is replacing an essentialist conception of 'individuality' with a conception congruent with the larger [earth] systems approach now pushing the life sciences in diverse directions. These findings lead us into directions that transcend the self/nonself, subject/object dichotomies that have characterized Western thought" ("A Symbiotic View of Life" 326).

Finally, Gilbert's key argument can also be read as the subtext informing Vandermeer's weird ecology: For Gilbert, the "whole dear notion of one's own Self, marvelous, old, free-willed, free-enterprising, autonomous, independent isolated island of a Self - is a myth. For [human and nonhuman] animals as well as plants, there have never been individuals. [...] We are all lichens" (336). Lichen, moss and fungal spores are key agents in Vandermeer's work and highlight the complex, symbiotic forms of communication, connection and collaboration that pervade multi-species ongoingness in and beyond Area X. Ghost Bird and Area X inhabit fleshy, symbiotic networks that the clean, logical and programmatic networks characterizing the Southern Reach cannot interface with. That is, Ghost Bird and Area X figure a fungal, spongy, symbiotic mode of communication, connection and

collaboration that the Southern Reach attempts to repress and contain as unnatural. Figuring that "we are all lichen", Vandermeer is not proposing a perspective that reveres a benevolent, holistic mother-earth. Moreover, Vandermeer's symbiotic imaginary is not reducible to a systems theory imaginary of auto-poietic, self-referencing systems. Rather, Area X and Ghost Bird (like symbiosis) draw attention to the restless, messy and queer symbiotic articulations that do not emphasize the interaction of autonomous entities, but the looping, unexpected, non-linear entanglements defining forms of multi-species becoming-with.

Symbiotic entanglements, Hird notes, set off "unfathomably messy entanglements that constitute temporal assemblages that [...] challenge the boundaries of the organism, and the indifference of symboigenetic singularities and entanglements to the human or humanized world" ("Indifferent Globality" 58). And so just as a symbiotic organism, as well as the meaning of any text, always remain open, and thus escape being fully pinned down by a privileged observer or enclosed by a particular context of meaning or readability, Area X escapes human measure and meaning. Moreover, just as the meaning of a text is never inscribed or enclosed within the boundaries of that text and is distributed across a discordant plurality of historical, cultural, gendered, class, and geo-political contexts, the entangled messiness of microbial symbiosis, Area X and Ghost Bird direct attention to forces, scales and processes with the potential to escape anthropocentric and individualist enclosures.

In the end, Vandermeer's work, like work of geo-philosophers such as Nigel Clark, draws attention to earth-bound forces whose passage and/or non-passage

through the appropriating circle of human influence will likely remain opaque to us, and whose role in inducing transformations of the earth will carry a remainder of incalculability (Clark "Ex-Orbitant Globality" 181). In this sense, Vandermeer's ecological fiction puts readers in a position to confront, imagine and be affected by an uncanny earth that partakes of another system that is irreducible to our all-too-human tales and refrains of protection and control, containment and discipline.

Conclusion

Containing diverse genres and styles of knowledge and discourse, Vandermeer's ecological fiction provides a perspective and a discourse that creates space for new ecological lines of flight and multi-species imaginaries. In this sense, Vandermeer's ecological fiction articulates an ecological imaginary by drawing attention to the sprawling, exorbitant and discordant mesh of earthly co-existence that is irreducible to anthropocentric discourses of ecological stewardship and environmentalist imaginaries predicated on revering pure spaces of pristine nature. In contrast to rationalist and environmental knowledge practices built to smooth out messy, uncanny contradictions in order to foster discourses of mastery and control, innocence and purity, I showed that ecological discourse would benefit methodologically, conceptually and politically by incorporating aspects of the weird, the strange and the uncanny.

Showing how Vandermeer's ecological fiction contributes to work in the Environmental Humanities, I contextualized Vandermeer's *Trilogy* in relation to theoretical, scientific and artistic work that situates modes of ecological relationality outside humanist and naturalist enclosures. That is, artists, scientists,

environmentalists and humanists are not going to be able to respond to the mess of the Anthropocene if they cannot engage with weird and strange ecological processes that exceed rationalistic and naturalist space/time configurations built on self-contained individual organisms, linear time-lines and notions of progress-as-expansion. In short, rationalist discourses are not very good at responding to and noticing the full range of complexities, dimensions and scales climate change and the Anthropocene evoke. Moreover, in contrast to the dystopian and utopian writing practices contained in the genre of 'cli-fi', and distinct from a tradition of first person nature writing producing clear representations of a nature 'out-there', Vandermeer's contribution to the Environmental Humanities is to open his characters (and readers) to possibilities of communication, connection and collaboration beyond those archived in naturalist and humanist knowledge practices and narratives, and therefore beyond the Man of the Anthropocene.

Conclusion – Communication, Connection and Collaboration Across Species and Disciplinary Lines

One of the things that I learned putting this project together and that is exemplified by my past experiences with environmentalism is that historically and culturally situated arrangements of text and theory, subject positions and embodiments, shape and ground particular forms of environmental communication, connection and collaboration. Whether saving tress from being cut down, painting sublime mountain vistas or critiquing anachronistic representations of nature, environmental practices are informed by wider networks, assemblages and contexts of mediation and translation, discourse and aesthetics, politics and ethics. Since there is no way to get out of mediation and artifice, and since (I argue) all forms of environmentalism are practices of mediation (containing diverse intellectual and political archives and traditions), different intellectual, discursive and political networks and assemblages allow for different kinds of environmental communication, connection and collaboration.

This dissertation, therefore, has argued that the intellectual and conceptual assemblages shaping popular and scholarly forms of Anglo-North American environmentalism lack the theoretical networks and textual resources to address the challenges of the Anthropocene. Drawing on feminist STS, multi-species anthropology and posthumanism (that is, by weaving together textual practices situated across distinct humanistic domains into environmental considerations), my work has built contexts that shape forms of environmental mediation responsive to

Anthropocene environments. In this light, my work is predicated on the notion that the knowledge practices that are brought to bear on particular problems shape and impact the way that problem comes to matter, both materially and discursively, politically and ethically, epistemologically and ontologically.

This focus derived from an unease with forms of environmentalism predicated on notions of nature as a wild, awe-inspiring open space, pro-life 'return to nature' tropes, and masculine/classist narrative templates shaped by heroic 'into the wild' fantasies that, for me, restrictively enclosed too many iterations of middle class, Anglo-North American environmental mediation and practice. That is, the channels of environmental mediation that I came to inhabit in my suburban youth and at the UW contained particular kinds of archives, subject positions, reductions, technics, and thinking practices that I came to think of as methodologically and critically narrow. However, I was invigorated by the channels of environmental mediation I found in Environmental Humanities contexts worked on by scholars in feminist STS, multi-species anthropology and posthumanist ecological theory. As a result, my work gathers diverse archives, disciplines, citation practices and subject positions as a means to foster politically dynamic, environmentally imaginative forms of communication, connection and collaboration that push against anthropocentric, chauvinistic, xenophobic, ethnocentric and narrow defined disciplinary enclosures.

Making a mess of strict disciplinary and species divisions, enclosures and hierarchies, my work responds to the ecological issues of the Anthropocene by generating intellectual, affective and institutional networks that foster non-anthropocentric, multi-species and transdisciplinary media, publics and futures.

221

Multiplying methods and forms of knowledge allow environmental subjects to see differently, to tell different kinds of stories, and to attend to diverse kinds of world making agencies. For example, addressing the multi-species story-telling practices of Anna Tsing and Thom van Dooren in Chapter Three and the rewilding practices taking place at the OVP in Chapter Four, I showed different kinds of environmental practice working in the shadow of Anthropocene extinction events that scramble anthropocentric and nature-centric, conservationist and preservationist modes of environmentalism. These two chapters were grouped together because they address environmental practices emerging to respond to the extinction events of the Anthropocene, while also responding to a tradition/archive of environmentalism that has found itself at an impasse in relation to the specific messes of the Anthropocene. Multi-species storytelling and rewilding are two forms of environmental mediation that bring into focus ongoing debates about how to produce knowledge in the Anthropocene, and about what environmentalism can do to respond to the extinction events of the Anthropocene.

Moreover, working in the context of the Anthropocene, my work pushes against the shockingly flawed forms of masculine and colonial, anthropocentric and human exceptionalist tropes of representation many prominent Anthropocene writers are using to tell stories about the emerging planetary conditions of human-made non-livability.[1] To tell the story of the Anthropocene as a story about "The

---

[1] This idea is indebted to Anna Tsing. In a recent lecture title 'A Feminist Approach to the Anthropocene: Earth Stalked by Man', Tsing discusses how after decades of feminist and post-colonial critiques of the figure of 'Man', this figure has been resurrected, and is a consequential (and often un-criticized) player in many histories being told about the Anthropocene (2015).

Human Age" (Monastersky 2015), the "Human Epoch" (Nijhuis 2015), the "Good

Anthropocene" (Revkin 2014) or "The Age of Man" (Kolbert 2011), and thus as a

story of Man's sovereign transcendence over the earth ("Eco-Modernist Manifesto"

2015), blocks attention from noticing other stories of livability and world making

practice. Situated by universal progress time-lines and saddled by colonial and

patriarchal traditions, human exceptionalist narratives about the Anthropocene

cannot tell stories of multi-species and planetary livability. Subjects in the

Anthropocene need materially grounded forms of mediation that intervene and re-

write these anthropocentric stories of the "Human Age", stories that are coming to

materialize too much of the history of the Anthropocene.

Therefore, in addition to showing how situated knowledge practices contain

particular political templates and ethical registers that configure practices of

environmental mediation, I addressed how knowledge practices and environmental

histories show up in and shape bodies, environments and world making practice in

very particular ways. For example, I showed how the Anthropocene written and

imagined as the "Human Age" is not only a representative or referential category

signifying a particular geological epoch, but a material/semiotic apparatus

containing specific narrative impositions, political sedimentations and technological

accretions that render particular kinds of material, embodied and multi-species

collaborations (in the form of de-extinction, for example). Aware of the way that

situated knowledge practices show up on and in bodies, and aware of the way that

situated knowledge practices contribute to 'world' different domains of practice, my

work troubles many of the tropes that have reflexively and unconsciously been

223

imposed on ecological issues and concerns, and more positively, repopulates

environmental knowledge practice with different tropes and figures (like Haraway's

Chthulucene or Vandermeer's uncanny ecology, for example). In short, my

contribution has been to show how intellectual labour not only pushes against

received representations, tropes and figures, but also configures knowledge

practices that work otherwise by making a difference in the way that bodies and

multi-species environments come to matter (discursively and materially).

As a result, I don't devote any attention to popular historical narratives about

the decline of nature and theoretical critiques working to problematize false

representations of nature. Rather, my work is a response to the question of how one

works, pragmatically, as a knowledge producer in the Humanities in the

Anthropocene. It speaks to McKenzie Wark's point about the importance of

responding to the Anthropocene by creating "the space within which very different

kinds of knowledge and practice might meet" (Wark, "Molecular Red"). More than a

question of accurately representing what the Anthropocene is or isn't, my questions

are a pragmatic challenge about how to craft politically imaginative, ethically

responsive, transdisciplinary domains of knowledge practice responsive to

Anthropocene environments.

Situated by these questions, my work is more a compositional, relation-making

practice than principally a critical practice. That is, the work I have engaged with in

this dissertation, for example, multi-species storytelling, Haraway's Chthulucene

and "weird" ecological fiction, is affirmative rather than optimistic or idealistic in

that it actively works to provide material/semiotic assemblages and discursive

mediums that make room for archives, imaginaries, embodiments and subject positions that work otherwise than anthropocentric, authoritative, chauvinistic, and other dominant frames of reference.

This focus on knowledge practice as a technique of mediation, rather than a representative, argumentative, referential or a deconstructive practice is crucial for fostering future research trajectories in the Anthropocene. As such, my focus has been to situate Environmental Humanities work in a way that is open to a multiplicity of subject positions, and open and leaky enough to partially (and perhaps provisionally) attach to other intellectual domains of practice. Therefore, since a consequential feature of the Environmental Humanities is an ability to foster forms of transdisciplinary communication, connection and collaboration that do not remain limited to academic contexts, interesting areas for future research can connect with broader discursive formations and environmental imaginaries that span academic and non-academic publics and spaces. For example, asking how scholarly and academic work in the Environmental Humanities can collaborate and contribute to the sustainability of broader cultural, political and public infrastructures. The need to do so outside of pedantic and authoritative modes of engagement, is, I think, a matter that Environmental Humanities scholars are in a unique position to address.[2] Environmental issues are ripe for broad public engagement, and critically informed, publicly attuned Environmental Humanities scholarship can engage with emerging discussions in higher education about what

---

[2] For example, Chapter Five's emphasis on Jerimenenko's work at the "Environmental Health Clinic" and her work on the "OneTrees Project" allowed me to question and probe how relation making and knowledge making practices can make broader, publicly situated connections and collaborations.

academic research[3] can do amidst an academic environment shaped by a changing

academic labour force,[4] funding models,[5] a growing corporate/administrative

labour environment, and an expectation that academic labour facilitate, mobilize

and flow into private interests.[6]

Myra Hird's research initiative "Canada's Waste Flow", for example, located at

Queens University is an example of an academic infrastructure contextualized by

Environmental Humanities archives and discourses that productively intra-act with

public humanities initiatives. "Canada's Waste Flow" is a multi-phased, SSHRC

funded project bringing humanists, social scientists and engineers to work with

intergovernmental and industry-government bodies to address waste management

issues and "how these practices might change in the future" ("Canada's Waste Flow:

About"). Oriented by the core questions of what we do with our waste and about our

waste future, Hird's project is overseeing a "comprehensive examination of current

and emerging [public and private] waste management technologies, [and] aims to

make an original and innovative contribution toward both practical and theoretical

knowledge about the futurity of waste" ("Canada's Waste Flow: About"). The

---

[3] An interesting space asking questions about the future of transdisciplinary humanities research in relation to public organizations located outside the university would be McGill University's "Institute for the Public Life of Arts + Ideas": see, http://iplai.ca.
[4] For example, increased adjunct and limited term appoints seem the status quo.
[5] For example, SSHRC's promotion of 'Connection Grants' and 'Future Challenge Areas'.
[6] These discourses on the future of the humanities and the public humanities are fraught with both risks and possibilities, and trigger hot-button issues about graduate professionalization. For example, the creeping coupling of scientific knowledge production with industrial/corporate agenda's dangerously encloses the questions and lines of flight that academic science can pursue (on this issue, see Stengers "Another Science is Possible: A Plea for Slow Science" (2013). Also, expecting humanities knowledge work connect to public infrastructures risks a top-down imposition of a business style rhetoric that dampers the critical edge of humanities scholarship. However, facilitating forms of academic discourse and knowledge practice situated to make broader public connection and collaborations is a site for innovative, cutting-edge research.

transdisciplinary base and focus of this project contributes not only to diverse scholarly communities, but also provides intellectual and political resources that connect academic knowledge production to diverse forms of public making practice.

Contributing to create and foster spaces where different kinds of knowledge and practice might meet, in Wark's terms, I'm interested in research initiatives like Hird's that continue this impulse to build collaborative, transdisciplinary infrastructures and projects. Importantly, I am interested in ways that the subject positions and knowledge practices I have been working with in this dissertation can connect and collaborate with other subject and knowledge making positions in diverse intellectual, public and institutional domains. In this light, I think a promising line of research that Environmental Humanities scholars will (increasingly have to) explore is the intersection between city-building practice (mega-cities/global cities) and the Anthropocene. As human populations grow, and as human populations increasingly come to dwell in dense urban environments inhabited by diverse human and nonhuman agencies and assemblages, the question of how the Anthropocene refocuses city-building (across urban planning, architecture, infrastructure, economy, culture, science and technology) becomes consequential.

Opposed to the utopian and colonial imaginaries projecting a future where humans escape earth to terraform Mars,[7] and putting aside paranoid post-oil fantasies about urban decline and rising urban neo-feudalism, I'm interested in

---

[7] I am thinking here of the proposal by Elon Musk, billionaire entrepreneur and founder of SpaceX, to engineer a spaceship taking thousands of people to Mars starting in 2024. See: http://www.nytimes.com/2016/09/28/science/elon-musk-spacex-mars-exploration.html?_r=0.

taking seriously multi-temporal, multi-spatial and multi-species practices of city-building in and for the Anthropocene. That is, can my focus on the question of how to compose, build and configure non-anthropocentric, multi-species techniques of environmental mediation for the Anthropocene, collaborate with city-building practices to address the challenge of composing urban infrastructures for the Anthropocene? These questions are increasingly being asked across architecture, landscape architecture and urban theory in relation to low-carbon infrastructure, self-aware cities, rising sea levels, warming climates, the growth of urban slums, and driverless cars.[8] What can Humanities scholars contribute to questions about how multi-species publics fold into questions of city-building across architecture, environmental infrastructure and urban planning. How can the relation making practices of the Environmental Humanities communicate, connect and collaborate with domains of practice that address issues of city-building? How can city-building practices and the subject positions open to city-builders respond to the Anthropocene in ways that avoid "good Anthropocene" imaginaries, narratives and tropes? How can people and things get around in low-carbon, densely populated, multi-species urban environments? What does urban planning and urban theory look like in the Anthropocene? How can the theoretical networks of the Environmental Humanities remediate, infect and re-configure work on urban infrastructure (energy, transit, food, etc.), architecture and landscape architecture?

---

[8] For examples of related work on cities and the Anthropocene see Etienne Turpin (ed.) *Architecture in the Anthropocene*. Ann Arbor: Open Humanities Press: 2013. Also, the journal *Concentric: Literary and Cultural Studies* will be have an issue published in the fall 2016 on the topic of "The City and the Anthropocene".

Moreover, distinct from some urban studies methodologies that reduce questions and problems to quantitative methodologies that test narrowly defined hypothesis against standardized/static data sets, I want to focus on research projects that avoid being reduced to public relations projects that work on behalf of 'experts' who see the job of humanists to dress up hard, cold facts for easy public consumption and digestion. Rather, the kind of transdisciplinary work I would like to continue pursuing is more challenging, non-innocent, and risky. Inspired by STS methodologies that focus on learning how scientists learn, on how scientists build knowledge about their objects of study, and that work to understand what it means to inhabit the subject position of 'a scientist', I want to pursue how Environmental Humanities methodologies can communicate and collaborate with domains of practice that frame city-building practice and understand the subject positions that city-builders inhabit, while retaining the critical, feminist, anti-colonial and anti-racist frames of reference situating humanities knowledge practice.

These questions and considerations connect with this dissertation's objectives to open critically informed and historically attuned knowledge making positions responsive to the specific differences of the Anthropocene, and knowledge making positions that creatively avoid essentialisms, universalisms, imperialisms, enclosures, and forms of (human, gendered, racial etc.) exceptionalism. Considering that different knowledge practices, disciplines and methodological approaches have different kinds of relationships with the world and are comprised of different conceptual, political and theoretical components and archives, the unique disciplinary entanglements taking place across the Environmental Humanities have

229

allowed for different kinds of meaning, regimes of visibility, and imaginaries to be produced. Pushing the humanities to increasingly consider the nonhuman world, and to incorporate a heightened "conceptual sensitivity" regarding environmental questions and mediations (Rose "Multi-Species Knots", 2), my research in the Environmental Humanities has opened a broader intellectual and institutional space for humanistic and environmental scholarship, a space for scholarship that does not leave subjects and objects the way they 'are', but fosters processes of intra-action that add new relational, transdisciplinary dynamics to ecological futures and publics.

Bibliography

Agamben, Giorgio. *The Open: Man and Animal*. Stanford: Stanford University Press, 2003. Print.

Alagona, Peter, John Sandios, and Yolanda Wiersma. "Past Imperfect: Using Historical Ecology and Baseline Data for Conservation and Restoration Projects in North America." *Environmental Philosophy* 9.1 (2012): 49–70. Print.

Alaimo, Stacy. *Bodily Natures: Science, Environment and the Material Self*. Bloomington: Indiana University Press, 2010. Print.

Alaimo, Stacy, and Susan Hekman. *Material Feminisms*. Bloomington: Indiana University Press, 2008. Print.

Amstutz, Nina. "Caspar David Friedrich and the Anatomy of Nature." *Art History* 37.3 (2014): 454–481. Print.

"Anthropocene: Arts of Living on a Damaged Planet." *Institute for Humanities Research: UC Santa Cruz*. N.p., 2014. Web. 15 May 2014.

Arts of Living on a Damaged Planet. "Living in the Anthropocene; Profile." *Aarhus University Research on the Anthorpocene*. N.p., 15 Oct. 2015. Web. 12 Dec. 2015.

Australian Environmental Humanities Hub. "Australian Environmental Humanities Hub: About." N.p., n.d. Web. 15 Feb. 2016.

Barad, Karen. *Meeting The Universe Halfway: Quantum Physics and the Entanglment of Matter and Meaning*. Durham: Duke University Press, 2007. Print.

---. "On Touching—The Inhuman That Therefore I Am." *differences: A Journal of Feminist Cultural Studies* 25.3 (2012): 206–223. Print.

Barnosky, Anthony, Nicholas Matzke, and Susumu Tomiya. "Has the Earth's Sixth Mass Extinction Already Arrived?" *Nature* 471.51-57 (2011): n. pag. Print.

Bate, Jonathan. *Romantic Ecology : Wordsworth and the Environmental Tradition*. New York: Routledge, 1991. Print.

Beck, Ulrich. *Risk Society: Towards a New Modernity*. London: SAGE Publications, 1992. Print.

Beer, Gillian. "Darwin and the Uses of Extinction." *Victorian Studies* 51.2 (2009): 321–331. Print.

Bennett, Jane. *Vibrant Matter: A Political Ecology of Things*. Durham: Duke University Press, 2010. Print.

Berlant, Lauren. *Cruel Optimism*. Durham: Duke University Press, 2011. Print.

Biermann, Christine, and Becky Mansfield. "Biodiversity, Purity, and Death: Conservation Biology as Biopolitics." *Environment and Planning D: Society and Space* 32 (2014): 257–273. Print.

Blomqvist, Linus, and Michael Shellenberger. "How Modern Agriculture Can Save the Gorillas of Virunga." *Scientific American* Oct. 2015. Web.

Bowker, G.C. "Time, Money and Biodiversity." *In: Ong, A., Collier, S. (Eds.), Global Assemblages: Technology, Politics, and Ethics as Anthropological Problems*. Oxford: Blackwell Publishers Ltd, 2005. 107–123. Print.

Boyer, Dominic, and Imre Szeman. "The Rise of Energy Humanities: Breaking the Impasse." *University Affairs* 12 Feb. 2014. Web.

Brady, Emily. *The Sublime in Modern Philosophy: Aesthetics, Ethics and Nature*. New York: Cambridge University Press, 2013. Print.

Braidotti, Rosi. *Metamorphoses: Towards a Materialist Theory of Becoming*. N.p. Print.

---. *The Posthuman*. Cambridge, UK: Polity Press, 2013. Print.

Brand, Stewart. "Opinion: The Case for Reviving Extinct Species." *National Geographic* 12 Mar. 2013. Web. 15 Oct. 2015.

---. "Rethinking Extinction." *Aeon* 21 Apr. 2015. Web.

---. "TED2013: The Dawn of De-Extinction. Are You Ready?" TED2013. 2013.

Brassier, Ray. *Nihil Unbound*. New York: Palgrave Macmillan, 2007. Print.

Braun, B, and S Whatmore. *Political Matter: Technoscience, Democracy, and Public Life*. Minneapolis: University of Minnesota Press, 2010. Print.

Bristow, Tom. "Ecocritics Have Never Been Green." *AJE: Australasian Journal of Ecocriticism and Cultural Ecology* 2 (2012): i–iv. Print.

---. "Memory: Living Lexicon for the Environmental Humanities." *Environmental Humanities* 5 (2014): 307–311. Print.

Bryant, Levi, Nick Srnicek, and Graham Harman. *The Speculative Turn: Continental Materialism and Realism*. Melbourne: Re.Press, 2011. Print.

Buell, Lawrence. "Ecocriticism: Some Emerging Trends." *Qui Parle: Critical Humanities and Social Sciences* 19.2 (2011): 87–115. Print.

Cadena, Marisol De La. *Earth Beings: Ecologies of Practice Across Andean Worlds*. Durham: Duke University Press, 2015. Print.

---. "Indigenous Cosmopolitics: Dialogues about the Reconstitution of Worlds." *Seminar Abstract*. N.p., 2012. Web. 13 May 2014.

Canada's Waste Flow. "Canada's Waste Flow: About." N.p., 12 Dec. 2015. Web.

Carrington, Damian. "The Anthropocene Epoch: Scientists Declare Dawn of Human-Influenced Age." *The Guardian* 29 Aug. 2016. Web.

Carroll, Siobhan. "The Ecological Uncanny: On the 'Southern Reach' Trilogy." Los Angeles Review of Books. N.p., 5 Oct. 2015. Web. 10 Mar. 2016.

Carson, Rachel. *Silent Spring*. New York: First Mariner Books, 2002. Print.

Ceballos, Gerardo, Paul Ehrlich, and Anthony Barnosky. "Accelerated Modern Human–induced Species Losses: Entering the Sixth Mass Extinction." *Science Advances* 1.5 (2015): 1–5. Print.

CENHS. "Center for Energy & Environmental Research in the Human Sciences @ Rice: About." N.p., n.d. Web. 15 Feb. 2016.

Chakrabarty, Dipesh. "Climate and Capital: On Conjoined Histories." *Critical Inquiry* 41.1 (2014): 1–23. Print.

---. "Postcolonial Studies and the Challenge of Climate Change." *New Literary History* 43.1 (2012): 1–18. Print.

---. "The Climate of History: Four Theses." *Critical Inquiry* 35 (2009): 197–222. Print.

Challenger, Melanie. *On Extinction: How We Became Estranged from Nature*. New York: Counterpoint, 2013. Print.

Chandler, Katerine. "Political Environments." *Qui Parle: Critical Humanities and Social Sciences* 19.2 (2011): 299–308. Print.

Cheney, Matthew. "Submergence by J.M. Ledgard." *The Mumpsimus*. N.p., Dec. 2013. Web. 13 Mar. 2016.

Chrulew, Matthew. "Reversing Extinction: Restoration and Resurrection in the Pleistocene Rewilding Projects." *Humanimalia: a journal of human/animal interface studies* 2.2 (2011): 4–27. Print.

Church, George, and Ed Regis. *Regenesis: How Synthetic Biology Will Reinvent Nature and Ourselves*. New York: Basic Books, 2014. Print.

Clark, Nigel. "Ex-Orbitant Globality." *Theory, Culture & Society* 22.5 (2005): 165–185. Print.

---. "Geo-Politics and the Disaster of the Anthropocene." *The Sociological Review* 62.1 (2014): 19–37. Print.

---. *Inhuman Nature: Sociable Life on a Dynamic Planet*. New York: SAGE Publications, 2010. Print.

---. "Volatile Worlds, Vulnerable Bodies." *Theory, Culture & Society* 27.2-3 (2010a): 31–53. Print.

Clark, Timothy. "Some Climate Change Ironies: Deconstruction, Environmental Politics and the Closure." *The Oxford Literary Review* 31.1 (2010): 131–149. Print.

---. *The Cambridge Introduction to Literature and the Environment*. Cambridge: Cambridge University Press, 2011. Print.

Cohen, Jeffrey Jerome. *Prismatic Ecology: Ecotheory beyond Green*. Minneapolis: University of Minnesota Press, 2014. Print.

Colebrook, Claire. "A Globe of One's Own: In Praise of the Flat Earth." *SubStance* 41.127 (2012): 30–39. Print.

---. *Death of the PostHuman: Essays on Extinction, Vol. 1*. University of Michigan Library, Ann Arbor: Open Humanities Press, 2014. Print.

---. "Not Symbiosis, Not Now: Why Anthropogenic Change Is Not Really Human." *The Oxford Literary Review* 34.2 (2012): 185–209. Print.

---. *Sex After Life: Essays on Extinction, Vol. 2*. University of Michigan Library, Ann Arbor: Open Humanities Press, 2014a. Print.

Colebrook, Claire, and Tom Cohen. "Critical Climate Change Series." *Open Humanities Press*. N.p., n.d. Web. 20 July 2015.

Connolly, William. *The Fragility of Things: Self-Organizing Processes, Neoliberal Fantasies, and Democratic Activism*. North Carolina: Duke University Press, 2013. Print.

Coole, Diana, and Samantha Frost. *New Materialisms: Ontology, Agency, and Politics*. Durham: Duke University Press, 2011. Print.

Cooper, Melinda. *Life as Surplus: Biotechnology and Capitalism in the Neoliberal Era*. Washington D.C: University of Washington Press, 2008. Print.

Crist, Eileen. "On the Poverty of Our Nomenclature." *Environmental Humanities* 3 (2013): 129–147. Print.

Crutzen, Paul. "Geology of Mankind." *Nature* 415 (2002): 23. Print.

Crutzen, Paul, and C Schwagerl. "Living in the Anthropocene: Towards a New Global Ethos." *Environment 360* (2011): n. pag. Web.

Crutzen, Paul, and E.F. Stoermer. "The 'Anthropocene.'" *Global Change Newsletter* 41 (2000): 17–18. Print.

Cruz, Mariolga Reyes. "What If I Just Cite Graciela? Working Toward Decolonizing Knowledge Through a Critical Ethnography." *Qualitative Inquiry* 14.4 (2008): 651–658. Print.

"Dark Ecology." *Sonic Acts*. N.p., 2014. Web. 20 June 2015.

Darwin, Charles. *On the Origin of Species*. New York: Wordsworth Editions, 1998. Print.

Davis, Heather. "The Plastisphere and Other Queer Futures." *philoSOPHIA* 5.2 (2015): 231–250. Print.

Davis, Heather, and Etienne Turpin. *Art in the Anthropocene: Encounters Among Aesthetics, Politics, Environments and Epistemologies*. London: Open Humanities Press, 2015. Print.

Davis, Mark. "Don't Judge Species on Their Origins." *Nature* 474 (2011): 153–154. Print.

Deleuze, Gilles, and Felix Guattari. *Thousand Plateaus: Capitalism and Schizophrenia*. Minneapolis: University of Minnesota Press, 2009. Print.

Derrida, Jacques. *The Animal That Therefore I Am*. New York: Fordham University Press, 2008. Print.

Descola, Philippe. *Beyond Nature and Culture*. Chicago: University Of Chicago Press, 2014. Print.

Despret, Vinciane. "Beasts and Humans." *Angelaki* 20.2 (2015): 105–109. Print.

---. "Responding Bodies and Partial Affinities in Human–Animal Worlds." *Theory, Culture & Society* 30.7/8 (2013): 51–76. Print.

---. "The Body We Care For: Figures of Anthropo-Zoo-Genesis." *Body & Society* 10.2-3 (2004): 111–134. Print.

Diamanti, Jeff, and Ryan Bellamy. "Editors' Introduction: Envisioning the Energy Humanities." *Reviews in Cultural Theory* 6 (Special issue on the Energy Humanities).3 (2016): n. pag. Print.

Donlan, Josh. "Re-Wilding North America." *Nature* 436 (2005): 913–914. Print.

Edwards, Paul. *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming*. Cambridge, Massachusetts: The MIT Press, 2013. Print.

Ellis, Erle. "The Anthropocene: A Man-Made World." *The Economist* 26 May 2011. Web.

Esposito, Roberto. *Bios: Biopolitics and Philosophy*. Minneapolis: University of Minnesota Press, 2008. Print.

Evans, J. "Resilience, Ecology and Adaptation in the Experimental City." *Transactions of the Institute of British Geographers* 36 (2011): 223–237. Print.

Foucault, Michel. "Nietzsche, Genealogy, History." *The Foucault Reader*. New York: Pantheon Books, 1984. 76–100. Print.

---. *The Birth of Biopolitics: Lectures at the College de France, 1978-1979*. New York: Palgrave Macmillan, 2008. Print.

---. "What Is Enligtenment?" *The Foucault Reader*. New York: Pantheon Books, 1984. 32–50. Print.

Fox, Justin. "We Might Be Near Peak Environmental Impact." *BloombergView*. N.p., 11 Sept. 2015. Web. 20 Nov. 2015.

Franklin, Sarah. *Dolly Mixtures: The Remaking of Genealogy*. Durham: Duke University Press, 2007. Print.

Garrard, Greg. *Ecocriticism*. New York: Routledge, 2004. Print.

---. "Worlds Without Us: Some Types of Disanthropy." *SubStance* 41.127 (2012): 40–60. Print.

Gilbert, Scott, Jan Sapp, and Alfred Tauber. "A Symbiotic View of Life: We Have Never Been Individuals." *The Quarterly Review of Biology* 87.4 (2012): 325–341. Print.

Ginn, Franklin. "When Horses Won't Eat: Apocalypse and the Anthropocene." *Annals of the Association of American Geographers* 105.2 (2015): 1–10. Print.

Glotfelty, Cheryll, and Harold Fromm. *The Ecocriticism Reader: Landmarks in Literary Ecology*. Atlanta: University of Georgia Press, 1996. Print.

Gourevitch, Philip. "'There Is Another World in Our World': A Conversation with J. M. Ledgard." *The New Yorker* 20 Apr. 2013. Web. 18 Sept. 2014.

Greenberg, Joel. *A Feathered River Across the Sky: The Passenger Pigeon's Flight to Extinction*. New York: Bloomsbury USA, 2014. Print.

Griffiths, Christine et al. "Resurrecting Extinct Interactions with Extant Substitutes." *Current Biology* 21 (2011): 762–765. Print.

Grusin, Richard. "Anthropocene Feminism." *C21: University of Wisconsin-Milwaukee*. N.p., n.d. Web. 15 Apr. 2014.

---. *The Nonhuman Turn*. Minneapolis: University of Minnesota Press, 2015. Print.

Gupta, Akhil, and James Ferguson. *Culture, Power, Place: Explorations in Critical Anthropology*. Durham: Duke University Press, 1997. Print.

Hamilton, Clive. "Can Humans Survive the Anthropocene?" *The Dr Dark Memorial Lecture delivered at the Carrington Hotel, Katoomba on 19th May 2014 and the Sydney Writers Festival on 22nd May 2014* 2014: 1–13. Print.

---. "Climate Change Signals the End of the Social Sciences." *The Conversation*. N.p., 25 Jan. 2013. Web. 13 Apr. 2014.

---. "The New Environmentalism Will Lead Us to Disaster." *Scientific American* 19 Sept. 2014. Web.

---. "The Technofix Is In: A Critique of 'An Ecomodernist Manifesto.'" *Earth Island Journal* 21 Apr. 2015: n. pag. Print.

---. "The Theodicy of the 'Good Anthropocene.'" Breakthrough Institute Dialogue. Sausalito, California. 2015.

Hamilton, Clive, Christophe Bonneuil, and François Gemenne. "Thinking the Anthropocene." *The Anthropocene and the Global Environmental Crisis: Rethinking Modernity in a New Epoch*. New York: Routledge, 2015. 1–14. Print.

Hamilton, Clive, François Gemenne, and Christophe Bonneuil. *The Anthropocene and the Global Environmental Crisis: Rethinking Modernity in a New Epoch*. New York: Routledge, 2015. Print.

Haraway, Donna. "A Curious Practice." *Angelaki* 20.2 (2015B): 5–14. Print.

---. "A Game of Cat's Cradle: Science Studies, Feminist Theory, Cultural Studies." *Configurations,* 1 (1994): 59–71. Print.

---. "Anthropocene, Capitalocene, Chthulhocene: Donna Haraway in Conversation with Martha Kenney." *Art in the Anthropocene: Encounters Among Aesthetics, Politics, Environments and Epistemologies*. London: Open Humanities Press, 2015. 255–270. Print.

---. "Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin." *Environmental Humanities* 6 (2015A): 159–165. Print.

---. "Ecce Homo, Ain't (Ar'n't) I a Woman, and Inappropriate/d Others: The Human in a Posthumanist Landscape." *Feminists Theorize the Political*. Ed. Joan Scott and Judith Butler. New York: Routledge, 1992. 87–101. Print.

---. "Manifesto for Cyborgs: Science, Technology, and Socialist Feminism in the 1980s." *Socialist Review* 80 (1985): 65–108. Print.

---. *Modest_Witness@Second_Millennium.FemaleMan©_Meets_Oncomouse™*. New York: Routledge, 1997. Print.

---. "SF: Science Fiction, Speculative Fabulation, String Figures, So Far." *Ada: A Journal of Gender New Media & Technology* 3 (2013): n. pag. Print.

---. *Simians, Cyborgs and Women: The Reinvention of Nature*. New York: Routledge, 1991. Print.

---. "Situated Knowledges: The Science Question in Feminism as a Site of Discourse on the Privilege of Partial Perspective." *Feminist Studies* 14.3 (1988): 575–599. Print.

---. "Speculative Fabulations for Technoculture's Generations:Taking Care of Unexpected Country." *(tender) Creature Exhibition Catalogue*. Artium, 2007. Web.

238

---. *The Companion Species Manifesto: Dogs, People, and Significant Otherness*. Chicago: Prickly Paradigm Press, 2003. Print.

---. "The Promises of Monsters: A Regenerative Politics for Inappropriate/d Others." *Lawrence Grossberg, Cary Nelson, Paula Treichler, Eds., Cultural Studies*. New York: Routledge, 1992. 295–337. Print.

---. *When Species Meet*. Minneapolis: University of Minnesota Press, 2008. Print.

---. "When We Have Never Been Human, What Is to Be Done?: Interview with Donna Haraway." *Theory, Culture & Society* 23.7-8 (2006): 135–158. Print.

Harding, Sandra. *Sciences from Below: Feminisms, Postcolonialities, and Modernities*. Durham: Duke University Press, 2008. Print.

---. *The Science Question in Feminism*. Ithaca NY: Cornell University Press, 1986. Print.

Harman, Graham. "Bruno Latour and the Politics of Nature." *Humanity at the Turning Point: Rethinking Nature, Culture, and Freedom*. Ed. Sonja Servomaa. Helsinki: Renuall, 2006. 147–158. Print.

---. *Prince of Networks: Bruno Latour and Metaphysics*. Melbourne: re.press, 2009. Print.

---. *The Quadruple Object*. New York: Zone Books, 2011. Print.

---. *Towards Speculative Realism: Essays and Lectures*. New York: Zone Books, 2010. Print.

Hartigan, John. "Somatosphere: Science, Medicine, and Anthropology." *Multispecies vs Anthropocene*. N.p., 12 Dec. 2015. Web. 20 Dec. 2015.

Hayles, Katherine. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago: The University of Chicago Press, 1999. Print.

Hayward, Eva. "Fingeryeyes: Impressions of Cup Corals." *Cultural Anthropology* 25.4 (2010): 577–599. Print.

---. "Sensational Jellyfish: Aquarium Affects and the Matter of Immersion." *differences: A Journal of Feminist Cultural Studies* 25.3 (2012): 161–196. Print.

Heidegger, Martin. *The Fundamental Concepts of Metaphysics: World, Finitude, Solitude*. Trans. William McNeill and Nicholas Walker. Bloomington, Indiana:

Indiana University Press, 1995. Print.

---. "The Question Concerning Technology." *Basic Writings*. San Francisco: HarperSanFrancisco, 1993. Print.

Heise, Ursula. "Comparative Literature and the Environmental Humanities." *ACLA Report on the State of the Discipline 2014-2015*. N.p., 2014. Web.

---. "Globality, Difference, and the International Turn in Ecocriticism." *PMLA* 128.3 (2013): 636–643. Print.

---. "Lost Dogs, Last Birds, and Listed Species: Cultures of Extinction." *Configurations* 18 (2010): 49–72. Print.

---. *Sense of Place and Sense of Planet: The Environmental Imagination of the Global*. London: Oxford University Press, 2008. Print.

---. "The Hitchhiker's Guide to Ecocriticism." *PMLA* 121.2 (2006): 503–516. Print.

Hekman, Susan. *The Material of Knowledge: Feminist Disclosures*. Bloomington: Indiana University Press, 2010. Print.

Heller-Roazen, Daniel. *The Inner Touch: Archaeology of a Sensation*. Reprint. Zone Books, 2009. Print.

Hird, Myra. "Coevolution, Symbiosis and Sociology." *Ecological Economics* 69 (2010b): 737 – 742. Print.

---. "Indifferent Globality: Gaia, Symbiosis and 'Other Worldliness.'" *Theory, Culture & Society* 27.2-3 (2010): 54–72. Print.

---. "Knowing Waste: Toward an Inhuman Epistemology." *Social Epistemology* 26.3-4 (2012): 453–469. Print.

---. "Meeting with the Microcosmos." *Environment and Planning D: Society and Space* 28 (2010a): 36 – 39. Print.

Hobbs, Richard et al. "Intervention Ecology: Applying Ecological Science in the Twenty-First Century." *BioScience* 61.6 (2011): 442–450. Print.

Hobbs, Richard, Eric Higgs, and Carol Hall. *Novel Ecosystems: Intervening in the New Ecological World Order*. Hoboken, New Jersey: John Wiley & Sons, Ltd, 2013. Print.

Hobbs, Richard, Eric Higgs, and James Harris. "Novel Ecosystems: Implications for Conservation and Restoration." *Trends in Ecology and Evolution* 24.11

(2009): 599–605. Print.

Horkheimer, Max, and Theodor Adorno. *Dialectic of Enlightenment*. Stanford: Stanford University Press, 2002. Print.

Hulme, Mike. "Climate: Living Lexicon for the Environmental Humanities." *Environmental Humanities* 6 (2015): 175–178. Print.

Ingold, Tim. *Being Alive: Essays on Movement, Knowledge and Description*. New York: Routledge, 2011. Print.

---. "Looking for Lines in Nature." *EarthLines* 3 (Nov, 2012a): 48–51. Print.

---. "Toward an Ecology of Materials." *Annu. Rev. Anthropol* 41 (2012): 427–442. Print.

Ingold, Tim, and Gilsli Palsson. *Biosocial Becomings: Integrating Social and Biological Anthropology*. Cambridge: Cambridge University Press, 2013. Print.

"International Colloquium 'The Thousand Names of Gaia: From the Anthropocene to the Age of the Earth.'" N.p., 15 Sept. 2014. Web.

Iovino, Serenella. "Steps to a Material Ecocriticism. The Recent Literature About the 'New Materialisms' and Its Implications for Ecocritical Theory." *EcoZone* 3.1 (2012): 134–145. Print.

Iovino, Serenella, and Serpil Oppermann. *Material Ecocriticism*. Bloomington: Indiana University Press, 2014. Print.

Ivakhiv, Adrian. *Ecologies of the Moving Image: Cinema, Affect, Nature*. Waterloo, ON: Wilfrid Laurier University Press (Environmental Humanities Series), 2013. Print.

Jasanoff, S. "A New Climate for Society." *Theory, Culture and Society* 27.2/3 (2010): 233–253. Print.

Jeremijenko, Natalie. "An Interview with Natalie Jeremijenko." *Substratum: A Series of Inspirational Interviews* July 2011. Web. 5 Sept. 2014.

---. "Artificial Trees & Artificial Life." *OneTrees: An Information Environment*. N.p., 12 Sept. 2014. Web.

---. "Environmental Health Clinic Introduction." *The Environmental Health Clinic, New York University*. Web. 1 Sept. 2014.

---. "Feral Robotic Dogs: Mission Statement." N.p., n.d. Web. 31 Aug. 2014.

---. "Feral Robotic Dogs (project Website)." N.p., n.d. Web. 31 Aug. 2014.

---. "Goosespeak': Human Goose Interface." N.p., n.d. Web. 1 Sept. 2014.

---. "Introduction to the Project." *OneTrees: An Information Environment*. N.p., n.d.
        Web. 12 Sept. 2014.

---. *OneTrees: The FAQs, A Bioinformatic Instrument*.
        http://web.mit.edu/anthropology/pdf/articles/helmreich/helmreich_onetre
        escloning.pdf. N.p. Print.

---. "Sites and Ecosystems." *OneTrees: An Information Environment*. N.p., n.d. Web. 10
        Sept. 2014.

---. "The Art of the Eco-Mind Shift." Business Innovation Factory, TED talk. 2009.
        Business Innovation Factory, TED talk.

---. "The Q&A: Natalie Jeremijenko, Thingker." *The Economist* 20 Sept. 2010. Web. 3
        Oct. 2014.

Jeremijenko, Natalie, and Benjamin Bratton. "Suspicious Images, Latent Interfaces."
        The Architectural League of New York: Situated Technologies Pamphlets 3
        (2008): 6–53. Print.

Kant, Immanuel. *Critique of the Power of Judgment*. Cambridge: Cambridge
        University Press, 2000. Print.

Keller, Evelyn Fox. *The Century of the Gene*. Cambridge: Harvard University Press,
        2002. Print.

Kirksey, Eben. *Emergent Ecologies*. Durham: Duke University Press, 2015. Print.

---. *The Multispecies Salon*. Durham: Duke University Press, 2014. Print.

Kohn, Eduardo. *How Forests Think: Toward an Anthropology Beyond the Human*.
        Oakland: University of California Press, 2013. Print.

Kolbert, Elizabeth. "Anthropocene: Age of Man." *National Geographic* Mar. 2011.
        Web. 5 Feb. 2016.

---. "Recall of the Wild." *The New Yorker* 24 Dec. 2012: 50–59. Print.

---. *The Sixth Extinction: An Unnatural History*. New York: Henry Holt and Company,
        2014. Print.

LaRocque, Olivier. "Revisiting Distinctions between Ranching and Pastoralism: A
        Matter of Interspecies Relations between Livestock, People, and Predators."
        Critique of Anthropology 34.1 (2014): 73–93. Print.

Latour, Bruno. "Agency at the Time of the Anthropocene." *New Literary History* 45.1
        (2014): 1–18. Print.

---. "An Attempt at a 'Compositionist Manifesto.'" *New Literary History* 41.3 (2010):
        471–490. Print.

---. *An Inquiry into Modes of Existence: An Anthropology of the Moderns*. Cambridge,
        Massachusetts: Harvard University Press, 2013. Print.

---. "Facing Gaia: Six Lectures on the Political Theology of Nature." Edinburgh,
        Scotland: N.p., February 18-28, 2013a. Print.

---. "Love Your Monsters." *The Breakthrough Institute* (2012): n. pag. Web.

---. *Pandora's Hope: Essays on the Reality of Science Studies*. Cambridge,
        Massachusetts: Harvard University Press, 1999. Print.

---. *Politics of Nature: How to Bring the Sciences into Democracy*. Cambridge,
        Massachusetts: Harvard University Press, 2004. Print.

---. "Reflections on Etienne Souriau's Les Différents Modes D'existence." *The
        Speculative Turn: Continental Materialism and Realism*. Melbourne: Re.Press,
        2011. 304–333. Print.

---. *Science in Action: How to Follow Scientists and Engineers through Society*.
        Cambridge, Massachusetts: Harvard University Press, 1988. Print.

---. "Telling Friends from Foes in the Time of the Anthropocene." *The Anthropocene
        and the Global Environmental Crisis: Rethinking Modernity in a New Epoch*.
        New York: Routledge, 2015. Web.

---. *The Pasteurization of France*. Harvard: Harvard University Press, 1993. Print.

---. "Waiting for Gaia. Composing the Common World through Arts and Politics." N.p.,
        2011. Web.

---. *We Have Never Been Modern*. Cambridge, Massachusetts: Harvard University
        Press, 1993. Print.

---. "Why Has Critique Run out of Steam? From Matters of Fact to Matters of
        Concern." *Critical Inquiry* Vol. 30.No. 2 (2004): pp. 225–248. Print.

Ledgard, J. M. *Submergence*. New York: Coffee House Press, 2011. Print.

LeGuin, Ursula. "The Carrier Bag Theory of Fiction." *The Ecocriticism Reader: Landmarks in Literacy Ecology*. Athens, GA: University of Georgia Press, 1996. 149–154. Print.

LeMenager, Stephanie. *Living Oil: Petroleum Culture in the American Century*. New York: Oxford University Press, 2016. Print.

---. "The Aesthetics of Petroleum, after Oil!" *American Literary History* 24.1 (2012): 29–86. Print.

LeMenager, Stephanie, Teresa Shewry, and Ken Hiltner, eds. *Environmental Criticism for the Twenty-First Century*. New York: Routledge, 2011. Print.

Leopold, Aldo. *A Sand County Almanac: And Sketches Here and There*. Oxford: Oxford University Press, 1949. Print.

Lorimer, Jamie. "Multinatural Geographies for the Anthropocene." *Progress in Human Geography* 36.5 (2012): 593–612. Print.

Lorimer, Jamie, and Clemens Driessen. "Bovine Biopolitics and the Promise of Monsters in the Rewilding of Heck Cattle." *Geoforum* 48 (2013): 249–259. Print.

---. "Wild Experiments at the Oostvaardersplassen: Rethinking Environmentalism in the Anthropocene." *Transactions of the Institute of British Geographers* (2013): 1–13. Print.

Lowe, Celia. "Infection: Living Lexicon for the Environmental Humanities." *Environmental Humanities* 5 (2014): 301–305. Print.

Lynas, Mark. *The God Species: How the Planet Can Survive the Age of Humans*. London: Fourth Estate Books, 2011. Print.

Lyotard, Jean-Francois. *Postmodern Condition: A Report on Knowledge*. Minneapolis: University of Minnesota Press, 1984. Print.

Machin, Amanda. *Negotiating Climate Change*. New York: Zone Books, 2013. Print.

Mahmood, Mamdani. "Settler Colonialism: Then and Now." *Critical Inquiry* 41 (2015): 1–19. Print.

Malm, Andreas, and Alf Hornborg. "The Geology of Mankind? A Critique of the Anthropocene Narrative." *The Anthropocene Review* 1 (2014): 62–69. Print.

Malone, Nicholas et al. "Ethnoprimatology: Critical Interdisciplinarity and
    Multispecies Approaches in Anthropology." *Critique of Anthropology* 34.1
    (2014): 8–29. Print.

Marcuse, Herbert. *One-Dimensional Man: Studies in the Ideology of Advanced
    Industrial Society*. New York: Beacon Press, 1991. Print.

Margulis, Lynn, and Dorion Sagan. *Microcosmos: Four Billion Years of Evolution from
    Our Microbial Ancestors*. New York: HarperCollins Publishing, 1987. Print.

Markley, Robert. "Time: Time, History, and Sustainability." *Telemorphosis: Theory in
    the Era of Climate Change Volume 1*. University of Michigan Library, Ann
    Arbor: Open Humanities Press, 2012. 43–64. Print.

Marris, Emma. "Interview with Emma Marris." *American Society for Landscape
    Architects*. N.p., 2014. Web. 1 June 2014.

---. *Rambunctious Garden: Saving Nature in a Post-Wild World*. New York:
    Bloomsbury USA, 2011. Print.

---. "Reflecting the Past." *Nature* 462 (2009): 30–32. Print.

Marris, Emma, Joseph Mascaro, and Erle Ellis. "Perspective: Is Everything a Novel
    Ecosystem? If So, Do We Need the Concept?" *Novel Ecosystems: Intervening in
    the New Ecological World Order*. Hoboken, New Jersey: John Wiley & Sons,
    Ltd, 2013. 345–349. Print.

Masco, Joseph. "The Six Extinctions: Visualizing Planetary Ecological Crisis Today."
    After Extinction Conference, UM Minnessota. 2014.

Massumi, Brian. *What Animals Teach Us about Politics*. Durham: Duke University
    Press, 2014. Print.

Mastnak, Thomaz, Julia Elyachar, and Tom Boellstorff. "Botanical Decolonization:
    Rethinking Native Plants." *Environment and Planning D: Society and Space* 32
    (2014): 363 – 380. Print.

McFall-Ngai, Margaret. "Animals in a Bacterial World, a New Imperative for the Life
    Sciences." *Proceedings of the National Academy of Sciences* 110.9 (2013):
    3229–3236. Print.

---. "The Secret Languages of Coevolved Symbioses: Insights from the Euprymna
    scolopes–Vibrio Fischeri Symbiosis." *Seminars in Immunology* 24 (2012): 3–8.
    Print.

Meillassoux, Quentin. *After Finitude: An Essay on the Necessity of Contingency*. New

York: Bloomsbury Academic, 2010. Print.

Merchant, Carolyn. "The Scientific Revolution and The Death of Nature." *ISIS: A Journal of the History of Science Society* 97.5 (2006): 513–533. Print.

Mitchell, Audra. "Gendering Extinction." *WorldlyIR*. N.p., 3 Aug. 2015. Web. 10 Aug. 2015.

Mitchell, Timothy. *Carbon Democracy: Political Power in the Age of Oil*. New York: Verso Press, 2013. Print.

Mol, Annemarie. *The Body Multiple: Ontology in Medical Practice*. Durham: Duke University Press Books, 2002. Print.

Monastersky, Richard. "Anthropocene: The Human Age." *Nature* 519.7542 (2015): n. pag. Print.

Monbiot, George. "The Great Rewilding." *Orion Magazine* (2014): n. pag. Print.

Moore, Jason. *Anthropocene or Capitalocene? Nature, History, and the Crisis of Capitalism*. New York: PM Press, 2016. Print.

---. *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*. New York: Verso Press, 2015. Print.

---. "The Capitalocene, Part I: On the Nature & Origins of Our Ecological Crisis." 2014. Web.

Moore, Sarah. "Garbage Matters: Concepts in New Geographies of Waste." *Progress in Human Geography* 36.6 (2012): 780–799. Print.

Morin, Marie-Eve. "Cohabitating in the Globalised World: Peter Sloterdijk's Global Foams and Bruno Latour's Cosmopolitics." *Environment and Planning D: Society and Space* 27 (2009): 58–72. Print.

Mortimer-Sandilands, Catriona, and Bruce Erickson. *Queer Ecologies: Sex, Nature, Politics, Desire*. Indianapolis: Indiana University Press, 2010. Print.

Morton, Marsha. "German Romanticism: The Search for 'A Quiet Place.'" *Art Institute of Chicago Museum Studies* 28.1 (2002): 8–23. Print.

Morton, Timothy. *Ecology without Nature: Rethinking Environmental Aesthetics*. Cambridge, Massachusetts: Harvard University Press, 2007. Print.

---. *Hyperobjects: Philosophy and Ecology After the End of the World*. Minneapolis: University of Minnesota Press, 2013. Print.

---. *Realist Magic: Objects, Ontology, Causality*. New York: Open Humanities Press, 2013. Print.

---. "Sublime Objects." *Speculations* II (2011): 207–227. Print.

---. *The Ecological Thought*. Cambridge, Massachusetts: Harvard University Press, 2010. Print.

---. "The Oedipal Logic of Ecological Awareness." *Environmental Humanities* 1 (2012): 7–21. Print.

Mouffe, Chantal. *On the Political (Thinking in Action)*. New York: Routledge, 2005. Print.

Myers, Natasha. "Amplifying the Gaps between Climate Science and Forest Policy: The Write2Know Project and Participatory Dissent." *Canada Watch* (2015): 18–21. Print.

---. "Conversations on Plant Sensing: Notes from the Field." *NatureCulture* 3 (2015): 35–66. Print.

---. "Photosynthesis." *Theorizing The Contemporary, "Cultural Anthroplogy" website*. N.p., 21 Jan. 2016. Web.

---. *Rendering Life Molecular: Models, Modelers, and Excitable Matter*. Durham: Duke University Press, 2015. Print.

Myers, Natasha, and Carla Hustak. "Involutionary Momentum: Affective Ecologies and the Sciences of Plant/Insect Encounters." *differences: A Journal of Feminist Cultural Studies* 25.3 (2012): 74–118. Print.

Navarro, Laetitia, and Henrique Pereira. "Rewilding Abandoned Landscapes in Europe." *Ecosystems* 15 (2012): 900–912. Print.

Neimanis, Astrida. "Alongside the Right to Water, a Posthumanist Feminist Imaginary." *Journal of Human Rights and the Environment* 5.1 (2014): 5–24. Print.

Neimanis, Astrida, Cecilia Asberg, and Johan Hedren. "Four Problems, Four Directions for Environmental Humanities: Toward Critical Posthumanities for the Anthropocene." *Ethics and the Environment* 20.1 (2015): 67–97. Print.

New Books Network Podcast. *Anna L. Tsing - The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*. N.p. Audio Recording.

Nijhuis, Michelle. "When Did the Human Epoch Begin?" *The New Yorker* 11 Mar. 2015. Web. 5 Feb. 2016.

O'Gorman, Emily, and Kate Wright. "Living Lexicon for the Environmental Humanities." N.p., n.d. Web. 15 July 2015.

Oppermann, Serpil. "From Ecological Postmodernism to Material Ecocriticism: Creative Materiality and Narrative Agency." *Material Ecocriticism*. Bloomington: Indiana University Press, 2014. 21–36. Print.

Outka, Paul. "Posthuman/Postnatural: Ecocriticism and the Sublime in Mary Shelly's Frankenstein." *Environmental Criticism for the Twenty-First Century*. New York: Routledge, 2011. 31–48. Print.

Petrocultures. "Petrocultures: About." N.p., 2 Feb. 2016. Web.

Pettman, Dominic. *Human Error: Species-Being and Media Machines*. Minneapolis: University of Minnesota Press, 2011. Print.

Phillips, Dana. *The Truth of Ecology: Nature, Culture, and Literature in America*. Oxford: Oxford University Press, 2003. Print.

Pickering, Andrew. *The Mangle of Practice: Time, Agency, and Science*. Chicago: University Of Chicago Press, 1995. Print.

Pompilio, Natalie. "Robot Dogs and Other Weird Creatures Bring Nature to the City How to Create a World Where People Fly, Salamanders Text, and Trash Is Useful." *YES! Powerful Ideas, Practical Actions* Winter 2013. Web.

"PostNatural // SLSA Conference 2013." *The Society for Literature, Science and the Arts*. N.p., 2013. Web. 15 June 2013.

Quammen, David. *The Song of the Dodo: Island Biogeography in an Age of Extinction*. New York: Scribner, 1997. Print.

Rajan, Kaushik Sunder. *Biocapital: The Constitution of Postgenomic Life*. Durham: Duke University Press, 2002. Print.

Reed, Stanley. "A Dutch Plan to Let Nature Takes Its Course." *The New York Times* 18 Sept. 2013. Web. 2 Feb. 2014.

Reno, Joshua Ozias. "Toward a New Theory of Waste: From 'Matter out of Place' to Signs of Life." *Theory, Culture & Society* 31.6 (2-12): 3–27. Print.

Revkin, Andrew. "Exploring Academia's Role in Charting Paths to a 'Good' Anthropocene." *The New York Times* 16 June 2014. Web.

Rigby, Kate. "Writing in the Anthropocene: Idle Chatter or Ecoprophetic Witness?" *Australian Humanities Review* 47.1 (2009): 1–12. Print.

Robbert, Adam. "Knowledge Ecology: The World Is Already Stranger Than It Is." *The Ecological in Foucault and Deleuze.* N.p., 13 Jan. 2015. Web. 13 Jan. 2015.

Robbins, Paul, and S.A. Moore. "Ecological Anxiety Disorder: Diagnosing the Politics of the Anthropocene." *Cultural Geographies* 20.1 (2013): 3– 19. Print.

Rogers, Mac. "The Illusions of Control." The Slate Book Review. N.p., 8 Sept. 2014. Web. 20 Aug. 2015.

Rojas, Carmen. "At the Forefront of a New Field of Study." *Work of Arts* 25 Sept. 2014. Web.

Roosth, Sophia. "Evolutionary Yarns in Seahorse Valley: Living Tissues, Wooly Textiles, Theoretical Biologies." *differences: A Journal of Feminist Cultural Studies* 25.3 (2012): 9–41. Print.

Roosth, Sophia, and Astrid Schrader. "Feminist Theory Out of Science: Introduction." *differences: A Journal of Feminist Cultural Studies* 25.3 (2012): 1–8. Print.

Rose, Deborah Bird. "Multispecies Knots of Ethical Time." *Environmental Philosophy* 9.1 (2012): 127–140. Print.

---. *Nourishing Terrains: Australian Aboriginal Views of Landscape and Wilderness.* Canberra: Australian Heritage Commission, 1996. Print.

---. *Wild Dog Dreaming: Love and Extinction.* Charlottesville, VA: University of Virginia Press, 2011. Print.

Rose, Deborah Bird, and Thom van Dooren. "Introduction: Unloved Others: Death of the Disregarded in the Time of Extinctions." *Australian Humanities Review* 50 (2011): 1–4. Print.

Rothman, Joshua. "The Weird Thoreau." *The New Yorker* 14 Jan. 2015. Web.

Rubenstein, Dustin et al. "Pleistocene Park: Does Re-Wilding North America Represent Sound Conservation for the 21st Century?" *Biological Conservation* 132 (2006): 232 – 238. Print.

Rust, Stephen, Salma Monani, and Sean Cubitt. *Ecomedia: Key Issues.* New York: Routledge, 2016. Print.

Schrader, Astrid. "Haunted Measurements: Demonic Work and Time in

Experimentation." *differences: A Journal of Feminist Cultural Studies* 25.3 (2012): 119–160. Print.

Schulz, Kathryn. "Schulz on J.M. Ledgard's Submergence: The Best Novel I've Read This Year." *Vulture* 27 June 2013. Web. 23 Dec. 2014.

Seymour, Nicole. *Strange Natures: Futurity, Empathy, and the Queer Ecological Imagination*. Chicago: University of Illinois Press, 2013. Print.

Shapin, Steven, and Simon Schaffer. *Leviathan and the Air-Pump: Hobbes, Boyle, and The Experimental Life*. Princeton: Princeton University Press, 1985. Print.

Shapshay, Sandra. "Contemporary Environmental Aesthetics and the Neglect of the Sublime." *British Journal of Aesthetics* 53.2 (2013): 181–198. Print.

---. "The Sublime in Modern Philosophy: Aesthetics, Ethics, and Nature." *Notre Dame Philosophical Reviews* (2014): n. pag. Web. 1 Dec. 2014.

Shaviro, Steven. *The Universe of Things: On Speculative Realism*. Minneapolis: University of Minnesota Press, 2014. Print.

Shellenberger, Michael, and Ted Nordhaus. "The Death of Environmentalism: Global Warming Politics in a Post-Environmental World." *The Breakthrough Institute* (2004): 1–36. Print.

Slattery, Brian. "End of the Line: Jeff VanderMeer and the Southern Reach Trilogy." *Tor.Com: Science Fiction, Fantasy, The Universe* 15 Dec. 2014. Web.

Smart, Alan. "Critical Perspectives on Multispecies Ethnography." *Critique of Anthropology* 34.1 (2014): 3–7. Print.

Smith, Mick. "Ecological Community, the Sense of the World, and Senseless Extinction." *Environmental Humanities* 2 (2013): 21–41. Print.

Smith, Neil. *Uneven Development: Nature, Capital, and the Production of Space*. Athens, GA: University of Georgia Press, 1984. Print.

Soule, Michael. "The 'New Conservation.'" *Conservation Biology* 27.5 (2013): 895–897. Print.

Soule, Michael, and Reed Noss. "Rewildig and Biodiversity: Complementary Goals for Continental Conservation." *Wild Earth* (1998): 1–11. Print.

Spivak, Gayatri Chakravorty. *Death of a Discipline*. New York: Columbia University Press, 2005. Print.

Steffen, Will et al. "The Trajectory of the Anthropocene: The Great Acceleration." *The Anthropocene Review* 2.1 (2015): 81–98. Print.

Stengers, Isabelle. "'Another Science Is Possible!': A Plea for Slow Science." Inauguratial lecture Chair Willy Calewaert 2011-2012 (VUB). Faculté de Philosophie et Lettres, ULB. Dec. 13, 2011d.

---. *Cosmopolitics I*. Minneapolis: University of Minnesota Press, 2010. Print.

---. "Gaia, the Urgency to Think (and Feel)." Casa de Rui Barbosa, Rio de Janeiro: https://osmilnomesdegaia.files.wordpress.com/2014/11/isabelle-stengers.pdf, 2014. Print.

---. *In Catastrophic Times: Resisting the Coming Barbarism*. New York: Open Humanities Press, 2015. Print.

---. *Invention Of Modern Science*. Minneapolis: University of Minnesota Press, 2000. Print.

---. "Matters of Cosmopolitics: On the Provocations of Gaia" Isabelle Stengers in Conversation with Heather Davis and Etienne Turpin." *Architecture in the Anthropocene: Encounters Among Design, Deep Time, Science and Philosophy*. University of Michigan Library, Ann Arbor: Open Humanities Press, 2013. 171–182. Web.

---. "Relaying a War Machine?" *The Guatarri Effect*. Ed. Éric Alliez and Andrew Goffey. New York: Continuum International Publishing Group, 2011. 134–155. Print.

---. *Thinking With Whitehead: A Free and Wild Creation of Concepts*. Cambridge, Massachusetts: Harvard University Press, 2011. Print.

---. "Wondering about Materialism." *The Speculative Turn: Continental Materialism and Realism*. Melbourne: Re.Press, 2011. 368–380. Print.

Sundberg, J. "Decolonizing Posthumanist Geographies." *Cultural Geographies* 21.1 (2014): 22–47. Print.

Swyngedouw, Erik. "Apocalypse Forever? Post-Political Populism and the Spectre of Climate Change." *Theory, Culture & Society* 27.2-3 (2010): 213–232. Print.

Szerszynski, B. "The End of the End of Nature: The Anthropocene and the Fate of the Human." 34.2 (2012): 165–184. Print.

Takacs, D. *The Idea of Biodiversity: Philosophies of Paradise*. Baltimore, MD: John Hopkins University Press, 1996. Print.

"The Anthropocene Project: Basic Cultural Research Using the Means of Art and
      Science 2013/2014." *The Haus der Kulturen der Welt*. N.p., 2013. Web. 13
      Nov. 2014.

The Breakthrough Institute. *An EcoModernist Manifesto*. The Breakthrough Institute,
      2015. Web.

The Long Now Foundation. "De-Extinction Projects, Techniques, and Ethics." N.p., 15
      Oct. 2015. Web.

---. "Revive & Restore; De-Extinction Defined." N.p., n.d. Web. 15 Oct. 2015.

---. "Revive & Restore; Revival Criteria." N.p., n.d. Web. 15 Oct. 2015.

---. "Revive & Restore; What 'Genetic Rescure' Means." N.p., n.d. Web. 15 Oct. 2015.

Thoreau, Henry David. *Walden*. New Haven, CT: Yale University Press, 2006. Print.

TIME Staff. "The 25 Best Inventions of the Year 2013: The Gastric-Brooding FROG."
      TIME Magazine Nov. 2013. Web.

Tompkins, David. "David Tompkins on Acceptance and Authority and Annihilation:
      Weird Ecology: On The Southern Reach Trilogy." *The Los Angeles Review of
      Books*. Web. 15 Oct. 2014.

Tsing, Anna. "A Feminist Approach to the Anthropocene: Earth Stalked by Man."
      Barnard Center for Research on Women: N.p., 2015. Web.

---. "'Auto-ReWilding' Landscapes and the Anthropocene - Interview With Anna
      Tsing." Allegra Lab. N.p., 17 Nov. 2015. Web. 20 Nov. 2015.

---. "Blasted Landscapes (and the Gentle Arts of Mushroom Picking)." *The
      Multispecies Salon*. Durham: Duke University Press, 2014. Print.

---. *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*.
      New Jersey: Princeton University Press, 2015. Print.

Turpin, Etienne. *Architecture in the Anthropocene: Encounters Among Design, Deep
      Time, Science and Philosophy*. London: Open Humanities Press, 2013. Print.

Tyler, Mike. "Lazarus Frog Resurrection in Time's Top 25." *PHYS.org*. N.p., 25 Nov.
      2013. Web.

Uggla, Y. "What Is This Thing Called 'natural'? The Nature-Culture Divide in Climate
      Change and Biodiversity Policy." *Journal of Political Ecology* 17 (2010): 79–

91. Print.

Urry, John. "CARBON CAPITALISM AND THE PROBLEM OF ENERGY." *Journal of Globalization Studies* 4.1 (2013): 78–83. Print.

Vandermeer, Jeff. *Acceptance*. New York: HarperCollins Publishers Ltd, 2014c. Print.

---. *Annihilation*. New York: HarperCollins Publishers Ltd, 2014a. Print.

---. *Authority*. New York: HarperCollins Publishers Ltd, 2014b. Print.

---. "The Nature Of Reading: 10 Influences On The Southern Reach Trilogy." *Huffington Post* May 5, 2014d. Web.

---. "The Slow Apocalypse and Fiction." Electric Literature. N.p., 23 Apr. 2015. Web. 1 May 2015.

van Dooren, Thom. "Care: Living Lexicon for the Environmental Humanities." *Environmental Humanities* 5 (2014): 291–294. Print.

---. "Ethics From the Field." *How Far Should We Go To Bring Back Lost Species*. N.p., n.d. Web. 13 Sept. 2015.

---. *Flight Ways: Life and Loss at the Edge of Extinction*. New York: Columbia University Press, 2014. Print.

---. "Invasive Species in Penguin Worlds: An Ethical Taxonomy of Killing for Conservation." *Conservation and Society* 9.4 (2011): 286–298. Print.

van Dooren, Thom, and Michelle Bastian. "Symposium Description." *m/mortality and In/finitude in the Anthropocene: Perspectives from the Environmental Humanities*. N.p., n.d. Web. 10 Feb. 2015.

van Dooren, Thom, and Deborah Bird Rose. "Keeping Faith with Death: Mourning and De-Extinction." *Extinction Studies Working Group*. N.p., 10 Nov. 2013. Web. 10 Sept. 2015.

---. "Storied-Places in a Multispecies City." *Humanimalia: a journal of human/animal interface studies* 3.2 (2012): 1–27. Print.

Viveiros de Castro, Eduardo. "Cannibal Metaphysics: Amerindian Perspectivism." *Radical Philosoph* 182 (2013): 17–28. Print.

---. "Perspectival Anthropology and the Method of Controlled Equivocation." *Tipití: Journal of the Society for the Anthropology of Lowland South America* 2.1 (2004): 3–22. Print.

Voosen, Paul. "Atomic Bombs and Oil Addiction Herald Earth's New Epoch: The Anthropocene." *Science* 24 Aug. 2016. Web.

Wark, McKenzie. "Climate Science as Sensory Infrastructure." *The White Review* Aug. 2014. Web.

---. *Molecular Red: Theory for the Anthropocene*. New York: Verso Press, 2015. Print.

---. "Molecular Red: Theory for the Anthropocene (On Alexander Bogdanov and Kim Stanley Robinson)." *e-flux* Mar. 2015. Web.

---. "Theory for the Anthropocene." The New School, New York. 2015.

Waters, Colin, and Jan Zalasiewicz. "The Anthropocene Is Functionally and Stratigraphically Distinct from the Holocene." *Science* 351.6269 (2016): n. pag. Print.

Watson, Matthew. "Cosmopolitics and the Subaltern Problematizing Latour's Idea of the Commons." *Theory, Culture & Society* 28.3 (2011): 55–79. Print.

---. "Derrida, Stengers, Latour, and Subalternist Cosmopolitics." *Theory, Culture & Society* 31.1 (2014): 75–98. Print.

Watts, Vanessa. "Indigenous Place-Thought & Agency amongst Humans and Non-Humans (First Woman and Sky Woman Go on a European World Tour!)." *Decolonization: Indigeneity, Education & Society* 2.1 (2013): 20–34. Print.

Weik von Mossner, Alexa. "Science Fiction and the Risks of the Anthropocene: Anticipated Transformations in Dale Pendell's The Great Bay." *Environmental Humanities* 5 (2014): 203–216. Print.

Weiskel, Thomas. *The Romantic Sublime: Studies in the Structure and Psychology of Transcendence*. Baltimore: John Hopkins University Press, 1975. Print.

Wenzel, Jennifer. "Taking Stock of Energy Humanities." *Reviews in Cultural Theory* 6 (Special issue on the Energy Humanities).3 (2016): n. pag. Print.

White, Damian, and Chris Wilbert. *Technonatures: Environments, Technologies, Spaces, and Places in the Twenty-First Century*. Waterloo, ON: Environmental Humanities, 2010. Print.

Wolfe, Cary. *Animal Rites: American Culture, the Discourse of Species, and Posthumanist Theory*. Chicago: University Of Chicago Press, 2003. Print.

---. *What Is Posthumanism?* Minneapolis: University of Minnesota Press, 2009. Print.

Yang, Andrew. "Whole in Every Part: Art of the Natural-Cultural." Lesley University
    College of Art & Design, 2014. Print.

Yusoff, Kathryn. "Aesthetics of Loss: Biodiversity, Banal Violence and Biotic
    Subjects." *Transactions of the Institute of British Geographers* (2011): 578–
    592. Print.

---. "Biopolitical Economies and the Political Aesthetics of Climate Change." *Theory,
    Culture & Society* 27.2-3 (2010): 73–99. Print.

---. "Excess, Catastrophe, and Climate Change." *Environment and Planning D: Society
    and Space* 27 (2009): 1010–1029. Print.

---. "Geologic Life: Prehistory, Climate, Futures in the Anthropocene." *Environment
    and Planning D: Society and Space* 31 (2013): 779–795. Print.

---. "Insensible Worlds: Postrelational Ethics, Indeterminacy and the (k)nots of
    Relating." *Environment and Planning D: Society and Space* 31 (2013): 208–
    226. Print.

---. "The Valuation of Nature: The Natural Choice White Paper." *Radical Philosophy*
    170 (2011): 2–7. Print.

Zahara, Alexander, and Myra Hird. "Raven, Dog, Human: Inhuman Colonialism and
    Unsettling Cosmologies." *Environmental Humanities* 7 (2015): 169–190.
    Print.

Zalasiewicz, J. *What Is the "Anthropocene"? - Current Definition and Status.*
    International Commission on Stratigraphy, 2015. Web. 10 May 2015.
    Subcommission on Quaternary Stratigraphy.

Zalasiewicz, J, M Steffen, and P Crutzen. "The New World of the Anthropocene." *The
    New World of the Anthropocene* 44.7 (2010): 2228–2231. Print.

Zalasiewicz, J, and Mark Williams. "Are We Now Living in the Anthropocene?"
    Geological Society of America (GSA) Today 18.2 (2008): 4–8. Print.

Zimmer, Carl. "Bringing Them Back to Life." *National Geographic* Apr. 2013. Web. 15
    Oct. 2016.

Žižek, Slavoj. *Living in the End Times*. New York: Verso Press, 2011. Print.

Zylinska, Joanna. *Bioethics in the Age of New Media*. Cambridge, Massachusetts: The
    MIT Press, 2009. Print.