CATASTROPHE AESTHETICS:

AFFECTIVE EPISTEMOLOGIES OF
CLIMATE CHANGE IN EXPERIMENTAL MEDIA ART

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ABSTRACT

Catastrophe is no longer an exception to the everyday. Anthropogenic (or *capitalogenic*) climate change is slowly but radically altering Earth. But climate catastrophe does not abide by conventional understandings of the catastrophic. Rather than a temporally and spatially bound rupture, climate change is slow-moving, vast, and in the everyday, imperceptible. This complicates its representation. My dissertation contributes to a growing conversation that asks: how do we effectively (and affectively) convey the slow warming of Earth, the accumulation of CO_2 in the atmosphere, or the geological imprint of the human species? These are crucial questions for making sense of a complex present and for exposing and resisting the structures and systems that have produced this present.

I argue that the aesthetic realm is a privileged space in which climate change catastrophe can be made visible and, more broadly, sensible. I examine a diverse group of experimental media artworks: Buckminster Fuller's expanded cinema environments, The Geoscope and World Game; the fossil-fuel themed interactive documentaries *Offshore* (Brenda Longfellow, 2013) and *Fort McMoney* (David Dufresne, 2013); and a collection of contemporary, 'geological' experimental film and photography. While emerging from diverse contexts and focusing on different climate-related themes, these artworks provide a rich arena to explore what I am calling 'catastrophe aesthetics.' Catastrophe aesthetics is a mode of critical art making that attempts to express the catastrophic nature of climate change. Not trying to provide solutions to climate change, my case studies instead offer fertile grounds for elucidating the indiscernible contours, interrelations, and violence that make up this quotidian catastrophe. They do so by employing

innovative image technologies and experimental formal strategies, which engender affective encounters with various worlds and entities on screen. In producing novel experiences and modes of relation with a changing Earth new affective epistemologies of climate change can emerge.

For David John Mulvogue (1952-2002)

ACKNOWLEDGEMENTS

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INTRODUCTION: Catastrophe Aesthetics

I. Shaking the Foundations of Everyday Life

When I moved to Vancouver Island from Calgary in 1993, one of the most novel aspects of my

new home —besides the beautiful temperate rainforests and ocean that surrounded me, the

relative smallness of my new town with its weird and playful, if not outright absurd, names of its

streets and institutions (due, lore has it, to a notoriously drunk but endlessly popular mayor who

regularly dressed as a pirate), and the annual festivity in which residents raced bathtubs-turned-

boats in the harbour —was the earthquake drill. At least once a semester, a loud rumbling sound

would blast throughout the school's p.a. system, signalling us to adopt the earthquake emergency

protocol that we rehearsed at least twice a year. When the earthquake 'struck', everyone was to

get underneath their desks, hold on to one of its legs, and cover their necks to protect themselves

from falling objects and breaking glass. We were to count aloud for the duration of the

earthquake and then, once it stopped, to count to sixty before attempting to exit the building. As I

had spent most of my childhood in the prairies, this was a mysterious, thrilling, but eerie

practice: absolutely more exciting than a fire drill.

I imagine earthquake drills are similar around the world and that millions of the world's

inhabitants have experienced such drills. What was perhaps unique about the drills in BC was

that, unlike Japan's citizens, for instance, most of us had never experienced an earthquake or at

least not a significant earthquake in which such an emergency protocol would be carried out.

And, for the most part, neither had our teachers, parents, or grandparents. At yet, for Pacific

Northwest residents, especially those living on coasts, the imagination of an earthquake is accompanied by a heavy dose of catastrophism. For every earthquake drill was an anticipation of what we refer to as 'the big one.'

The Cascadia subduction zone stretches from northern California to northern Vancouver Island, where the Juan de Fuca plate meets the North America plate. Scientists believe that the last major earthquake—magnitude 9.0 or greater—occurred in January 1700, causing great devastation and wiping out entire First Nation tribes living in coastal areas. Since there hasn't been a major earthquake since, local legend intimated that the 'big one' was long overdue.[1] We were told that when (not if) such an earthquake strikes the island would sink (or at least half of it), that all of our buildings would be reduced to rubble, that the death toll would be in the tens of thousands (a big number for a smallish city) and that infrastructure would be so thoroughly damaged that those of us lucky to survive would have to live without power and water for weeks on end. The 'big one' was truly going to be the end of the world for this remote part of the planet.

In fire drills no one really imagined, as they were slowly sauntering out onto the designated meeting point in the soccer field, the suffocating smoke, the intense heat, or the fear and disorientation of being in a burning building. But these earthquake drills were accompanied by a whole simulated sensory environment of the event: the manufactured noise of the earth splitting in two over the p.a. system; the students shaking their desks from underneath, a facetious act that sent books and pencils flying; the horrific chorus of voices counting

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[1] Sources suggest that there is a 17-20% likelihood that there will be a magnitude 8.0 or greater earthquake in the next fifty years. Robinson Meyer, "A Major Earthquake in the Pacific Northwest Looks Even Likelier," *The Atlantic* Aug 11, 2016. Accessed August 8, 2017 https://www.theatlantic.com/science/archive/2016/08/a-major-earthquake-in-the-pacific-northwest-just-got-more-likely/495407/

monotonously against the roar of the p.a. earthquake; and to top it all off, over all this din, a math teacher yelling at us to explain that windows will be breaking and glass will be hurling at us, so aim your head away from the walls and that if we see our best friend pinned down by furniture or a collapsed roof we cannot under any circumstances attempt to save her, we have to just leave her, save ourselves, get out when we can, or risk both of us dying. After counting to around 120 we would all get up to exit and proceed to line-up in a field in the (inevitable) pouring rain as we waited for the all clear. I suspect that my trembling body was not only due to the wet weather.

I have begun with this anecdote to illustrate two points that are central to the notion of catastrophe upon which this dissertation builds. First, the conception of 'the big one' represents a commonplace understanding of catastrophe. It suggests that catastrophe is a singular event, a moment of discontinuity or rupture in the otherwise banality of daily life. An attitude both apocalyptic and nonchalant accompanied the idea of 'the big one': it was something not even worth worrying about it, for we could not predict when it might occur and if it ever did, we'd probably perish anyway. We could develop measures to reduce the severity of the damage and lives lost, but as a seemingly random event, such a catastrophe could not be prevented. It would be an act of 'nature' or 'god', decidedly out of human hands. Second, my vivid recollection of the phenomenal experience of these drills reveals that there is an important sensory, affective element to the event of catastrophe. The earthquake drills not only performed a certain commonplace idea of what catastrophe *is*, they were also sensory experiences that hinted at how catastrophe *feels*. The shaking chairs, the cold metal of the desk and the floor, and the cacophony of the ersatz earthquake combined with students' voices all formed and informed the experience of this event many years ago in BC.

The naturecultural phenomenon of climate change, this dissertation suggests, shifts these

two facets of catastrophe in significant ways. For it is a very peculiar kind of catastrophe: it

manifests in acutely different ways than how the 'big one' was understood and felt. Its face

sometimes appears, surprising and brutal, in events like Hurricane Katrina, which advanced from

a category three to category five hurricane within ten short hours, leaving residents and response

units vastly under-prepared. In these instances, it conforms to the commonplace understanding of

catastrophe: a sudden, novel, and temporally bounded cataclysmic event, like the Pacific

Northwest imagination of the 'big one'.

But most of the time, climate change is imperceptible. It describes a range of phenomena,

including global warming, sea level rise, loss of ice mass, shifts in flora and fauna, and extreme

weather events, which have largely been caused by the burning of fossil fuels: carbon emissions

from human industry are creating a stronger greenhouse gas effect which in turn causes

temperatures to rise; and as oceans warm and polar ice melts, atmospheric conditions are altered,

and weather patterns change.[2] Climate change in this way is disrupting diverse and delicate

ecologies of the biosphere. And yet such devastating effects are operating at rates much slower

and scales much larger than how we normally consider the catastrophic.

Scholars and policy-makers have therefore considered the effects of climate change to

still be future *risks*. Ulrich Beck, one of the great writers on risk, is a case in point here, and I

will return to his work later in this introduction. We can observe this future oriented

understanding in most discourses on climate change, wherein the great and terrifying changes to

human and nonhuman life—species extinction, mass migrations of environmental refugees,

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[2] Climate change is sometimes used interchangeably with global warming, but the latter refers specifically to the upward temperature trends across the Earth, as seen since the beginning of the twentieth century and most notably since the 1970s. "What's in a name? Weather, global warming, and climate change" Global Climate Change: Vital Signs of the Planet, NASA, last modified July 31, 2018, https://climate.nasa.gov/resources/global-warming

water scarcity, and so on—are still envisioned as scenarios to come. My research is premised on the idea that climate change should not be considered an umbrella term for a series of risks. It is not a name for the anticipation of *potential* catastrophes. As climate change is already happening, it demands of us, I argue, to rethink the nature of catastrophe. It can no longer be thought of in terms of near or distant future events; it has to be thought of as the time in which we are presently living.

But in the everyday the catastrophic contours of climate change exceed human sensory faculties. As such, representations struggle with 'making sense' of it. For, as many thinkers have wondered: how can we capture a force that is incremental and accretive not spectacular or instantaneous?[3] How do we represent something that is playing out across vast temporal and spatial scales? Or to use Rob Nixon's words, "how do we bring home—and bring emotionally to life—threats that take time to wreak havoc, threats that never materialize in one spectacular, explosive, cinematic scene?"[4]

Art, this dissertation argues, plays a central role in attending to these questions. Scientific discourses and representations are of course essential to communicating climate change facts and numbers, for generating statistics, and creating simplified explanations of complex biological and chemical processes that can be cited and displayed by media, governments, and environmental organizations. But scientific narratives often abstract climate change, making it seem like something happening in geographically and temporally distant spaces.[5] What this kind

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[3] Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Cambridge, MA: Harvard University Press, 2013), 2.

[4] Nixon, *Slow Violence*, 31.

[5] Miriam Burke, David Ockwell, Lorraine Whitmarsh, "Participatory arts and affective engagement with climate change: the missing link in achieving climate compatible behaviour change?" *Global Environmental Change* 49 (March 2018): 95-105, https://doi.org/10.1016/j.gloenvcha.2018.02.007

of explanation fails to capture is a sense of the lived experience of climate change as a global, pervasive phenomenon; it does not account for the affective components involved in living with a changing Earth. As Bill McKibben wonders: "We can register what is happening with satellites and scientific instruments, but can we register it in our imaginations, the most sensitive of all our devices?"[6] For this, I suggest, we need the aesthetic realm. Following its roots in the Greek *aisthesis*, I understand aesthetics to be a unique kind of sensory experience, one that differs from our experience of in the everyday. Art can thus help to make perceivable, by appealing to a variety of sensory faculties, the affective facets of climate change that eschew the everyday. And in doing so, it can engender new ideas, encounters, and ways of relating that are not given to scientific inquiry.

In contemporary experimental media practices, I have discerned this attempt to make perceptible, through both representational and non-representational means, the rather indiscernible nature of climate change as it is happening in the present. However, the artworks I consider in this dissertation do not, for the most part, represent catastrophic events; these are not disaster movies or post-apocalyptic narratives. In fact, they resist the sensationalism of such cultural objects. Indeed, although catastrophe is a key conceptual framework for this project, my case studies are not artefacts of *catastrophism*, a mode of thinking in terms of worst case scenario or total collapse. In engaging with the present, on various scales and in varied contexts, these works are instead interested in providing novel ways of knowing the conceptual and material systems, processes, structures, and entanglements of Earth that constitute the catastrophe of climate change. I understand them as raising important avenues of inquiry into

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[6] Bill McKibben, "Imagine That: What the Warming World Needs Now is Art, Sweet Art," *Grist Magazine*, April 21, 2005, http://www.grist.org/comments/soapbox/2005/04/21/mckibben-imagine/

how we can understand this new kind of catastrophe—how do we know, feel, think climate change catastrophe?

What I am calling catastrophe aesthetics is thus a mode of critical art making that attempts to express the catastrophic nature of climate change. In three chapters, I examine the different ways in which a variety of experimental media works do just this. My case studies include: Buckminster Fuller's expanded cinema environments, the Geoscope and the World Game; the fossil-fuel themed interactive documentaries *Offshore* (Brenda Longfellow, 2012) and *Fort McMoney* (David Dufresne, 2013); and a collection of contemporary, 'geological' experimental films and photography, which includes Adrien Missika's *Darvaza* (2011), Sasha Litvintseva and Isabel Mallet's *The Stability of the System* (2016), Lori Blondeau's *Asiniy Iskwew* (2016)*,* and Terra Jean Long's *Notes from the Anthropocene* (2014)*.*

Before examining climate change as a catastrophe and the role of aesthetics in expressing this catastrophe, I will first provide a brief historiography of catastrophe. Fleshing out what this concept has meant and how it has been employed sheds light both on present understandings of climate change and on the ways in which climate change *qua* catastrophe shifts these present meanings. As we will see, climate change challenges some of the crucial onto-epistemological dimensions of present day interpretations of catastrophe. As John David Ebert submits, "our concepts, just like our cities, are being eroded by [climate change] events."[7] Climate change is revealing that the 'ground' beneath our feet is not as stable as we might think. As Earth slowly moves away from the temperate climate that has made human civilization possible, so too does the nature of catastrophe and the ways in which we speak of it. But this process has been under

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[7] John David Ebert, *The Age of Catastrophe: Disaster and Humanity in Modern Times* (Jefferson, NC: McFarland Publishing, 2012), 5.

theorized precisely because it is bound up with the very civilization whose foundations it is slowly but surely undercutting.

II. Towards a new understanding of catastrophe

When first used in English near the end of the sixteenth century, 'catastrophe' specified the denouement or, "the change or revolution which produces the conclusion or final event of a dramatic piece" (OED). Decades later a slightly altered version of its meaning was employed, which introduced a negative connotation to original theatrical meaning. It was then seen as "a conclusion generally unhappy; a disastrous end… overthrow, ruin, calamitous fate" (OED). And, from this, a third meaning emerged: "an event that produces a subversion of the order or system of things" (OED). The present-day definition of catastrophe—a sudden disastrous event that is widespread and fatal—emerges in the mid-eighteenth century.

These different uses of 'catastrophe' are grounded in the etymology of the word. It comes from the Greek *katastrophe*, which means to overturn, a sudden turn, or a conclusion. Its roots derive from *kata*, meaning down, and *strephein*, to turn. Embedded within the word, then, is a sense of change or revolution. In the case of climate change, catastrophe's etymological roots speak to the ways in which the planet is 'turning' or 'shifting' (into *what* remains to be seen). These multiple, sometimes archaic, meanings of catastrophe will guide me throughout this dissertation.[8] They will also allow me to parse out how catastrophe differs from many closely associated concepts in this section.

In common parlance, catastrophe is often used interchangeably with crisis, disaster, emergency, calamity, and cataclysm. But these must be differentiated as they signify different

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[8] Ebert, *The Age of Catastrophe*, 5.

scales and varying temporalities of hazardous events. We frequently hear climate change being

described as an environmental 'crisis.' Crisis is defined as a time of intense difficulty and

danger. It denotes the critical stage in a dangerous situation in which a decision must be made.

That is, to call something a crisis implies that it must and can be mitigated with decision-making,

through intervention or policy change. To say that we are faced with an environmental crisis is

not incorrect, but it suggests that the fallout is preventable, that the explosive, disastrous outcome

of a given situation has not yet begun.

'Disaster' is the word closest to catastrophe. The OED defines disaster as "anything that

befalls of ruinous or distressing nature; a sudden or great misfortune, mishap, or misadventure; a

calamity." This definition suggests that a disaster speaks to a wider range of events than

catastrophe. It denotes everything from the mishap to the calamity. But the clearest distinction

between disaster and catastrophe comes from emergency response organizations, who categorize

different events based on intensity, size, and capacity to respond. The US Federal Emergency

Management Association's (FEMA) classification system, for instance, is especially

straightforward. It organizes different kinds of dangerous events on a scale of intensifying

destruction: emergency, disaster, catastrophe, extinction. Aligning with FEMA's classification,

E.L. Quarantelli describes the differences between disaster and catastrophe from a planning and

response perspective in an article on Hurricane Katrina, which he labels a catastrophe. He

considers issues such as the scale of damage to community infrastructure, the ability of

institutional organizations to operate in the aftermath, the needed response from outside

communities and organizations, the coverage from media, and the level at which the political

arena is implicated.[9] To put it simply, a disaster is an event of which organizations such as

FEMA are, along with state and local resources, able to prepare for and manage the aftermath—

albeit not without difficulty.

A catastrophe, however, is that event which surpasses any efforts for preparedness. In

their book, *The Politics of Catastrophe*, sociologists Claudia Aradau and Rens Van Munster

astutely point out that it is telling that "catastrophe does not become an attribute of management

as 'crisis management,' 'emergency management,' 'risk management,' or 'disaster

management.'"[10] There is no such 'catastrophe management,' nor is there a profession which

deals particularly with catastrophes, as there is for other scales of ruin, such as emergency and

disaster planners.[11] This is because catastrophe is something that defies any planning or control.

It exceeds human efforts to thwart the 'worst case scenario.' Catastrophe so thoroughly shakes

the social, political, and technological infrastructure that an immediate response is next to

impossible.

As the infrastructures of everyday life crumble in a catastrophe, the spatial dimensions of

everyday life also shift. In his article, "The Politics of Catastrophization: Emergency and

Exception," philosopher Adi Ophir notes how catastrophe reorganizes space; it is marked first by

a deterritorialization of a region and then often by a reterritorialization of a special zone within it:

a disaster zone.[12] Survivors may "experience a dramatic reduction in their ability to move and

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[9] E.L. Quarantelli, "Catastrophes are Different from Disasters: Some Implications for Crisis Planning and Managing Drawn from Katrina," Understanding Katrina: Perspectives from the Social Sciences, Social Science Research Council, http://understandingkatrina.ssrc.org/

[10] Claudia Aradau and Rens Van Munster, *Politics of Catastrophe: Genealogies of the Unknown* (London: Routledge, 2011), 4.

[11] Aradau and Van Munster, *Politics of Catastrophe*, 4.

[12] Adi Ophir, "The Politics of Catastrophization: Emergency and Exception," *Contemporary States of Emergency: The Politics of Military and Humanitarian Interventions*, eds. Didier Fassin and Mariella Pandolfi (New York: Zone Books, 2010), 41.

communicate" as former orders disintegrate and expectations of everyday life is lost.[13]

"[Catastrophe] marks a tipping point," Kindervater states.[14] Its immense force disrupts both a way of living and how a way of living is conceived.[15] In his provocative book *Learning to Die in the Anthropocene*, writer Roy Scranton observes how war and natural catastrophes incite similar breakdowns of society. Connecting his personal experiences of being an American soldier in Baghdad in 2003 to what he witnessed on television of Hurricane Katrina, he states, "this time it was the weather that inspired shock and awe, but I saw the same chaos and collapse I'd seen in Baghdad, the same failure of planning and the same tide of anarchy."[16]

Interestingly, Canada's federal Emergency Management Framework speaks only of emergencies and disasters. 'Catastrophe' comes up only once in a sentence that points to the possibilities of some incidents being so large that they defy provincial, territorial, or federal response. But Canada's apparent omission of catastrophe within its emergency framework is revealing of another characteristic of catastrophes today: these are events that not only cause the momentary breakdown of a society but also have global reverberations and may need global intervention. In other words, they exceed the borders of the nation-state. [17]

Indeed, globalization is thought to have changed the workings of catastrophe. Given the intricate interconnections of different global systems—human, natural, technological,

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[13] Ophir, "The Politics of Catastrophization," 41.

[14] Kindervater, "Catastrophe and Catastrophic Thought," 98.

[15] Aradau and Van Munster, *Politics of Catastrophe*, 5.

[16] Roy Scranton, *Learning to Die in the Anthropocene: Reflections on the end of Civilization* (San Francisco: City Lights, 2015), 14.

[17] "National Emergency Response System," Department of Public Safety and Emergency Preparedness, The Government of Canada, last modified January 31, 2018, https://www.publicsafety.gc.ca/cnt/rsrcs/pblctns/ntnl-rspns-sstm/index-en.aspx

economic—all catastrophes now have a global reach. In his recent book *After Fukushima: The Equivalence of Catastrophes*, Jean-Luc Nancy explains, stating:

> From now on there is an interconnection, an intertwining, even a symbiosis of technologies, exchanges, movements, which makes it so that a flood – for instance – wherever it may occur, must necessarily involve relationships with any number of technical, social, economic, political intricacies that keep us from regarding it as simply a misadventure or a misfortune whose consequences can be more or less easily circumscribed.[18]

The interconnectedness of the world is actually exacerbating what once would have remained local and contained disasters and turning them into global events. Or as Frédéric Neyrat says, when "everything is connected, an accident can spread everywhere."[19] For example, environmental scientist Vaclav Smil has shown how Hurricane Katrina, even though it was contained to a coastline area on the Gulf of Mexico, it ended up being a global event. First, Katrina impacted global economics as it disrupted the flows of oil coming from the gulf, which caused fuel prices around the world to flux. Second, Katrina was an event that altered global perspectives on the USA. As media images of the vast neglect of hundreds of thousands of people swept around the globe, the oppressed black underclass of America, who rarely features on television, was seen and heard. Katrina was an event that wreaked havoc not only on the infrastructure of a specific area and its people, but on global economics, politics, and culture.[20]

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[18] Jean Luc Nancy, *After Fukushima: The Equivalence of Catastrophe,* trans. by Charlotte Mandell (Fordham University Press, 2015), 4.

[19] Frédéric Neyrat, "The Biopolitics of Catastrophe: or How to Avert the Past and Regulate the Future," *South Atlantic Quarterly* 115.2 (2016): 251.

[20] Vaclav Smil, "How (Not) to Look Ahead," in *Global Catastrophes and Trends: The Next 50 Years* (Cambridge, MA: MIT Press, 2012), 1-9.

Sociologist Ulrich Beck thus calls Katrina a "global media event" that "performed an involuntary and unintended enlightening function" as it revealed the "racist face of poverty in the sole remaining superpower."[21] In other words, globalization has produced a kind of hazardous event that is 'excessive' in terms of its impact; it defies the possibility for adequate preparation and response as it spills over the edges of what is thought to be its immediate boundaries.

The difference between disaster and catastrophe cannot be measured in regard to personal suffering, as, surely, they both are accompanied by an unspeakable amount of horror, grief, and trauma for the individuals involved. Rather, the key distinction lies on the scale of which these events reverberate across social, political, environmental, technological, and economic systems. But just as catastrophe brings about the breakdown of social (infra)structures, it also radically disrupts everyday perceptions of the flow of time.

Catastrophe alters the ways in which we experience the past, present, and future. In their book *The Time of Catastrophe,* Christopher Dole et al. maintain that "the meaning of catastrophe turns in fundamental ways around temporal presumptions—a sense of time and history being ruptured, a characteristic eventfulness, an emphasis on the 'here and now', an urgency of response and anxiety of anticipation."[22] Within a catastrophe the "nature of time itself changes."[23] Ophir notes how "durations, sequences, repetitions, the empty moments of waiting, the intervals between one happening and another" are transformed.[24] When catastrophe strikes temporal notions such as past, present, and future are skewed; time is thrown from its conventional linearity. One of the most prevalent tropes in catastrophe literature is the historical

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[21] Ulrich Beck, *World at Risk,* trans. by Ciaran Cronin (Cambridge, UK: Polity, 2009), 57.

[22] Dole et al., *The Time of Catastrophe*, 1.

[23] Ophir, "The Politics of Catastrophization," 41.

[24] Ibid., 41.

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rupture. Catastrophe presents us with a stark break from the past; it is the moment of 'things will never be the same.' Catastrophe may even momentarily halt the flow of time, leading some to question whether or not catastrophe is an event that is contained within history or is "an event that obliterates the very coordinates of time?"[25]

From this perspective, catastrophe appears to share qualities with apocalypse. While apocalypse comes from the Greek word *apokalyptein*, which means disclosure, it is today most closely associated with eschatology.[26] In Christian and Islamic theologies, apocalypse is the 'end of days' during which Jesus or Isa returns, humanity faces its final judgment, and God's will is revealed. For John R. Hall, however, apocalypse need not mean the end of the world full stop. In line with its etymological roots in "disclosure," the time of the apocalypse encompasses much more than eschatology: "rather than the actual end of the world, the apocalypse is typically 'the end of the world as we know it,' an extreme social and cultural disjuncture in which dramatic events reshape the relations of many individuals at once to history."[27] The idea that apocalypse signifies the end of one kind of world and the beginning of another kind of world is akin to the etymological roots of catastrophe. It relates to catastrophe's older meanings 'to overturn'/ 'to turn' and to subvert the order or systems of things.

Indeed, apocalyptic thinking resembles 'catastrophism,' a psychological and discursive orientation that forecasts the worst-case scenario—complete collapse, be it economic, social, or environmental. Sasha Lilley, David McNally, Eddie Yuen, and James Davis' book *Catastrophism: The Apocalyptic Politics of Collapse and Rebirth* shows how catastrophism has been adopted to further political agendas. For the left and the environmental movement,

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[25] Dole et al., *The Time of Catastrophe*, 2.

[26] John R. Hall, *Apocalypse: From Antiquity to the Empire of Modernity* (Cambridge: Polity Press, 2009), 2.

[27] John R. Hall, *Apocalypse*, 3.

catastrophism usually follows an accelerationist logic—speed up the route to collapse so that a new society can be born—or embraces the spread of fear, with the hopes that it will spark people into action. This, the book argues, is ultimately a dangerous and futile mode of approaching politics. As Lilley points out, what these tactics miss is the ways in which capitalism appropriates catastrophe and, as Naomi Klein has demonstrated, uses crises for its regeneration and expansion.[28] As will be discussed later, this dissertation aims to avoid the trappings of this kind of catastrophism, even if its focus is on catastrophe.

A likely reason catastrophism has been exploited for political aims is that we most often temporally relate to catastrophe, in its current definition, through anticipation. Catastrophe represents a fearful future that has not yet appeared. Our anticipation may be based on events of the past, but we direct ourselves with angst towards the future. As such, it provides fertile territory for ideological narratives.

As Ulrich Beck has shown through his notion of 'risk society,' a defining feature of modern society is the 'management' of such anticipatory risks. 'Risk society' centres on the idea that the bureaucracy of risk is in fact a defining feature of the process of modernization.[29] Beck differentiates *risk* from *threat* in historical terms. Whereas threat has always been a part of human existence (threat of illness, death, and so on), risk is a thoroughly (late) modern lens through which to view the world: "Risk society… epitomizes an era of modern society that no longer merely casts off traditional ways of life but rather wrestles with the side effects of successful modernization—with precarious biographies and inscrutable threats that affect

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[28] Sasha Lilley, "Introduction," *Catastrophism: The Apocalyptic Politics of Collapse and Rebirth* (Oakland, PM Press, 2012), 2.

[29] Beck, *World at Risk*, 4.

everybody and against which nobody can be adequately insured."[30] There are two key ideas central to his thesis that need to be unpacked.

The first is that risk society speaks to a development of, what Anthony Giddens has called, 'reflexive modernity.' Put simply, classical modernity is regarded as the modernization, via rationalization, of traditional feudal society. Reflexive modernity describes the point at which modern societies are now the object of modernization.[31] Or, as Giddens puts it, reflexivity refers to the process by which "social practices are constantly examined and reformed in the light of incoming information about those very practices."[32] Beck builds on this by showing how, paradoxically, it is precisely the successful processes of modernization that have created the risks. Thus, risk society's dynamic "rests less on the assumption that now and in the future we must live in a world of unprecedented dangers" and instead that "we live in a world that has to make decisions concerning its future under the conditions of manufactured, self-inflicted insecurity."[33]

Accordingly, and this is the second critical point of the risk society thesis, the border between a 'traditional' modern society and risk society is defined by the possibility of being *insured.* Risk society "becomes visible when societies are exposed to risks which are no longer covered by any kind of insurance."[34] The acceleration of globalization and technological advancements in the last half-century has altered the principle of insurance. As Dirk Matten explains, previously risks, such as workplace or car accidents, were covered by the principle of

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[30] Beck, *World at Risk*, 8.

[31] Dirk Matten, "The impact of risk society thesis on environmental politics and management in a globalized economy – principles, proficiency, perspective," *Journal of Risk Research* 7.4 (June 2004): 379.

[32] Anthony Giddens, *The Consequences of Modernity* (Palo Alto: Stanford University Press, 1990), 38.

[33] Beck, *World at Risk,* 8.

[34] Matten, "The impact of risk society thesis," 379.

insurance whereas "the risks inherent in… nuclear power, genetic engineering, and climate change transcend the capacity of conventional insurance solutions."[35]

Non-compensability, along with de-localization and incalculableness, are the three features of what Beck now calls 'world risk society.' Indeed, in his updated thesis, recounted in *World Risk Society* (2010) and *World at Risk* (2009), Beck maintains that "modern societies are shaped by new kinds of risks, … their foundations are shaken by the global anticipating of global catastrophes." [36] Beck makes clear however that risk is not synonymous with catastrophe: "risk means the anticipation of the catastrophe. Risks concern the possibility of future occurrences and developments; they make present a state of the world that does not (yet) exist."[37] He continues, "whereas every catastrophe is spatially, temporally and socially determined, the anticipation of catastrophe lacks any spatio-temporal or social concreteness…The moment risks become real, when a nuclear power station explodes or a terrorist attack occurs, they become catastrophes."[38]

For Beck, climate change falls in the category of *risk*. It, he asserts, "is not (yet) a reality."[39] The language of risk and threat is used in the 2016 Paris Agreement; like Beck, it understands climate change still as a risk, as a potential future reality. It states that were the two degrees Celsius warming threshold to be crossed, a new age of climate chaos would be in effect.

Beck and the Paris climate agreement's perception of the catastrophe of climate change as a future event, and not a present reality, is perplexing. All evidence suggests, for instance, that Earth's average temperature *is* rising, slowly but steadily, and that "the current, observable rate

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[35] Ibid., 380.

[36] As Beck holds, it is irrelevant whether or not the world is actually safer today than before, for, if disasters are anticipated, "then that produces a compulsion to act." *World at Risk*, 332.

[37] Beck, *World at Risk*, 10.

[38] Beck, *World at Risk,* 10.

[39] Ibid., 52.

of change in the climate system, marked by oceanic warming, snow and ice melt, sea level rise, and atmospheric greenhouse gas concentrations, is historically anomalous."[40] The consequences of global warming, for instance, such as the melting of the arctic permafrost, are no longer just possible futures.

While politicians and certain scholars still consider climate change a future risk, for insurance companies, whose entire business is about the future, it is already here. Intact, the largest provider of property and casualty insurance in Canada has partnered with the University of Waterloo to create an applied research centre called the Intact Centre on Climate Adaptation (ICCA). In 2012, they published a report entitled "Climate Change Adaptation: A Priorities Plan for Canada", in which they outline best practices and processes for adapting to climate change. This work is preceded by decades of warnings from insurance companies that climate change was upsetting the predictive models on which their enterprises are based. According to CBC business columnist, Don Pittis, it was as early as 1973 that insurance companies first warned about global warming, when they "recognized claims were rising more than their risk tables had told them they should."[41] ICCA's 2012 report states explicitly that climate change mitigation is no longer an economically plausible route. Instead, adaptation must now be the key focus since "there is evidence that the climate is already undergoing observable change and will continue to do so."[42] From their perspective climate change is no longer merely a *risk*. It is a liability for which they must account in the here and now.

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[40] Jonathan T. Park, "Climate Change and Capitalism," *Consilience: The Journal of Sustainable Development* 14 (2015), https://doi.org/10.7916/D86H4H4K

[41] Don Pittis, "As climate change claims heat up, insurance industry says we need to adapt," *CBC News,* May 12, 2016, https://www.cbc.ca/news/business/fort-mac-climate-insurance-1.3576918

[42] Blair Feltmate and Jason Thistlethwaite, "Climate Change Adaptation: A Priorities Plan for Canada," Intact Centre on Climate Change Adaptation, 2012, https://www.intactcentreclimateadaptation.ca/about/climate-change-adaptation-project-canada/

Everyday headlines point to this new reality: "Climate change study in Canada's Hudson Bay thwarted by climate change" (*The Guardian*, June 14, 2017); "It's not your imagination: summers are getting hotter" (*The New York Times,* July 28, 2017); "Suicides of nearly 60,000 Indian farmers linked to climate change, study claims" (The Guardian, July 31, 2017), and so on. While the Maldives have yet to sink and New Delhi, Bangkok, New York and other low-lying metropolises are yet to be submerged, headlines point to other signs that climate catastrophe is already here: thousands of farmers committing suicides, heat waves that kill even healthy adults, severe ecosystems disruption to the point that species are becoming extinct at unprecedented rates. If climate change is the larger force that is unleashing a variety of disasters globally, should not climate change as such be considered a catastrophe?

The challenge in shifting the viewpoint from seeing climate change as an umbrella term for a series of risks towards understanding it as catastrophic *already* is that climate presents us with a different kind of catastrophe, one that doesn't necessarily abide by the ways in which catastrophe has thus been understood. This catastrophe is quite unlike the catastrophe understood by proponents and critics of catastrophism. As Lilley writes, catastrophists' "focus on spectacular catastrophe typically overlooks the prosaic catastrophes of everyday life that are the sediment upon which capitalism is constructed."[43] As much as I have pointed to the horrific climate-related disasters that have plagued us over the last few decades, climate change as a whole emerges as precisely this kind of prosaic catastrophe, one that is thoroughly entangled in contemporary capitalism. In the everyday it may lack the violent, incendiary spectacle of other kinds of catastrophe, but it is no less alarming.

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[43] Lilley, *Catastrophism*, 2.

There is a growing body of scholarship that suggests catastrophe is no longer an exception to the everyday. Catastrophes have become, rather, the "mundane background of our daily lives."[44] They surround us and, as political geographer Garnet Kindervater asserts, "[constitute], at least in part, our reality."[45] Catastrophe is, then, in the words of cultural critic John David Ebert, "becoming something of a way of life for us" —a "new norm."[46] It put us, according to Frédéric Neyrat, into a "crazy relation with the world", wherein our sense of continuity is grounded on permanent discontinuity.[47]

III. Climate Change and the New Dimensions Catastrophe

Society & Nature: Entanglements of Climate Change Catastrophe

Permanent discontinuity is a good way to describe the geological changes Earth is currently undergoing. The Anthropocene names a proposed new geological epoch that has been brought about due to human industry and activity. Climate plays a crucial role in the birth of the Anthropocene. For, from a geological perspective, climate represents one of nine 'planetary

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[44] Christopher Dole, Andrew Poe, Robert Hayashi, Austin Sarat, and Boris Wolfson, eds, *The Time of Catastrophe: Multidisciplinary Approaches to the Age of Catastrophe* (London: Routledge, 2015), 7.

[45] It is hard to deny such statements. On top of the many natural disasters are the increasing number of terrorist attacks around the world, the ongoing wars in Syria, Afghanistan, and Yemen, the refugee 'crisis' in Europe and the persecution of the Rohingya in Myanmar. These are just a few examples of today's catastrophic events. Garnet Kindervater, "Catastrophe and Catastrophic Thought," in *Biopolitical Disaster,* eds. Jennifer L. Lawrence Sarah Marie Wiebe (New York: Routledge, 2017), 97.

[46] Ebert, *The Age of Catastrophe*, 1.

[47] Neyrat, "The Biopolitics of Catastrophe," 248.

boundaries'—those processes and systems that regulate the stability and resilience of Earth. Climate *change* thus signifies that one of these boundaries has already been crossed.[48]

The dawn of the Anthropocene suggests that we have moved from the geological epoch of the Holocene, which is defined "above all by its climate, an interglacial moment that has been agreeably stable so far compared to what came before."[49] The Holocene began at the end of the last ice age, roughly 11,700 years ago; it brought temperate climate and provided environments in which human civilization could flourish. Clive Hamilton tell us that "the principal reason for Earth scientists' belief that the planet has shifted out of the previous epoch, the Holocene, lies in the rapid increase in the concentration of carbon dioxide in the atmosphere and its cascading effects throughout the Earth System."[50] Indeed most scholars agree that the displacement of carbon is a major cause of the geological shift. Huge amounts of carbon, once dormant as fossils deep beneath Earth's surface, have been unearthed, burned, and released in the atmosphere and oceans. As Hamilton recounts, this carbon dioxide will persist in the atmosphere for millennia; the warming of Earth that will result from this accumulation will suppress, for possibly the next 130,000 years, ice ages that would have otherwise occurred.[51] Over one, or a handful of, centuries human beings have changed the shape of Earth and will have left their mark for tens of thousands of years.

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[48] Eddie Yuen, "The Politics of Failure Have Failed: The Environmental Movement and Catastrophism," in *Catastrophism: The Apocalyptic Politics of Collapse and Rebirth*, eds. Sasha Lilley, David McNally, Eddie Yuen, and James Davis (Oakland: PM Press, 2012), 15.

[49] J.R. McNeill and Peter Engelke, *The Great Acceleration: An Environmental History of the Anthropocene since 1945* (Cambridge, MA: Harvard University Press, 2016), 1.

[50] This is combined with the system-changing forces of ocean acidification, species loss, and disruption of the nitrogen cycle. Clive Hamilton, *Defiant Earth: The Fate of Human Beings in the Anthropocene* (Cambridge: Polity Press, 2017), 1.

[51] Hamilton, *Defiant Earth*, ix.

In the deep time of geology, the boundary crossing phenomena happen over vast stretches of time. While normally the flows of geological change happen over millennia, every so often a catastrophic event occurs that shifts the geology of the planet more rapidly. The Anthropocene is understood to mark a catastrophic shift in geological epochs. From a human framework, the changes that take place to cross epochal boundaries occur across long periods of time; but from a geological perspective, these appear almost instantaneous. Neyrat's understanding of the present as being a continuity built on *permanent discontinuity* becomes evident from a geological perspective.

The Anthropocene brings back into view the geological notion of *catastrophism*, which should not be confused with its psychological twin. In geology, this theory suggests that global catastrophe has brought about the end of certain geological epochs. Geologist George Cuvier developed this concept at the turn of the 19th century to explain the gaps that he saw in the fossil record, those patterns of extinction and faunal succession that appeared to be abrupt. He proposed that our planet had undergone these changes due to major global upheavals: natural global catastrophes that radically altered the shape of Earth.

Cuvier's catastrophism, which was linked to religious doctrines and used as proof for biblical events, such as the great flood, was rejected by secular geological thought for almost two centuries. Against it, most scientists supported 'uniformitarianism,' a theory that maintains that geological change occurs slowly over long periods of time.[52] Two Scottish geologists were crucial in popularizing this theory: James Hutton, who coined the term 'deep time', and Sir Charles Lyell, who, influenced by Hutton, published his theory of uniformitarianism in the

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[52] See A. Hallam, *Catastrophes and Less Calamities: The Causes of Mass Extinctions* (London: Oxford University Press, 2004).

Principles of Geology in 1830. Uniformitarianism has been highly influential for evolutionary thought, and with it, linear, progress-based conceptions of time. [53]

It wasn't until 1980, with the publication of Luis Alvarez's famous paper on the dinosaur extinction, that catastrophism was acknowledged as a plausible geological theory. Alvarez, of course, had found major geological evidence that a massive asteroid struck Earth 65 million years ago, igniting a mass extinction and bringing about the end of the Cretaceous period. His research focused on the large traces of iridium –an element rare on Earth but abundant in meteorites– found at the Cretaceous-Paleogene boundary all over the world. A decade later, evidence of the asteroid's impact would be discovered in the Yucatan Peninsula in Mexico. Today, geologists thus believe in a combination of uniformitarianism and catastrophism. That is, changes on Earth are slow and gradual but are punctuated by rare catastrophic events.

While climate change's contours are not as defined as say the asteroid that wiped out the dinosaurs, its force may be just as great. This is to say that from a geological perspective, we may already be in the throes of catastrophe. At the time of writing, the Anthropocene is still a proposition. The International Commission on Stratigraphy of the International Union of Geological Sciences has yet to officially confirm that we are no longer in the Holocene. Nor has a consensus position on when the Anthropocene began been reached. Many suggest, such as Paul Crutzen, who helped popularize the term, that the start should be pinpointed to the industrial revolution and the invention of the steam engine, as this begins the huge displacement and burning of fossil fuels in the form of coal.[54] Others, such as Colin N. Waters, submit that it is not until the 1950s, which marks the nuclear age and the beginnings of the Great Acceleration, when

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[53] Charles Darwin cites Lyell in *The Origin of the Species.*

[54] Paul J. Crutzen and E.F. Stoermer, "The Anthropocene," *IGBP Global Change Newsletter* 41 (2000): 17-18.

the impact of human activity on Earth increased exponentially, that the Anthropocene starts.[55]

Simon L. Lewis and Mark A. Maslin believe that the Anthropocene began in either 1610 or 1964 –the former marks the clashing of the 'old' and 'new' worlds through exploration, slavery, and mass migration and the latter references the year in which radioactive isotopes are discernible in the rock layers of Earth.[56] Bronislaw Szerszynski provocatively suggests, "maybe the Anthropocene in all its geohistorical specificity really starts when humans become aware of their role in shaping climate, and this awareness shapes their active relationship with the environment."[57]

While these perspectives are debating the Anthropocene within the framework of human history, the Anthropocene exceeds such boundaries. It brings together two vastly different temporal frameworks: the history of Earth and human history. As Dipesh Chakrabarty states, we are in a "unique phase when we connect events that happen on vast, geological scales with what we might do in the everyday lives of individuals, collectives, institutions, and nations."[58] This, he continues, "requires us to think on two vastly different scales of time that Earth history and world history respectively involve."[59] Understanding climate change as catastrophe necessitates thinking across these historical scales: the temporality of climate change catastrophe is geological but it is a human inflicted geology; this catastrophe may have been caused by human

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[55] Colin N. Waters, James P. M. Syvitski, Agnieszka Galuszka, Gary J. Hancock, Jan Zalasiewicz, Alejandro Cearreta, Jacques Grinevald, Catherine Jeandel, J. R. McNeill, Colin Summerhayes and Anthony Barnosky. "Can nuclear weapons fallout mark the beginning of the Anthropocene Epoch?" *Bulletin of the Atomic Scientists* 71. 3 (2015), https://doi.org/10.1177/0096340215581357

[56] Simon L. Lewis and Mark A. Maslin, "Defining the Anthropocene," *Nature* 519.7542 (March 12, 2015), http://dx.doi.org.ezproxy.library.yorku.ca/10.1038/nature14258

[57] Bronislaw Szerszynski, "The End of the End of Nature: The Anthropocene and the Fate of the Human," *Oxford Literary Review* 34.2 Deconstruction in the Anthropocene (2012): 171.

[58] Dipesh Chakrabarty, "Anthropocene Time," *History & Theory: Studies in the Philosophy of History* 57.1 (2018): 6.

[59] Chakrabarty, "Anthropocene Time," 6.

beings but the traces of it will remain in Earth far longer than the ends of human history. Intimately bound up with the Anthropocene, the temporal dimensions of catastrophe of climate change, from a human perspective, are characterized by both an 'all of the time' and an 'outside of time.'

Understanding climate change catastrophe through this newfound merging of the geological and human temporal scales has its corollary when thinking about its spatial dimensions. The fact that the interconnections of globalization turns what should be local disasters or catastrophes into global events cannot, as shown in the example of Hurricane Katrina, be disentangled from climate change. And yet, this should not blind us to the unique spatial dimensions of climate change catastrophe. While a terrorist attack may have rippling effects across the world, climate change is by its very nature planetary—its boundaries are one and the same with the entirety of the world. As Smil states, atmospheric circulation is one of few natural processes that operate on a truly global scale: it "is a fundamental example of a unified, planet-wide, climate-shaping flux that is powered by a single source (solar radiation)."[60] As such, climate change does not only threaten, as other catastrophe, to cause the momentary or total breakdown of societies; it reaches well beyond the human realm, affecting living things in regions uninhabited by human beings (polar regions, oceans, remote forests, and so on), indeed, even as the Anthropocene submits, the substratum of Earth. This prompts us to stop thinking history and social analysis "as a purely intra-human affair."[61]

If previously catastrophes appeared as either 'natural', like the Lisbon earthquake, or 'human' like wars and terrorism, climate change disrupts the boundaries between these

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[60] Smil, *Global Catastrophes and Trends*, 5.

[61] Hamilton, *Defiant Earth*, 93.

categories of human and nature. It is rather a weird combination of the two. This facet of climate change, combined with its connection to the Anthropocene, has led many scholars to creatively rethink the relation between humans and nature in terms of entanglement: concepts such as humannature or natureculture are among the ways of describing this connection. Climate change has not *produced* this entanglement. It rather revealed to us that this was always, necessarily the case.

A broad philosophical approach to this entanglement has gained traction in the last decade: 'new materialism' is an umbrella designation to describe a body of scholarship that attempts to (re)think nonhuman entities, in themselves and in their interrelations with the human sphere. While there are varying schools of thought within this broad denomination, the thinkers associated with it include, among others, Bruno Latour, Karen Barad, Jane Bennett, Donna Haraway, Graham Harman, and Timothy Morton. This new trend in western philosophy finds its antecedent in deep rooted Indigenous ontologies, as will be discussed in greater detail in chapter three, where I bring in understandings of Earth/human relations from Indigenous Turtle Island scholars, such as, Zoe Todd, Leanne Simpson, Vanessa Watts, Jarrett Martineau, Tasha Hubbard, and Dolleen Tisawii'ashii Manning. Their perspectives have traditionally been overlooked as part of the way in which, as Manning puts it, "Indigenous ways of knowing have been delegitimized, pathologized, and reduced to obscurantism, or primitive and infantile ineptitude."[62] But they present powerful modes of understanding the interconnections between various human and nonhuman beings. These insights are especially needed now, as a crucial reason for the catastrophe of climate change is to be found in the ways in which nonhuman

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[62] Dolleen Tisawii'ashii Manning, "The Murmuration of Birds: An Anishinaabe Ontology of Mnidoo-Worlding," in *A Feminist Phenomenology Manifesto*, ed. Helen A. Fielding (Bloomington: Indiana University Press, 2017), 156.

entities—including the living and nonliving—have been relegated by Western culture to the status of property, externalities, and other objects whose value is solely monetary.

Indeed, climate change cannot be divorced from larger socio-economic and political histories. For Naomi Klein climate change is the unintentional outcome of capitalism, a socio-economic system built on the promise of endless growth fuelled by the exploitation of 'nature.' And as such, she contends, climate change will not be mitigated without an overhaul of this system itself. The international climate co-operations, such as the Paris agreement, through which governments work towards halting the rise in global temperatures through the signing of accords are, as Klein shows, mere band-aid solutions. For, as she outlines in her book *This Changes Everything: Climate Change vs. Capitalism*, climate stability is fundamentally incompatible with the main tenets of neoliberal capitalism.[63] Mark Fisher presents a similar argument, writing that "the relationship between capitalism and eco-disaster is neither coincidental nor accidental: capital's 'need of a constantly expanding market,' its 'growth fetish', means that capitalism is by its very nature opposed to any notion of sustainability."[64] As such, "climate change can't be solved within the confines of the status quo, because it is a product of the status quo."[65]

The elucidation of these deep connections between capitalism and climate change constitutes a large body of scholarship in the humanities and social sciences. Much of this work, but far from all, is adamant like Klein that the only solution to climate change is a change in the socio-economic structuring of the world. Jason Moore's *Capitalism in the Web of Life* (2015),

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[63] Naomi Klein, *This Changes Everything: Climate Change vs. Capitalism* (Toronto: Knopf Canada, 2014).

[64] Mark Fisher, *Capitalist Realism* (London: Zero, 2009), 18-19.

[65] Elizabeth Kolbert, "Can Climate Change Cure Capitalism?" *The New York Review of Books,* December 4, 2014, https://www.nybooks.com/articles/2014/12/04/can-climate-change-cure-capitalism/

Andreas Malm's *Fossil Capital* (2016) and *The Progress of This Storm* (2018), McKenzie

Wark's *Molecular Red* (2015), George Monbiot's *How Did We Get Into This Mess?* (2016) are

other works pursuing a similar line of argument. Many of these works address John Bellamy

Foster's ecological reading of Marx and 'the metabolic rift.' Foster builds upon Marx's

understanding of how capitalist property relations "provoke an irreparable rift in the

interdependent process of social metabolism, a metabolism prescribed by the natural laws of life

itself."[66] He sees the ecological crisis as evidence of rupture in the metabolic interaction of

humanity and nature caused by capitalist production. For Malm and Wark, fossil fuel regimes

and the disinterring of huge amounts of carbon are to blame for the global metabolic rift that is

climate change or, more broadly, the Anthropocene. For Moore, climate change necessitates a

reconfiguration of the understanding of the relationships between capitalist society and nature

itself. Rather than understanding capitalist production as something that does something to

nature, a perspective that upholds distinctions between society and nature, Moore wants to

understand capitalism a "mosaic of relations that work[s] through nature" at the same time as

"nature works through…capitalism."[67] While these thinkers diverge in often combative ways,[68]

what is important for us is their effort to link the historical structures and systems of power and

production –a "labour point of view"[69]– with the present day climate catastrophe. They remind

us that climate change has both a discursive and material history.

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[66] Karl Marx, *Capital vol. 3, 1863-65* (New York: Vintage, 1981), 949-50. See also John Bellamy Foster, "Marx's Theory of Metabolic Rift: Classical Foundations for Environmental Sociology*," America Journal of Sociology* 105.2 (September 1999): 366-405.

[67] Jason Moore, *Capitalism in the Web of Life: Ecology and the Accumulation of Capital* (London: Verso, 2015), 3.

[68] See for instance Andreas Malm's scathing critique of Moore's position in *The Progress of this Storm: Nature and Society in a Warming World* (London: Verso, 2017).

[69] McKenzie Wark, *Molecular Red: Theory for the Anthropocene* (London: Verso, 2015).

While climate change is often discussed as being *anthropogenic*, these perspectives also prompt the question: is there really a 'we' in this story*?* Are 'humans' as such to blame? Or should the finger be pointed at the privileged of the world, those enjoying the wealth created by capitalism, whose conspicuous consumption patterns and expenditure of non-renewable energy sources are exacerbating the problem? Or should we be more specific, pointing to world leaders and CEOs? Such questions throw doubt on whether the Anthropocene, with its roots in *anthropos*, is an apt definition, for it both distributes responsibility to everyone and abstracts humanity in its species thinking, eschewing the social, economic, and political structures that have brought it about.[70]

The catastrophe of climate change is thus an event that not only encompasses biogeophysichemical processes but also the socio-historical, politico-economic, and philosophical. The immensity of climate change and its profound and vast spatio-temporal dimensions, combined with its entanglement with multiple words—human, nonhuman, animate and inanimate—refigures catastrophe entirely. Catastrophe in this version is drawn-out; it unfolds incrementally instead of erupting instantaneously; it is 'deep,' geologically connected to deep pasts and far futures; its spatial contours are equivalent to the boundaries of Earth itself; and as such it embroils all facets of the planet. It is truly an unprecedented catastrophe. It is 'excessive' in all of its dimensions.

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[70] Moore has suggested that we call it the *Capitalocene*, Donna Haraway the *Chthuluscene*, and Wark (facetiously) the *#misanthropocene*. Since the main focus of this dissertation is not the Anthropocene, I stick with this denomination while nonetheless recognizing it problematic connotations. The consideration of the effects and consequences of climate change poses similar problems. Climate change is currently affecting most beings on Earth, but not in even ways. In wealthy countries, the rising temperatures and droughts can be dealt with through air conditioning and imported water (both of which only exacerbate the problem).

<u>The problem of feeling climate change catastrophe</u>

The magnitude of climate change has led many to suggest that it is something that surpasses the human faculties of apprehension. Timothy Morton describes climate change as a 'hyperobject': an object of such huge magnitude that it defies human comprehension.[71] And Garnet Kindervater similarly notes that "climactic calamity remains an abstraction too unspecific to be contained in specific ideational realities."[72]

This excessive, unknowable nature of climate change finds its parallel in theories of catastrophe. [73] For instance, in the *Writing of Disaster,* Maurice Blanchot contends, "the disaster is an event which we cannot simply turn into an object of knowledge—for such is its force and shock that it dismantles the very platforms from which we apprehend reality."[74] The way in which catastrophe speaks to the limits of knowledge, its ability to dismantle our faculties of apprehension is reiterated by key texts on catastrophe, including those by Kindervater, Aradau and van Munster, and Dole et al.

As the excessiveness of climate change, the way it eschews our faculties of apprehension, is characteristically catastrophic, it needs to be approached in the same way. In an essay on rationality in catastrophic times, Jean-Pierre Dupuy discovers a central contradiction in how a coming catastrophe is faced. He draws on Henri Bergson's account of the period leading up to World War One. Bergson describes the war as appearing "at one and the same time as probable and as impossible: a complex and contradictory idea, which persisted right up to the fateful

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[71] Timothy Morton, *Hyberobjects: Philosophy and Ecology after the End of the World* (Minneapolis: University of Minnesota Press, 2013).

[72] Garnet Kindervater, "Catastrophe and catastrophic thought," 105.

[73] Aradau and Van Munster, *The Politics of Catastrophe*, 5.

[74] Though Blanchot uses the term 'disaster,' he is clearly speaking of catastrophe as we have just outlined for he speaks of events such as the Holocaust.

date."[75] For Dupuy, Bergson's contradictory attitude toward the war comes down to a distinction between *knowing* and *believing.* One might *know* that a catastrophe is on the horizon because factual information has been provided that attests to imminent catastrophe, but one cannot *believe* it. Why? As Bergson's reflection betrays *belief* only emerged on the 'fateful day', when war was made manifest. A sensory knowledge was thus crucial for making a knowable event into a believable event.

There is an analogous gap that exists in the experience of climate change. Arguably, climate change is even more contradictory for we've already passed its moment of 'probability;' it is already occurring and yet the sense that it is equally impossible accompanies its occurrence. This may be because we suffer from what Claire Colebrook calls "hyper-hypo-affective disorder": despite being surrounded by repeated warnings about global warming, resource depletion, and other forms of environmental degradation, "there is neither panic nor any apparent affective comportment that would indicate that anyone really feels or fears [climate change]."[76] That is, climate change is something that is not only excessive in terms of comprehension, its affective dimensions are also excessive, seemingly beyond human capacities to 'sense.' The affective dimensions of climate change appear as indeterminate, due to the characteristics of its scale and temporality, but also simply because this is a kind of catastrophe that *we've never experienced before.* In order for this dissertation to situate how art has a role to play in bringing to the fore the affective registers of a profoundly new kind of global catastrophe whose

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[75] Jean-Pierre Dupuy, "The Precautionary Principle and Enlightened Doomsaying: Rational Choice Before the Apocalypse," *Occasion: Interdisciplinary Studies in the Humanities* 1.1: 9.

[76] Claire Colebrook, "Earth felt the wound: The affective divide," *Journal for Politics, Gender and Culture* 8.1 (2011): 45.

dimensions push beyond human frameworks, we need a working definition of affect and how it 'operates.'

'Affect' is a notoriously slippery concept that escapes clear definition. The word comes from the Latin *affectus*, which means passion or emotion. But most scholars agree that affects are not equivalent to emotions. Emotions and affects are interrelated; an affect may, it has been argued, 'become' an emotion when it is cognitively apprehended and classified.[77] But, affects are much more ambiguous than emotions; "intensities", as Gilles Deleuze says, rather than definable feelings. Affect is something that precedes or eludes cognition; it is not confined to one body or individual like an object possessed by a subject. Nor can its quality be fixed in sociolinguistic terms.[78] Affects are not, like emotions, personal, subjective, or 'contained.'

Many scholars, such as Michael Hardt, Nigel Thrift, Ben Anderson, Sara Ahmed, and Lauren Berlant, understand affect through the philosophy of Spinoza and Gilles Deleuze's ethological reinterpretation of Spinoza. As Thrift explains, Spinoza challenged Descartes model of the body "as animated by the will of an immaterial mind or soul" through a monist worldview. For Spinoza, all worldly forms were modes of one unfolding substance— 'God' or 'Nature'; as such, "everything is part of a thinking and doing simultaneously: they are aspects of the same thing expressed in two registers."[79] Knowing thus "proceeds in parallel with the body's physical encounters, out of interaction."[80]

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[77] Jennifer K. Ladino, "Mountains, Monuments, and other Matter: Environmental Affects at Manzanar," *Environmental Humanities* 6.1 (2015): 134.

[78] Brian Massumi, *Parables for the Virtual: Movement, Affect, Sensation* (Durham, NC: Duke University Press, 2002), 28.

[79] Nigel Thrift, "Intensities of Feeling: Towards a Spatial Politics of Affect," *Geografiska Annaler Series B: Human Geography* 86.1 (2004): 62.

[80] Thrift, "Intensities of Feeling," 62.

The relational aspect of affect is key; being affected and affecting are two sides "of the same dynamic shift or change in the body."[81] For Ben Anderson affect is the "transpersonal capacity which a body has to be affected and to affect."[82] Similarly, Massumi explains that "when you affect something, you are at the same time opening yourself up to being affected in turn."[83] That is, affect emerges in the encounter between bodies, which, it is important to highlight, are not confined to human bodies, but extend to all kinds of nonhuman and inanimate 'bodies.' One's power to be affected, for Hardt, is like "a gauge of your capacity to be really in the world, to register and feel its diverse powers."[84] Starting from Spinoza's insight that we do not even know 'what a body can do,' Deleuze sees in the power to be affected an arena for an exploration of an ethical and political project. In this way, the most 'powerful' one is not the least affected, but "the one affected the most and in the most ways."[85]

Breaking with a Cartesian subject of knowledge, affect scholars help to rethink how we can know the world, and thus, how we can approach catastrophe epistemologically. For Lauren Berlant, affect is that through which the present is first perceived: "the present is what makes itself present to us before it becomes anything else, such as an orchestrated collective event or an epoch on which we can look back."[86] As our present is defined by a catastrophe that is not, or is hardly, 'felt', we need to find avenues of bringing affectivity to the foreground. One way to do so is through aesthetics.

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[81] Thrift, Ibid.

[82] Ben Anderson, "Becoming & Being Hopeful: Towards a Theory of Affect," *Environmental & Planning D: Society and Space* 24 (2006): 735.

[83] Brian Massumi, *Parables for the Virtual*, 212.

[84] Michael Hardt, "The Power to be Affected," *International Journal of Politics Culture Society* 28 (2015): 216.

[85] Hardt, "The Power to be Affected," 217.

[86] Lauren Berlant, *Cruel Optimism* (Durham, NC: Duke University Press, 2011), 4.

<u>Affective atmospheres: catastrophe aesthetics</u>

The links between affect and aesthetics go back to the Greeks. Aesthetics comes from *aisthesis,*

the Greek term for sense experience or sensory knowledge. This is a knowledge different to

cognition, but a kind of knowledge nonetheless. Aesthetic objects have been described as

bundles of affects or, as Deleuze and Guattari say, "blocs of sensations" [87]; or, similarly, Mikel

Dufrenne labels them "coalescences of sensuous elements."[88] They are crucial sites for

instigating manifold ways of being affected and doing so in ways different from ordinary

experience. As Berlant states: "Aesthetics is a place where we re-habituate our sensorium by

taking in new material and becoming more refined in relation to it."[89]

Compellingly for the subject of this dissertation, Dufrenne describes aesthetic objects as

"affective atmospheres" that express bundles of spatial-temporal relations; in his view, art does

not just re-present the world, but instead presents an 'expressed world.' As Ben Anderson writes,

'atmosphere' is Dufrenne's term to capture "how the 'expressed world' overflows the

representational content of the aesthetic object."[90] The atmosphere of an aesthetic object creates

"a space of intensity" through which a represented object will be apprehended and will take on a

certain meaning. 'Catastrophe aesthetics' thus speaks to the ways in which art works, as

"affective atmospheres," are expressing the present catastrophic nature of climate change –the

atmosphere of the present day.

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[87] Deleuze and Guattari, "Percept, Affect, Concept" in *What is Philosophy?* trans. Hugh Tomlinson and Graham Burchell III (New York: Columbia University Press, 1996), 184-5.

[88] Mikel Dufrenne, *The Phenomenology of Aesthetic Experience*, trans. By Edward S. Casey (Evanston, IL: Northwestern University Press, 1973), 13.

[89] Berlant, *Cruel Optimism*, 13.

[90] Ben Anderson, "Affective Atmospheres," 13.

While catastrophe aesthetics has the potential to describe the workings of a large range of different kinds of art, I have chosen in this dissertation to centre on experimental media art. With the exception of one performative photographic series, all of my case studies are moving images, broadly put: data visualizations, interactive web-based documentaries, experimental film and video. I have chosen to focus on these kinds of images, as opposed to paintings, sculptures, literature and so on, because they speak to the image-landscape of present.

My case studies could all be considered 'post-cinematic media', to use Steven Shaviro's term. For Shaviro, the 'post-cinematic' refers to computer and networked based and digitally generated media. Even if some of the projects I discuss were shot partially on analogue film (*Notes from the Anthropocene*, for instance) or were envisioned prior to the rise of computers (The Geoscope), they are either digitally edited and distributed (in the case of the former) or anticipatorily engage with a digital imaginary (in the case of the latter). They thus take part in the production and circulation of the digital, technological landscape, which, according to Shaviro, has "given birth to radically new ways of manufacturing and articulating lived experience."[91]

Media works, as Steven Shaviro states, are "machines for generating affect."[92] The myriad of screens with which we engage in the everyday are involved in the production and circulation of both representational and affective ways of knowing worlds. For Shaviro, this also means that these are means of capitalizing upon or extracting value from affect. The works that I discuss are indeed part of this affective economy, but as experimental works, and moreover as 'committed' experimental works, they exhibit a self-awareness about the kinds of image regimes they are operating within. By 'committed' I refer to Tom Waugh's understanding of

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[91] Steven Shaviro, *Post-Cinematic Affect* (London: Zero Books, 2010), 2.

[92] Steven Shaviro, *Post-Cinematic Affect*, 3.

documentary activism; my case studies all emerge from real concerns with social and environmental justice. In different ways, they push the boundaries of the media traditions and conventions within which they are working in an effort, as I see it, to generate new kinds of affective engagements, ones that disrupt the 'status quo' of images today. In other words, by disrupting visual and narrative conventions, they open up the space for a new kind of affective relation that emerges precisely from the different kinds of relations and experiences they create. I explore then across three chapters how experimental media function as "affective atmospheres" to express the new contours of our current catastrophic atmosphere (both literally and figuratively). But to what end?

There is no definite answer to this question. Part of the 'function' of art is precisely to be a site of potentiality and possibility, not of solutions or instrumentality. Many submit that art is a realm that carries great transformational force. In a recent book on art and ecology, TJ Demos suggests that climate change is the best motivation for a 'great transition': "a systemic shift in reorganizing social, political, and economic life, in order to bring us into greater harmony with the world around us, including its human and nonhuman life-forms."[93] For Demos, art plays a big role in instigating such a transformation. He states:

> I'm convinced that art, given its long histories of experimentation, imaginative invention, and radical thinking, can play a central transformative role here. In its most ambitious and far-ranging sense, art holds the promise of initiating…creative perceptual and philosophical shifts, offering new ways of comprehending ourselves and our relation to the world..."[94]

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[93] TJ Demos, *Decolonizing Nature: Contemporary Art and the Politics of Ecology* (Berlin: Sternberg Press, 2015), 12.

[94] Demos, *Decolonizing Nature*, 18-19.

Timothy Morton suggests something similar when he writes that aesthetics perform a crucial role in "coming up with a new worldview" as it deals with "establishing ways of feeling and perceiving" human beings' place in the world.[95] As such, art may provide us with experiences of different kinds of worlds and different ways of being and knowing within worlds. Nigel Clark considers catastrophe as something that may overwhelm but that it "also challenges us to try and begin sensing, thinking, acting in new ways. It ends the world, and begins it turning anew."[96] Within the context of catastrophe, it is tempting to grasp onto this transformative potential of art, especially since the etymological roots of catastrophe tells us that there is a generative potential, a potential for change.

Though these viewpoints can be read as too idealistic in their perspectives on what art can *do*, I believe it is crucial within this present context of climate change to not admit total defeat; opening space for the possibility of transformation needn't be taken as proclaiming that art will bring about a global revolution. Change and transformation matter on multiple scales; the 'world' that turns anew in Clark's account above needn't be *the* world but instead *a* world: a community, a single human, a mollusc, a rock. If there is one thing that climate change makes clear, it is that change matters. And to sense how, we need art.

As I discuss in the conclusion of this dissertation, *care* should be foregrounded in an era of expansive catastrophe. Frédéric Neyrat takes a similar perspective in an essay that considers the possibilities for an ecopolitics in an era of catastrophe. Neyrat has a variety of concrete suggestions, one of which points to art. "We need a creative imaginary beyond real time."[97] He

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[95] Timothy Morton, *Ecology Without Nature: Rethinking Environmental Aesthetics* (Cambridge, MA: Harvard University Press, 2007), 2.

[96] Nigel Clark, "Geo-politics and the disaster of the Anthropocene," *The Sociological Review* 62.51 (June 2014): 21.

[97] Neyrat, "The Biopolitics of Catastrophe," 262.

calls for the production of images of a desirable world, of a desirable future that resists what he sees as a weakness of contemporary imagination: to only express negativity. "Having a future requires desiring a future," he concludes, "and not only forecasting the worst."[98] I agree but what this dissertation suggests is that a clearer understanding of the present atmosphere is necessary in order to generate imaginations of the future. What we need are imaginations of the present.

IV. Literature Review, Methodology, Chapter Descriptions

Environmental Humanities and Ecomedia Studies

I have already outlined the ways in which my project is in dialogue with certain theoretical perspectives on catastrophe, climate change, affect and aesthetics. But I will here consider how my project is situated within the broad field of environmental humanities and the specific field of eco-media studies.

As an academic field the environmental humanities emerged at the beginning of the twenty-first century, although various foundational texts date back to the beginnings of the modern environmental movement, usually thought as starting with Rachel Carson's *Silent Spring.* The environmental humanities recognize the global environmental crisis as demanding "new ways of thinking and new communities that produce environmental solutions as a form of civic knowledge"[99] as it "engages with the fundamental questions of meaning, value, responsibility and purposes in a time of rapid, and escalating, change."[100] It is an

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[98] Neyrat, 262.

[99] Robert S. Emmett and David E. Nye, *The Environmental Humanities: A Critical Introduction* (Cambridge, MA: MIT Press, 2017), 4.

[100] Deborah Bird Rose, Thom van Dooren, Matthew Chrulew, Stuart Cooke, Matthew Kearnes and Emily O'Gorman, "Thinking Through the Environment, Unsettling the Humanities," *Environmental Humanities* 1 (2012): 1.

interdisciplinary field that weaves together discourses from science and social science within a humanities framework. As Imre Szeman states, "At the heart of the environmental humanities is the insight that anything and everything deemed natural is, of necessity, cultural; how we frame our relation to the natural world and the environmental is expressed linguistically, is culturally contingent, and changes over time."[101] Or, as Rose et al. put it, the premise of environmental humanities is that the human is not separate from nature or the non-human world and, accordingly, nature cannot be removed from broader questions of politics and social justice: "At the core of this approach is a focus on the underlying cultural and philosophical frameworks that are entangled with the ways in which diverse human cultures have made themselves at home in a more than human world. In short, there is now recognition that the whole world, at all scales, is a 'contact zone.'"[102] These basic premises of the environmental humanities are central to my dissertation; the entanglement of natureculture, of the environmental and the political, is a key thread. My case studies provide different contexts and different scales from which to see and feel the interrelations between human and nonhuman worlds that climate change catastrophe brings to the fore.

Given that most of my case studies are moving images, however, my project can be situated within a specific subfield of the environmental humanities: ecomedia studies. Ecomedia studies incorporates both eco-critical and materialist examinations of media. While media here refers to a broad range of audio-visual works, most publications within this field, as the following overview of literature will reveal, focus on cinema.

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[101] Imre Szeman, "On the Energy Humanities: Contributions from the Humanities, Social Sciences, and Arts to Understanding Energy Transition and Energy Impasse," SSHRC Imagining Canada's Future Initiative Final Report, May 13, 2016, 2. Available at: http://afteroil.ca/on-the-energy-humanities/

[102] Rose, van Dooren, Chrulew, Cooke, Kearnes and O'Gorman, "Thinking Through the Environment, Unsettling the Humanities," 2.

The large portion of ecomedia studies texts investigate how films shape our perception of nature and/or how nature on screen reflects human ideologies, beliefs, values, anxieties and so on. Gregg Mitman's *Reel Nature* (1999), Derek Bousé's *Wildlife Films* (2000), Anat Pick and Guinevere Narraway's *Screening Nature: Cinema beyond the Human* (2013), and Cynthia Chris's *Watching Wildlife* (2006) are examples of this approach. Others, such as Sean Cubitt's *EcoMedia* (2005), David Ingram's *Green Screen* (2000)*,* Tommy Gustafsson and Pietari Kääpa's *Transnational Ecocinema: Film Culture in An Era of Ecological Transformation* (2013), Robin L. Murray and Joseph K. Heumann's *Ecology and Popular Film: Cinema on the Edge* (2009), Pat Brereton's *Hollywood Utopia: Ecology in Contemporary American Cinema* (2005), and Sheldon H. Yu and Jiayan Mi's *Chinese Ecocinema In the Age of Environmental Challenge* (2009) present readings of the ecological imaginations of fiction and documentary media through examinations of genre, cinematic space, narrative, and aesthetics.

This scholarship helps us to understand the ways in which screen cultures have historically mediated the 'natural' world and how various ideas of 'nature' have historically informed the way in which it appears on screen. While such scholarship has been influential for my thinking on these matters, my work departs from this literature in three crucial ways. First, my conceptualization of climate change as catastrophe narrows my focus considerably. I am less interested in how 'nature' as such is represented on screen and more interested in how certain artworks attempt to communicate perceptual and affective aspects of climate change that often escape us in day-to-day life. This of course involves creating images of the 'natural world,' but thinking about representations of nature through the history of landscape, the pastoral, wilderness, or other nature tropes falls outside of the framework of this dissertation. Second, by bringing affect into the conversation, I move away from a solely representational, semiotic

reading of the environment and the environmental catastrophe on screen. While there are a

handful of books that consider affect, which I address below, the majority of scholarship

approaches climate change through a solely representational lens. Third, unlike most of the work

in the field of eco-media studies, I do not look particularly at 'traditional' feature fiction and

documentary films.[103] My case studies are experimental in form.

A few works within the field of ecomedia studies look specifically at disasters. Robin L.

Murray and Joseph K. Heumann's *Film and Everyday Eco-Disasters* (2014) and Julia Leyda and

Diane Negra's *Extreme Weather and Global Media* (2015) focus particularly on environmental

disaster on screen. In *Film and Everyday Eco-disasters* Murray and Heumann examine the way

in which our basic needs (air, water, clothing, food, shelter and energy) emerge in popular fiction

and documentary over the course of cinema history. Doing so they observe a "changing

perspective toward everyday eco-disasters."[104] The satisfying of our basic needs comes to be

seen as causing environmental degradation. Though providing arresting reflections about the way

in which popular film addresses our role in causing environmental damage, their book sheds

little light on climate change in particular and uses 'disaster' in a very conventional sense of the

word. Julia Leyda and Diane Negra's *Extreme Weather and Global Media* considers

representations and rhetoric of extreme weather in film and news media. Extreme weather

events, they suggest, "operate as points of entry into public affective cultures and to lay bare the

precarities of twenty-first-century capitalism."[105] They scrutinize the various ways in which

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[103] There are a few exceptions: Scott McDonald's *The Garden in the Machine* (2001), which considers experimental or avant-garde film from the lens of American landscape traditions. Sean Cubitt looks at the use of data visualization within documentary and news media in his essay "Everybody Knows This is Nowhere: Data Visualization and Ecocriticism" that appears in his co-edited book *Ecocinema Theory and Practice* (2013).

[104] Robin L. Murray and Joseph K. Heumann, *Film and Everyday Eco-disasters*, (Lincoln: University of Nebraska Press, 2014), xi-xii.

[105] Julia Leyda And Diane Negra, eds. *Extreme Weather and Global Media* (London: Routledge, 2015), 2.

'disaster capitalism' feeds off extreme weather events. My dissertation is informed by this careful examination, with the crucial difference that I am interested in artworks that are *resisting* such spectacularization and sensationalism of climate change.

In ecomedia studies, scholars have also broached the topic of affect. Alex Weil von Mossner's *Moving Environments: Affect, Emotion, Ecology and Film* (2014) and Adrian Ivakhiv's *Ecologies of the Moving Image: Cinema, Affect, Nature* (2013) both investigate the affective dimensions of nature on screen. At first glance von Mossner's book seems particularly relevant to my project because it addresses the socio-cultural ramifications of the experience of watching nature on film. However, von Mossner adopts a cognitive-analytic approach to affect theory, which falls outside the framework of my project's theoretical perspectives. The case is similar with Ivakhiv's *Ecologies of the Moving Image*. It contains insights into the affective dimensions of environments on screen that are pertinent for me. But it relies solely on process-philosophy to shed light on its case studies. While I do think this is an elucidating perspective, I hesitate to be confined to one theoretical framework, and prefer, given the complexity of my topic, to take a more eclectic approach. What is more, both von Mossner's and Ivakhiv's book are interested in popular feature films and documentaries.

Another recent approach in ecomedia studies is to view the link between affect and environmental damage through the lens of trauma. Here one should mention Anil Narine's *Eco-Trauma Cinema* (2015) and E. Ann Kaplan's *Climate Trauma* (2016). *Eco-Trauma Cinema* looks at how film posits a symbiotic relationship between human beings' destruction of Earth and the trauma people suffer when experiencing a natural disaster. To establish this relationship Narine mobilizes a conventional understanding of disaster and catastrophe, as a singular event that is widely represented by media or portrayed to spectacular effect in film. He then ties it to an

understanding of trauma that emphasizes the temporal lag, or what Freud called

Nachträglichkeit. In this context it means that trauma occurs as an aftereffect of the experience

of a disastrous event. While thought provoking, what puts such a take outside of my framework

is that trauma is therefore, in Narine's reading, linked to an event that has already occurred, not

to one that is ongoing. By refiguring trauma to consider future catastrophe, Kaplan's book is

more similar to my project. In it she asks: how might future catastrophe emerge in aesthetic

expression? Looking at dystopian films and novels, she finds what she calls 'pretrauma', a

traumatic awareness of the future climate catastrophe that emerges in various kinds of

imaginations. These imaginations are for her "a kind of 'memory of the future'" which bear

witness to *possible* catastrophic futures.[106] Such insights have an ethical dimension: they make

the witnesses responsible for past and future injustices.[107] However, she still considers the

catastrophe of climate change as something that *will* occur, in the future, and not, as this project

does, something that is already happening.

Lastly, I should acknowledge that there is an important subfield of ecomedia scholarship

whose conclusions intrigue me but whose 'problematics' fall outside of my scope. In recent

works—such as Jussi Parrika's *The Geology of Media* and his edited collection *Medianatures:*

The Materiality of Information Technology and Electronic Waste; Jennifer Bagyr's *Digital*

Rubbish: A Natural History of Electronics; Richard Maxwell and Toby Miller's *Greening the*

Media; as well as Maxwell, Jon Raundalen, Nina Lager Vestberg's *Media and the Ecological*

Crisis (2014)—ecomedia scholars have employed a media materialist perspective to think about

the 'greening' of film practices. These scholars share a devotion "to identifying and analyzing

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[106] E. Ann Kaplan, *Climate Trauma: Foreseeing the Future in Dystopian Film and Fiction* (Jersey City: Rutgers University Press, 2015), 3.

[107] Kaplan, *Climate Trauma*, 24.

the material, physical links of media technologies, cultural production and environment."[108] If

we want to take seriously the ways in which media and art can express climate change, they

think we need to consider such media and art as objects in the world, indeed, as part of the world.

And this, so their argument goes, involves recognizing the material impacts that media-making

and creative practices have on the environment. Such inquiries require avenues of research that

are unfortunately beyond the scope of this dissertation project.

Methodology & Chapter Descriptions

Adopting a critical hermeneutic approach, this dissertation works towards elucidating the ways

in which a selection of environmentally themed media artworks approach and express the

catastrophe of climate change. To do so, I follow the tendency in the environmental humanities

to bring together scholarship from a range of disciplines. This leads me to interpret my chosen

artworks, an eclectic mix of grand-scale innovation with low budget experimentation, both as

texts and as experiences. While they are for the most part moving images, they vary widely in

terms of form and style; they move—in an only seemingly anachronistic way—from data

visualization environments to interactive documentary to experimental film and photography

across a historical period that loosely coincides with the emergence of the environmental

movement to the present day.

While all addressing Earth, these artworks are situated in and bring to life different

worlds. In Janine Marchessault's recent *Ecstatic Worlds*, she asks: do we live in one world or

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[108] Richard Maxwell, Jon Raundalen, and Nina Lager Vestberg, eds., *Media and the Ecological Crisis* (London: Routledge, 2014), xi.

many?[109] Her answer to that question is given in the title of the book, in which she suggests that there is one Earth, one planet, and many worlds. This is an earth that is not reducible to 'nature' or to 'humans' or to one particular 'world'; it is an aggregate of these things, at the same time discrete and interconnected to human life. Following this framework, I cast the artworks as concerned with the state of Earth but based on subject matters that are situated in different worlds. They emerge from different times, places, and contexts and each consider different aspects of climate catastrophe.

Moreover, their differences in 'worlding' plays out through different magnitudes: from the immensity of the planetary in the first chapter, to the familiar scale of the human sphere in the second, to the depth of the geological in the third. The movement from the scales of the celestial spheres to the rocks upon which we stand signals a trajectory of changing ways of thinking about Earth and its inhabitants: my dissertation begins with media experiments sprung from a universalist, human-centred understanding of Earth (Ch. 1); it then moves to artworks that present a human-focused (not centric) picture of an Earth upon which many (unequal) worlds are formed (Ch. 2); and it ends, bringing us down to earth, with films and photography that suggest radical reconfigurations of agency as a force that is distributed across Earth residing entities (Ch.3).

Turning to the historical moment which marked the dawn of the modern environmental movement, I, in Chapter One, "Expanded Screen Environments for an Earth on the Brink of Catastrophe," examine these two key planetary works of R. Buckminster Fuller: the Geoscope and World Game. Both were massive spherical screen environments from which a spectator could view planetary processes from within the structures. Departing from the existing

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[109] Janine Marchessault, *Ecstatic Worlds: Media, Utopias, Ecologies* (Cambridge, MA: MIT Press, 2017).

scholarship's dominant interest in Fuller's utopianism, I focus on how these works emerged out of his intellectual concerns of the 1950s-1970s, which were informed by what he saw as human beings' path towards global catastrophe. Fuller's projects wanted to reveal Earth as a system. Through 'mini-Earth' screen apparatuses he tried to visualize the global and planetary circuits that are crucial for the wellbeing of the future. In this, I show that he was engaged in a dialogue with both systems theorists, such as Vladimir Vernadsky and Ludwig von Bertalanffy, and with the burgeoning field of cybernetics. And yet, as I also point out, Fuller's planetary screen-machines cannot be reduced to being science-machines. Their screen components made them early examples of what Gene Youngblood termed *expanded cinema*. Drawing on my research at the Fuller archives at Stanford University in Palo Alto, California, I show how the immersive, aesthetic facets of these screens aimed to spark a planetary consciousness by attuning people to the interconnectivity of Earth. Fuller thought that part of raising a planetary consciousness involved allowing spectators to *feel* themselves a part of this great whole-system. In Fuller's visions, Earth and 'the world' are one and the same. While I am critical of Fuller's universalist perspective of the world, his effort to arouse a sense of the scale of Earth is important for the expression of the global nature of climate change today.

Chapter Two, "Catastrophic Oil Worlds," considers the two interactive documentaries *Offshore* (Brenda Longfellow) and *Fort McMoney* (David Dufresne), which, in different but equally innovative ways as Fuller, elucidate the catastrophic nature of the fossil fuel regime. Here, we 'come down' to the scale of the human sphere, and the various worlds that such a sphere encompasses. Using video game-based web technologies, *Offshore* and *Fort McMoney* illuminate the slow catastrophic forces of the fossil fuel industries: offshore drilling in the Gulf of Mexico and the tar sands in Northern Alberta, respectively. Using Rob Nixon's idea of 'slow

violence,' I consider how this often imperceptible kind of violence is enacted not just in the content of the works but in their interactive form. To do so, I situate *Offshore* and *Fort McMoney* within a broader framework of oil narratives, focusing on Frederic Buell's idea that the key motifs of twentieth century fossil-fuel stories are exuberance and catastrophe. Building on Buell's observation that the twenty-first century has seen the emergence of non-exuberant motifs, I propose that, as oil narratives, *Offshore* and *Fort McMoney* embrace melancholy over exuberance, and that this choice is central to these works' activist intentions. For this argument, I engage with petro-culture studies, a specific mode of petrol-focused inquiry that is a part of what is being called the 'energy humanities.' As Imre Szeman and Dominic Boyer explain, energy humanities is a new dimension of the environmental humanities, which stems from an understanding of energy as "a key aspect of the fabric of our social experience, and not just a neutral input that helps run the engines of our economies and societies."[110] I suggest that this insight, which is reflected in both the i-docs's content and form, makes playing them a melancholic exercise.[111]

In Chapter Three, "The Matter of Matter in the Era of Climate Change," I pursue a more philosophical line of inquiry regarding the interrelationships between humans and nonhumans. By examining 'geological' experimentations in film and photography, I show how the reciprocity between humans and nonhumans is crystallizing because of anthropogenic climate change. Here the gaze is directed downward, to the materials of the ground that are normally out of focus: rocks, dirt, fossils are the subjects of these projects. The artworks I consider include, *Darvaza* (Adrien Missika), *Stability of the System* (Sasha Litvintseva and Isabel Mallet), *Asiniy*

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[110] Szeman, "On the Energy Humanities," 2.

[111] In addition to Szeman, Boyer, Nixon, Buell, key petro-culture scholars with whose work I engage are Stephanie LeMenager, Lawrence Buell, Amitav Ghosh.

Iskwew (Lori Blondeau), and *Notes from the Anthropocene* (Terra Jean Long). These four works are emblematic of the ways in which art is telling new stories about the inanimate world, opening horizons of thought and rooms for experiences that push against the boundaries of how the world has been traditional understood. They explore how the things in the world, in particular its ground materials, are both deeply entangled with but also sometimes radically separate from human beings. I use this chapter to think through the potentials and pitfalls of 'new materialism'—a philosophical approach that has made a big impact on the environmental humanities—and to consider the critiques this approach has faced from both historical materialism and Indigenous scholarship. These artworks provide me a way to do so, because, while expanding our ways of understanding the onto-epistemological dimension of nonhuman, inanimate materials of Earth, they never lose sight of the specific contexts, structures, and systems of the human sphere of which these materials are a part.

My case studies offer fertile ground for the exploration of climate change catastrophe as it takes various shapes across diverse contexts. While not trying to provide solutions to climate change, these media experiments attempt to express the aspects and issues of the catastrophic present that climate change has brought about. In doing so, they provide arenas where novel experiences and relational modes can be explored, and where new, affective epistemologies of climate change can be cultivated.

CHAPTER ONE

Expanded Screen Environments for an Earth on the Brink of Catastrophe:
Buckminster Fuller's Geoscope and World Game

"Ours is possibly one of the most critical periods in human experience up till this time. Poised in
the transition between one kind of world to another, we are literally on the hinge of a great
transformation in the whole human condition…All of our previously local actions are now writ
large on a planetary scale. The knowledge with which we might make the correct decisions is
barely adequate—yet our gross ecological errors may reverberate for many generations."[112]
- John McHale

I. Utopia or Oblivion

This chapter returns to the post-war period, a time in which the 'great acceleration' was

unfolding and the modern environmental movement developing, and to a contentious figure that

has been neglected in discussions of climate change and culture: R. Buckminster Fuller. Like

many, what I knew of Fuller before embarking on this research was limited to his geodesic

domes and his role in Expo '67. Fuller was to me an inventor and architect that I vaguely

associated with other utopian and counterculture figures of the 1960s and 70s. I was not wrong in

thinking this. Buckminster Fuller, who preferred to go by 'Bucky,' was many things: an

architect, designer, inventor, scientist, mathematician, and philosopher. But what I didn't know

was that Fuller was an artist and thinker of global catastrophe who created media environments

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[112] John McHale, "Global Ecology: Toward the Planetary Society," *The American Behavioral Society* (July-August
1968): 33.

that put the spectator into a novel relationship with the planet. Two of these works—The Geoscope and the World Game—are the focus of this chapter.

Throughout his life Bucky was convinced that human beings were meant to be a success on this planet. But his outlook by the end of the 1960s was that 'human beings' had come to a point in their history in which they faced a stark choice between two extremes: utopia or oblivion.[113] His 1969 book *Utopia or Oblivion* explicitly examines this dilemma; however, all of his writings more or less deal with the need for human beings to anticipate catastrophe and steer the planet onto a path toward a better world. His metaphorical image of humankind standing on the edge of a precipice is well rehearsed throughout his written works; it expresses his understanding that human actions were creating global catastrophic conditions that could plunge us over the edge into oblivion.

Fuller saw the 20th century as a remarkable era in which, thanks to technology and human ingenuity, the quality of life for most people in the West had vastly improved.[114] He was encouraged by the various equality-based movements of the 1960s and 70s and was both fascinated and inspired by student and youth culture across the globe.[115] He championed the creation and spread of communication media such as television and computers, which he saw as advancing human life in their ability to connect distant cultures and people and to make everyday tasks simpler and more efficient.[116]

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[113] My use of 'human-beings' as a universal group reflects Fuller's thinking not my own.

[114] See, for instance: R. Buckminster Fuller, "A Citizen of the 20th Century Looks Back," in *Utopia or Oblivion: The Prospects for Humanity* (Baden: Lars Müller Publishers, [1969] 2008), 23-36.

[115] Buckminster Fuller, *Critical Path* (New York: St Martin's Press, 1981), 232.

[116] The celebration of human ingenuity is throughout his works. See: R. Buckminster Fuller, "Comprehensive Thinking," in *Operating Manual for Spaceship Earth* (Baden: Lars Müller Publishers, 2008), 21.

But the great destructive force of humans and of technology—or at least the way technology was being employed—also informed much of his creative and intellectual output. Wars, both of the hot and cold variety, were for him very much the sign of a failing human sphere. He was dismayed by what was then a growing culture of needless consumption; and he disparaged the nation-state system that for him only furthered inequalities and encouraged conflict.[117] Indeed, nations for Fuller were mere blockades that prevented the flowering of the 'family' of humankind. But the gravest risk facing the planet for Fuller was environmental: he feared that the West had created cultures that Earth could not sustain. He was interested in how resources—which included energy sources, food, water, as well as human goods and technologies—and their global production, distribution, and consumption patterns informed and exacerbated geopolitical conflict and environment degradation.[118]

Fuller was keenly aware that Earth had limited resources, but he was adamantly *not* a Malthusian. As a 'planetary' humanist through and through, he was passionately against Malthus's thesis and expressed this in many publications and lecture presentations. According to Fuller, Earth could sustain an exponential increase in human population if, but only if, resources were more economically sourced and evenly distributed. His life was thus devoted to creating and promoting technological-design solutions that would assist human beings in living more successfully on the planet, and by 'successful' he meant without inequality, poverty, wars, or irrevocable ecological damage.

Although his vision of the future was indeed utopian—and there is much scholarship on his utopianism—, the impetus for the great "world-around" change he advocated was his

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[117] R. Buckminster Fuller, "Introduction: Twilight of the World's Power Structures," in *Critical Path,* xvii-xviii.

[118] See, for example: R. Buckminster Fuller and John McHale, *The Inventory of World Resources, Human Trends and Needs* (Carbondale, IL: World Resources Inventory, Southern Illinois University, 1963).

awareness that the human sphere was spiralling out of control, towards imminent catastrophe.[119] In other words, much of his utopian thinking was spurred by his prescient sense that catastrophe was on the horizon. I say prescient because from the age of climate change, Fuller's fears have come true. That is, if we consider catastrophe in terms outlined in the introduction, Fuller was indeed right about the need for a great planetary change. We have since descended into a world imbued with catastrophe. One cannot do away with Fuller's utopian orientation; however, I want to highlight the 'catastrophic' impetus in his work instead. Thus, unlike most of the extant scholarship, this chapter will approach Fuller's designs and thought from the lens of the present catastrophe. In this chapter, I provide an analysis of Fuller's most advanced planetary designs: the Geoscope and the World Game.

Of all of Fuller's works, the Geoscope and the World Game most clearly emerge from his perspective that Earth is in a dangerously precarious position. These designs, in part, intended to be social and scientific apparatuses for the visualizing and tracking of planetary trends and systems. They elucidate Fuller's vision of 'Spaceship Earth,' which is his metaphor used to describe human beings' role on the planet. Like astronauts aboard a spaceship, human beings must treat Earth as their 'vessel'; they must work together to steer this 'ship' productively. The Geoscope and World Game were imagined to be tools to do precisely this type of Earth 'management.'

But they were also aesthetic environments that employed massive screens to visualize the flows of planetary data in an effort to spark a planetary consciousness. Long before 'data visualization' was a key means of imaging information, Fuller was engaged in the attempt to make visible those invisible systems and processes that are crucial for the 'balancing' of Earth.

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[119] "World-around" was Fuller's way of describing the 'global.'

To render these processes as visible images within an immersive sensory environment was thus his attempt to elucidate the ways in a catastrophic future was being created by less than efficient and outright damaging human activities and practices. Insofar as they employed 360° screens, the Geoscope and World Game could be described as instances of *expanded cinema*, decades before that term came about.

Just as I shift away from Fuller's utopianism, then, I move the focus on these artefacts away from their scientific, instrumental purposes—although this cannot be entirely ignored—towards an understanding of them as media environments that visualized Earth as a series of interconnected systems. For if we see these as cases of expanded cinema *avant la lettre*, we can highlight the aesthetic component of the way these objects try to make a complex interconnected world on the brink of catastrophe both visible and sensible. And this attempt was crucial for the 'planetary consciousness' that Fuller envisioned.[120]

This chapter thus presents a new perspective on works by a figure who has largely fallen out of favour in academia, at least beyond the field of architecture. In his own time, Fuller was extremely prolific and well-known. Marshall McLuhan called him the Leonardo da Vinci of their time and John Cage exclaimed that future generations would remember the revolutionary spirit of 1960s and 70s as one defined by him. From the vantage point of almost two decades into the twenty-first century, these proclamations have not yet held true. His name is littered across literature on global communications and media, the 'planetary,' and the 1970's environmental movement, but mostly only in passing, mentioned alongside more in-depth examinations of

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[120] While scholarship on his architectural designs implicitly casts Fuller as an artist with a particular aesthetic inclination, there is little no work that considers Fuller as a media artist out right. Fuller often communicated his ideas through poetry and presented his lectures as performances. And though much of his artistic work was in the name of pedagogy (how do we communicate in ways beyond scientific discourses?), Fuller did insist that the differences between scientists and artists are negligible, for both were 'inventors' that similarly engaged in processes of discovery and creation.

people like McLuhan and Stewart Brand. That his work has been overlooked in the humanities is partially due to cross-disciplinary theoretical trends. In the tradition of the hermeneutics of suspicion, Fuller's famous utopian humanist spirit would be considered at best naïve and out-dated and at worst a dangerous reiteration of the "machinations of the military-industrial logic of an emerging global Empire."[121] I believe these are well-founded, valuable critiques of contradictory figure.

However, I also believe that there is a way to recuperate aspects of his work, and the thinking that informed it, in ways, as I've suggested above, that highlight the experiential and aesthetic dimensions over the rational, instrumentalist objectives. But to do so is not to celebrate one side and deny the other. It is about recognizing the limitations without giving up on all the potentials of his work and thought. For Fuller was a Janus-like figure: he can be, and has been, considered to be both a genius and a kook, a technocratic prophet of industrialization and guru for the new age movement, a radical visionary who rejected all political organization and a role model for a Playboy gadget-consumer culture, a progressive utopian and a reactionary.

The research for this chapter is largely informed by my time spent at Fuller's archive, housed at Stanford University. The Fuller Collection contains both his project files and the 'Dymaxion Chronofile'—the name he gave to his personal archive. Fuller famously documented all of the activities of his professional and personal life, leaving behind a vast, if somewhat unruly, archive. It seemingly contains every imaginable document that pertained to Fuller's life and work: from drafts of books and articles to doodles and scribbled notes; from meticulously

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[121] Felicity Scott, *Architecture and or Techno-Utopia: Politics After Modernism* (Cambridge, MA: MIT Press, 2007), 204.

copied and dated letter correspondences to receipts and travel bookings; from fan mail to hate mail to pages torn from magazines.

While I entered the archive thinking that the Geoscope was a minor design of Fuller's, I left feeling certain that it, and not merely the geodesic dome, should be Fuller's legacy. Focusing primarily on archival material from the mid-1950s to the late 1960s, I encountered a wealth of documents on the Geoscope and the World Game. These objects have not been given much attention in scholarship because their full visions were never realized. The archive reveals, however, that they were a key focus of Fuller's last three decades on the planet and the objects which espoused most fully his comprehensive thinking about the state of Earth. This chapter aims to fill in some of the gaps in research on Fuller and his two planetary works.

The archive also nuanced my perspectives on the man himself. He is often described as a 'visionary' and having the chance to see countless highly imaginative and innovative drawings, design blueprints, notes and scribbles, this assessment has solidified for me. While the archive is beyond thorough, the contents sometimes seemed unanchored from any coherent organization. In part, it was exciting to dig through boxes whose contents were mostly mysterious. But it also seemed to me rather sad that a man who prepared his whole life to be meticulously documented ended up with an archive that is somewhat disorderly. Contrary to some critiques of Fuller, I didn't sense a megalomaniac behind his ambition. Nor do I think that his vociferous devotion to his vision of utopia should be written off as deluded or 'crazy', as many commentators have suggested. But I had the impression of an almost maniacally driven person, one who didn't appear to be fazed by detractors or setbacks, a person determined to be a trailblazer. Fuller lived by the rule 'dare to be naïve' and this was apparent in some of his wild ideas and idealist visions, but it also meant that perhaps some of his ideas weren't entirely thought through. From today's

standpoint, however, surrounded by exacerbating environmental catastrophe, Fuller's urgent call to think and imagine at planetary or, even, cosmic scales, to be risk-taking, and to consider nothing impossible, now appear to be plausible options for what sometimes seems to be a hopeless situation.

In what follows I first provide an overview of Gene Youngblood's theory of expanded cinema in order to shed light on how it relates to Fuller's aesthetics. The link between Youngblood and Fuller is explicit; they communicated often, and Youngblood took part in trials of the World Game in California. In spite of this and the fact that Youngblood's ideas of expanded cinema seem to speak directly to the Geoscope and World Game, these objects are not considered by him, or anyone else for that matter, as exemplary works. By tracing the development of Fuller's Geoscope—a large-scale geodesic model of the world in which spectators could observe different aspects of Earth and the cosmos—, I offer a reading of it as an expanded cinematic environment. Two particular Geoscopes—the Cornell Geoscope and the Optimum Geoscope—are my focus here. The latter extends the former's planetary environment into a cybernetic picture show that aims to visualize Earth as a system. I conclude the chapter with an examination of the transformation of the Geoscope into the World Game; I investigate the history of the World Game and excavate its underlying theoretical premises. Throughout this chapter I rely on Fuller's published and unpublished works, archival materials, as well as secondary sources on Fuller's work. The contributions of Fuller's associates who worked with him closely on the development of the World Game, such as designer Ed Schlossberg, landscape architect Tom Turner, architect Shoji Sadao, and, especially, artist John McHale have also influenced this work.

II. Expanded Consciousness Environments

Gene Youngblood, 'father' of expanded cinema, was a friend and associate of Fuller's in the 1960s and 70s. Youngblood became interested in Fuller in the late 1960s when he was a film critic and columnist for the Los Angeles Free Press. In the early fall of 1968, Youngblood wrote a letter to Fuller describing ideas for both a film project and an upcoming book. Dated September 5th, the letter explains that Youngblood had discovered Bucky's writings through conversations with John McHale and Ed Schlossberg. Youngblood, like Fuller, believed deeply that human beings were travelling down a wrong and dangerous path and that art was a realm in which our senses and thoughts about the world could be enlivened, and, indeed, expanded. Youngblood explains to Fuller in this letter that he has been inspired to make movies "which relate more to the world *you* describe than the world perpetuated by Hollywood cinema." He describes a new book in the works, one that would be about the use of new technology in cinema —"3-D, computer films, multiple imagery, stereo projection, hemispherical environments, etc."[122] This book would become the seminal *Expanded Cinema* (1970) and Fuller would be given the honours of writing its introduction.

Youngblood's use of the term 'expanded cinema' describes "an explosion of the frame outward towards immersive, interactive, and interconnected forms of culture."[123] His *Expanded Cinema* is a diverse collection of essays that meditate on many different emerging technologies and the ways in which they are breaking down traditions and boundaries of cinema and art in general. He documents the multiplication of screens in artistic experiments that employ varying image technologies—video, holography, multiple film formats, slide projectors, TV monitors,

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[122] Letter from Gene Youngblood to Buckminster Fuller, R. Buckminster Fuller Collections, M1090, Series 2, Box 209, Folder 3, Stanford University Archives, Palo Alto, California, USA.

[123] Janine Marchessault and Susan Lord, eds., *Fluid Screens, Expanded Cinema* (Toronto: University of Toronto Press, 2007), 7.

and early computers—and that are that displayed across a variety of spaces—galleries and artist

centres, planetariums, classrooms, concert stages, and more.[124]

The work is famous for what Andrew Uroskie calls Youngblood's "unapologetically

funky, tie-dyed, star-child ethos."[125] It opens with a fitting image in this regard: "a hairy,

buckskinned, barefooted atomic physicist with a brain full of mescaline and logarithms, working

out the heuristics of computer-generated holograms or krypton laser interferometry,"[126] who

heralds a new 'Paleocybernetic Age' as the new dawn of Man. Indeed, as Janine Marchessault

and Susan Lord write, "the intense utopianism of Youngblood's era is embedded in every page

of his book—from the idea of the collective ownership of the Earth and the cosmic

consciousness of its citizens to the…final chapter's assertion that the 'open empire' balancing

nature and technology is all but upon us."[127] Youngblood is a figure who represents the close

link between the counterculture of the 60s and 70s and the emergent cyber-culture, as well

documented by Fred Turner.[128]

As a filmmaker, Youngblood loathed commercial cinema, which, according to him,

frustratingly portrayed a 'reality' that didn't exist.[129] In line with the critiques of cinema

emerging out of the inchoate field of film theory in the 1970s, Youngblood viewed mainstream

cinema as a mind-numbing apparatus that lulls an audience into passivity and complacency.

However, instead of using an Althusserian-structuralist framework to speak of the cinematic

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[124] Tess Takahashi, "Experimental Screens in the 1960s and 1970s: The Site of Community," *Cinema Journal* 51.2 (Winter 2012): 162.

[125] Andrew Uroskie, *Between the Black Box and White Cube* (Chicago: University of Chicago Press, 2014), 9.

[126] Gene Youngblood, *Expanded Cinema* (New York: Dutton Press, 1970), 1.

[127] Marchessault and Lord, eds., *Fluid Screens*, 7.

[128] See: Fred Turner, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (Chicago: University of Chicago Press, 2006).

[129] Youngblood, *Expanded Cinema,* 50.

apparatus, Youngblood employs ecological/cybernetic terms. He states: "Commercial entertainment may be considered a closed system since entropy dominates the feedback process—to satisfy the profit motive it must give audience what is expects" and "since the viewer remains passive and is acted upon by the experiences rather than participating in it with volition, there's no feedback, that vital source of negentropy."[130]

Art, for Youngblood, should operate as a negentropic force. It should not confirm what we already know and believe, nor should it be relegated to the confines of a gallery or a cinema. It should move beyond traditional borders, connect with a larger environment, and challenge our understanding of the world. Expanded cinema is often described as being an artwork that brings facets of the cinematic apparatus out from the screen and into an environment. But what makes it 'expanded' is not only its architectural or technological form. Youngblood states: "the act of creation of the artist is not so much the invention of new objects as the revelation of previously unrecognized relationships between existing phenomena both physical and metaphysical."[131] In short, expanded cinema expands consciousness.

Fuller of course was not invested in cinema per se, but he shared Youngblood's vision of an immersive technological apparatus that would function as a consciousness expander. Unbeknownst to Youngblood when he wrote that initial letter, Bucky had in fact already designed a spherical, moving image environment that answered Youngblood's call for an "aesthetic application of technology" that could achieve a "new consciousness to match our new environment."[132] Fuller called this apparatus the Geoscope. As we will see, the Geoscope, and

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[130] Youngblood, *Expanded Cinema,* 64.

[131] Ibid., 346.

[132] Ibid., 189.

later the World Game, are deeply informed by a systems worldview; and like Youngblood, Fuller

employed cybernetic and ecological theories to design and describe his apparatus.

Fuller was also interested in negentropy. He used it both as a conceptual base and an

operational modality of his designs. Inspiration for his thought and designs came from the

patterns and processes of nature. According to Fuller, nature's blueprints which "disclosed an

extraordinarily sublime, a priori orderliness" are the patterns on which the human sphere—our

built environment, social organization, and cultural artefacts—should be based.[133] 'Nature' was

his aesthetic model; his designs can be understood as forms of biomimicry. Rather than building,

dwelling, and thinking against or in spite of the "patterned dynamism of the natural world," he

believed in a process of working with and within the efficiency of nature.[134] For him, the natural

world, through the process of evolution, found 'design solutions' that optimized the expenditure

of energy, whereas the human realm had gone completely astray from this well-organized

system. Humankind, for instance, created technologies that expended much more energy—in the

long run—than available on the planet. If we looked to nature, he thought that ways of

'economizing' across all aspects of human life could be discovered.[135]

The geodesic dome provides a clear example of how working with nature for design

blueprints was put into practice. The design emerged from Fuller's question: what would an

enclosed structure look like if it were to fulfil the requirements of being as strong, lightweight,

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[133] R. Buckminster Fuller, "The Music of the New Life," in *Utopia or Oblivion: the Prospects for Humanity* (New York: Overlook Press, 1969), 75.

[134] Scott Eastman, *American Dreamer: Bucky Fuller and the Sacred Geometry of Nature* (Cambridge: The Lutterworth Press, 2007), 18.

[135] I should be clear that Fuller did not want to stop 'progress' or return to some kind of mythical 'more natural' way of living. Human technology and our built environments were very much a part of the evolutionary processes (we will see this later in the discussion of the biosphere/noosphere) but human beings hadn't yet quite found the best way to use our technological appendages.

large, and easy to assemble as possible?[136] The answer was found in the molecular foundations

of organic life, the sub-structures of which most 'things' in the world are built. He found that the

triangle was the most efficient and strong shape and thus based his designs for the dome on this

shape found throughout nature.

It should be noted that 'nature,' for Fuller, was very broadly construed—it encompassed

everything, from the molecular to the cosmic. Fuller was less interested with the way in which

natural phenomena appeared as whole forms and more concerned with both their structural

components and the way they interacted with other phenomena. So rather than isolating

phenomena, Fuller adopted a perspective that took the object's surroundings into consideration.

A continuing thread throughout his oeuvre is the idea that in attempting to solve any problem one

must always 'start with the universe.' Starting with the universe meant quite simply starting from

very vast or broad and working back to the special case. It was a mantra that asks one to find

patterns and connections between seemingly disparate things; it was a mode of comprehensive

thinking.[137] Throughout his life, Fuller wanted to find ways to illuminate the radical

interconnectivity of the world, and even, the cosmos.[138] In this respect, the ethos of 'expansion'

takes on new meaning: if Youngblood's expanded cinema wished to dissolve spatial, formal,

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[136] R. Buckminster Fuller, "Prevailing Conditions in the Arts," *Utopia or Oblivion*, 115-152.

[137] Fuller was a great opponent of specialization. He believed the continual narrowing of specialized fields in academia created a community of scholars who were perhaps individually brilliant, but unable to speak each other's language. Not only does such specialization create an increasingly hierarchical society in which the 'general public' are estranged from an academic-elite, but it also espouses a perception of phenomena as discrete. See Fuller, "Origins of Specialization," in *Operation Manual for Spaceship Earth*, 33-42.

[138] "Synergetics" is the name that Fuller gave to both his exploratory strategy of starting with the whole and to his geometry that he developed based on triangles and tetrahedrons – the shapes that are the foundations of all carbon chemistry of organic life. As Scott Eastman explains in his book *American Dreamer: Bucky Fuller and the Sacred Geometry of Nature,* 'synergy' comes from Greek and means "working together." In Fuller's time, it had currency solely in chemistry, but had also been used in theology. It was first used by St. Paul in Epistles (Rom. 8:28; I Cor. 3.9) to "illustrate not a static but a dynamic conception of human, divine, and cosmic cooperation: 'I did the planning, Apollos the watering, but god made things grow … We are fellow workers (synergoi) with God; you are God's farm, God's building.'" As Eastman also notes, it has since the 70s become a key word in the business sector. Eastman, *American Dreamer*, 29.

institutional, and technological boundaries of cinema and media, Fuller was interested in dissolving much vaster boundaries, namely, those structuring the human sphere and the 'natural' world.[139]

As expanded media works, The Geoscope and the World Game wanted to reveal the planet in its entirety, with the aim of bringing about far-reaching cultural transformations.[140] For Fuller, this cultural transformation would be instigated by the formation of a planetary consciousness. In his keynote speech at the Vision '65 conference, Fuller asserted: "We're going to have to have some way for all humanity to see total Earth. Nothing could be more prominent in all the trending of all humanity today than the fact that we are soon to become world man; yet we are greatly frustrated by all of our local, static organizations of an obsolete yesterday."[141] Such a request to see the 'whole' Earth would famously be put on a button by Stewart Brand in 1967 and was seemingly fulfilled with the publication of the Apollo photos shortly after.[142] Fuller, however, was not asking for a *photograph*. What was needed was a perspective of *total* Earth; for him, this meant a complex cybernetic model of Earth and its systems. This is what the Geoscope and the World Game attempted to do.

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[139] This is not to say that he did not envision a hierarchy of earthly entities. He clearly assumed that human beings were the 'commanders' of Spaceship Earth.

[140] Eastman, *American Dreamer*, 9.

[141] Vision 65 Lecture, Fuller Collection, M1090, Series 18, Box 39, Folder 1.

[142] Stewart Brand's button asked: "Why haven't we seen a photo of the whole Earth?"
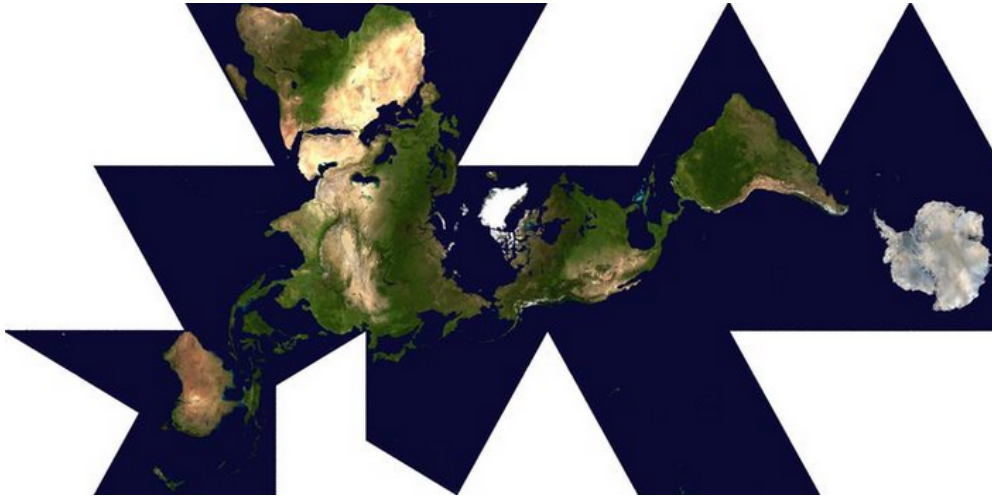
Image 1, Buckminster Fuller, *The Dymaxion Map*, 1954, The Buckminster Fuller Institute

III. The Geoscope: Immersive Visualizations of Earth as System

The Geoscope was the first design that attempted to answer Fuller's call for a means of seeing 'total-Earth.' It was a geodesic sphere on whose surface Fuller's Dymaxion Map (Image 1)—his famous cartographic projection that supported both 2D and 3D planes with minimal distortion—was overlaid.[143] This apparatus allowed individuals to view the world (and the stars) from *within* a model of Earth. A handful of different sized Geoscopes were produced in the 1950s-60s: the 20ft Cornell Geoscope (1952), the 6ft Princeton Geoscope (1953), the 40ft University of Minnesota Geoscope (1955), the 12ft Nottingham Geoscope (1965) and the 6ft Colorado Geoscope (1965). But the ultimate vision of the Geoscope, the 'Optimum Geoscope,' which was to be 200ft in diameter, was never realized. Like many of his designs, Fuller's technological

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[143] The Dymaxion Map is a projection of the world map onto the surface of an icosahedron (a polyhedron with twenty faces). On a 3D plane the map would form an image of the globe in its likeness. But on a 2D plane, all the landmass of the world in this projection appears to be connected. The purpose of this map was to minimize distortion and to eliminate the hierarchy of polar-oriented projections. Notably, the Dymaxion Map does not show any human made borders and divisions; Fuller believed that the future was dependent on our abandoning of nation-states, believing instead that the world was best understood as one shared 'home.' In 1943 LIFE Magazine famously published a cut-out version of the Dymaxion Map that could be folded into a small globe.

vision for the Optimum Geoscope was far too advanced for its time. As we will see, it required a complex computer system that hadn't yet been developed. In what follows, I consider two of these Geoscopes, the Cornell Geoscope and the Optimum Geoscope—the initial and final versions of this apparatus. I examine the concept governing the Geoscope and try to parse out the key aesthetic intervention it aimed to make.

The Cornell Geoscope

The first Geoscope was built in 1952 at Cornell University in Ithaca, New York. On the roof of a university building, Fuller and his students constructed a twenty-foot diameter geodesic dome. Continental landmasses were marked using transparent copper screens mounted on the grid work of the dome. The 'mini-Earth's' poles were oriented to be parallel with the axis of real Earth and it was rotated such that Ithaca was the zenith. The sphere was entered through its base by a ladder that led to a platform at its centre (Images 2 and 3). The apparatus was primarily used for observation of the night sky, as the stars would be viewable through the transparent markings of geographical Earth. Since the distance between the centre of the miniature Earth and the centre of real Earth are "astronomically negligible," observations of stars and other planets made from within the Geoscope would appear in the same way as to "a superman using x-ray vision from a station at the centre of real Earth."[144] At night, observers would be able to see the North Star fixed directly above the Geoscope's North Pole while other stars moved in relation to it. Being positioned within this mini-earth, it would become clear that the movement witnessed was not that of the stars but of Earth's rotation itself. The Cornell Geoscope was reportedly very popular among the students; they were fascinated by the experience and would spend entire nights in the

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[144] "Geoscope Concept, 1960," Fuller Collection, M1090, Series 18, Box 38, Folder 4.

Geoscope.[145] Such accounts of the Cornell Geoscope reveal that the Geoscope was not just used a scientific tool. That students spent hours in the sphere tells us that it provided a unique experience of the cosmos and of Earth.

Image 2, Aerial view of the Cornell Geoscope, Photograph courtesy R. Buckminster Fuller Collection, Stanford University Archives.

Image 3, Close-up of the Cornell Geoscope, Photograph courtesy R. Buckminster Fuller Collection

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[145] Robert Poole, *Earthrise: How Man First Saw the Earth* (New Haven: Yale University Press, 2008), 142.

From a screen studies perspective, the Cornell Geoscope shares affinities—both in design and function—with older immersive apparatuses. Its central raised-platform design resembles the interiors of 19th century panoramas, while its dome shape, its orientation, as well as its object of study are explicitly tied to planetariums. In fact, Fuller described the Cornell Geoscope as a 'true' planetarium—'true' because it operated without screen illusions. However, its steel structure nonetheless created a frame for the night sky, encouraging a kind of spectatorship aligned with screen experiences. Moreover, the experience of being "encased" within the sphere invited a special affective relation to Earth and the cosmos. I turn to Tim Ingold's differentiation between globe and sphere to elaborate on this unique positioning.

Earth has historically been imagined as either a globe or a sphere. "A globe," Ingold explains, "is solid and opaque," whereas a sphere is "hollow and transparent."[146] A 'global' perspective is the familiar view of Earth that we obtain from classroom globes; positioned outside of these mini-earths, we learn about the world through a gaze that is directed downward. A 'sphere' however harkens back to ancient Western cosmology, which understood the universe to be composed of a series of transparent or crystal spheres, at the centre of which stood human beings. In this model, human beings' attention was drawn from within Earth outwards, and not by vision but by hearing: the "spheres, being transparent, could not be seen, but undergoing their own autonomous rotations about the common centre, they could be heard."[147] If the 'global' perspective presents the world as an object from which human beings are detached, the spherical conception presents Earth less as an impenetrable surface than as a 'lifeworld,' a dwelling 'environment' from which we cannot be removed.

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[146] Tim Ingold, "Globes and Spheres: The topology of environmentalism," in *The Perception of the Environment: Essays on Livelihood, Dwelling, and Skill* (London: Routledge, 2000), 210.

[147] Ingold, "Globes and Spheres," 210.

The historical development of the 'global' perspective of Earth has been thoroughly examined by Denis Cosgrove in his book *Apollo's Eye.* After tracing the history of the cartographic imaginations of the globe throughout Western history, he ends his book with a chapter largely devoted to the Apollo photographs. Unlike the cartographic drawings and models that form the bulk of the case studies in his book, these photographs seemingly satisfy a long desire to see whole Earth, the *real* Earth. But while they ostensibly depict an objective perspective of planet Earth, Cosgrove shows how they still embed and are embedded within certain Western (and Christian) ideas of Earth, globe, and 'globality'; their perspectival registers are akin to that of their precursors. He calls this perspective the 'Apollonian Eye.'[148]

In Greek and Roman mythology, Apollo is the god of sun who "drives the sun's golden chariot about the terrestrial sphere."[149] In early imaginations of Earth as globe, Apollo stands over Earth, his body emanating rays of light that shine down, illuminating the planet and thereby bringing it into vision. Apollo later becomes the risen Christ in Christian iconography.[150] The "Apollonian Eye" is therefore a god-like, omniscient, masterful eye that is distanced from but not altogether disconnected from Earth. The Apollo photographs—named *Blue Marble* and *Earthrise*—are indicative of such a vantage point in their literal view from space, aligning the observer's gaze with that of a god. It is a perspective of Earth that is detached from lived experience. In Ingold's words, "a world apart from life."[151]

The Geoscope contains some elements of this 'global' point-of-view. While not solid, it was nonetheless made to be viewable from outside as well as inside. But its primary function

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[148] Denis Cosgrove, *Apollos's Eye*: *A Cartographic Genealogy of the Earth in the Western Imagination* (Baltimore: John Hopkins University Press, 2001).

[149] Cosgrove, *Apollo's Eye*, 1.

[150] Cosgrove, 57.

[151] Ingold, 210.

situates it closer to Ingold's definition of the sphere. I use Ingold's model of the sphere not to imply of course that Fuller is expressing a pre-Copernican view of the cosmos but to draw out a key dimension of the Geoscope: it aimed to yield a distinctive affective experience. Still hailing the spectator as supernatural ("x-ray vision"), the Cornell Geoscope reveals a posture that, if we adopt Cosgrove's language, is more Dionysian than Apollonian. In Nietzsche's terms the Dionysian and Apollonian describe the contrasting yet interdependent tendencies running through art and culture. Opposed to Apollo, who stands for order and intellect from the heavens above, Dionysus is associated with chaos and the sensual pleasures of the earthly realm. The realm of Apollo is the unified, mimetically represented world, whereas for Dionysus it is the emotional, amorphous realm of non-representational art, such as music. If the Apollo photographs are, as Cosgrove implies, the pinnacle of imaginations of the globe because they allowed, for the first time, people to actually see the real spherical Earth from afar, the Geoscope is a sphere that attunes observers to Earth's presence by non-representational means.

Fuller believed that such an instrument could give the observer a direct sensation of true Earth and universe relations: "by observing the movements of the sun and stars against the grid lines relative to the polar constants the rotation of Earth could be vividly experienced."[152] Indeed the Cornell Geoscope was designed to not just enable human beings to see whole Earth but to provide sensations of Earth and its movements. Standing on the central platform at night and looking out through planet Earth at the stars above would allow people to feel themselves on 'Spaceship Earth' as it moves through the cosmos: "for the first time in human experience Geoscope's mini-Earth spherical structure is clearly seen *and felt* to be revolving within the

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[152] "Geoscope Concept, 1960," Fuller Collection, M1090, Series 18, Box 38, Folder 4.

theater of Universe."[153] Fuller compares the experience of movement here to the way we feel

when we look out of the window of a moving vehicle. We would see the scene changing and

understand it as a consequence of Earth's movement, rather than seeing a moving sun relative to

a still Earth. We can imagine that from the centre of the Geoscope we would feel not the

omniscient and distanced mastery of the Apollonian vision but would instead recognize

ourselves as one small part of the whole, dwelling within a planet from which we look out into

the unknown. This is precisely what Fuller wanted.

For, such an experience would encourage one "to see and think in large patterns and

[become] deeply aware of the huge forces influencing mankind the world over."[154] The

Geoscope would also make clear certain everyday misnomers: the concepts of 'up' and 'down,'

'sunrise' and 'sunset' would reveal their incongruity. Furthermore, the Geoscope would help to

instantiate normally abstract understandings of Earth in the cosmos. Positioning the observer

within Earth-as-transparent-sphere, at the centre looking out, the world ceases to be merely an

object or even a ground beneath us, but becomes an *environment,* something that surrounds us,

that we are immersed within. It envelops the observer in order to communicate things impossible

to experience in everyday life: the magnitude of Earth and its orbital movements.

Although neither Fuller nor his associates state it explicitly, it is implied that the

Geoscope could spark new understandings of planet Earth. Fuller states: "[The Geoscope] is

aimed at extending man's range of understanding of himself, Earth and the universe, and most

important, the interrelationship between them. It is being done at a time in history when having

or not having this understanding can make the difference between success or failure of this

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[153] R. Buckminster Fuller, *Critical Path*, 173.

[154] "Geoscope Concept, 1960," Fuller Collection, M1090, Series 18, Box 38, Folder 4.

relatively recent experiment called man."[155] This, it should be noted, was written almost two decades before human beings were orbiting the moon. The immersive and affective qualities of the Geoscope thus expounds the crucial insight that the ability to have a 'sense' of the whole Earth was a vital step in rousing concern for a planet on the verge of widespread catastrophe. In other words, it is not good enough to merely think abstractly about the planet, one must engage with Earth on an affective level. The Geoscope was one such imaginative strategy through which people could form an attachment to Earth as a 'global environment.'

Unfortunately, the Cornell Geoscope was short-lived, as it became the victim of an end of year prank in 1953.[156] But throughout the 1950s and 60s, Fuller continued his Geoscope work, designing a much larger, more complex Geoscope that he called The Optimum Geoscope. This Geoscope replaced the Cornell Geoscope's cosmic perspective with a model that focused more closely on human/Earth inter-relationships. It is with this Geoscope that Fuller's full vision of the planet comes into being.

The Optimum Geoscope

Fuller wrote frequently about the Optimum Geoscope from the 1960s until his death in 1983. Unfortunately, due to the need for technology far too advanced for its time and the enormous cost and resources required for its construction, the Optimum Geoscope has not yet been realized. However, it was not just one of Fuller's fantastical designs. He devoted much time and resources to its development and actualization. His final publication *Critical Path* (1980) devotes a chapter to this ambitious project; and he states that he still has hope that it will one day be

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[155] "Geoscope Concept 1956," Fuller Collection, M1090, Series 18, Box 38, Folder 4.

[156] Lloyd Steven Sieden, *Buckminster Fuller's Universe: His Life and Work* (New York: Basic Books, 2000), 264.

realized. There is thus enough documentation on it to consider it seriously and in detail, although some imaginative speculation is needed to fill in the entire picture.

The Optimum Geoscope (Image 4) was imagined to be ten times the size of the Cornell Geoscope. At 200 feet in diameter, this massive structure would be similarly oriented on its polar axis to align with its location. The scale of this globe would conform to the ratio of 1:200,000—a number adopted from the US Air Force's aerial surveying practices—, which would permit much greater detail than the Cornell Geoscope. Cities, towns, rivers, and other small geographical data could be made visible. The city of Los Angeles, for example, would be one and a half feet in diameter and a small town of 5000 people would appear as a one-inch.[157] Such magnitude would allow individuals to locate their own towns on the globe, enabling them to fully sense the scale of Earth in comparison to their immediate environment. Again, such detail would render the experience of the sphere far different from a standard globe. The affective potential of the Geoscope takes centre stage, as the Geoscope would "enable the observer to recognize many things… from his [or her] own actual experiences. One might locate the 'old swimming hole,' for example, or see the bends in the river that were familiar from walks along the bank."[158] In other words, the personal connection we have to our own local environments would be extended to a planetary scale. This can be seen as another strategy to bring things that remain abstract— such as our size compared to the size of Earth— 'home,' as it were.

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[157] Fuller, *Critical Path*, 180.

[158] "Geoscope Concept, 1960," Fuller Collection, M1090, Series 18, Box 38, Folder 4.
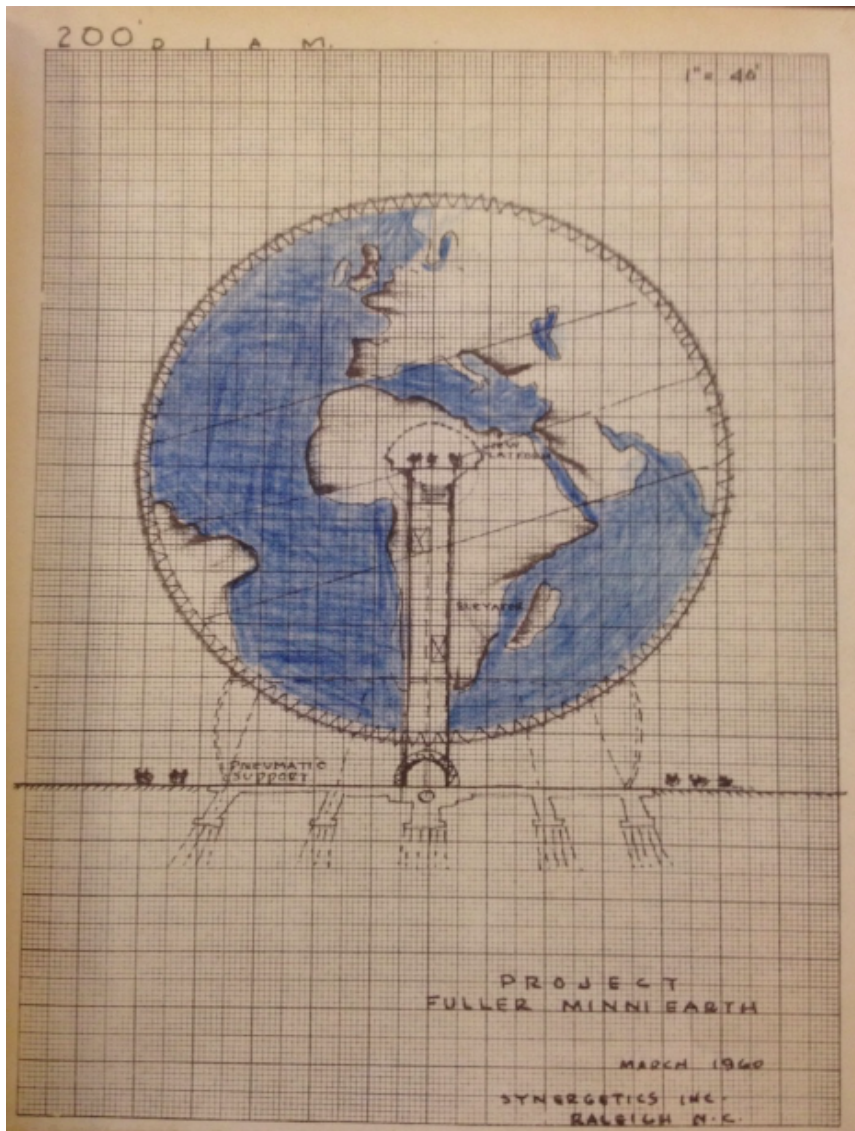
Image 4, Drawing of the 200ft Optimum Geoscope showing central platform, 1960. Image courtesy of Buckminster Fuller Collection, Stanford University Archives

However, the most notable aspect of this Geoscope and what distinguishes it most from the Cornell Geoscope was that it had a screen surface that could be illuminated, making it akin to a giant spherical moving image screen. In this version, the Geoscope becomes exemplary of expanded cinema. Fuller refers to the screen as a "controlled illuminated surface" that would be covered with "ten million variable intensity light points" connected to multiple computers.[159]

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[159] "Geoscope Concept, 1960," Fuller Collection, M1090, Series 18, Box 38, Folder 4.

One can't help but to imagine such a surface as a giant digital screen, the 'light points' being prototypes of pixels. Fuller instead compared the Geoscope screen technology to television. Television was for Fuller a revolutionary technology that was paramount for the 'world-around' communication needed for the spawning of universal humankind. Just like television's ability to broadcast live information in the form of moving picture, the Geoscope would, with the help of the computer, relay both historical and real-time world information.

Besides a massive spherical television (or indeed, a digital screen), the Geoscope also bears relations to other optical instruments. One of Fuller's lifelong convictions was that the great obstacle for human beings was to make the invisible motions of the universe visible to the human eye. Fuller compared the ability of the Geoscope to visualize data to the way in which other optical technologies extend human perception. Just as time-lapse photography allows us to witness movement not observable to the human eye or as the telescope allows us to overcome distance and scale, the Geoscope was an apparatus designed to make visible invisible worldly information and processes crucial to life systems. Fuller writes:

> [The Geoscope's] electronic display facilities would enable him to see and comprehend patterns far beyond his normal 'timing' range … Most of the important trends and surprise events in the life of man are invisible, inexorable motion patterns creeping up surprisingly upon him. Historical patterns too slow for the human eye and mind to comprehend such a changing geology, population growths and resources transpositions may be comprehensively introduced into the computer's memory and acceleratingly pictured around the surface of the earth.[160]

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[160] Buckminster Fuller, "Phase I Document I: Inventory of World Resources, Human Trends and Needs" *World Design Science Decade 1965-1975*, World Resources Inventory: Carbondale, Ill, 1963 https://www.bfi.org/sites/default/files/attachments/literature_source/wdsd_phase1_doc1_inventory.pdf

Fuller claimed that this apparatus would be "a total information integrating medium."[161] It would

be used to visualize human and non-human activities and processes to reveal their patterns and

impacts on a planetary scale. The kinds of data that could be relayed were population,

distribution of resources, flows of commerce and trade, migration statistics, important geological

and biological information, weather patterns, and so on.[162]

The need to visualize such data on planetary scale is rooted in Bucky's understanding that

the scale of global human systems—production, distribution, communication, transportation, and

so on—had far surpassed the workings of any individual nation state to sustain and operate.[163] As

explained in the *Inventory of World Resources,* "each system is intricately and complexly

interlocked with all others—production with transport, with communications, etc. The whole is

increasingly dependent on the global interchange, not only of physical resources and finished

products, but of the 'knowledge pool'—of research, development, technical and managerial

expertise and the highly trained personnel who sustain and expand this."[164] The Optimum

Geoscope was thus an apparatus that would allow a centralized look at Earth's systems and their

interaction.

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[161] Vision 65 Lecture, R. Buckminster Fuller Collection, M1090, Series 18, Box 39, Folder 1, Stanford University Archives, Palo Alto, California, USA.

[162] Fuller had been collecting this data for decades since his work at *Fortune* magazine. As Jonathon Keats notes, when *Fortune* moved offices in 1945, Fuller was given its archive. Jonathan Keats, *You Belong to the Universe: Buckminster Fuller and the Future* (London/New York: Oxford University Press, 2016), 142.

[163] John McHale, "Phase II Document 6: The Ecological Context: Energy and Materials," *World Design Science Decade 1965-1975*, World Resources Inventory: Carbondale, Ill, 1967 https://www.bfi.org/sites/default/files/attachments/literature_source/wdsd_phase2_doc6_ecol_context.pdf

[164] Ibid.

The Geoscope's Planetary Perspective: Earth as System

Like Youngblood, Fuller was interested in thinking about the world as *system*. As we saw, Youngblood used metaphors of cybernetics and systems ecology to discuss the workings of his intermedia technologies and their consciousness expanding objectives. For Fuller, systems thinking is the basis of the designs for his expanded planetary cinema artefacts. In particular, the concepts of the biosphere and noosphere, entropy and negentropy, and feedback loops are central to the Optimum Geoscope and its development into the World Game.

Though Fuller rarely explicitly grounds his ideas in extant research, terms like 'biosphere' and 'negentropy' are littered throughout documents on the Geoscope. For instance, in volume six of the *Inventory of World Resources* (1972), it is explained that Earth can be theoretically considered a whole system because the "overall energy flux into and out of the biosphere and its larger containing Earth system, by radiation received from the sun and that radiates outwardly from the Earth, is roughly in balance."[165] It is necessary to provide an overview of these concepts, beginning with the biosphere, to fully understand the implications of Fuller's planetary vision.[166]

There are many versions of the biosphere concept, but it is Russian biogeochemist Vladimir Vernadsky's theory that is most widely accepted today.[167] Developed alongside Pierre

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[165] McHale does not reference Vernadsky or Bertalanffy. He was rather most likely relying on environmental discourses circulating at the time. McHale, "Phase II Document 6: The Ecological Context: Energy and Materials."

[166] Doing so is also an effort to ground Fuller's designs and thinking within the *historical discursive context* of the 1960s. Such contextualizing is often left out of scholarship on Fuller. This may be because Fuller often frames his ideas as coming from his own life experiences and common-sense observations about the world. This is a troubling part of Fuller's published texts. While there are a few scant references to figures such as Norbert Wiener as well as to process-based philosophers Henri Bergson and A.N. Whitehead, Fuller fails to situate his thinking within a related constellation of scientific and philosophical scholarship.

[167] Edward Suess is the first person to use the term biosphere in his 1883 *Das Antlitz der Erde* (*The Face of the Earth*), but it is Vernadsky and Teilhard, along with Edouard LeRoy, who developed the concepts most thoroughly. The three were in fact part of a loose circle of intellectuals in Paris 1920s, which included the philosopher Henri Bergson, who were invested in alternative understandings of the way in which the universe

Teilhard de Chardin and Edouard LeRoy in the 1920s, Vernadsky's theory is an exercise in holistic thinking and foreshadows what is today called Earth Systems science. The biosphere refers to the "terrestrial envelope where life can exist."[168] It stretches from the upper layers of the lithosphere, through the hydrosphere, and into the atmosphere. The theory of the biosphere "embraced the reciprocal interrelationships of both inert and living matters in the metabolism of Earth within the solar system," and stressed the "wonderful circulation between the three kingdoms: [animal, mineral, vegetal]."[169] His theories are said to have "opened the road to both the contemporary 'ecologized' Hutchinsonian interpretation of the Biosphere and the Lovelockian view of a living 'super-ecosystem' deeply intertwined with its abiotic environment."[170] Vernadsky's key insight is that life makes geology: "life is not merely *a* geological force, it is *the* geological force" as "virtually all geological features at Earth's surface are bio-influenced."[171] The biosphere drives the cycles of chemical substances through various spheres: the atmosphere, hydrosphere and lithosphere. Importantly, human beings played a central role the processes of the biosphere.

Alongside his notion of the biosphere, he developed a theory of the noosphere.[172] If for Vernadsky the biosphere described all living matter, the noosphere was the realm of human

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'worked'. For an overview of other thinkers involved in the creation and development of the noosphere, see Paul R. Samson and David Pitt, *The Biosphere and Noosphere Reader* (New York: Routledge, 1999).

[168] Vladimir Vernadsky, "The Biosphere," in *The Biosphere and Noosphere Reader*, eds. Paul R. Samson and David Pitt (New York Routledge, 199), 36.

[169] Bertrand Guillaume, "Vernadsky's Philosophical Legacy: A Perspective from the Anthropocene," *The Anthropocene Review* 1.2 (2014): 137-146; 139.

[170] Guillaume, "Vernadsky's Philosophical Legacy," 139.

[171] Lynn Margulis, "Foreword," in *The Biosphere,* Vladimir I. Vernadsky*,* trans. David B. Langmuir (New York: Copernicus, 1998), 15.

[172] Teilhard's elaboration of the noosphere did most to popularize this concept. For him, the noosphere represents an inevitable evolution of the human species as intelligent life. Human consciousness and self-reflexivity represent a "higher place of evolution, moving beyond Darwinism." The noosphere is a part of a universal process wherein "intelligent life takes on a new form of existence in which the spiritual takes precedence over the material." He states that the "Earth gets a new skin. Better still, it finds it soul." Teilhard's understanding of the noosphere

thought and its applications—scientific, technological, creative. The noosphere was an evolutionary concept, which represented a "creative development in the biosphere" and, like the biosphere, was a planetary phenomenon.[173] Vernadsky believed an inchoate noosphere could be discerned in his time, that is, a full-fledged development was in the works. Just as the biosphere is the geological force, Vernadsky's concept of the noosphere suggests that humankind will become a "planetary geological agent."[174] Like the Anthropocene, then, the noosphere equally posits the human species as a global geological force.[175] While the noosphere concept has been less adopted in scientific discourse, it informs Fuller's understanding of the relationship between the human and 'natural' worlds. The Optimum Geoscope presented a visualization of the interactions of the biosphere and noosphere.

Fuller's idea of Spaceship Earth and its manifestation in the Geoscope and World Game has been compared to Lovelock's theory of Gaia, which also concerns the biosphere. But there is an important difference. Where Lovelock, in Gaia theory's first iteration, contends that Earth is a system that maintains homeostasis apart from human action, Fuller, and Vernadsky, claimed that human activity—the noosphere—is a central force in the workings of the biosphere. While the word "noosphere" is not used in Fuller's literature, his publication *The Inventory of World Resources* stresses the need to consider human activity in relation to the biosphere. It states:

> We need to extend the physical and biological concepts of ecology to include the social
> behaviours of man—as critical factors in the maintenance of his dynamic ecological
> balance. Nature is not only modified by human action as manifested in science and

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bridges evolutionary science with religious mysticism. Pierre Teilhard de Chardin, *The Phenomenon of Man* (New York: Harper Perennial, 2008), 183.

[173] Guillaume, 141.

[174] Samson and Pitt, *The Biosphere and Noosphere Reader*, 2-3.

[175] The relationship between Vernadsky's noosphere and the Anthropocene emerges again in chapter three.

technology – through physical transformations of the earth to economic purpose—but

also by those factors, less amenable to direct perception and measure, which are political-

ethical systems, education, needs for social contiguity and communication, art, religion,

etc. Such 'socio-cultural' factors have played and will increasingly continue to play a

considerable role in man's forward evolutionary trending and its effects on the overall

ecology of the earth.[176]

The importance of human thought as a planetary force would play a key role in The World

Game, as we will see in the next section.

Vernadsky's theories have been called the original source of systems thinking, but his

writings would fall into relative obscurity in the West when he returned to Soviet Russia.

Instead, it was the Austrian biologist Ludwig von Bertalanffy who would be known as the

'father' of general systems theory. Bertalanffy considered the ways in which the laws of

thermodynamics did not seem to describe observable living organisms.[177] In particular, the

second law— of entropy—posed an interesting problem for life scientists. For, "in their forms of

life and patterns of interaction living organisms have not tended toward sameness, randomness

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[176] Fuller and McHale, *Inventory of World Resources*, 41.

[177] The first law of thermodynamics is that of energy conservation: the quantity of energy in the universe is fixed; energy is neither created nor lost. The second law of thermodynamics is the law of entropy: matter and energy tend inexorably toward the uniformity of total equilibrium. The first law is consistent with a Newtonian model of the universe, in which the universe was imagined as a perfectly ordered machine –the clockwork model of the universe - whose movements were governed by forces; but this model only held for closed systems, on which no outside forces could act. The second law of thermodynamics, however, greatly disrupted this understanding of the universe as it brought to the world vast disorder. In fact, according to this law the universe "will ultimately succumb to heat death, dissolution and complete static equilibrium." Importantly, the second law of thermodynamics posits the universe as dynamic rather than static, its energy changing not in quantity but in quality as it moves from a state of order towards disorder. William Harold Bryant, *Whole System, Whole Earth: The Convergence of Technology and Ecology in Twentieth-century American Culture* (Iowa City, University of Iowa Press, 2006), 27.

and disorganization. Living systems differentiate, evolve and maintain increasingly complex forms of social and self-organization."[178]

To explain how living systems warded off entropy required refiguring them as open systems. This broke with the scientific paradigm, which at that time had largely considered systems to be closed. Bertalanffy recognized that systems are "incessantly involved in processes of exchange and transformation—in states of inflow and outflow—the system is recognized as maintaining a continual state of flux. Never stationary or fixed in chemical or thermodynamic equilibrium, its components are constantly altered by metabolic events."[179] Bertalanffy thus theorized how 'negentropy' functioned in open systems, taking useable energy from the environment.

This new approach to biological phenomena suggested that "process and dynamics, relationship and function were essential qualities to investigate" rather than observable, material parts.[180] Directing attention to the processes in which all living things take part reoriented perspectives towards the organization of organisms as *wholes* and how these wholes function. Put differently, rather than just looking at the substance, structure, and mechanics of an individual organism, a perspective emerged that considered the flows, changes, and exchanges of energy within an organism and between it and its larger environment. Such a model was therefore applicable to multiple kinds of phenomena—be they human, animal, or plant.

Central to this new interest in how energy is exchanged is the notion of feedback. The feedback loop is the term for the process by which a system performs an action that causes a

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[178] Lawrence S. Bale, "Gregory Bateson, Cybernetics, and the Social/Behavioral Sciences," *Cybernetics & Human Knowing* 3.1 (1995): 33.

[179] Bale, "Gregory Bateson," 37.

[180] Bryant, *Whole System, Whole Earth*, 27.

change and that change is communicated to the system via information which in turn causes the system to adapt to new conditions. [181] The feedback loop is of course central to the field of cybernetics, which like the biological theories presented above examines the flows and exchanges of information within and between systems. While human, animal, and other organic systems can be the focus of cybernetics, it extends its systems theory to technological systems. The title of the foundational cybernetic text, Norbert Wiener's *Control and Communication in the Animal and the Machine* (1948), makes this clear.[182] In that the Geoscope is a computer-run device that visualizes the interrelationships of the biosphere and noosphere with the goal to find the most negentropic functioning of the systems, it brings together Vernadsky's ideas of the biosphere/noosphere with general systems theory and cybernetics.

The novelty of the Geoscope at this time is precisely the way in which it united the biological and the technological. The emergence of a 'planetary consciousness' is often attributed to *Earthrise* and *Blue Marble*, taken in 1968 and 1972, respectively. Cosgrove has

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[181] Gregory Bateson's explication of a feedback process explains how information flows can cut across seemingly discrete systems. Defining information as a "difference which makes a difference," he takes the example of a person cutting down a tree with an axe: "Each stroke of the axe is modified or corrected, according to the shape of the cut face of the tree left by the previous stroke." The system here is made up of a circuit that includes the tree, the person's eyes, brain, muscles, the axe, the movement of the stroke, etc. The information transmitted around this circuit is "transforms of differences": "(differences in tree) – (differences in retina) – (differences in brain) – (differences in muscles) – (differences in movement of axe) – (differences in tree), etc." This process of "self-correction" operates only as a total system and has for Bateson characteristics of "immanent mind." Another way to understand this is that the whole system is always greater than the sum of its parts. Bateson's insight into the transformation of information in a system is interesting as it begins to disrupt boundaries between entities such as, self, tree, and object. In his most famous example of a blind man with their support cane, Bateson asks: "Where does the blind man's self begin? At the tip of the stick? At the handle of the stick? Or at some point halfway up the stick? These questions are nonsense, because the stick is a pathway along which differences are transmitted under transformation, so that to draw a delimiting line across this pathway is to cut off a part of the systemic circuit which determines the blind man's locomotion." N. Katherine Hayles, Donna Haraway, and others have used this example to explore how implicit in cybernetics is a notion of the cyborg body. See Bateson, "The Cybernetics of Self: A Theory of Alcoholism," in *Steps to an Ecology of Mind* (Chicago: University of Chicago Press, 2000), 309-337.

[182] Indeed, while cybernetics is often reduced to its role in the formation and analysis of computer technologies, it is a theory that deals not only with machines. In addition to the mathematicians and engineers that attended and presented at the foundational Macy Conferences on Cybernetics (1943-1952), were biologists, sociologists, anthropologists, psychologists, neuroscientists, and others from a wide range of disciplines.

written about how these photographs encapsulated two different kinds of 'globalisms' circulating at this time. He calls these the 'whole earth' and the 'one world' discourses.[183] Briefly, the whole-earth discourse is aligned with the concepts of Gaia and the biosphere; it was an environmentally oriented understanding of the planet as whole system. The one-world discourse, on the other hand, celebrates less the natural Earth as system than the advances in telecommunications that connect the planet as a 'global village'; this is the 'cybernetic' view of a technological world system. As we have seen, not only did Fuller's Geoscope predate this new planetary awareness, the Geoscope merges these two perspectives together, presenting a truly holistic vision of Earth as a system.

Visualizing Earth as System

Bucky believed that visualizing different data sets, within and between systems, was the first step towards making the world function more effectively. There are two key reasons. First, the Geoscope could visualize the impeccable efficiency and beautiful designs of nature, offering human beings a blueprint for their own creations and processes. Second, the interrelations between the biosphere and noosphere could be mapped. For example, weather patterns could be shown and tracked, potentially highlighting the way in which human industry was affecting atmospheric conditions, which in turn could shed light on catastrophes such as famine and drought, and even anticipate such events. Or, the accelerating pace at which human beings extracted natural resources and the unequal sharing of these resources across the world could be

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[183] Denis Cosgrove, "Contested Global Visions: One-World, Whole-Earth, and the Apollo Space Photographs," *Annals of the Association of American Geographers* 84.2 (June 1994): 270-294.

animated. In other words, the Geoscope brought what is now called Earth Systems science into an immersive visual space in an effort to raise consciousness of a world that had fallen out of harmony due to human action. Fuller and his colleagues who worked on the Geoscope concept provide fairly clear descriptions of the architecture of this apparatus and there are multiple drawings of this 200 ft. Geoscope. But how the data would appear on screen is less certain. One small Geoscope model—the Colorado Geoscope—provides some clues.

The Colorado Geoscope was designed by students at the school of Architecture at University of Colorado under the direction of John McHale. It was conceived for the World Design Science Decade's (WDSD) inaugural exhibition in 1965.[184] Described as a 'personal' Geoscope, given that it could fit only one person at a time, the Colorado Geoscope was icosahedral (i.e. it had twenty connected equilateral triangular planes) (Image 5) rather than a geodesic sphere. Its frame was made of light steel and on each triangular section were clipped two layered transparent Plexiglas panels. These panels formed the basic display unit and could be individually removed or opened for insertion of data.[185] Fuller's Dymaxion map was inscribed in black line on one of the sheets of Plexiglas. Between the two Plexiglas sheets additional data could be inserted using film transparencies.

On top of this surface unit, a vertical storage and display unit could also be attached (Image 6). As explained in a report on the exhibition, this unit used a "set of telescoping tubes"

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[184] WDSD was a program proposed by Fuller to the International Union of Architects (IUA) in 1961; it would encourage architecture and design students around the world to think in terms of "comprehensive design policy with respect to total world resources." The program was developed by Bucky and John McHale. The WDSD featured a series of exhibitions and a six-volume publication called *Inventory of World Resources,* co-authored by Fuller and John McHale. The first exhibition was held, alongside the annual IUA congress, at Tuileries Gardens in Paris, 1965. The exhibition was comprised of many projects by students from North America, UK, and New Zealand, but the Colorado Geoscope was a standout work.

[185] Geoffrey Smyth, "The WDSD Exhibition, Paris, Summer, 1965," *British Architectural Students' Report,* Buckminster Fuller Collection, M1090, Series 18, Box 100, Folder 2

that connected at the centre of the icosahedron and "ran through the frame hubs thus providing a tetrahedronal frame upon which vertical data planes may be attached."[186] This allowed data planes to be inserted parallel to, above and below, the base structure. As such, a great range of data could be mapped onto the mini-Earth for comparison. The entire structure was built for the observer to be able to easily view and manipulate the data from both inside and outside. Set upon a circular track, the globe could revolve under manual control.

From the photographs and drawings of the Colorado Geoscope, we can begin to see how the information relayed by Optimum Geoscope could be layered, compared, and juxtaposed. Slide images found in the Fuller archives suggest the way in which data would be visualized on a dymaxion map. Images 7-9 show slides of different kinds of mapped data. The first image depicts world-shipping routes in simple white lines; the second displays "sulphur consumed in electrical generation fuels" through red dots; and the third shows food distribution throughout the world through lines and dots.[187] While there is not a clear example of how these visualizations would be animated, it is clear that the Geoscope, as a pedagogical tool for visualizing those things and patterns that were not visible, anticipates the current practice of digital data visualization.

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[186] Ibid.

[187] These images were most likely the result of experiments during the trials of the World Game (discussed in the next section).
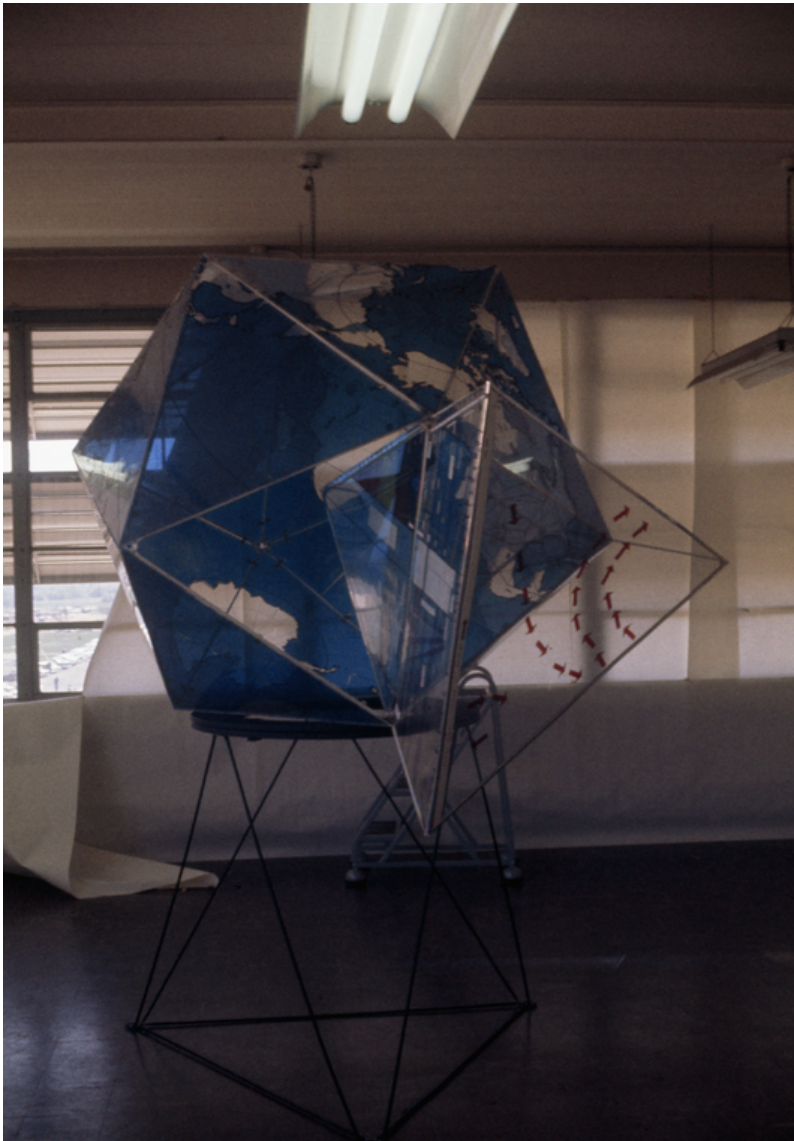
Image 5, The Colorado Geoscope on display at the World Design Science Decade exhibition, 1965. Image courtesy of Buckminster Fuller Collection, Stanford University Archives.
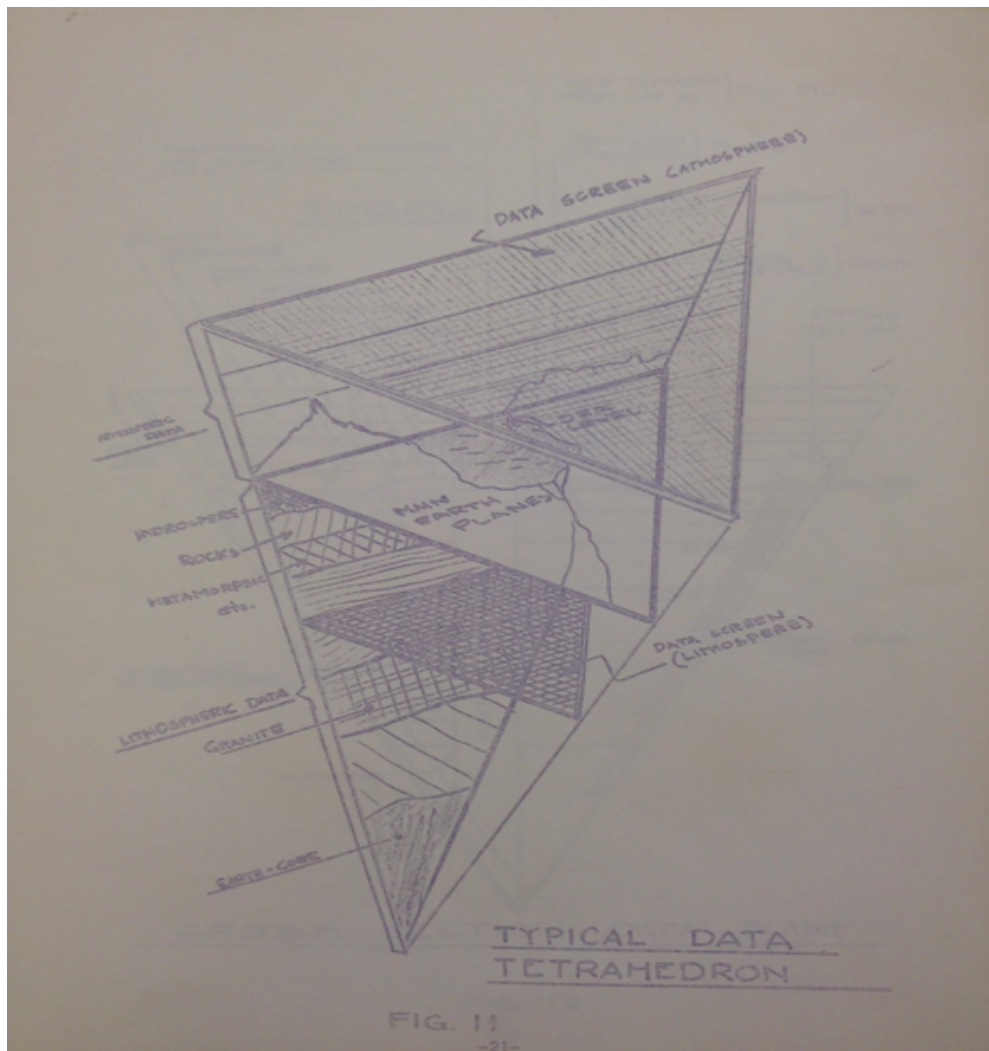
Image 6, Drawing depicting the data layers of Colorado Geoscope. Image courtesy of Buckminster Fuller Collection, Stanford University Archives.

Indeed, Sara Diamond's description of data visualization as allowing "representations to be mapped onto each other, to compare and overlay vastly different data sets, permitting the representation of infinite permutations and complexity" sounds precisely like Fuller's vision for the Optimum Geoscope.[188] Data visualization has become a key way of communicating

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[188] Sara Diamond, "Lenticular Galaxies: The Polyvalent Aesthetics of Data Visualization," *CTheory* Code Drift: Essays in Critical Digital Studies 2 (2010) http://ctheory.net/ctheory_wp/lenticular-galaxies-the-polyvalent-aesthetics-of-data-visualization/#_edn5

information in contemporary culture, especially information whose time and space scales are outside of human perception, like climate change. "Visualization," as Orit Halpern tells us, "is the language for the act of translation between a complex world and a human observer."[189] Like the Geoscope, it is about "making the inhuman, that which is beyond or outside sensory recognition, relatable to the human being. One might understand 'visualization' in this context as the formulation of an interaction between different scales and agents—human, network, global, nonhuman."[190]

In its aim to translate empirical information, data visualization has a pedagogical and scientific function. But its translation into visually legible symbols, usually for a non-specialist audience, marries it to the realm of aesthetics. Many scholars have noted how even if the goal is instrumental, the visualization cannot be divorced from aesthetics. Diamond writes, "Given that sensory-experience—most often visual, sometimes sonic or tactile—is the only means to perceive many contemporary data sets, aesthetics are fundamental, not additive to the enlivening field of data visualization."[191] And Tom Corby adds that the "critical, aesthetic, and affective experience" of data visualizations can often override their analytical function.[192]

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[189] Orit Halpern, *Beautiful Data: A History of Vision and Reason since 1945* (Durham, NC: Duke University Press, 2015), 22.

[190] Halpern, *Beautiful Data*, 22.

[191] Diamond, "Lenticular Galaxies."

[192] Tom Corby, "Landscapes of Feeling, Arenas of Action: Information Visualization as Art Practice." *Leonardo* 41.5 (2008): 461.
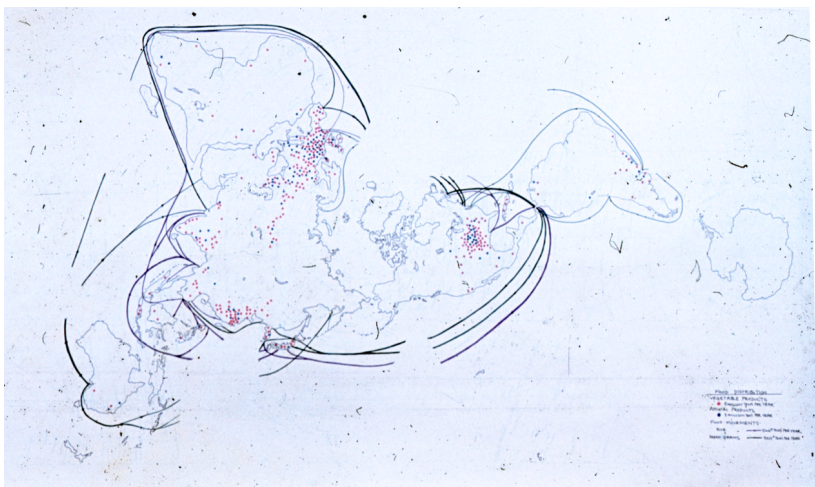
Image 7, Visualization of Sulphur Consumed in Electrical Generation Fuels
Image 8, Visualization of World Shipping Lanes
Image 9, Visualization of Food distribution
Images courtesy of Buckminster Fuller Collections, Stanford University Archives.

Sean Cubitt has made a case for why ecocriticism should consider not only images of pictorial realism but also those that abstract the empirical world through data visualization. As he notes, many climate change documentaries and cli-fi blockbusters incorporate data visualization into the narratives in order to present a visual representation of the invisible changes taking place. While these are ostensibly supposed to persuade an audience through reason, they also have the force to "mobilize at an affective level."[193] A review of *An Inconvenient Truth* (Davis Guggenheim and Al Gore, 2006) by A.O. Scott is a case in point. Speaking of the charts and graphs that appeared in the film, Scott states: "I can't think of another movie in which the display of a graph elicited gasps of horror…But when the red lines showing the increasing rates of carbon dioxide emissions and the corresponding rise in temperatures come on screen, the effect is jolting and chilling."[194] Given that the Geoscope was not just a flat screen, but a massive immersive environment, its affective potential was enormous. It was these sensory experiential functions, not the rational-analytical aspects, that were critical for the apparatus. The Optimum Geoscope's status as an immersive screen environment—or, an expanded cinema—is what would rouse an informed planetary consciousness that Fuller so desired.

Certain of the brilliance of the Optimum Geoscope design, Fuller brought it to the UN in 1962 and proposed that this massive construction be suspended 200 feet above the East River, directly across from the UN building in New York City. He imagined that it could be used as a resource for the UN as well as for public education. While this proposal for such an enormous structure to be built midtown in New York City seems quite fantastical, Fuller actually received

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[193] Sean Cubitt, "Everybody knows this is nowhere: data visualization and ecocriticism," in *Ecocinema Theory and Practice*, eds. Stephen Dust, Salma Monami, and Sean Cubitt (New York: Routledge, 2012), 282.

[194] A.O. Scott, "Warning of Calamities and Hoping for a Change in 'An Inconvenient Truth,'" *The New York Times*, May 24, 2006 https://www.nytimes.com/2006/05/24/movies/24trut.html

an enthusiastic response from then UN Secretary General U Thant. Thant even organized a

formal meeting at which Fuller proposed his Geoscope to ambassadors from around the world.

Again, there was an overwhelmingly positive reaction. However, the project never got off the

ground because it would have cost upwards of ten million dollars, a sum impossible for the UN

to acquire.

With the NYC project stalled, Fuller turned his attention more fully to another idea,

related to the Geoscope, that had been in the works for a decade. This was the World Game, an

open for-all 'game' that used the Geoscope's computer display surface to again explore "ways to

make it possible for anybody and everybody in the human family to enjoy the total Earth without

any human interfering with any other human and without any human gaining advantage at the

expense of another."[195] The World Game added to the Geoscope a vital dimension: a game-based

interactivity between the audience and the computer display. For as much as Fuller praised the

computer as a neutral 'brain," stating "only the computer will have such angelic dedication to

virtue, to unbiased assessment of economic alternatives as well as their political impact upon the

community,"[196] he considered human beings as the ultimate negentropic force in the universe.

He explains: "Of all the disorder to order converters, the human mind is by far the most

impressive...Man's physical function is the same of that of all other biological life; to impound

and regenerate physical life with means inherently to produce reconstructive order of every

variety. The metaphysical, absoluteness weightless function in universe, unique to humans, is

that of continually looking for the generalized principles which are operative in all the special

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[195] Fuller and McHale, "World Game: State of the Art Report," Fuller Collections, M1090, Series 18, Box 35, Folder 4.

[196] Ibid.

case experiences."[197] The human mind's capacity for the creative interpretation of the world, to find patterns and order within the chaos of the 'real' made it uniquely fit for reshaping the world. In providing an active role for the spectator—an early example of human-computer interaction—the World Game expanded the Geoscope's cybernetic vision. Here, human beings became a part of the feedback system. The World Game was an arena in which planetary decisions for Spaceship Earth could be 'tested' out. It was a radical, democratic vision—a "game" so powerful that Bucky and his associates claimed it would uproot the staid social and political order: it would be the means through which the planet would be revolutionized.

IV. The World Game

For clarity's sake, I am presenting the World Game as following chronologically from the Geoscope. In fact, the World Game was something that Fuller had been thinking about since the late 1920s. Its first, fully fleshed-out model was nonetheless not to be found until his 1964 US Pavilion proposal for the world exposition that would occur in Montreal three years later. The famous geodesic dome that was indeed built has become the symbol of Expo '67 and still stands on Île Sainte-Hélène today. Lesser known, however, is what he proposed for the interior of this dome. His vision was of a 400-ft. geodesic dome (almost twice the size of the dome that would be built), which would house a 100-ft. Geoscope, suspended from the top of the dome. Unlike the Geoscopes examined above, this one would mechanically unfold into a 2D plane, much like the paper cut-out versions of the Dymaxion globe/map. Like the Optimum Geoscope, the surface of this Geoscope would be a screen connected to computers that would relay world data. The

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[197] Ibid.

difference here was that the public would not only marvel at the luminous mechanical Earth but would be able to interact with the screen technology and with each other in a game format.

Fuller imagined that teams would 'compete' with the goal to do exactly what his life's work aimed to do: to make the world work better. So explicit was this goal that the game was originally titled "How do we make the world work?" Teams would test their theories on how the world could be more efficiently organized to the advantage of all human beings. Theoretically, they would input a change in data on the computer system and see how the change played out on the planetary stage. The World Game, then, was the ultimate balancing act: how could the world be managed in a way that would send it on a trajectory towards utopia and away from catastrophe and chaos?

That this was to be a game played by 'ordinary' people—non-specialists—supported a truly democratic process. It would invite people to recognize their membership in a globally interconnected family and to see themselves as part of the larger processes of world and universe: "World gaming is an engineered attempt to plug in our sensory awareness mechanisms to the switchboard of 'universe,' to get in sync with the metabolism of this spaceship's environment."[198] This goal aligns with Youngblood's theorizing of expanded cinema. As Youngblood explains, "we're now moving into the Cybernetic Age, in which man learns that to control his environment he must cooperate with it; he not only participates but actually recreates his environment both physically and metaphysically, and in turn is conditioned by it."[199] The Geoscope and World Game take such a principle onto a planetary scale.

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[198] Fuller and McHale, "World Game: State of the Art Report," Fuller Collections, M1090, Series 18, Box 35, Folder 4.

[199] Youngblood, *Expanded Cinema*, 55.

One of the most remarkable (and far-fetched) goals of the World Game was to eradicate the need for nation-states. In *Critical Path*, Fuller disparages: "We have today, in fact, 150 staterooms each trying to run their respective stateroom as if it were a separate ship."[200] As it encouraged everyone to take part in trying to make the world work, the World Game would help to usher in a new kind of radical world democracy— "technoanarchy", as Gene Youngblood put it—that would dissolve any geopolitical organization.

Unsurprisingly, the utopian dream of the "brotherhood" of "mankind" or of the "technoanarchy" to come was left out of the USIA proposal. Fuller instead optimistically suggested that such an exhibition would make the USA "regain the spontaneous admiration and response of the whole world."[201] For while the USIA did commission Fuller to build a 250-ft dome, it rejected the interior exhibition, deciding instead to showcase American popular culture and design through a series of themed exhibits. Of course, in the socio-historical context of the Cold War as well as the already decade long Vietnam War, it is no surprise that Fuller's game for bringing world peace was denied.[202] Why would the US want to reveal the inefficiencies and inequalities of itself and the world when it could instead promote a fantasy of American life? But the USIA's rejection of the World Game as interior exhibition for Expo '67 did not stop Fuller from pursuing it elsewhere and in bolder ways.

From the experiments with and proposals for the Optimum Geoscope, Fuller realized that to accumulate the information and data needed to analyze world trends a permanent research and storage centre was needed. In the mid 1960s, as a professor at Southern Illinois University (SIU),

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[200] Fuller, *Critical Path,* xxxiv.

[201] "Expo '67: The World Game," Fuller Collections, M1090, Series 18, Box 38, Folder 3.

[202] The ideological war Expo '67 emerged in the layout of the pavilions: the Soviet pavilion was positioned directly across from the US pavilion.

Fuller turned his attention to developing a huge research facility for the World Game, known as the World Resource Simulation Centre (WRSC) at the Carbondale campus. This facility would house multiple computer labs and lecture rooms; its main attraction would be the massive arena in which the World Game would be played. Architecturally, it would be a standard arena, whose stage would be the entire ground floor around which would encircle multiple levels of balconies. Like in the Expo '67 proposal, a Geoscope would be suspended from the ceiling and would be able to be mechanically lowered and opened up into a 2D Dymaxion map, which would cover the ground floor. In its 2D plane, the world map would be the size of an American football field. Beneath the stage floor a basement would house the many computers needed to run the game. Similar to descriptions of the Optimum Geoscope, John McHale explains that "In the SIU facility the whole world map complex would be treated as a dynamic display surface capable of showing a comprehensive inventory of the planet's raw and organized resources, together with the history and trending patterns of world people's movements and needs."[203]

Fuller had full support from SIU President Delyte W. Morris. A document from the Office of the President, SIU, dated November 1st, 1968, outlines the proposed purposes of the WRSC and the World Game. In addition to the playing of the World Game, the facility was imagined to be a great computer centre, in which world information would be stored in vast memory banks. It was to be a "repository of international data on physical, natural, and human resources, including but not limited to agricultural, forestry, geographic, cartographic, geologic, hydrological, oceanographic, environmental, health and human capacities data."[204] Scientists

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[203] Fuller and McHale, "World Game: State of the Art Report," Fuller Collections, M1090, Series 18, Box 35, Folder 4.

[204] Memo: 'Notes Concerning Plans for the Establishment of the World Resources Inventory Computing Center (Physical Plant for World Game,' Office of the President, University of Southern Illinois, November 1, 1968, Fuller Collections, M1090, Series 18, Box 35, Folder 4.

from around the world would use the centre for research and analysis. It would therefore also function to integrate and coordinate "often fragmented efforts of international governmental agencies and research institutes."[205] As such, it would be a national laboratory to serve the international community.[206] In addition, "instead of detecting incoming missiles and aircraft," it would function as an Early Environmental Warning System, "a trend-analyzer to forecast situational and environmental threats in specific areas such as population, pollution, and food."[207]

Thanks to Morris' political influence, the project was supported by the state of Illinois. In 1968, the State Legislature passed an Enabling Act, signed by then Governor Otto Kerner, in the amount of four million dollars to fund the computing centre at SIU Carbondale. These funds, however, required an additional twelve million in matching funds, which they hoped to raise from various federal agencies. And on May 1st, 1968, Fuller took his proposal to Washington. In front of representatives from the White house, the State Department, the Departments of Defence, Agriculture, and Commerce, as well representatives from NASA, among others, he outlined his vision for the World Resource Centre and the World Game.[208] Focused more on the usefulness of having a central resource inventory and a means of visualizing world trends, the proposal's reception was generally supportive, although many questions were asked around the mathematical foundations of such a computer system and the feasibility of such an enormous project. Funding was another issue, but funds from specific departments were suggested as well

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[205] Ibid.

[206] Ibid.

[207] Ibid.

[208] Memo: 'Items for Conference Between President Morris and Dr. Lindsey to be scheduled at President Morris's earliest convenience, re: Washington, D.C., Meeting of May 1st,' Office of the President, Southern Illinois University, May 3rd, 1968, Fuller Collections, M1090, Series 18, Box 35, Folder 3.

as the possibility of reaching out to private institutions and organizations. The seed had been planted in the agencies of the federal government, but much more research and preparatory work would need to be done before the project come into fruition.

It was understood that an enormous and expensive project was going to take years of development and fundraising. Never one to shy away from a seemingly impossible task, Fuller and his many assistants associated with the WRSC began accumulating the vast amounts of "planetary" information that was proposed in the Optimum Geoscope design. This would include information on: industry, natural resources, climate, geology, human and animal migratory patterns, population statistics, and so on. To do this in a time before the internet appears to have been an enormous and rather cumbersome task: Fuller's research assistants sent out hundreds of letters to various organizations asking for any and all data on their respective areas of expertise, sometimes requesting data as far back as 1900. Copies of these letters can be found in Fuller's chronofile. The Mining Congress, Aluminium Extruders Counsel, The Malayan Tin Bureau, MDA Scientific Inc., Copper and Brass Warehouse Assn., American Iron & Steel Institute, Defense Supply Agency, Society of Die Casting Engineers Inc., and American Society for Testing & Minerals are just some examples of the organizations to which letters were sent. Not surprisingly, the response, if any, from these companies was often pure bewilderment.

SIU outlined a possible timeline for the overall project. By 1972 a 'miniaturized' system would be developed, and the construction of the buildings would be started. From 1972-1990 it was proposed that this mini-system be built into its real intended size as needs changes and technologies advance.[209] In addition to the building's construction and technological

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[209] Document: Memo from Office of the President: "The World Game: An International Computer Gaming System on Design Futures of the World's Resources," Fuller Collection, M1090, Series 18, Box 34, Folder 3.

development of the computer system, SIU wanted to establish courses and even degrees up to the doctoral level that would further the WRSC's research. They imagined that campuses across North America—Boston, Montreal, New York, Washington DC, and LA—would also have centres, each with their own Geoscope that would allow instant communication of activities at the central headquarters at Carbondale.[210]

In 1969 an inaugural World Game was held at the New York Studio. This was a significant year: human beings had successfully walked on another celestial body and back on Earth the uprisings of May '68 and the sweeping equal rights across the West produced a widespread spirit of revolution. Technologically, scientifically, and socio-politically, the times seemed to be a-changing. Fuller viewed these events as signs that the world was ready for his world-changing game.[211] Without adequate computer technology, however, what are referred to as the 'World Game trials' had to be vastly simplified: they reduced their holistic vision to a small portion of world trends and relied on dymaxion wall maps overlaid with transparencies (much like a 2D version of the Colorado Geoscope) rather than a football field sized screen. Over the course of six weeks, a group of twenty-six college students from different disciplines worked together to 'save the world.' Ed Schlossberg ran the seminar and Fuller gave guest lectures when his schedule permitted. After this initial test, other colleges and universities, such as Pace College, UC Berkeley, and California Institute of the Arts, ran their own World Game seminars, usually with the help of McHale or Schlossberg.

In spite of the focus on empirical data, the seminars surprisingly began with more philosophical questions: Is it necessary for man to work in order to survive? How can we define

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[210] John McHale, "Status Report: World Game Centennial Project, Dec./Jan. 1967," Fuller Collection, M1090, Series 18, Box 34, Folder 3.

[211] Sieden, *Buckminster Fuller's Universe*, 392.

aggression if everyone has enough to eat? Will the concept of ownership change when everyone

has all his needs satisfied?[212] The students then turned to the data in order to 'solve' these

questions. They were put into smaller groups and tasked with a particular data set—world

population trends or trends in world energy consumption from 1900-1950, for instance. They

then regrouped and visualized their research on wall maps with transparent overlays (Image 10).

Image 10, Buckminster Fuller at the World Game trial. Image courtesy of Buckminster Fuller Collections, Stanford University Archives.

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[212] Gene Youngblood, "Technoanarchy Part Five: World Game Report," Appendix D, *LA Free Press* (Dec. 26, 1969)

The rudimentary tools with which they were given to run these seminars limited the efficacy of the results, but Fuller framed them as 'educational experiments' that, if anything, engrossed a younger generation in Fuller's worldview and garnered support for the larger project.[213] One year after writing his first letter to Fuller, Gene Youngblood would be fully ensconced in the promotion and development of the World Game. In addition to writing extensively about the World Game in his LA Free Times Press column, he was also involved in trials of the World Game at UCLA.

Earth as Game

While some have pointed to the fact that its status as a 'game' is questionable, we should consider the *game* element of the World Game first as a rhetorical strategy and second as an aesthetic one.[214] The World Game was a refutation of *war games* and the game theory of John

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[213] The World Game idea garnered a lot of press in the USA, Canada, and across the world and Bucky spent years traversing the globe giving lectures on his ideas. At some point in the early 1970s, the notion of 'world gaming' was appropriated across campuses and other organization, much to Fuller's chagrin. Speaking of these 'imposters' in a letter to Ed Schlossberg, Fuller called these pseudo-world games "excursions in ego-centric soul-searching" and lamented that his World Gaming was being conflated with the Whole Earth Catalogue as "just some kind of new philosophy without any important technique intended." He even proposed that he rename his World Game to "Geoscope: Synergetics of Planetary Operations" as to separate it from the imposters. Letter from Buckminster Fuller to Ed Schlossberg, October 13th, 1970, R. Buckminster Fuller Collection, M1090, Series 2, Box 209, Folder 7.

[214] If we take the trials of the World Game as some indicator of what would be done with the computerized version, there seems to be little game structure. The trials were more like elaborate exercises in problem-solving. Fuller often stressed that the World Game was unlike traditional games because teams were not working against one another; rather, they were trying to work *together* to make the world work. In the World Game dossier, he juxtaposes two cartoons to exemplify how this game was one based on cooperation rather than competition. The first cartoon shows two people playing chess. The second shows a team of mountain climbers, who are attached to each other by climbing gear, trying to ascend a mountain peak. The cartoons were used to show the differences between a game in which two sides compete and a game in which cooperation was fundamental to any player's success. Fuller likened the World Game to the latter. If one mountain climber gets too tired, too sick, or slips and falls, the entire team is at peril of either not reaching the top or toppling over the precipice. Jonathon Keats contends that this analogy is confused for the simple reason that mountain climbing is an activity outside of the category of games as such: "whereas the challenge of scaling a mountain requires that each participant reinforce the decision made by fellow climbers, the decisions made in a game are independent and deliberately subverted by fellow players." (Keats, *You Belong to the Universe*, 155.) But what if team mountain climbing was considered a kind of puzzle? For play theorist Johann Huizinga, puzzles are part of the 'contest for something' category of play, which does not necessarily imply competition. When a group puts together a jigsaw

von Neumann on which they were premised. Throughout Fuller's writings in the late 60s and

early 70s, he disparages the development of game theory and its use in military scenarios. Fuller

states: "Game theory, as outlined by the late Princeton Professor, John Von Neumann, is

employed by all the powerful nations today in their computerized reconnoitring in scientific

anticipation of hypothetical World Wars III, IV, and V."[215] Besides being an advocate for peace,

Fuller's main contention with war games is that they are premised on the assumption of the

validity of the ideas of Thomas Malthus. When such ideas are cast in the theatre of nation-states,

military and political establishments "assume eventual Armageddon": it is either "them" or "us"

that survives in the long run.[216]

Contrary to such zero-sum ideas, the World Game is a game in which, if successfully

played, there are no losers. Working through trial and error on a model Earth, players would

learn what the best options were for organizing human and non-human resources more

efficiently. There was one rule, however: no team could resort to political or ideological pressure

to accelerate their advantages. For Fuller, when you get into politics you are most likely to get

into war. Starting a war was the way in which one immediately 'lost' the game. Fuller called this

a game, in other words, to directly oppose the war-games that had proliferated during the Second

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puzzle, for instance, they are working together with a shared goal: to complete the picture on the box. Both the
World Game and mountain climbing involve such a contest for something. The World Game is particularly like a
puzzle however, in that it works towards moving from a state of disorder (a broken, mismanaged world) to order
(putting the world together 'correctly). But we can also see how the mountain climbing analogy is a way for
Fuller to distinguish the processes of making the world work from something like the processes of winning a
chess game. Making the world work is not a task that mathematical skills used to predict likely outcomes alone
can achieve; rather, like the mountain climbers near the peak who must test their footing and adjust their tactics
continuously as they ascend, the World Game works by trial and error.

[215] R. Buckminster Fuller, "The World Game," speech at the Joint National Meeting of the American Astronautical
Society and Operations Research Society, Denver, Colorado, June 18, 1969. Fuller Collection, M1090, Series 18,
Box 34, Folder 2.

[216] Ibid.

World War. In doing so, he emphasized its anti-war stance, positioning himself alongside the spirit of the younger generations protesting at this time for peace, rights, and justice.

The popularity of the World Game idea provoked ripostes from those institutions that Fuller was implicitly inculpating. The RAND Corporation—the Pentagon funded institution where game theory and war-gaming were developed during the Cold War—lambasted Fuller's World Game ideas as "a potpourri of pitchmanship for an ill-conceived computer-based game" that would "retard real progress in the field."[217] Although retorts that brushed off Fuller as an egomaniacal 'kook' were common, the fact that a key strategist in the Cold War nuclear weapons game felt the need to respond intimates that his ideas hit a nerve.

It was hardly the feasibility of the World Game actually 'working'—putting the world on the path to utopia—that worried figures at RAND. It was arguably rather the way in which such an apparatus could rouse feelings of support for Fuller's vision of a radically democratic Spaceship Earth: the emotional and affective elements of such a game could engender social dissent. The aesthetic components of The World Game—those affective, sensory responses to the collective participation in an event in which at stake is nothing less than the planet itself— were in this sense more important and indeed more critical than its scientific capacities. That is, the potential for creating real change in the world and in the perception of human beings' place in the world lay less in any empirical conclusions made in the playing of the game than in the *play* involved in such an activity.

As play theorist Johann Huizinga has suggested, playing is a community building exercise that generates affective forces that traverse the boundaries between what he calls the 'magic circle' of play and real life. The magic circle names the separate and almost sacred space

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[217] Keats, *You Belong to the Universe*, 137.

in which play unfolds. The magic circle of play forms a "[temporary world] within the ordinary world, dedicated to the performance of an act apart."[218] But while play is a temporary act apart from 'real life,' it has lasting reverberations: "A play-community generally tends to become permanent even after the game is over…the feeling of being "apart together" in an exceptional situation, of sharing something important, of mutually withdrawing from the rest of the world and rejecting the usual norms, retains its magic beyond the duration of the individual game."[219] However, in the case of the World Game, this momentary withdrawing from the world would be in fact the means to connect people with the 'whole Earth.' Again, like the earliest Geoscope— the Cornell Geoscope—the goal here was to communicate the scale of Earth, to incite feelings of being on a shared planet, but it was also to make visible the interconnected nature of various kinds of processes in order to make clear why and how 'we' might have led 'ourselves' to this precipice overlooking oblivion.[220]

The World Game's participatory, collective nature connects it both to the collective political movements and to the expanded, participatory zeitgeist of the art world at this time: these were both impelled by the desire to break down barriers and hierarchies, and to challenge oppressive bourgeois traditions. In the case of the Geoscope and the World Game, it would be through the making sensible of the changes and patterns of a system on the precipice of 'oblivion' that the lines between human beings and how they understood their place on Earth could be redrawn. Geoscope and the World Game did rest on a utopian belief in the future, but they equally worked to create a sensorium alert to catastrophe.

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[218] Johann Huizinga, *Homo Ludens: A Study of the Play Element in Culture* (London: Routledge & Keagan Paul, 1949), 10.

[219] Huizinga, *Homo Ludens*, 10.

[220] As far as I have researched, there is no direct link between Huizinga and Fuller. Fuller does not mention Huizinga in his work and no traces of Huizinga's influence was found in the archival documents I consulted.

V. Conclusion

Many scholars have discussed the political shortcomings and sometimes blatant hypocrisy of Fuller's utopian thinking and the projects that were developed alongside it. Included in these criticisms—and there are many!—are: his problematic links to the American military; his complete lack of discussion of issues of class, race, and gender; his homogenization of the world; his mysticism that is veiled by rationality; his perpetuation of the capitalist myth of growth; his American imperialist stance hidden under the guise of a universal perspective; and that his "charade of 'revolution' is founded on the myth of the rationalist and inevitability of a computer-centred world."[221] These are important perspectives that problematize what Fuller himself called his 'naïve' approach to understanding the world. And to this list we could add his intense anthropocentrism, the hubris with which he approaches 'humankind's' role on the planet. From today's perspective, the Geoscope and World Game thus stem from views, systems, and practices that ultimately exacerbate the catastrophe they are trying to mitigate.

This chapter is not meant to rescue Fuller from these critiques, nor is it suggesting that the Geoscope or World Game are apparatuses that could 'work' in the ways that Fuller claimed. But this chapter does suggest that the Geoscope and World Game are complex and multifaceted: Fuller's designs should not be relegated to merely being visions of a technocrat who believed science and technology could replace political organization. For, as I have tried to show by approaching them from the lens of catastrophe and expanded cinema, his works are also early artistic strategies that bring to the fore aspects of the planetary, crucial for the well-being of Earth, that we cannot visualize or sense in daily life, and ones that anticipate many contemporary media practices. Besides their Apollonian qualities—such as their instrumental, world-

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[221] Felicity Scott, *Architecture and Techno-Utopianism*, 290. For other criticisms see Fred Turner, *From Counterculture to Cyberculture.*

managerial functions—these works feature a Dionysian side: they are immersive and affective. And if we focus on their experiential potentialities, they are revealed as fertile aesthetic sites for exploring the planetary catastrophe underway. They were concerned with summoning a new affective relation to Earth. They were premised on the belief that, through immersive screen experiences and the use of play in his designs, affective communities, and even solidarity, with Earth, and others on it, could be formed.

From today's vantage point, it is hard to deny that Fuller was right in his predictions that the world was on the wrong path and that an understanding of the planetary was essential to recognizing the extent of the catastrophe. Fuller's Geoscope and World Game are truly anticipatory objects of climate change. In an essay on utopia and climate change, Kim Stanley Robinson expresses our current predicament using a metaphor very similar to that employed by Fuller. Robinson exclaims: today, "the future is a kind of attenuating peninsula; as we move out on it, one side drops off to catastrophe; the other side, nowhere near as steep, moves down into various kinds of utopian futures. In other words, we have come to a moment of utopia or catastrophe; there is no middle ground, mediocrity will no longer succeed."[222]

It is my contention that we've already entered into the catastrophic. In fact, Bill McKibben proposes that the planet has been so irrevocably altered by polluting, mining, oil extraction and so on, that it can no longer be considered the same Earth. He suggests we rename our planet "Eaarth," a homonym of the planet we thought we knew, but one marked by difference.[223] From this perspective, the planet that Fuller wanted to bring to sensory attention, that majestic sphere imaged in the Apollo photographs, is literally something else today—a

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[222] Kim Stanley Robinson, "Remarks on Utopia in the Age of Climate Change," *Arena Journal* Issue 35/36 (2011). https://arena.org.au/remarks-on-utopia-in-the-age-of-climate-change/

[223] Bill McKibben, *Eaarth: Making Life on a Tough New Planet* (Toronto: Vintage Canada, 2011).

different entity all together: Earth has already undergone catastrophic change. But catastrophe here is not equivalent to 'oblivion.' Catastrophe represents a protracted present day in which Earth's system has and is continuing to change rapidly, even if these changes are not given to human vision. While we may question their trajectory for bringing about utopia, The Geoscope and World Game are anything but mediocre. Imaginative, ambitious, innovative, and experimental, they are media apparatuses that attempted to make sensible the contours of an Earth on the precipice of great change.

CHAPTER TWO

Catastrophic Oil Worlds: Slow Violence and Activist Melancholy in *Offshore* and *Fort McMoney*

"I don't know if the Gulf [of Mexico] will ever recover from the losses…What we don't know are the future impacts. How long will this play out?" – Rosina Phillipe, Member of the Atakapa Ishak Tribe, Grand Bayou, Louisiana

I. Introduction: Twenty First Century Fossil Fuel Narratives

In a short but rich article on fossil fuel culture, Frederick Buell suggests that 19th and 20th century

stories of coal and oil are characterized by the twin motifs of exuberance and catastrophe.

Primarily looking at literature, he shows how the relationship between these motifs shifts

alongside changes in energy systems—from coal-capitalism to the first age of oil extraction to

today's coal-oil-electric capitalism. Buell follows William Catton, who described the energy

culture of the twentieth century as an 'age of exuberance.'[224] Such exuberance spoke to the sense

of profuse growth and never-ending possibilities that fossil fuel energy seemed to promise. It

was seen as inciting a new vitality for the wondrous progress of modernity and for a 'humanity'

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[224] Buell borrows the 'age of exuberance' from William Catton in his book *Overshoot: The Ecological Basis of Revolutionary Change* (Chicago: University of Illinois Press, 1982).

that was gaining extraordinary power. Fossil fuel energy came to represent an expansion of the human knowledge of, and power over, nature.[225]

The exuberance Buell finds in fossil fuel culture represents a 'promethean' perspective on progress.[226] Referring to the Prometheus myth recounted in Plato's Protagoras, 'promethean' is a denomination given to those that believe that the harnessing of energy combined with technological advancement is the means not just of the survival but of the thriving of the human species. As Imre Szeman and Dominic Boyer assert, 'progress'—in which they include, rights and freedoms, scientific insight and technological innovation, and the geographical expansion and social entrenchment of capitalism—is directly tied to the harnessing of energy.[227] Quoting Catton, Buell adds that fossil fuel energy in particular helped to galvanize "a faith in progress so strong that 'the idea that mankind could encounter hardships that simply will not go away' was not just unlikely but in fact 'unthinkable.'"[228] Such views "play a powerful role in sustaining the prevalent mode of capitalist production in the face of its environmental consequences."[229]

For Buell, this faith in progress also provided a pretext for that which underpinned the exuberance of fossil fuel culture: catastrophe. As he puts it, the exuberance of fossil fuel culture

[225] Leo Marx, "Technology: The Emergence of a Hazardous Concept," *Social Research* 64.3 (Fall 1997): 965.

[226] As recounted in Plato's *Protagoras*, the Prometheus myth accounts for human beings' discovery of fire, which allowed them to develop skills that the Greeks named *techne*. The myth tells us that after Epimetheus forgot to assign the human species with qualities that would aid their survival on earth, Prometheus stole fire and mechanical arts from Athena to give to the human. That the oil industry finds inspiration from the Promethean myth is evident in the numerous companies and their affiliates whose names pay tribute to this Greek anti-hero: Prometheus Energy (US), Prometheus Gas (Greek-Russian), Prometheus Group (Italy), are just a few examples.

[227] Imre Szeman and Dominic Boyer, eds. *Energy Humanities*: *An Anthology* (John Hopkins University Press, 2017), 2.

[228] Frederick Buell, "A Short History of Oil Cultures; Or, the Marriage of Exuberance and Catastrophe," *Journal of American Studies* 46.2 (2012): 276. See also William R. Catton Jr., *Overshoot: The Ecological Basis of Revolutionary Change* (Chicago: University of Illinois Press, 1982), 6.

[229] Michael Keary, "The New Prometheans: Technological Optimism in Climate Change Mitigation Modelling," *Environmental Values* 25 (2016): 7.

is always "haunted by catastrophe."[230] Catastrophic accidents at coal mines due to unsafe and unfair labour practices, high levels of pollutions in industrial cities that poisoned mostly the workers and the poor, exploding oil wells that alighted villages of makeshift barracks in the extraction sites: these are just a few expressions of twentieth century fossil fuel culture. But they are not freak events. Buell asserts that "exuberance and catastrophe materialized as historically specific forms of capitalist triumph and oppression, of environmental domination and destruction, and of human liberation and psychic and bodily oppression."[231]

Indeed, it has been argued that the 'progress' of the global North has been made possible only by centuries of exploitation of people and resources, especially those of the global South.[232] In *The Energy of Slaves*, Andrew Nikiforuk shows how the fossil fuel industry is "built upon the institution of human slavery, which once served as the globe's dominant energy institution."[233] The discovery of fossil-fuel energy, in the form of coal and then oil and gas, he argues, allowed machines to take over from human slaves. This, Nikiforuk points out, is not a cause for celebration: he does not cast fossil fuels as forces of total emancipation. Instead, he suggests that just like many slave owners who recognized the cruelty and immorality of this practice but nonetheless considered it a 'necessary evil', we are today shackled to the way of life that fossil fuels provide, even though we know its grave costs to the planet.[234]

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[230] Buell, "A Short History of Oil Cultures," 276.

[231] Ibid., 280.

[232] Szeman and Boyer, *Energy Humanities*, 2.

[233] Andrew Nikiforuk, *The Energy of Slaves: Oil and the New Servitude* (Vancouver: Greystone Books, 2012), xi.

[234] The subject of chapter one, R. Buckminster Fuller, plays a role in Nikiforuk's link between fossil fuels and human slaves. Fuller in fact coined the term "energy slave," a metaphor that neatly reflects Nikiforuk's argument about the fossil fuel industry. In the 1940s he calculated the amount of energy human beings have 'gained' with the shift from human labour to fossil fuels as the primary energy source. Fuller discovered that based on population statistics in the early 1800s there was approximately one human slave per family. A century and a half later, coal and petroleum fired mechanical energy "placed approximately thirty-nine slaves at the service of every American." This resulted in, of course, a huge leap forward Americans' quality of life. But it came at a huge ecological cost. In typical Fuller fashion, he began to calculate how much 'natural capital' such a surging of

The knowledge that our energy industries are both finite and destructive informs what Buell sees as a new direction in millennial culture. While most of his article is focused on 20th century literature, Buell begins to muse on how catastrophe has become more prominent in culture of late. We could think here of the rise in post-apocalyptic or disaster novels, films, television shows. For Buell, these artefacts combine exuberant narratives with post-apocalyptic milieus, expressing the curious combination of excitement for high tech culture alongside anxieties about civilizational collapse.[235] He references blockbuster films such as *Children of Men* (Alfonso Cuarón, 2006) and *I Am Legend* (Francis Lawrence, 2007), neither of which are directly related to oil but "they do the oily cultural work of injecting exuberance into catastrophe in post-apocalyptic settings."[236] We could also mention a film such as *Geostorm* (Dean Devlin, 2017), which was released after the publication of Buell's work. This film speaks to a Promethean belief in technological advancements as a means to escape a world plagued by climate related catastrophe. Here, while the film targets anthropogenic climate change as the root of global catastrophe, it posits an acceleration of techno-scientific interventions as the only plausible way to reinsert a balance in Earth's systems. In this way catastrophe, even global catastrophe, is accepted as a by-product of the ebullient promise of technology.

However, Buell also notes near the end of his essay a new kind of narrative, one that eschews the spectacular exuberance seen in many of the stories of climate catastrophe and narratives of post-oil worlds. He names Cormac McCarthy's *The Road*, Kazuo Ishiguro's *Never*

energy consumption was costing the earth. He asked geologist J. Francois de Chadenedes to estimate what it cost the earth to make one gallon of petroleum, an inquiry which included "the cost of photosynthesis as well as the slow cooking by heat and pressure into crude over millions of years." De Chadenedes came back with a number: he estimated that one gallon of oil cost more than one million units of 'natural capital.' Nikiforuk, *The Energy of Slaves.*

[235] Buell, 292.

[236] Ibid.

Let Me Go, Sarah Hall's *The Carhullan Army* as examples of works that, in contrast to the above, feature "narratives of slow, painful, on foot struggles" and stifle the "fantasies of post-physical acceleration and quicktime metamorphosis."[237] We could add the novels *Oryx and Crake* (Margaret Atwood) and *Station Eleven* (Emily St. John) as well as the film *Into the Forest* (Patricia Rozema, 2015, based on the novel by Jean Hegland). Buell is not yet clear on what the cultural significance of these artefacts are, but what they do make clear is that "the old faith in stability is gone."[238]

This chapter considers two more narratives of the 21st century that are equally indicative of these new kinds of oil stories. My case studies are two oil themed interactive documentaries, or 'i-docs': *Offshore* (Brenda Longfellow, 2013) and *Fort McMoney* (David Dufresne, 2013). As web-based digital media works that adopt databased, hyperlinked, networked forms, they embrace the structures and modes of image engagement that dominate everyday life in the twenty-first century. While Buell's analysis of oil narratives focuses on fiction, his framework can be extended to these i-docs because they inhabit a space in between fiction and nonfiction. That is, the content of these works is documentary—based in factual evidence and testimony—, but their interactive form invites the viewer into a fictional framework, in which we are 'characters' within the oil worlds. Both works are docu-games, a sub category of the i-doc that adopt the aesthetic and structures of the first-person video game to lead the viewer/player through the oil worlds.

Interactive documentaries are characterized by nonlinearity, open-ended stories, modularity, complexity, choice, and the use of database interfaces, presenting the viewer with a

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[237] Buell, 292.

[238] Buell, 293.

collection of artefacts that can be navigated in various ways.[239] Unlike traditional documentary

forms, i-docs "actively interpellate viewers as cocreators of meaning."[240] Sandra Gaudenzi

suggests that these innovative techniques render i-docs not just digital extensions of linear

documentary but "something else" entirely.[241] Their form is neither archive nor narrative "but

something in-between—cinematic and arranged, though open and interactive."[242] As many

scholars, including Ella Harris, have noted, "a key aspect of this professed 'something else' is a

politics that hangs on multiplicity, contingency and the ability to change and evolve."[243] Or, as

Ryan Watson puts it, "the use of new media technology, as deployed in these projects, enhances

the political power of the documentary form by providing an interface and design architecture for

the dissemination of vast archives of information, media, images, and perspectives that more

traditional forms are unable to accommodate."[244]

Like many i-docs, *Offshore* and *Fort McMoney* employ interactivity as an activist tactic,

intending to engage the viewers in ways that promote radical change. While their interactivity is

novel, we can situate these works within a long history of what Tom Waugh calls "committed

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[239] Ella Harris, "Introducing i-docs to geography: exploring interactive documentary's nonlinear imaginaries," *Area* 49.1 (2017): 25. See also: Judith Aston, Sandra Gaudenzi and Mandy Rose, *I-Docs: The Evolving Practices of Interactive Documentary* (New York: Wallflower Press, 2017); Kate Nash, Craig Hight, Catherine Summerhayes, eds., *New Documentary Ecologies: Emerging Platforms, Practices and Discourses* (Basingstoke: Palgrave MacMillan, 2014).

[240] Paolo Favero, "Getting our hands dirty (again): Interactive documentaries and the meaning of images in the digital age," *Journal of Material Culture,* 18.3 (2013): 267.

[241] Sandra Gaudenzi, "The Living Documentary: from representing reality to co-creating reality in digital interactive documentary," Ph.D. Diss., Goldsmiths, University of London, London, 2013, 12. https://research.gold.ac.uk/7997/1/Cultural_thesis_Gaudenzi.pdf

[242] Ryan Watson, "Affective Radicality: prisons, Palestine, and interactive documentary," *Feminist Media Studies* 17.4 (2017): 604.

[243] Harris, "Introducing i-docs to geography," 25; Gaudenzi, "The Living Documentary,' 2013, 13; Favero, "Getting our hands dirty (again)."

[244] Watson, "Affective Radicality," 600.

documentary"—those that are aligned with movements for social justice and change.[245] From this

perspective, they depart significantly from Buell's featured novels and films. However, I suggest

that their interactivity lends a new mode of communicating the catastrophe of the novel twenty-

first century oil narratives Buell acknowledges.

If, amongst the exuberant blockbusters of disaster, there is a new kind of narrative

emerging, it may be because, as this dissertation suggests, catastrophe itself is changing. The

landscape of the oil world has shifted: both physically because of new 'tough oil' extraction

practices, and figuratively, because of the widespread knowledge of the relationship between

CO_2 emissions and climate change. How we understand the catastrophe of the oil industry may

thus be entirely different than what catastrophe meant in the context of the extraction of fossil

fuels in the twentieth century.

Here, Rob Nixon's idea of slow violence provides a useful means to understand a

particular aspect of the catastrophic, which is perpetuated by the fossil fuel industries and the

neoliberal system upon which they are upheld. The first section of this chapter thus outlines

Nixon's thesis of slow violence within the context of the oil world today. I then look at how

Offshore and *Fort McMoney* bring to life this slow violence at the level of both content and form.

In particular, I consider the way in which affect emerges in the interactive structures of the work.

The works are both permeated with a melancholic ambience—an irreconcilable grieving for the

victims of slow violence. By arguing that such melancholy can be a productive mode of

resistance, I locate the activist work of these i-docs at the intersection of cognition, emotion, and

affect. Lastly, I suggest that, in these narratives, melancholy replaces exuberance. I conclude the

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[245] Thomas Waugh, "Why Documentary Filmmakers Keep Trying to Change the World, or Why People Changing the World Keep Making Documentaries" in *Show us Life: Towards a History and Aesthetics of Committed Documentary*, ed. Thomas Waugh (Metuchen, NJ: Scarecrow, 1984), xiii.

chapter by reflecting on the implications of such a shift, according to which the new motifs of 21st century oil stories are catastrophe and melancholy.

II. The Slow Violence of Twenty-First Century Tough Oil

As the dominant energy source, oil is the lifeblood of the globalized world. According to the International Energy Agency, approximately 97 million barrels of oil are consumed worldwide per day.[246] More than just a liquid that fuels the automobiles and airplanes that allow the transfer of goods and peoples across the globe, oil permeates our everyday lives and bodies. Asphalt, pharmaceuticals, fertilizers, cleaning agents, synthetic fabrics, cosmetics, not to mention the myriad of plastic products we consume: all are derived from petroleum.

It follows, then, that oil is not just the liquid that fuels and saturates our practical lives; it is also the linchpin of our cultural and symbolic practices. It is both the substance that supports all modern media forms as well as that which undergirds the cultural imagination of the last one hundred and fifty years.[247] As Stephanie LeMenager tells us, "from film to recorded music, novels, magazines, photographs, sports and the wikis, blogs, and videography of the internet," all are supported by oil.[248] We are, as Szeman and Boyer aptly put it, "citizens and subjects of fossil fuels through and through, whether we know it or not."[249]

Our reliance on fossil fuels is paradoxical: it is the energy that sustains quotidian life, particularly in the global north, but also that which threatens this very existence. While many

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[246] "Oil 2018," International Energy Agency, https://www.iea.org/oil2018/

[247] Stephanie LeMenager, *Living Oil: Petroleum Culture in the American Century* (London: Oxford University Press, 2014), 6-7.

[248] LeMenager, *Living Oil*, 6.

[249] Szeman and Boyer, *Energy Humanities*, 1.

factors play into climate change, CO_2 emissions from the burning of fossil fuels occupy a key role in atmospheric change. Jennifer L. Lawrence calls this a 'system of sustainable degradation' which "implicitly concedes and cynically builds upon the second contradiction of capitalism whereby the very conditions of production (in this case the Earth's resources) are slowly degraded in order to extend/sustain (oil based) production and consumption."[250] Such a system has recently entered into absurd territory: as oil reserves run out, petrol industries are forced to look for oil in increasingly inhospitable places where the scale of environmental destruction is vast, thereby accelerating climate change.

Michael T. Klare has suggested that we have shifted from an era of 'easy oil' to that of tough or extreme oil. Easy oil names the accessible and relatively inexpensive petroleum found in the natural reserves that lie beneath Earth's surface. Decades ago, the 'peak oil' conversation centred on this oil, as reserves were reaching the threshold after which they would be forever in decline. But what the idea of peak oil underestimated was the oil industry's ingenuity and determination in discovering new sources of oil and new technologies of extraction. As reserves started running out, the oil and gas industries began looking for the 'black gold' elsewhere, in what the oil industry calls 'unconventional' sources. Deep and ultra-deep offshore oil, Arctic oil, shale oil, tar sands: these are the new sources of extreme oil. These are extreme not only because they are found in difficult to reach locations or involve complex chemical processes and advanced extraction technologies, but also because of the devastating scale of their effects on the surrounding environment. As LeMenager writes, "going ultradeep [in water or earth] implies an unprecedented potential for destruction because of where these last reserves are and the violence

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[250] Jennifer L. Lawrence, "Manufacturing biopolitical disaster: instrumental (ir)rationality and the Deepwater Horizon disaster," in *Biopolitical Disaster*, eds. Jennifer L. Lawrence and Sarah Marie Wiebe, (London: Routledge, 2017), 20-21.

of the experiments necessary to get them."[251] Inviting us to enter the worlds of deep offshore

drilling and tar sands operations, respectively, *Offshore* and *Fort McMoney* are emblems of fossil

fuel culture in the age of tough oil and they reveal the profound violence of this new era of oil.

Like the central premise of this dissertation—that climate change is a new breed of

catastrophe, one that is hard to sense in the everyday—the devastating effects of the fossil fuel

industry are often not immediate or direct. In his book *Slow Violence and the Environmentalism

of the Poor*, Rob Nixon submits that the destructive consequences of human industry within

neoliberal capitalism, such as the energy industries, and their pollution and toxic waste, are kinds

of violence. However, this violence does not play out, temporally or spatially, in the

conventional sense of the word. Slow violence extends Johan Galtung's idea of structural

violence, which sought to name those social institutions, systems, and structures which, due to

their failure to meet people's basic needs, give rise to acts of personal violence. Galtung's notion

necessitated a reconsideration of the causes of violence and the agents involved.[252] While Nixon

shares with Galtung a concern "with social justice, hidden agency, and forms of violence that are

imperceptible," slow violence is not equivalent to structural violence.[253] Slow violence, Nixon

explains, "might well include forms of structural violence, but has a wider descriptive range in

calling attention, not simply to questions of agency, but to broader, more complex descriptive

categories of violence enacted slowly over time."[254]

The accumulation of the CO_2 in the atmosphere is a slow violent act. This is a violence

that does not confront people "body-to-body but [plays] out over vast stretches of time through

[251] LeMenager, *Living Oil*, 4.

[252] Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Cambridge, MA: Harvard University Press, 2013), 28.

[253] Rob Nixon, *Slow Violence*, 27.

[254] Ibid., 28.

the medium of ecosystems."[255] CO_2 accumulation in the atmosphere does not affect people directly, but as it contributes to the warming of Earth it will slowly provoke a wide range of disasters: hurricanes, floods, droughts, rising sea levels, food shortages, species loss, which may incite mass involuntary migrations of people, wars, and other kinds of conflict. The invisibility of fossil fuel emissions is mirrored in the invisibility of the communications that transport oil across vast stretches of the world. Pipelines, as Darin Barney points out, "are imperceptible devices that deliver their commodities (and power and wealth) to their operators, without notice until something goes wrong—a leak usually—and they suddenly become present, briefly demanding our attention."[256] As we will see in the i-docs discussed, the range of slow violence unleashed by the fossil fuel industries needn't only be linked to climate change. Acts of violence, invisible and visible, play out on the scale of the local and specific, in both these works.

Slow violence can thus be seen as a way to describe the particular hazardous and violent effects of the fossil fuel industries. While there are many parallels between slow violence and catastrophe, as outlined in the introduction, these two conceptual frameworks are not equivalent. Slow violence names how acts of harm and damage unfold within climate change, but catastrophe here describes more than just those violent effects. It also speaks to the all-encompassing shifts that Earth within climate change is experiencing, and, accordingly, to the curious temporal and spatial dimensions of climate change. Put differently, the catastrophic nature of climate change certainly comprises slow violence, but it extends further to describe the many changes taking place and lends conceptual weight to the excessive nature of climate

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[255] Françoise Verges, "Racial Capitalocene," in *Futures of Black Radicalism*, eds. Gaye Theresa Johnson and Alex Lubin (London: Verso, 2017), reprinted online https://www.versobooks.com/blogs/3376-racial-capitalocene

[256] Darin Barney, "Who we are and what we do: Canada as a pipeline nation," in *Petrocultures*, eds. Sheena Wilson, Adam Carlson, and Imre Szeman (Montreal: McGill-Queen's University Press, 2017), 81.

change. And while perhaps not a helpful way of understanding climate change, it has been pointed out that not all of the changes taking place are necessarily negative. However, the impetus of Nixon's project is also mine: we urgently need to rethink in ways imaginative, theoretical, and political the slow, attritional, destructive force of climate change. But the question remains: how do we represent, in images and narratives, a violence that is incremental and accretive, not spectacular or instantaneous?[257] How do we represent something that is playing out across vast temporal scales? And how do we, Nixon asks, "bring home—and bring emotionally to life" a violence that may "never materialize in one spectacular, explosive, cinematic scene?"[258] The two interactive documentaries I examine here offer responses to these questions.

As I was researching this chapter in the Summer 2017, Hurricane Irma was battering southeast Florida, after having caused vast devastation across the Caribbean Islands. Some islands, such as Barbuda, had 95% of their buildings damaged or completely destroyed. As if this category five storm wasn't enough, two more hurricanes followed—Hurricane Jose and Hurricane Maria, which both hit similar areas. And only a week prior Hurricane Harvey inundated the state of Texas. At the same time, regions of Pakistan, India, Bangladesh, and Nepal were underwater from severe flooding that left 1200 dead and millions affected and vulnerable to the spread of cholera. As parts of Earth were being deluged, others were on fire. My home province of B.C., and all of the west coast of North America experienced extreme summer heat and an unprecedented drought, which turned temperate rainforests into tinderboxes. Some 50,000 people were evacuated from B.C.'s interior towns, many of them having lost their entire homes.

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[257] Nixon, *Slow Violence*, 2.

[258] Nixon, 31.

For a handful of these people, this is the second major fire which they had to face in a year and a half period: the news reported that one man who lost his new home in BC had lost his previous house in the Fort McMurray fires of 2016.[259]

It may seem wrong then to continue speaking about the imperceptibility of climate change catastrophe or of the *slow* violence of accumulating CO_2 emissions. But these kinds of events—the spectacular eruption of destructive weather and the quiet perniciousness of a gradually warming Earth—go hand in hand and operate simultaneously. The former, however, is given adequate representation from corporate, mainstream media. In times of major weather catastrophes, for instance, the media basks in the violent sublimity of storms, the nightmarish scenes of entire forests on fire, and the desperation and suffering of humans and animals, for it means higher ratings and higher profits. And yet all over the planet, fossil fuel industries are wreaking havoc on people (mostly poor) and ecosystems in ways not yet apparent. As Nixon states, "this representational bias against slow violence has, furthermore, a critically dangerous impact on what counts as a casualty in the first place."[260]

The problem of representing slow violence is especially an obstacle for activist documentary film, for they have long had a concern with elucidating those events, people, and things that remain 'unseen' in mainstream media. Using witnesses, testimonies, and archives, documentary aims to provide "visible evidence."[261] Moreover, central to the affective impact of

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[259] And just one year later, August 2018, as I am editing this document, things have gotten much worse. The largest fire on record is burning in California; another out of control wildfire fire recently killed over seventy people in a seaside village just outside of Athens; widespread and anomalous fires have been also burning in Northern Sweden, above the Arctic Circle! It doesn't end there. Raging heatwaves have hit most countries in the Northern Hemisphere, killing many; multiple reports suggest that this is the new norm and that the Middle East, India, China and parts of Northern Africa and Southern Europe will regularly see temperatures above 45° C.

[260] Nixon, 13.

[261] See Jane Gaines and Michael Renov, eds., *Collecting Visible Evidence* (Minneapolis: University of Minnesota Press, 1999).

documentary is its ability to capture a "certain kind of fact" or to provide "evidence of material conditions"[262]; Jane Gaines calls this its "pathos of fact."[263] As Ryan Watson puts it, "to transform the world, then, would include a combination of aspiration (to transform) coupled with evidence of material conditions."[264] But what happens when the material conditions are not yet evident? What happens when a cause can be pinpointed but not its effects?

As we will see, *Offshore* and *Fort McMoney* do employ traditional documentary strategies for documenting some aspects of slow violence, at least those that can be relayed through witness interviews, testimonies, statements from specialists and authorities, and archival materials. The 'pathos' or affective quality of the works is in part generated by the factual information provided as Gaines suggests. However, their interactive form and the mode of engagement they demand engender another layer of affect. And it is here where they may bring affectively and emotionally to life those protracted, invisible, not yet manifest aspects of slow violence.

The relationship between interactivity and affect has been a key area of inquiry in the study of the i-doc. Adrian Miles situates the interactive documentary within the tripartite structures of perception, affect, and action, or "notice, decide, do." He explains: "in interactive documentary something is presented to a user (notice), the user views this material more or less quickly (decide), and is then obligated to make a decision that is literally a motor action that effects some sort of change within, or to, the work (do)."[265] For him, affect emerges in the virtual

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[262] Jane Gaines, "Documentary Radicality," *Canadian Journal of Film Studies* 16.1 (Spring 2007): 6.

[263] Gaines, "Documentary Radicality," 9.

[264] Watson, "Affective Radicality," 604.

[265] Adrian Miles, "Interactive Documentary and Affective Ecologies" in *New Documentary Ecologies: Emerging Platforms, Practices and Discourses*, eds. Kate Nash, Craig Hight, and Catherine Summerhayes (Basingstoke: Palgrave MacMillan, 2014), 79.

encounter between the information on screen and the viewer/user insofar as it moves the viewer from their traditionally passive role into one of activity. While I think we should be sceptical of easy divisions and unnuanced understandings of passivity/activity in cinema spectatorship, there *is* a difference of intensity between watching a linear film and using an interactive documentary, at least in successful instances of the latter. Indeed, it is important to remember that, as Brian Massumi asserts, that "you may interact with a work is not enough."[266] It is not interactivity as such that generates meaningful encounters. When interactive art *works* affectively and effectively, according to Massumi, it "[takes] the situation as its object" and "potentially 'open[s]' the interactions it affords."[267] This 'opening of interactions' involves going "into an existing situation, and [opening] it into a relational architecture."[268] The 'relational architecture' is precisely the site for an accumulation of affect; for, as Melissa Gregg and Gregory Seigworth claim "affect is in many ways synonymous with force or forces of encounter …" and "accumulates … becoming a palimpsest of force encounters."[269]

The interactivity of *Offshore* and *Fort McMoney* is therefore best understood not just in terms of how it activates the viewer, but in the ways in which they create relational encounters that generate affective forces within the indeterminate situation of slow violence. The connections between interactivity and slow violence is heightened when we remember that interactivity itself relies on the actions of things that we cannot see, such as algorithms.[270] The i-

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[266] Massumi, "The Thinking-Feeling of What Happens: A Semblance of a Conversation," *Inflexions* 1.1 (2008): 13, http://inflexions.org/n1_The-Thinking-Feeling-of-What-Happens-by-Brian-Massumi.pdf

[267] Massumi, "The Thinking-Feeling," 13.

[268] Ibid., 14.

[269] Melissa Gregg and Gregory Seigworth, eds., *The Affect Theory Reader*, (Durham, NC: Duke University Press, 2010), 2.

[270] Miles, "Interactive Documentary and Affective Ecologies," 16.

docs open up the potential not for *seeing* slow violence but for *feeling* it. I-docs put the spectator

into a new kind of situation, a novel relational mode with the subject and subjects of slow

violence. And this, for Massumi, is what makes art political: "aesthetic politics is an exploratory

politics of invention, unbound, unsubordinated to external finalities. It is the suspensive aspect of

it that gives it this freedom. The suspension of the most available potentials, the potentials

already comfortingly embodied, well-housed and usefully institutionalized, gives a chance for

more far-fetched potentials to ripple up."[271]

One of Nixon's ambitions is to show that the effects of slow violence are unevenly

distributed. More often than not the populations burning the most fossil fuels are not the ones

who are exposed to its violent consequences. While the global north largely controls oil

production and consumes most of this oil, it is the global south that suffers most from its violent

effects.[272] The i-docs I examine both take place in the global north, but they nonetheless provide

evidence to the structural imbalance of slow violence. As we will see, even within a North

American context it is the marginalized people of small peripheral communities who are and will

be most affected.

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[271] Massumi, 14.

[272] If the average North American consumes 23.6 barrels of oil a year, five times the world average per capita consumption. Among the world's most economically advanced countries, Canada, according to recent data, is the third largest consumer of oil per person. Per capita, Canadians consume almost thirty times the amount of oil than Indians, for instance. And the negative repercussions of this consumption are similarly unequal.

III. In Deep Water: *Offshore*

Brenda Longfellow's *Offshore* is an interactive documentary that tells the story of the catastrophic consequences of deep offshore drilling.[273] The work is the final piece in Longfellow's trilogy of oil-themed films. *Carpe Diem* (2010), the first in the trilogy, is a satirical short film-opera that takes place on a plane headed for the tar sands of Northern Alberta. On the flight is a VP of a fictional oil corporation, accompanied by potential investors. Their world is briefly shaken by the turbulence of a drop in oil prices and a two-headed fished served for dinner, but they ultimately make it to Fort McMurray in one piece. In Longfellow's own words, *Carpe Diem* is "a completely perverse way of tackling the ongoing development of the Alberta tar sands."[274] *Dead Ducks*, the second in the trilogy, is a hybrid documentary-opera that investigates the real-life event of sixteen-hundred ducks dying when they landed on a tar sand's toxic tailing pond at the end of their migratory route. Both films push boundaries of generic conventions, combining opera, animation, live-action, as well as documentary footage.

Offshore continues in this vein of formal innovation, embedding documentary images and text on a CGI created platform. But here, Longfellow leaves the immediate context of Canada and takes the viewer to the Gulf of Mexico, where hundreds of offshore and deep offshore rigs pull oil from the ocean floor. In the prologue to the docu-game, the viewer/player is taken by helicopter over a dystopian landscape dotted with these rigs. Complete with a menacing score, statistics about the estimated reserves of oil in various parts of the world flash on screen alongside nightmarish images of an oil spill disaster. The helicopter lands on the CGI created rig,

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[273] *Offshore* was made in partnership with Helios Design Lab and in association with York University's Future Cinema Lab.

[274] Brenda Longfellow, "Extreme Oil and the Perils of Cinematic Practice," in *Petrocultures: Oil, Politics, Culture*, eds. Sheena Wilson, Adam Carlson, and Imre Szeman, (Montreal: McGill-Queen's University Press, 2017), 27.

the fictional Spartan 208, which is empty and ominous against a stormy sky and sea, and the game begins.

The i-doc uses a 360° scrollable screen in which are embedded hyperlinked materials, such as video, audio, and textual documents. Interestingly, the player is thus situated at the centre of a spherical world, much like the spectator of Fuller's Geoscope and World Game as described in Chapter 1. Here too a world of information surrounds the player, who engages with it in a game scenario. In the helicopter, at the start of the game, a click-through folder on the seat across from the player provides information about the rig. We discover that we are on an offshore rig in the near future and that the rig has been evacuated due to some kind of catastrophe; a fire had broken out and equipment may be damaged. The folder contains further information relayed in text and diagrams about the rig, such as that it is an ultra-deep water, semi-submersible. The player is to adopt the character of an official who is here to assess or investigate this disaster and its aftermath: we are instructed to "please proceed to investigate the possible cause of presumed catastrophic failure and assess impact on adjacent communities and eco-systems."

As you wander around the various levels of the rig you discover both audio-visual and textual artefacts that provide a variety of information on offshore oil drilling, the BP Deepwater Horizon spill, and 'frontier' offshore operations in other areas of the world. We are first given an overview of offshore extraction—its history, current use, predictions about its future use, the inherent dangers of such extraction techniques and so on—through talking heads interviews, audio information, maps and other textual-visual documents. The scope of the work is vast. As Szeman writes, "Longfellow's web-doc repeatedly draws our attention to the larger system of oil extraction that makes a disaster possible even when it is introducing us to oil-rig workers and to

fishermen who depend on the Gulf for their livelihoods."[275] While the focus of the i-doc is on the Deepwater Horizon spill, we also learn about initiatives to expand this extreme extraction method into other parts of the world.

The Deepwater Horizon catastrophe officially began on April 20th, 2010. The immediate blowout killed eleven men working on the rig and injured seventeen more. Oil gushed from the rig into the Gulf of Mexico for eighty-four days, inundating it with five million barrels of oil. It is considered to be the worst spill in the history of the petroleum industry. While this was a disastrous event, set in motion by a massive fiery explosion, it did not, according to Stephanie LeMenager, "work as a spectacle." She explains: "oil shooting out of the damaged well read as a humiliation of modernity as it was understood in the twentieth century, which is largely in terms of human capacity to harness energy."[276] Video footage of the gushing underwater well is included in *Offshore*, presented alongside pleasant underwater images of sea life captures. Such a juxtaposition creates an interesting tone: a calm sort of dread that captures the many ways—more than we can possibly imagine—that this oil will cause harm. Significantly, these images are in the lowest level of the fictional rig, in the submersible. This architecture points to the ways in which slow violence is 'out of sight'; here, what is lurking beneath is having disastrous effects on the people, places, and things documented above, on the upper levels of the rig.

While the slow violence of this event is the focus of the i-doc, more direct forms of violence are also included. For instance, we encounter the direct violence of the event when we meet an attorney whose son, Gordon Jones, lost his life in the blowout three weeks before his

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[275] Imre Szeman, "Art Against Oil: Brenda Longfellow's *Offshore*" *POV Magazine* 97 (Spring 2015), http://povmagazine.com/articles/view/art-against-oil

[276] Stephanie LeMenager, "PetroMelancholia: The BP Blowout and the Arts of Grief" *Qui Parle* 19.2 (Spring/Summer 2011): 26.

first child was born. He tells us what he knows of his son's final moments and that the Deepwater Horizon is his family's 'Titanic.' Elsewhere, the violence is more indirect. Multiple fisherman, whose livelihoods depend on the fish, shrimp, and oysters found in the gulf, are featured in *Offshore*. Most of them have seen a significant decrease if not outright disappearance of the species they depend on to support themselves and their family. Even years after the Deepwater Horizon event these fishermen have still not seen the ecosystems of the gulf return to their prior state. In one video, we are aboard the trawler of Timothy 'Blimp' Cheramie, who shows us that while shrimp are still to be found in the gulf, many of them have oil clogging their gills. While BP was forced to pay out to the various people whose lives were affected by the event to the sum of $4 billion, this financial loss was for them just a mere setback. But for the individual people who depend on the fishing industry, it will take many years to recover—if they ever will. *Offshore* testifies to the fact that it is people who live off the land or who rely on local wildlife for their livelihoods that are the most deeply affected by the practices of the oil industry. But because the violence inflicted on them is not direct they are often overlooked in representations of such events. "I'm lost in the world right now," Cheramie laments. The shrimping business, however small scale, was his entire life.

Nixon asserts that "the slow violence that underlies Deepwater Horizon long predates the out-of-control gusher."[277] Indeed, the kinds of violence that the characters in *Offshore* experience are only partially a result of the actual blowout. In a recently published essay on Deepwater Horizon that appears in the anthology *Biopolitical Disaster*, Jennifer L. Lawrence suggest that we consider what she calls the "flawed rationalities" and the problematic governance of the

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[277] Nixon, 290.

environment as constitutive of the disaster.[278] Such energy extraction rationalities and strategies of governance are, she argues, manufacturing "both acute and chronic biopolitical disasters."[279] As a response, Lawrence proposes that, rather than focusing on the particular events that led to the disaster—the actions of workers, technicians—, we pay attention to the ideological and structural issues that shape the oil industry.[280] We could say then that the violence enacted on the bodies of Deepwater Horizon workers, like Gordon Jones, is not circumscribed by the event of the blowout. Such violence is found in the very corporate practices, operations, and rhetoric that preceded, and most definitely will succeed, it. Another character corroborates this perspective: Tony Buzbee, a lawyer representing those suing BP, stresses that the company's philosophy privileges money over safety. As much as their 'brand image' revolves around safety—for workers, communities and ecosystems—Buzbee reveals that the top executives know little to nothing about some of the basic safety rules BP promotes to the public as driving their company's philosophy.

The controversial use of Corexit in the Deepwater Horizon case is exemplary of these kinds of catastrophic 'rationalities' and one to which *Offshore* pays particular attention. Corexit is the chemical dispersant that BP claims breaks up the oil into small particulates that are then consumed by oil eating microbes. But this is not quite the full truth of how Corexit works. For, while the chemical does indeed break down the oil and disperse it, it has been shown to be fifty times more toxic than undisturbed oil. What is more, the chemical is consumed and absorbed by people and other wildlife who come into direct contact with it. *Offshore* documents how the locals, who were in proximity to the spill or who helped to clean up the waters and beaches, have

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[278] Lawrence, 18.

[279] Ibid., 16.

[280] Ibid., 16-17.

since developed serious illnesses. One fisherwoman tells us she developed rashes, headaches, dizziness after going out on her boat in the Gulf in the days after the accident. A doctor working in the area has been witness to dozens of people, mostly those who helped clean up beaches, complaining of similar illnesses. For some, these symptoms have impacted their life to the point that they can no longer work. While BP remained quiet about what chemicals were actually used in the Corexit sprayed into the Gulf, it is now known that the cocktail contained 2-butoxyethanol, a chemical known to cause liver and kidney damage. Shockingly, it has been claimed that the mean life expectancy of those involved in the clean-up of the spill is only fifty-one.[281]

As Anne McClintock suggested in her investigative reportage of the incident and as both Lawrence and Nixon reiterate, Corexit wasn't used to clean up the oil in the Gulf. It was used primarily as an "image dispersant," to mask the amount of oil that had leaked.[282] Such practices recall Nixon's 'slow violence', but here an effort to purposely mask the violent effects of such activities is explicit.[283] While *Offshore* and Lawrence's essay provide statistics on the effect of Corexit in populations—human and otherwise—, it may take many years for some violent effects to emerge. As Rosina Phillipe, a Grand Bayou resident that appears in the i-doc, states: "we're sitting on a time bomb." This is especially the case with how Corexit has affected the food chain: those "oil eating" microbes are also food for many of the creatures that are themselves food for other sea life and hence, eventually, for human beings.

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[281] Lawrence, 23.

[282] Nixon, 290.

[283] This was done in other ways by BP and its proponents. For instance, Nixon points out that the oil industry apologist Rep. Don Young (R-AK) suggested at a congressional hearing that the Deepwater Horizon spill was "not an environmental disaster. I will say that again and again because it is a natural phenomenon. Oil has seeped into this ocean for centuries, will continue to do it. . . .We will lose some birds, we will lose some fixed sea-life, but overall it will recover." Quoted in Nixon, 38.

Image 11, Screengrab of the Spartan 208 Rig. Brenda Longfellow, *Offshore*, 2013.

Image 12, Screengrab of the submersible. Brenda Longfellow, *Offshore*, 2013.

What is especially striking about *Offshore* is the way it combines computer-generated imagery alongside documentary, realist images. The phrase to 'be like oil and water' takes on particular significance here. Ostensibly incompatible within the framework of the documentary film tradition, the movement between the imaginary video-game world and the real-life situation may be a forced coexistence of things that generates new meanings and new relations. Moving between these two realms, one's encounter with the 'real' people, who are situated within a historical time and space, extends in interesting ways. When you leave the documentary realm and find yourself again back on the CGI rig, there is strong sense of having witnessed a past that continues in a new catastrophic (future) present. The documentary characters linger in the CGI plane almost like ghosts, reminding you that as Nixon says, "the past of slow violence is never past" and "the post is never fully post: industrial particulates and effluents live on in the environmental elements we inhabit and in our very bodies, which epidemiologically and ecologically are never our simple contemporaries."[284]

Those entanglements of materials across time is reflected in the documentary's database structure, which, unlike linear documentaries opens up for new configurations of narrative and new relations between the subjects featured. The significance of the 'narrative' that the player constructs could emerge in stark variations when played by a different player; in other words, as different users move through the space in varying ways, the unique way they 'put the pieces together' holds the potential for the creation of diverse meanings.

But while the multiple space-times of *Offshore* generate certain sites of potential and possibility, the framing of the CGI rig also evokes a sense of inertia. The characters seem trapped

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[284] Nixon, 25.

as lingering presences within this fictional rig. In a way then the i-doc moves the characters'

real-life situation onto the formal plane of the work: just as they are 'trapped' within the

structures and systems that produce and perpetuate slow violence, they are in the i-doc forever

enclosed within the fictional world of another offshore rig catastrophe. The coexistence of

multiple documentary times and places heightens the intensity of this as the 'problem' at hand, as

it spreads across multiple lives, diverse contexts, from the Gulf region across the world. The

formal aspects of this work produce a state of in-betweenness that I would best describe as

inertia: a state in which the possibility of movement is forever present but never fully realized.

This situation of inertia extends to the viewers/players themselves. *Offshore* looks and

feels like a game, and this invites the viewer/player into a different space of spectatorship. The

game format of this work situates the viewer as a participant in the unfolding of the narrative.

While the documentary clips employ traditional techniques, one arguably approaches them in a

different way because of the fictional framing. Here, you are not just viewers witnessing

documentary evidence, you become part of the world in which the characters reside. An inchoate

community begins to emerge. And yet the game-play that is referred to in the formal elements of

the i-doc is ultimately denied. As you wander around the virtual environment, encountering the

many stories and characters, you begin to become aware that the goal set up for you at the i-

doc's beginning is never fully realized in the actual game. There is no winning or losing here;

there is, in fact, no real game. Acutely aware that there is no documentary 'voice' guiding you

towards a particular reading or suggestive of a particular solution or action to the problem, the

player is faced with the task of 'what to do next'.

This open-endedness in the experience of playing the game is mirrored in the intent for

this i-doc to be constantly evolving. It was designed as an ongoing work that could continue to

document offshore drilling as it develops in various parts of the world. While the i-doc is largely 'about' the Deepwater Horizon catastrophe right now, hints of the ways in which it will expand are already found in the information that documents the attempts to drill in the Arctic. Its evolution online has also made it an innovative platform for pedagogy. It has understandably been employed by many schools as an educational tool; not only does it provide a unique way into a heavy topic, one that recalls the modes of entertainment already popular with young people, but it usefully poses more questions than answers, inviting at every turn conversations and debates on various aspects of energy extraction practices.

IV. Tarried Toxicity: *Fort McMoney*

Like *Offshore*, *Fort McMoney* begins with a short prologue. Here you are positioned as the player in a car, driving down a highway that is set within a desolate snowy terrain. From the window, you see an abandoned car overturned in the highway's median strip as a narrator welcomes you to the "edge of the world." You pass huge factories, with smoke billowing from their many stacks, while the narrator stresses that you are entering a game in which your choices will not only affect your own experience but also the experience of others playing. Your task in this game is announced as getting to the impossible: the heart of the oil industry [does it have a heart?]. The player is thus set up as a kind of investigative journalist, attempting to uncover the 'truth' of the tar sands industry. The car stops in an unspecified location—a camp of some kind on the edge of town. You have arrived in Fort McMurray, the notorious tar sands town of northern Alberta.

The Albertan tar sands, also known as oil sands or bituminous sands, is the world's largest industrial project.[285] It is widely criticized for being one of the most destructive industrial projects on the planet.[286] This remote region of the world, which is the size of Florida in land area, contains the world's third-largest recoverable source of oil—approximately 315 billion barrels of oil, 170 of which can be extracted using current available technologies.[287] The disturbed land through surface mining amasses an area larger than the city of Beijing.[288] However, eighty percent of the total tar sands must be exploited by in-situ extraction, a method that involves the injection of high temperature steam into the ground to reduce the viscosity of heavy oils, which then drain into a recovery well and are pumped to the surface.

Beyond the CO_2 produced by the eventual burning of the oil obtained from the tar sands, the environmental costs of the extraction operations themselves are immense and numerous. This extraction method requires the burning of coal, natural gas, and diesel, which combined produces much more greenhouse gases than the extraction of conventional oil. In fact, carbon pollution in Alberta exceeded the combined totals of Ontario and Quebec, provinces of Canada that are home to more than sixty percent of its population. By 2022, Geo Takach tells us, "[tar sands'] emissions are expected to be analogous to adding 22.6 million cars to the road in the US."[289] The human and environmental costs of the sites themselves are also colossal. Massive destruction of

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[285] Geo Takach explains that "oil sands" is the preferred term of the industry since it makes the project sound cleaner and slicker, "bituminous sands" is the more scientific term, and "tar sands" has been adopted mostly by critics of the industry. See Geo Takach, *Tar Wars: Oil, Environment, and Alberta's Image* (Edmonton: University of Alberta Press, 2017), 3.

[286] Geo Takach, *Tar Wars*, 3

[287] Takach, 3. See also Jennifer Huseman and Damien Short, "'A slow industrial genocide': tar sands and the Indigenous peoples of northern Alberta" *International Journal of Human Rights* 16.1 (2012): 220.

[288] Takach, 7.

[289] Takach, 8.

land and the poisoning of water sources has greatly affected local wildlife as well as human communities which have historically lived off the land; and the tough life on this "carbon frontier" has led to many social issues such as rampant alcohol, drug, and gambling addiction, alongside poverty and homelessness.

Fort McMoney examines the region's many problems through three episodes, each which loosely deal with a key issue: *Boomtown* considers social issues; *Black Gold,* economic issues; and *Winter Road,* environmental ones. When the game was released in 2013 there was also a final episode that "looked ahead to the post-oil era and allowed users to engage in debate about post-oil civilization."[290] Each episode is organized as a 'choose your own adventure' narrative. At the beginning of episode one, for example, when the player is 'dropped off', they are presented with two characters. The player chooses one character to follow, and this choice leads to different areas of town, new scenarios, and more characters. For the most part, information about the region is discovered through 'interviews' with local inhabitants. In these interviews, the player assumes the role of the interviewer and must choose from a series of questions to pose to the interviewee; how many questions are asked is up to the player, who can choose to exit the interview at any time. The game also contains extra-textual elements such as 'influence points', discussion boards, a news feed, and bi-weekly polls and referenda in which you can vote on issues. The points earned through meeting a variety of people and visiting different locations grants one greater access to the spaces and stories of each episode.[291] The game departs from *Offshore* in that it is almost entirely composed of documentary images. It is only the

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[290] "Fort McMoney: Simulation, Storytelling, and Engaging the Audience in Play" MIT Open Doc Lab, http://opendoclab.mit.edu/interactivejournalism/fort_mcmoney.html

[291] The participatory element was open only for the period in which the game was 'live,' but the game continues to be playable to this day.

'dashboard'—which records your activity, provides a map, and is the interface through which you can participate in polls—that is computer generated.

In Episode 1, *Boomtown*, the player is introduced to a variety of Fort McMurray locals, municipal officials, and oil representatives. While in this first episode the player is initially provided with both positive and negative opinions on the industry and the town itself, the social misery of Fort McMurray soon becomes the episode's focal point. However much the representatives of the city and of the oil industry aim to downplay the fact that the 'frontier carbon society' is fraught with destitution, arguing that problems of addiction, homelessness, and crime are native to any city, the episode's other characters reveal the costs of a widespread 'work hard play hard' mentality. As numerous exposés have shown, the long and physically trying work in the tar sands is relieved by big cheques spent on alcohol, drugs, and heavy partying on days off. [292] Such destructive living is not confined to Alberta; social misery is often a part of 'frontier' towns. In her study of the Wyoming natural gas industry, Alexandra Fuller describes the destructive lifestyle the industry has brought to the state. She relates the fitfulness of 'frontier' life to the industry's boom and bust cycle. The state, she argues, is "indebted to minerals for its promise of an easy life, yet strangely impoverished by its own wealth."[293] The personal toll of this dependence is exposed in *Fort McMoney*. In Episode 2, *Black Gold*, we meet former trapper Jim Rogers who chronicles the cycles of impoverishment. In boom times, Rogers explains, people buy "big houses and big trucks." But "when there's a downturn they can't make

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[292] For instance, see http://www.cbc.ca/news/canada/edmonton/fort-mcmurray-motorcycle-gang-drugs-violence-law-lavigne-1.3997042 or, http://www.gq-magazine.co.uk/article/fort-mcmurray-oil-sands-strippers

[293] Alexandra Fuller, "Boomtown Blues: How Natural Gas Changed the Way of Life in Sublette County," *The New Yorker*, February 5, 2007 https://www.newyorker.com/magazine/2007/02/05/boomtown-blues

payments. They are enslaved to the oil industry." Rogers maintains that the real wealth is only for the "oil barons," the upper echelons of the various corporations and not for the labourers.

As you move from Episode 1 to Episode 3, the tone of the game becomes increasingly negative and the outlook hopeless. Episode 3, *Winter Road*, is as bleak as the 500km ice road the episode is named after. Only open in the winter months because part of it comprises frozen rivers, lakes, and streams, Winter Road connects Fort McMurray to Fort Chipewyan on the Athabasca River. The road is one of the most remote and dangerous in the country. When you reach Fort Chipewyan in the game, you are welcomed to "the end of the world", a turn of phrase that points to the remoteness of the community but that takes on new meaning as the episode advances. In this episode, the toxicity of the tar sands that has been hinted at or briefly touched upon throughout the game is fully unveiled.

The tar sands are located in an area that is home to what was once pristine boreal forest, "a verdant spongy bog [that] has been sucked dry of life,"[294] and to numerous species, such as woodland caribou, fish, and countless birds, which are being threatened by both the scale of the operations and its toxic refuse. The refuse from production—the tailings—is stored in toxic lakes that cover an area of 1.5 times the size of Vancouver. The threat of these toxic lakes to wildlife is high. Naomi Klein tells us that "every few minutes, the rancid air is punctured by the sound of booming cannons, meant to keep migrating birds from landing on the strange liquid silver surface of the huge tailing ponds…"[295] Research has shown that these tailings lakes leak into the groundwater and into the Athabasca River and Lake, affecting multiple communities that rely on this major waterway.

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[294] Naomi Klein, *This Changes Everything: Capitalism vs. The Climate* (Toronto: Knopf Canada, 2014), 326.

[295] Klein, *This Changes Everything*, 326.
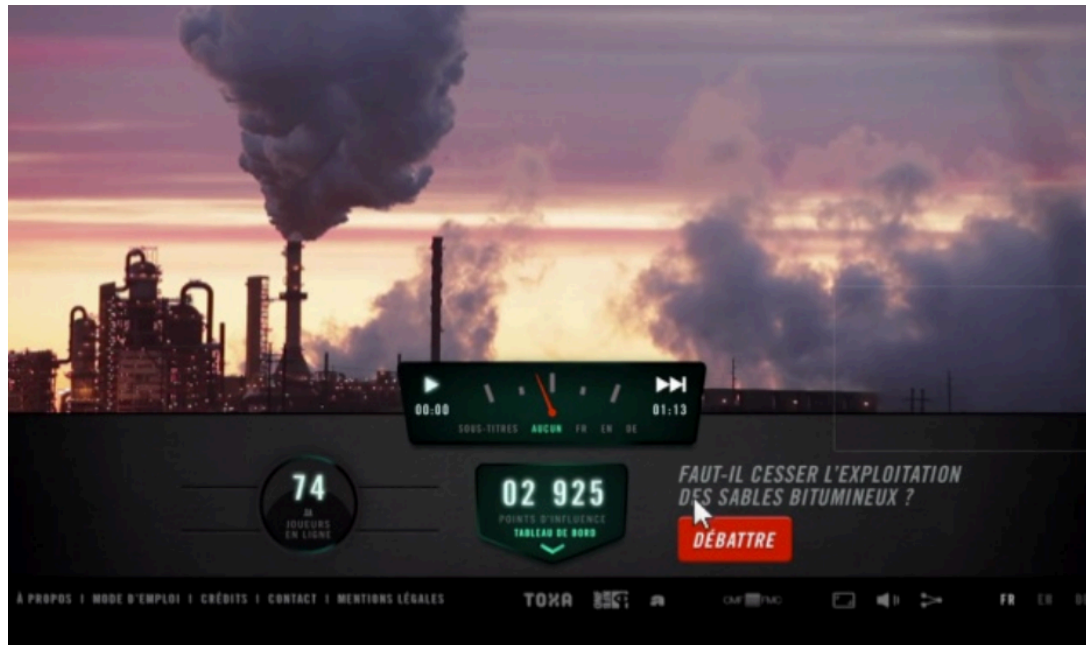
Image 13, Screengrab showing dashboard and tar-sands processing centre. David Dufresne, *Fort McMoney*, 2013.
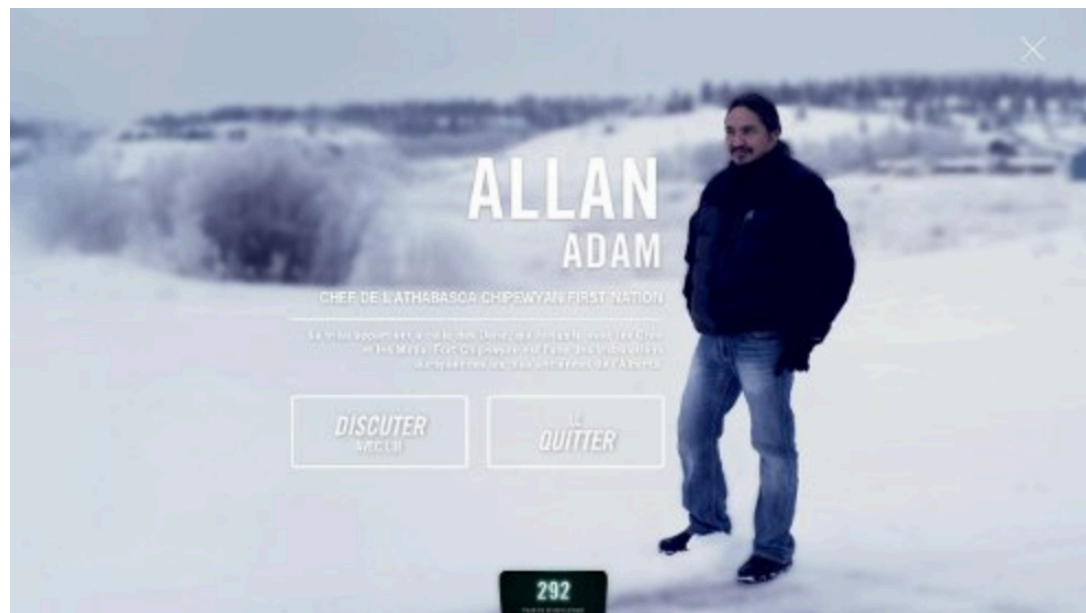
Image 14, Screengrab showing Allan Adam in *Winter Road*. David Dufresne, *Fort McMoney,* 2013

One of the first characters we meet in *Winter Road* is Ray LaDouceur, an Indigenous fisherman who has lived and worked in the Athabasca lake region for fifty-five years. He provides a first-hand account of the environmental changes, discussing the loss of species that he has witnessed in the last few decades. Frogs, muskrats, and birds that inhabited the lake region have all but disappeared. He exclaims: "there is less of everything." He shows us a fish that has been deformed and talks about the strange smells in the air and the funny colour of the sky. Such deformities and species loss cannot be uncoupled from the decades of pollution and toxic waste that have reached Fort Chipewyan by river and air. Nor can, LaDouceur suspects, the fatal cancer of his mother and other illnesses afflicting the community. We accompany the fisherman to his late mother's house where he discusses the cancer that killed her and her sudden, unexplained loss of mental capacity. Such unforeseen occurrences, he tells us, have become increasingly common in Fort Chipewyan.

His suspicions are corroborated later in the episode when we meet Doctor John O'Connor. O'Connor reached a certain level of notoriety when, in 2006, he publicly brought attention to what he saw as abnormally high levels of auto-immune diseases, such as leukaemia, lymphoma, lupus, colon cancer and Graves' disease, in the Fort McKay and Fort Chipewyan regions. He suspected that the prevalence of such diseases was a direct consequence of the rising levels of carcinogens in the waterways that pass by tar sands operations. His inference was questioned by the Alberta College of Physicians and Surgeons (ACPS), which lodged a formal complaint against him. And even though O'Connor's conclusions were eventually backed up by a series of scientific studies, in 2015 he was inexplicably fired. Many have since agreed with O'Connor's conviction that "the governments of Alberta and Canada have been deliberatively

ignoring evidence of toxic contamination on downstream Indigenous communities" as a result of tar sands mining.[296]

Although O'Connor's unfortunate story is not fully told in *Fort McMoney*, as a frightening example it hovers in the air. The i-doc's interviews are pervaded by an atmosphere of silence. Many characters are reticent about speaking poorly of the tar sands industry on camera. This is most apparent with a social worker who refuses to answer multiple questions on camera in Episode 1, *Boomtown*, for fear of losing his job and place in society. It is only those who have already lost so much, such as the fishermen, or have nothing more to lose, such as the homeless men, who are willing to speak out against the industry.

One of few outspoken critics of the impact of the tar sands is Allan Adam, Chief of the Athabasca Chipewyan First Nations. And for his criticism, Adam has been labelled a 'home grown terrorist' by the oil industry.[297] Such a label hardly fit his demeanour and argument in the i-doc. A despondent and cautious Adam tells us in *Winter Road* that his primary complaint is that the industry is allowed to be self-monitoring; the provincial and federal governments let it conduct its own environmental studies. Adams suspects that provincial and federal governments refuse to step in because of the economic power of the oil corporations. The combined unwillingness of people to speak out against the industry and the lack of thorough, disinterested scientific studies have resulted in what Klein calls a huge "knowledge gap…in our understanding of the ecological and human health impact of the Alberta tar sands themselves."[298]

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[296] Huseman and Short, "A Slow Industrial Genocide," 225.

[297] Adams tells us this in the i-doc.

[298] Klein, 325

Jennifer Huseman and Damien Short call the tar sands' polluting of the land and water in North Alberta a "slow industrial genocide."[299] While the deaths caused by the various auto-immune diseases the communities are suffering come into play in their thesis, the lives lost is only one part of their argument. They assert that the vast destruction of the land should be deemed genocidal. For, the concept of genocide as developed by Raphael Lemkin extends to both the physical and the cultural. As such, "the destruction of a nation / group could occur when any structural element was destroyed."[300] For many Indigenous peoples, the land is central to their livelihoods, to their rituals, traditions, and thus to their identity. Huseman and Short thus argue that the tar sands industry is just another instance of Canada's long history of the purposeful destruction of Indigenous peoples and their culture.[301] Such a thesis goes hand in hand with 'slow violence': it is not (for the most part) that Indigenous people are being directly killed, but that the slow destruction of the land is an act that ultimately constitutes a genocide.

There is seemingly no end in sight to these genocidal practices. As Howard Zinn has argued, Indigenous peoples continue to be "pushed to the edge by the environmental problems caused by industrialism."[302] The seeming hopelessness of the situation shines through in the heart-breaking interview with Allan Adam in *Winter Road*. He comes off as deflated. And no wonder: for while he refuses to give up, indeed he remains stubbornly wedded to resisting the oil

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[299] They borrow this phrase form Mike Mercredi who used it to describe the situation in Fort Chipewyan in a *Dominion* podcast (2009). See M. Mercredi, "Slow Industrial Genocide", Dominion (November 2008), available at http://www.dominionpaper.ca/audio/mike_mercredi.

[300] Huseman and Short, "'A Slow Industrial Genocide,'" 221.

[301] They point to the history of treaty's and the discrepancy between the federal government's understanding of these agreements and Indigenous peoples, who had no foundation for understanding land as property.

[302] Howard Zinn, "Foreword", in *Ecocide of Native America: Environmental Destruction of Indian Lands and Peoples*, Donald A. Grinde and Bruce E. Johansen (Santa Fe, NM: Clear Light Publishing, 1995), 1.

industry, there is no way to overlook the fact that the odds are overwhelmingly stacked against him.

In the last section of *Winter Road*, a close up of Syncrude operations factory reinforces this feeling of being up against a powerful foe. Viewed at night from the car of Cree writer and Greenpeace activist Melina Labourcan-Massimo, the site is monstrous. Its lights look like that of a city huddled below clouds of emissions, which industry representatives (unconvincingly) tell us are mostly steam. What was once a pristine forest has been turned into a suffocating nightmarish dystopia. For Labourcan-Massimo, this sight is indicative of "how far a country is willing to go. To risk our future." The drive and discussion with Labourcan-Massimo is the key to unlocking what the game tells you is your goal: to get into a mining site, which are for the most part entirely closed off to the public.

Like *Offshore*, *Fort McMoney* takes the player a on circuitous route that also ends in a kind of inertia. In the last section of the game, a Syncrude spokesperson (who ironically although unsurprisingly used to work for Alberta's ministry of the environment) takes you on site to view the mining operations. The hope, which the game has encouraged, that we can reach the 'heart' of the tar sands industry by reaching its centre of operation, is not fulfilled. While we do get on site, what we are privy to is limited. Presumably knowing that the filmmakers are critical of the environmental impacts of the industry, the spokesperson, speaking only in industry propaganda, shows us areas which are undergoing the 'reclamation' process. The land, which appears like one massive dirt pit, with grey toxic lakes dotting the landscape, will apparently be turned into rolling hills, on which, the spokesperson tells us, one even might be able to play golf! This is a far cry from many of the oil companies' propaganda videos which picture land reclamation as lush forests full of wildlife. The game comes full circle: we've reached the heart of the tar sands

industry only to feel what you were told multiple times in the journey: that you are at the edge or end of the world.

Over the course of your journey in Northern Alberta, you collect a massive amount of information over multiple sittings. This information is not, however, organized into a neat narrative. By denying the player any stable or guiding perspective, the game acknowledges the complexity of the situation. This strategy suspends any sense of closure. In its stead, what is gained for the player is an emotional and affective attachment to the place and its inhabitants, which drives you to continue returning to the work. Asking for the player's participation in polls and referenda, the game creates a sense of community. This attachment to the world is built slowly. Emerging from the accumulation of stories and places, it piles up as a palimpsest of encounters.

I started thinking and writing about *Fort McMoney* long before the 2016 fires that devastated Fort McMurray. Because I had spent so much time in the game I immediately wondered about the safety of the real people featured in the i-doc when the news broke. But I also could not help but to think of the allegorical dimensions of such an event, and how it would further veil the processes of slow violence that the i-doc revealed. The fires may not have been directly related to the petroleum industries of Northern Alberta (a discarded cigarette was the most likely culprit), but the unseasonably warm and dry weather of April 2016, an indicator of the new volatile weather patterns that climate change has brought about, exacerbated the situation considerably. And counter-intuitively this is part of the problem. Because the tar sands or the petroleum industry as a whole were in part to blame for this disaster, the Fort McMurray fires produced—if I may say so, without in any way meaning to be dismissive of the real devastation this fire caused—an almost too perfect image of the vicious cycle of CO_2 emissions.

As in Elizabeth Kolbert's short piece in The New Yorker, they could be summed up as "the fires of climate change."[303] Such a reading remains, however, fettered to a limited understanding of catastrophe, from which the i-docs emancipate us. The i-docs open up the possibility that the violent extent of climate change cannot be summed up in a fire, however devastating.

Offshore and *Fort McMoney* are both interactive works that, in different contexts, track the slow violence of the new extreme measures of the fossil fuel industries. They position the viewer/player within a network that connects them to not just the people, places, times, ideas, facts, and so on, of their immediate contexts, but also in their use of web-based technologies within a wider network of other players. Their interfaces and design structure thus create an architecture, which not only contains vast archives of information and images but generates a variety of multifaceted encounters: new relations, new experiences, and new configurations of situations are opened up. In both i-docs, the layers of encounters across time within the spaces of the two oil worlds are a tactic in bringing "emotionally to life" a violence that sometimes eschews traditional modes of representation. And what they so frighteningly document are different kinds of losses: people, places, environments, species, cultures. These are losses that, the playing of these games tells us, not only have occurred but will continue to occur. This laces the experience of playing these works with a sense of despair. In their lack of resolution, the games' moments of fear and outrage for a violence that, since it has already been unleashed, is hard to stop, are coupled with inertia. This combination gives these works an overwhelmingly melancholic tone.

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[303] Elizabeth Kolbert, "Fort McMurray and the Fires of Climate Change," *The New Yorker*, May 5, 2016, https://www.newyorker.com/news/daily-comment/fort-mcmurray-and-the-fires-of-climate-change

One cannot speak of petroculture and melancholia without mentioning the work of Stephanie LeMenager, who has outlined an emergent melancholy that follows from the 'love' of oil, so deep-seated in American ways of life. My use of melancholy does not conflict with her theories; but, insofar as the 'lost object' to which the melancholy is directed differs from LeMenager's, I am thinking about how melancholy operates from a different angle. Through the analysis of cultural artefacts and events, LeMenager discerns a "competition between emotional investments in modernity as we know it, through its fossil fuel infrastructure, and in ecology, as the network of human-nonhuman relations we theorize as given habitat."[304] If modern environmentalism is characterized by a melancholia for 'nature,' LeMenager thinks it may be eclipsed in the twenty-first century by "an unresolvable grieving of modernity itself, as it begins to fail."[305] She calls this 'petromelancholia.' I see melancholy operating in *Offshore* and *Fort McMoney* not as a grieving for a modernity built upon the burning fossil fuels, but as an activist tactic that refuses to accept the continuation of this kind of 'progress' and the various kinds of violence that accompany it.

V. Melancholy as activism

Melancholy/melancholia comes from the Greek melas (black) and khole (bile) and up until the eighteenth-century melancholia was considered a disease of the spleen, which was thought to have produced black bile, one of the four humours, along with blood, phlegm, and yellow bile. Dark, dry, cold, heavy, dense, gross and binding, black bile was cast as the metabolic agent of

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[304] LeMenager, "PetroMelancholia: The BP Blowout and the Arts of Grief," 27.

[305] Ibid., 27.

Earth, much like oil is today. Melancholia occurred, in this thinking, when there was an excess of black bile in the body.

The term has been used to describe a wide range of medical disorders throughout the ages, all of which were accompanied by a particular mental state characterized by sadness, fear, and withdrawal.[306] One of the most noted theorists of melancholia is Sigmund Freud, who in his 1917 essay "Mourning and Melancholia", distinguishes between the psychological and physiological states of melancholia and mourning. The two are related as they are both responses to the loss of a loved person, object, or idea. But whereas mourning represents the 'healthy' process involved in a painful loss, melancholia, for Freud, turns pathological. Freud notes that while the mourner withdraws temporarily from the world, eventually the loss of the beloved object is accepted, and the libido attaches to another object.[307] The sufferer thereby 'returns' to the world. But for the melancholic, it is the ego itself that becomes "poor and empty."[308] That is, the attachment to the lost object is not directed to another object, but is instead directed inward; the lost object becomes associated with the ego itself, thus creating an inner division.[309] While many critics still rely on this distinction between mourning and melancholia, Freud in fact later subverted the distinction between pathological and normal mourning in his essay "The Ego and

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[306] Jennifer Radden, ed., *The Nature of Melancholy: From Aristotle to Kristeva* (London: Oxford University Press, 2000), 5.

[307] While Freud in fact eventually changed his hypothesis on mourning and melancholia, rendering mourning more akin to the melancholic state. See T. Clewell, "Mourning beyond melancholia: Freud's psychoanalysis of loss," *Journal of the American Psychoanalytic Association* 52.1 (Winter 2002): 43-67

[308] Freud, "Mourning and Melancholia," *The Standard Edition of the Complete Psychological Works of Sigmund Freud, Volume XIV (1914-1916): On the History of the Psycho-Analytic Movement, Papers on Metapsychology and Other Works* (London: Hogarth Press and the Institute of Psychoanalysis, 1966), 246.

[309] Anne Enderwitz, "Modernist Melancholia and Time: The Synchronicity of the Non-Synchronic in Freud, Tylor, and Conrad" in The Literature of Melancholia: Modern to Postmodern, eds. M. Middeke and Christina Wald (London: Palgrave MacMillan, 2011), 175.

the Id" (1923). Here, he recognizes that a melancholic attachment with lost loved ones, "who are resurrected within the self, or introjected," is a crucial facet of the development of subjectivity.[310]

Anne Enderwitz sees in Freud's understanding of melancholia a synchronous existence of the non-synchronic that is paradigmatic for his broader ideas about the relation between past and present. In melancholy, the introjection of the lost object into the ego itself brings the past into the present. The past "is formative of the present on a day to day basis as objects of desire are embodied and kept alive in the medium of the self."[311] Time is spatialized in melancholy "so that the present self can accommodate different times… Through melancholic identification, attachments from various time persist in the self."[312]

The link between spatialized time and melancholia is found elsewhere in discussions of melancholia. In Walter Benjamin's *Trauerspiel*, for instance, spatialized time becomes a main facet of the German mourning play and of his presentation of history. Sean Carney tells us that just as Benjamin presents "history not as a temporal chain of events but as a spatial arrangement, challenging the historicism of cause-and-effect narrative, so too in the baroque drama history finds itself manifested or figured not temporally but arranged spatially."[313] History in the *Trauerspiel* merges into the setting.[314] In doing so, time becomes a "standstill of becoming", continuity "crumbles and the future appears foreclosed."[315] The idea is that the collapsing of past

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[310] Patricia Rae, "Modernist Morning," in *Modernism and Mourning*, ed. Patricia Rae (Lewisberg: Bucknell University Press, 2007), 16.

[311] Enderwitz, "Modernist Melancholia and Time," 176.

[312] Ibid.

[313] Sean Carney, *Brecht and Critical Theory: Dialectics and Contemporary Aesthetics* (London: Routledge, 2006), 68.

[314] Walter Benjamin, *The Origin of German Tragic Drama,* trans. John Osborne (London: New Left Books, 1977), 92.

[315] Enderwitz, 174.

and present forestalls the future and "devoid of the hopes and plans that constitute the future of the human, life is emptied of meaning."[316]

The relationship between melancholy and structures of time—a time out of joint—resonate in *Offshore* and *Fort McMoney*. Their disruption of the flow of linear time through the structure of the database, in which we are given snippets of moving image documents embedded within a spatial platform, quite literally presents time as spatialized. While the works make the viewer choose one particular story at a time, the potential for simultaneity is always there. The stories are formed as networks of multidimensional events. We are presented with a simultaneity of different times or with a "synchronicity of the non-synchronic."[317] In *Offshore*, especially, the characters and their situations seem to 'haunt' the present of the CGI rig. We can also think of the inertia felt in the playing of the games, as well as the lack of resolution, as being related to the structures of melancholy in that the games seemingly foreclose of the progression of the future and instead 'pile up' the past. That is, while there are certainly stories that incite feelings of melancholia, these are heightened by a formal architecture that equally evokes a melancholic imaginary.

But we needn't take their melancholic aspects to be indicative of a "life emptied of meaning" as in Carney's reading of the *Trauerspiel*. The lack of resolution and the disruption of linear time also implies an open-endedness that aims to work outside of traditional structures of narrative. In the context of the catastrophic force of the fossil fuel industries, we can see how melancholy can function as an affective structure of resistance: this is a refusal to accept the loss of human and nonhuman lives and entities, a strategy to keep their stories aligned and 'alive'.

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[316] Ibid.

[317] Ibid.

What Patricia Rae calls resistant or activist melancholia is a means of "keeping things unsettled."[318] She refers back to the strategies of the Greek heroines Electra, Antigone, and Medea who use "militant lamentation" as a way to counter the state's attempt to circumscribe mourning. Not agreeing to 'come to terms' with a loss is a means of disrupting social order. But there are also real-life examples of such tactics. Rae points to the ways in which mothers who lost children in the purges in Argentina and Serbia, in 9/11, and in the wars generated in the aftermaths of these events adopted tactics of militant sadness. In the context of the AIDS catastrophe, Douglas Crimp has similarly argued that 'completed mourning', the acceptance of loss, results in the restoration of the status quo. As Rae states, "consolations only serve to repress the full meaning of what has happened above all the question of who is responsible for the deaths."[319] Activist melancholia is a means to sustain a mode of resistance, a refusal to accept the losses and 'move on', preventing "a catastrophe from becoming assimilated into the order of things."[320]

Melancholy can also be a means of integrating those parts of slow violence that are out of reach of the present. Jacques Derrida's figure of irreconcilable mourning—the unsettled crypt—opens up to include "the ghosts of those who are not yet born or who are already dead, be they victims of wars political or other kinds of violence, nationalist, racists, colonialist, sexist, or other kinds of exterminations, victims of the oppressions of capitalist imperialism or any of the forms of totalitarianism."[321] We could add here too the victims of slow violence. Irreconcilable mourning or activist melancholia could be a way then to generate affective and emotional

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[318] Patricia Rae, "Modernist Mourning," 18.

[319] Rae, 19.

[320] Rae, 18.

[321] Jacques Derrida, *Spectres of Marx*: *The State of the Debt, the Work of Mourning, and the New International*, trans. Peggy Kamuf (New York: Routledge, 1994), xix.

attachments to those not yet, but who will be, harmed by slow violence. And these lives, stories, and unfolding violence are preserved on the internet in a participatory form.[322]

It should be noted that there has been recent scholarship surrounding the affective and emotional responses to the lived reality of climate change and other kinds of environmental catastrophe that have been framed within mourning and grief. Ashlee Cunsolo and Karen Landman's *Mourning Nature*, for instance, begins with the premise that "we are entering a time when ecologically based mourning seems likely to occupy more and more of our experience."[323] The anthology contains a variety of essays that deal with the loss of the nonhuman living and non-living. The prologue recounts Cunsolo's own research in Labrador and which led to the book's key questions surrounding how we mourn the natural world. There, she interviewed many Inuit people whose environment, on which their livelihoods and culture depend, was quickly changing. She recognized that her interviewees had entered into a phase of mourning for their lost lands, and Cunsolo herself, empathizing with such a loss, also felt adrift in the waves of grief for the environment.

In addition to the possible regressive functions of mourning intimated above, it is my contention that the experience of environmental atrocity, which is usually mediated, is not best described through the category of mourning. Put differently, I wonder if 'mourning' is the correct verb to describe the emotional and affective state that many of us face daily as we come to terms with climate change or with the slow violence of the fossil fuel industries? Upon seeing and hearing stories about the loss of sea-life in the Gulf or the total decimation of forests in

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[322] In *Living Oil,* LeMenager speaks of the blogosphere as a space in which an "environmental melancholia" can be "enabled as an effective means of preserving lost objects (lost lives) through Internet sociality." LeMenager, 117.

[323] Ashlee Cunsolo and Karen Landman, eds., *Mourning Nature: Hope at the Heart of Ecological Loss and Grief,* (Montreal: McGill-Queen's University Press, 2017), 6.

North Alberta does not resemble my experience with mourning. Losing a loved one is, it seems to me, a deeply private and all-encompassing suffering in which daily life and its activities seem frivolous. It is an emotional, affective, and physical experience in which the body feels at one and the same time equally leaden and empty, like there's a black hole—dense with everything but also hollow, made of nothingness itself—forming in your chest exposing and eating away at your innermost self. It is a terrifying, slow-moving experience of 'the world will never be the same.' While one can imagine feeling like this intermittently upon learning about or witnessing species or land or water loss, it strikes me that this is *not* what most of us, even those who spend most of their waking life researching and thinking about climate change, are feeling on a daily basis, and in spite of the fact that we are precisely living through events which are rendering the world as to never be the same. Instead I feel more closely akin with how Naomi Klein has expressed her climate fear: "as low-level melancholy, punctuated by moments of panic," not "full blown grief."[324]

With regards to climate change, slow violence, and other protracted catastrophes, melancholy—activist melancholy—is a more productive framework. While, grief can be a means "of making connections, of establishing kinship, and of recognizing [and taking responsibility or] the vulnerability and finitude of the other,"[325] it is this presupposition that something has died or is gone that is problematic. "We don't grieve abstractly", as Nancy Menning says, "we mourn particular losses of people, places, animals, objects, and ideas to whom and to which we are

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[324] Klein, *This Changes Everything*, 419.

[325] James Stanescu, "Species Trouble: Judith Butler, Mourning and the Precarious Lives of Animals" *Hypatia: A Journal of Feminist Philosophy* 27.3 (August 2012): 568.

attached."[326] And while certainly there are real cases of things dying and disappearing—there is

possibly a mass sixth species extinction underway right now! —if we consider the context of

slow violence and climate change through mourning we both accept the losses and almost

precipitate the future losses. For Timothy Morton, some ecological discourses "[ask] us to mourn

for something that has not completely passed, that perhaps has not even passed yet" and in doing

so they inadvertently (and metaphorically) kill that which they mean to protect and preserve.[327]

In creating platforms imbued with melancholy, *Offshore* and *Fort McMoney* ask us to resist

accepting the inevitability of the systems and structures of slow violence and put us into relation

with people, things, contexts that are beyond our given temporal and spatial frameworks, just

like the workings of slow violence itself. In doing so, they gesture to futures that we do not have

to accept.

Many works of interactive documentary suggest that the form can promote 'social

change.' I see this potential in *Offshore* and *Fort McMoney* but not in what has become a too

facile and cliché understanding of the literal activation of the viewer in the interactive form.

'Activist melancholy' is a means of recognizing how the social and political force of these

interactive documentaries emerges in the relationship between content and form, in their

generating of an affective knowledge of their subject matters. The point is not whether the

viewer/player then goes out to do something about the fossil fuel industry (although this would

be welcomed). It is rather that, in adopting a formal and narrative tactic in which straightforward

narratives and simple resolutions are withheld, these i-docs embody the situation of a violence

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[326] Nancy Menning, "Environmental Mourning and the Religious Imagination" in *Mourning Nature: Hope at the Heart of Ecological Loss and Grief*, eds. Ashlee Cunsolo and Karen Landman (McGill-Queen's University Press, 2017), 39.

[327] Timothy Morton, "The Dark Ecology of Elegy" in *The Oxford Handbook of the Elegy*, ed. Karen Weisman (London/New York: Oxford University Press, 2010), 254.

that will not simply go away. The predicament of slow violence permeates the very form of these works. The viewer is thus implicated in this radical insight; they become part of the melancholic structures, when they engage with the works.

As such, *Offshore* and *Fort McMoney* depart greatly from Buell's thesis that exuberance and catastrophe are the twin motifs of fossil fuel culture, at least of twentieth century fossil fuel culture. Any opportunity for exuberance is undercut by the melancholic structures of the works. Given that the slow violence of fossil fuel industries is bound up in a new kind of catastrophe— the protracted, indirect, and often invisible—we could speculate that it is melancholy that replaces exuberance as the counterpart to this new form of catastrophe. We should wonder, then, what a new marriage of melancholy and catastrophe could possibly imply?

The narratives that Buell points to, which similarly eschew exuberance, may, according to him, suggest a lack of faith in stability. If the exuberance of fossil fuel narratives betrayed an unrelenting belief in progress, in which catastrophe was just an unfortunate (but also sometimes exciting) side effect, the 'new' motif of melancholy intimates, accordingly, a waning in the belief of progress, or at least in the kind of promethean progress built upon the exploitation of Earth. For, melancholy, as it was discussed, is precisely a state in which progress is suspended. Climate change and slow violence reveal the dark underbelly to modern 'progress' and they problematize easy solutions for moving forward. Similar to my readings of *Offshore* and *Fort McMoney*, melancholy may potentially be found across a broader landscape of 21st century oil narratives and may also be cultural signs of a means of resisting the current catastrophic trajectory that the world is on. Of course, a more thorough study of a wider range of narratives would be needed to substantiate such a claim.

But *Offshore* and *Fort McMoney*, alongside these other oil narratives, may provide an answer to the question: what does it feel like to live within the catastrophe of climate change? These works tell us that it is not the heart-pumping, adrenalin fuelled, fight or flight scenario we have felt or imagine would feel in the experience of a conventional catastrophe. It is instead something akin to melancholy: lethargic, heavy, slow, with moments of trepidation, a cold sweat. The 'bodies' of these works stand firmly within the present catastrophe, embracing what it means to live and die in the now of climate change and slow violence; refusing to move on, 'get on with it' or 'come to terms', they implicate the spectator in this melancholic milieu through their interactivity as an effort to forge a kind of resistance to the relentless search for oil and its slow, violent destruction of Earth.

CHAPTER THREE

The Matters of Matter in the Era of Climate Change: Artistic Imaginations of an
Entangled Earth.

Image 15, Francisco de Goya Y Lucientes, *Fight to Death with Cudgels* (1820-23). Museo del Prado, Madrid.

I. Refocusing the material world

One of the most famous of Goya's 'Black Paintings,' *Fight to the Death with Cudgels* (1820-23)

(Image 11), depicts two men engaged in a brutal and—as the title makes clear—deadly fight.

Blood drips down one man's face as the other man covers his own with an arm; clubs swing high

in the air from both sides. There are no spectators watching this fight within the painting—only

the viewer who stands outside the frame. Alone, the two men are positioned against a hilly and

foreboding landscape as storm clouds slowly gather, threatening to engulf the last of the blue sky. Since the men's vicious exchanging of blows commands our attention, it takes a moment to realize something very strange about this scene: the men are up to their knees in quicksand. Any question of who might win the fight is replaced with an acknowledgement that they are both doomed. Their combative actions will make them sink lower and lower into the ground.

Scholars have read this painting as a moral tale about the brutal nature of humankind, a brutality that is ultimately self-destructive and futile. In such a reading, there are two active subjects: the men beating each other to death. We could also include a third—the painting's spectator who is engaged in witnessing this fight. But Michel Serres has a different take on it. For Serres, this painting reminds us that there is another, fourth subject who is active in this scene: the quicksand. Actively swallowing the men alive, the 'natural world' in this painting is not just a landscape, a background that is 'over there,' a setting or ground for the actions of humankind. Goya's painting gestures at a 'world' that is moving into the foreground. And it evokes a warning that to ignore the world—as these men do—is to risk our own destruction.

Serres' interpretation of Goya's painting opens his book *The Natural Contract* (1992). Here, he contends that global warming threatens to undo Western culture, which has, for the most part, been defined against and above 'nature'. He locates the root of the problem in Cartesian dualism—that foundational philosophy that posits human beings as the subjects of the world and that relegates everything else to the status of object, something to be conquered, appropriated, and exploited for human gain. More specifically, this relationship with the world 'out there' is, for Serres, defined by war and property. "Our culture abhors the world," he

states.[328] But if once this abhorrence took the shape of an indifferent neglect and disregard, today

our relationship with the world is hard to ignore:

> Earth, waters, and climate, the mute world, the voiceless thing once placed as a décor
>
> surrounding the usual spectacles, all those things that never interested anyone, from now
>
> on thrust themselves brutally and without warning into our schemes and maneuvers. They
>
> burst in on our culture, which had never formed anything but a local, vague, and cosmetic
>
> idea of them: nature. [329]

Furthermore, whereas 'nature' was once local—"*this* river, *that* swamp," he explicates—, it is

now global.[330] The world now challenges those who have for a long time seen themselves as its

masters: "Henceforth, men [sic] come back into the world, the worldly into the worldwide, the

collectivity into the physical. It's a bit like the era of classical natural law, but with big

differences, all of which have to do with the recent passage from the local to the global and with

our renewed relationship to the world, which was long ago our master and of late our slave,

always and in all cases our host, and now our symbiont."[331]

     In order to avoid global environmental catastrophe, nature, for Serres, must be considered

an active subject in a legal sense. It must be afforded a natural contract, akin to the social

contract. "Back to nature, then!" he exclaims, "That means we must add to the exclusively social

contract a natural contract of symbiosis and reciprocity in which our relationship to things would

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[328] Michel Serres, *The Natural Contract*, trans. Elizabeth MacArthur and William Paulson (Ann Arbor: University of Michigan Press, 1995), 3.

[329] Michel Serres, *The Natural Contract,* 3.

[330] Serres, 38, my emphasis.

[331] Ibid.

set aside mastery and possession in favor of admiring attention, reciprocity, contemplation and respect."[332]

There have been successful examples of doing just this. In 2008, Ecuador passed the first constitutional rights of nature and Bolivia passed a similar law, the Law of the Rights of Mother Earth, in 2010. Mihnea Tanasesciu locates Ecuador's passing of this law at the intersection of a series of historical events: a new government, led by Rafael Correa, that was radically opposed to the status quo; the successful, but long history of Indigenous land rights protests, organized by the Confederation of Indigenous Nationalities of Ecuador; and a history of massive environmental damage caused by the oil industry.[333] The strength of Indigenous voices in these countries need to be highlighted as a key factor in the creation and passing of these laws. In both Ecuador and Bolivia, the laws present an understanding of Earth and human beings' relationship to it rooted in local Indigenous philosophies. Contrary to the Western treatment of nature as property, these Indigenous cultures consider *pachamama* as a living entity that deserves the status of subject.

For the West, such radical reconfigurations of the legal status of Earth are not likely to occur any time soon. But many maverick thinkers—artists and scholars—are working towards changing perspectives on the relationship between Earth and human beings. A 'geological turn' encouraged by the naming of the Anthropocene has generated many diverse and novel meditations on the nonhuman world, in both artistic practice and academic scholarship. Such work, like Goya's painting, constitute stories. And "stories," as Christophe Bonneuil tells us, "matter for the Earth":

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[332] Ibid.

[333] Mihnea Tanasesciu, "The Rights of Nature in Ecuador: the Making of an Idea," *International Journal of Environmental Studies 70*.6 (2013): 847.

Indeed, the stories that the elites of industrial modernity have told themselves—about nature as external and purposeless, about the world as resource, about human exemptionalism, about progress and freedom as an escape from nature's determinations and limits, about technology as quasi-autonomous prime mover—have served as the crucial origins and conditions of the Anthropocene.[334]

What is needed now, then, are new stories that provide different ways of knowing and novel imaginations of Earth.

We might be tempted to say that in the Anthropocene, the 'conquering' of Earth by 'humankind' has led us to a similar situation as Goya's fighting men. From this perspective, our brutality against Earth has come back to bite: the viscous mud has gripped our legs, dragging us downward as we continue to fight our battles—with it and with ourselves—above. But such a perspective is still human-centric. Maybe, then, we need to shift our perspective even further, away from 'our' tragedy underway. Perhaps we can see the ground that grabs hold of the men's legs not as that which sinks human beings, but as a ground that is rising: a veritable 'uprising' of that which has previously been deemed unworthy of human concern and respect. Or as Bruno Latour puts it, it is "as if the décor had gotten up on stage to share the drama with the actors. From this moment on, everything changes in the way stories are told…"[335]

This is a chapter about stories of inanimate earth, and about why it matters that we closely consider the matter of Earth. The examined artworks practices are exemplary of modes of mattering Earth and its earth differently. They (re)figure and (re)think relationships between

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[334] Christophe Bonneuil, "The Geological Turn: Narratives of the Anthropocene," in *The Anthropocene and Environmental Global Crisis: Rethinking Modernity in New Epoch* eds. Clive Hamilton, C. Gemme, and Christophe Bonneuil (London: Routledge, 2015), 15.

[335] Bruno Latour, *Facing Gaia: Eight Lecture on the New Climactic Regime*, trans. Catherine Porter (Cambridge, UK: Polity, 2017), 2.

human and nonhuman entities through investigations of rocks, dirt, fossils—the matter that makes up Earth. Insofar as they direct their gaze to the ground these artworks can be considered 'geological.' They play a part in what Elizabeth Ellsworth and Jamie Kruse call the 'geologic now', adding "new layers of cultural meaning and aesthetic sensation to the geologic" in an era in which human beings have become the agents of planetary change.[336] The projects include three short films and one photographic series: *Darvaza* (2011)*,* a film by French artist Adrien Missika; *Stability of the System* (2016), a film by London-based artist/researchers Sasha Litvintseva and Isabel Mallet; *Asiniy Iskwew* (2016), a photographic series by Cree/Saulteaux/Métis performance artist Lori Blondeau; and *Notes from the Anthropocene* (2014), an essay film by Canadian filmmaker Terra Jean Long. In different ways, the films and photographs discussed push and pull at senses and sensibilities, undercutting staid divisions between the sentient and insentient, nature and culture, subject and object. But these projects are also grounded (pun intended!) in the socio-historical and politico-economic realities of their subject contexts, recognizing the ways in which matter is intertwined with various human practices.

Unlike previous chapters, *Darvaza*, *Stability of the System*, *Asiniy Iskwew*, and *Notes from the Anthropocene* are not explicitly focused on catastrophe. Climate change, and the Anthropocene more broadly, however, are the *raisons d'être* of these works. The realities of climate change necessitate shifting many ways in which the materials of Earth, animate and inanimate, are thought. These projects offer avenues towards transforming dominant patterns of

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[336] Elizabeth Ellsworth and Jamie Kruse, "Introduction," *Making the Geologic Now*, eds. Ellsworth and Kruse, http://www.geologicnow.com/intro_Ellsworth+Kruse.php

thought and habitual actions that undergird the damaging position, at least within a Western normative framework, that human beings are sovereign rulers of Earth.

As such, these artworks are part of a renewed focus in scholarship and creative practice on materiality. 'New materialism' is an umbrella designation for a varied body of scholarship that attempts to (re)think nonhuman entities, in themselves and in their interrelations with the human sphere. While new materialism provides us some tools with which to understand the four artworks discussed, it has had its fair share of critics, who rightly point to some of the flaws of new materialist thought. In the following section I provide an overview of the key contours of 'new materialist' thought, as well as consider some of the major criticisms of this philosophical approach to nonhuman entities. But my point here is not to take a strong stance or to adopt one approach as a unified theory. My readings of the films and photographic series amalgamate and move in between these different theoretical approaches to thinking the non-human world.

II. What's the Matter? New Materialism, Historical Materialism, and Indigenous Onto-Epistemologies

As intimated above, 'new materialism' comprises different schools of thought: vibrant materialism, actor-network theory, speculative realism, object-oriented ontology and others. While there are significant differences between the ideas in each school, there are nevertheless some key commonalities. In general terms, we can say that all attempt to think the reality of objects beyond human meanings and uses. They understand objects to have *agency* and propose that "humans and objects form networks or assemblages across which agency is distributed."[337]

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[337] David Joselit, Carrie Lambert-Beatty, and Hal Foster, eds., "A Questionnaire on Materialisms: 41 Responses," *October* 155 (Winter 2016): 3.

Matter, in these perspectives is not passive and inert, but rather active and creative. Accordingly, they present a "flat ontology" in which human beings are positioned alongside other living and nonliving things. (For the purposes of this chapter, I am less interested in object-oriented ontology and speculative realism, although thinkers from these fields do make appearances, as they tend to be situated within philosophical debates not entirely conducive to the discussion of human-made and human-experienced art works.)

Like Serres, new materialisms attempt to move beyond the Cartesian dualisms that have defined the Western philosophical tradition: human/nature, society/nature, subject/object. Rather than treat matter as brute and inert, "a passive substance to be mastered and manipulated by active human subjects", new materialists posit that the world of things is constitutive and creative, mobile and active, "producing effects and forming connections."[338] In this way, new materialists attempt to decentre the human, to disavow the privilege of the human perspective, and to undermine human mastery.[339] This is done in varying ways. Bruno Latour's actor-network theory (ANT), for instance, understands agency as something that arises in the relations of entities.[340] Any entity can be an actor, or "actant" to use ANT's terminology, insofar as it is embedded in network relationships and "modifies a state of affairs by making a difference."[341] It is "any entity that plays a role in a narrative; that is, any entity that other actants in the network

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[338] Simon Choat, "Science, Agency and Ontology: A Historical-Materialist Response to New Materialism," *Political Studies* published online, November 3, 2017: 4. http://journals.sagepub.com/doi/abs/10.1177/0032321717731926

[339] D. Graham Burnett, "A Questionnaire on Materialisms," eds. David Joselit, Carrie Lambert-Beatty, and Hal Foster, *October*, Iss. 155 (Winter 2016): 19.

[340] Angga Dwiartama and Christopher Rosin, "Exploring agency beyond humans: the compatibility of Actor-Network Theory (ANT) and resilience thinking," *Ecology and Society* 19.3.28. https://www.ecologyandsociety.org/vol19/iss3/art28/

[341] Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network Theory* (Oxford: Oxford University Press, 2005), 52-53.

recognize, take account of, or are influenced by."[342] An actant can thus be human or nonhuman,

living or non-living, material or conceptual. Emerging originally within the field of sociology,

ANT thus provides a novel approach to understanding society insofar as it moves beyond merely

the human to consider the relationships and associations between human beings and the entities

and objects that surround them. In *Vibrant Matter*, Jane Bennett builds on Latour, adopting his

terminology of actants who are endowed with the capacity "to make a difference, produce

effects, [and] alter the course of events."[343] But vibrant materialism is not just about giving

agency to objects. It is rather an endeavour to "uncover a whole world of resonances and

resemblances—sounds and sights that echo and bounce far more than would be possible were the

universe to have a hierarchical structure."[344] Bennett's work is interested in re-enchanting objects

in a way that may produce new ethical interrelations between humans and things. Enchantment

here becomes "an 'affective force' that might propel 'ethical generosity', a way of thinking that

contests dreary and destructive modes of reducing matter to raw material, diminishing objects to

uses."[345] Objects, Bennett notes, have a kind of "thing power" that beckons us. Thing-power is

that "strange dimension of matter" as it presents itself as an "out-side."[346] Bennett states that

thing-power "seeks to acknowledge that which refuses to dissolve completely into the milieu of

human knowledge."[347] Karen Barad produces a similar theory of the assemblages of things but

uses quantum physics as the conceptual-empirical base for her argument in *Meeting the Universe*

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[342] Anders Blok and Torben Elgaard Jensen, *Bruno Latour: Hybrid Thoughts in a Hybrid World* (New York: Routledge, 2011), 48.

[343] Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham, NC: Duke University Press, 2010), 96.

[344] Bennett, *Vibrant Matter*, 99.

[345] Jeffrey Jerome Cohen, *Stone: An Ecology of the Inhuman* (Minneapolis: University of Minnesota Press, 2015), 9.

[346] Bennett, 3.

[347] Ibid.

Halfway. She uses the term "intra-action" to signify "the mutual constitution of entangled agencies."[348] Agency, for her, emerges in intra-action. It does not proceed interaction.[349] These are just a few examples of the ways in which nonhuman agency is being recast in contemporary theory. While these thinkers are rooted in different disciplinary contexts, they all nonetheless generate a picture of the entanglement of things, of a world that is always 'naturalcultural,' to use Donna Haraway's term.

Acknowledging the agency of things is a move to decentre the human being, and thus new materialism shares conceptual premises with posthumanism. The idea that human beings are the 'masters' of Earth is upended; instead, humankind is positioned as one force alongside and intertwined with many other agents. As Jessica Horton and Catherine Berlo state, "the ecological promise [of new materialism] is to invite a dialogue among a wider host of agents, imaging a profoundly relational world in which humans interact with, rather than act upon, others."[350] But such ideas are not without their detractors.

The renewed focus on things, on asserting their power and eliciting their re-enchantment, has led many to question whether new materialism represents a capitulation to the commodity fetishism of capitalism.[351] D. Graham Burnett facetiously writes: "things are kind of magical, aren't they? Yes, indeed! And who doesn't love material culture? Why it's almost like Etsy! Like

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[348] Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and* Meaning (Durham, Duke University Press), 33.

[349] Latour's positing of actants as things that *do* rather than *are* bears similarities to Barad's notion of intra-action, but, unlike Latour, Barad wants to get away from thinking about individual entities as such.

[350] Jessica L. Horton and Janet Catherine Berlo, "Beyond the Mirror," *Third Text* 27.1 (2013): 17-18.

[351] For example, see Julia Bryan Wilson's, D. Graham Burnett's, and Andrew Cole's entries in "A Questionnaire on Materialisms," eds. David Joselit, Carrie Lambert-Beatty, and Hal Foster, *October*, Iss. 155 (Winter 2016): 3-111.

Etsy kissed by philosophy!"[352] But more important than the potential for fetishizing thingness, new materialism's flat ontology, its decentring of the human being, has been criticized as a means of destroying politics. The reading of new materialism as essentially apolitical has particularly been taken up by historical materialists.

In his recent book, *The Progress of this Storm* (2018), Andreas Malm devotes a chapter to opposing the perspectives of new materialism, and throughout the book, to taking down Latourian theory as such. Malm's main point of contention focuses on the question of agency. In the context of climate change, new materialist theory, for him, inevitably leads to a displacing of responsibility. If we consider, for instance, the fossil fuel industry to be an assemblage of actants, he would ask: are we suggesting that the petroleum in the ground, the pumps used to bring it to its surface, the trucks and pipes that transport it, are equal in terms of agency in the warming of Earth? If so, does this not disavow human responsibility and practices? The flat ontologies of new materialism and the desire to decentre the human being leads for Malm to a dangerous situation in which responsibility becomes distributed as far as possible across the world of things and thus resistance becomes futile.[353] Malm tends to rely on more extreme perspectives, such as those that have suggested that we must just let climate change unfold and learn to adapt as human beings are in Earth's hands and not the other way around. "In this sort of thinking," Malm states, "it is not a question of whether the resistance is strong enough, if it will succeed or fail

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[352] D. Graham Burnett, "A Questionnaire on Materialisms," eds. David Joselit, Carrie Lambert-Beatty, and Hal Foster, *October*, Iss. 155 (Winter 2016): 20

[353] Jane Bennett's example of how agency was distributed across various entities in the great blackout of Northeastern North America is used often as an example of why new materialism is problematic.

dismally in the end, if something could be done to promote it: a priori, the endeavour is ruled out as pointless."[354]

Malm argues, contra new materialism and posthumanism, that the human needs to be the centre point in the catastrophe of climate change. Indeed, for him:

the only sensible thing to do now is to put a stop to the extension of agency. In this warming world, that honour belongs *exclusively* to those humans who extract, buy, sell, and combust fossil fuels, and to those who uphold this circuit, and to those who have committed these acts over the past two centuries: causing the climate system to spin out of control, they and they alone instigate the paradox of historicised nature. Popular talk of the warming earth as 'agent of history' should be discontinued.[355]

For Malm, historical materialism is the only credible alternative to understanding and resisting climate change. This is because according to Malm it views society as distinct but not entirely separate from nature and recognizes its uniqueness in terms of its constructive and destructive role.

Malm's contentions are formulated as pragmatic, common sense responses to the experimental thoughts of new materialism and I am sympathetic to many of his points. As numerous scholars have rightly asserted, "not all humans are implicated in the forces that created the disasters driving contemporary human-environmental crises."[356] And as Chapter 2 discussed, the effects of climate are being felt most forcefully by those who have taken little part in the

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[354] Andreas Malm, *The Progress of this Storm: Nature and Society in a Warming World* (London: Verso, 2017), 109.

[355] Malm, *The Progress of this Storm*, 112-113.

[356] Zoe Todd, "Indigenizing the Anthropocene," in *Art in the Anthropocene: Encounters Among Aesthetics, Politics, Environments and Epistemologies*, eds. Heather Davis and Etienne Turpin (London: Open Humanities Press, 2015), 244.

spheres that have created and perpetuated it. The human cannot be decentred entirely; for, 'we' are the only agents who have the capacity to do something quickly and drastically about it. But sometimes Malm's critiques seem to purposely read new materialist thought through a very narrow lens. For instance, when he cites Graham Harman's defence of Latourianism as a better theory than that of the left, because the left for Harman "is unable to conceptualize the climate threat as anything but the inevitable side effect of a more encompassing human problem called Capitalism," Malm snidely responds, mocking what he believes is Harman's position: "unlike what the left believes, the threat is *not* anthropogenic in origin."[357] While I disagree that Latourianism presents a useful alternative theory to "that of the left," Malm is set upon reading this sentence in one way—that Harman is saying climate change is not anthropogenic. Couldn't this be read in another way, as Harman suggesting that the climate threat moves beyond just the human realm and human problems? That the nonhuman entities of the world are going to be altered in ways and throughout times that surpass the historical context of capitalism? This is to say that for all its limitations, isn't there a potential in new materialisms push to understand the entanglement of agencies as a means to in fact *raise* human responsibility in the case of climate change and to develop an ethics of things? Julia Bryan-Wilson asks, "if we take seriously the idea that we are comprised of the stuff around us (and the substances inside us), might this open up important conversations about justice, accountability, and care?"[358] Or as Horton and Berlo maintain, "grasping multiple forms of liveliness has implications for questions of global

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[357] Malm, 111.

[358] Julia Bryan-Wilson, "A Questionnaire on Materialisms," eds. David Joselit, Carrie Lambert-Beatty, and Hal Foster, *October*, Iss. 155 (Winter 2016): 16.

environmental justice in raising the possibility of an ethics that binds not only affluent and poor, colonizer and colonized, but also the material entities upon which all our livelihoods depend."[359]

A response that accepts the agency of things whilst still acknowledging the historical structures of power and exploitation in the reproducing of relations is possible. Jason W. Moore provides a broad historical materialist approach in theorizing an entangled world ecology in his book *Capitalism and the Web of Life*, which results in similar new materialist tactics of disrupting the nature/society dualism. He suggests that we understand capitalism not as an economic or social system, but as a way of organizing nature. Moore's perspective returns history to nature, proposing that we adopt a dialectical perspective in which the "mosaic of relations that we call capitalism work through nature" and "nature works through…capitalism"; he calls this double movement the 'double internality.' In this figuration, nature cedes being a metaphysical concept of externality and 'humanity-in-nature' becomes a world-historical process. Likewise, Simon Choat has attempted to show how historical materialism can actually help to address some the flaws of new materialism, without having to reject all the premises of the latter, like Malm does. Against Manuel DeLanda's and Latour's rejection of socialism, Choat focuses on how a generous, non-determinist reading of Marx's views on science, agency, and ontology can help to bring historical rigour to some of the more purely philosophical dimensions of new materialism, exposing relations of power that structure how materials in the world act and interact. For example, he states that "rather than extending agency to everything, historical materialism insists that we need both to understand how different agents have acquired their powers to act and to acknowledge the asymmetric power relations within which their agency is

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[359] Horton and Berlo, "Beyond the Mirror," 18.

developed and enacted."[360] Choat's point is to show how historical materialism and new

materialism are not incompatible. These more generous attempts to think between and across

grand or high theories are in my opinion a more fertile ground for producing ways of

understanding the complex relations between human and other things in the world.

But new materialism has also been criticized from another angle: many Indigenous

scholars have pointed out that new materialist philosophies are in fact engaged, knowingly or

not, in a colonial agenda. For example, much of new materialist thought as we've seen positions

itself against what it takes for granted as 'foundational' ideas, such as Cartesian dualism. But

these are of course philosophies particular to the European academic tradition. Similarly, though

not the only offenders, new materialist thought often poses a 'we' or a 'humanity' that is taken to

be universal, when in fact it is again historically and culturally situated. In doing so, they present

what Juanita Sundberg calls the 'world as universe'—an ontological assumption of a singular

reality or nature that is not only at odds with Indigenous worldviews but also perpetuates a

colonial agenda, insofar as such assumptions contributes to erasing traditional cultural

knowledges.[361] In this, new materialism treads a well-beaten path. Indigenous perspectives may

be gaining some traction today, but, as Jessica L. Horton and Janet Catherine Berlo point out,

"after some thirty years of postcolonial critique, [even] Indigenous intellectual and artistic

activities are still relegated to deconstructing the foundational binaries of Europe."[362]

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[360] Simon Choat, "Science, Agency and Ontology: A Historical-Materialist Response to New Materialism," *Political Studies* published online November 3, 2017:14. http://journals.sagepub.com/doi/abs/10.1177/0032321717731926

[361] Juanita Sundberg, "Decolonizing Posthumanist Geographies" *Cultural Geographies* 21.1 (2014): 38; see also Zoe Todd, "Indigenizing the Anthropocene" in *Art in the Anthropocene: Encounters Among Aesthetics, Politics, Environments and Epistemologies*, eds. Heather Davis and Etienne Turpin (London: Open Humanities Press, 2015), 244.

[362] Horton and Berlo, "Beyond the Mirror," 20.

Many Indigenous thinkers have also contested the 'newness' of new materialism, noting that new materialism's focus on the agency of matter, of thinking things as active forces in connection with as well as beyond the human, are positions long held in different ways by various Indigenous onto-epistemologies. Albertan based Maori scholar Makere Stewart-Harawira suggests that Indigenous cosmologies "have much to contribute towards [an understanding of the deep interconnectedness of being] and its translation as a response to the existential crisis of our time."[363] As First Nations of Turtle Island are extremely heterogeneous, with languages and cultures informed by the specific geographies of their lands, one should not, as Stewart-Harawira points out, assume the monolithic category of 'Indigenous thought.' And yet it would not be essentializing to suggest that land as an agential force is a thread, for it appears in across Indigenous cosmologies.

To provide just one example: Vanessa Watts, a member of the Bear Clan from the Mohawk and Anishinaabe Nations, examines how "agency is circulated through human and nonhuman worlds in the creation and maintenance of society" from an Indigenous perspective in her essay "Indigenous Place-Thought and agency amongst humans and nonhumans (first Woman and sky woman go on a European world tour!)."[364] Looking at Haudenosaunee and Anishinaabe creation "histories", which "speak to the common intersection of the female, animals, the spirit world and the mineral and plant world," Watts shows how they describe a theoretical understanding of world, described as "Place-Thought."[365] Place-Thought "is based upon the

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[363] Makere Stewart-Harawira, "Returning the Sacred: Indigenous Ontologies in Perilous Times," in *Radical Ecology: Intercultural and Indigenous Approaches*, eds. Lewis Williams, Rose Roberts and Alastair McIntosh (London: Routledge, 2016), 75.

[364] Vanessa Watts, "Indigenous place-thought and agency amongst humans and nonhumans (first Woman and sky woman go on a European world tour!)," Decolonization: Indigeneity, Education and Society 2.1 (2013): 20.

[365] Watts, Indigenous place-thought," 21.

premise that land is alive and thinking, and that human and nonhumans derive agency through the extensions of these thoughts."[366] Many parallels to new materialist thought are found here, not least the understanding that all living things contain a form of agency/spirit. Watts asserts that "non-human beings are active members of society… [and] directly influence how humans organize themselves into the society"[367] Place-Thought extends beyond something like vibrant materialism or actor-network theory as it grants nonhuman inanimate things a capacity to think; as Watts says: "A river may act (flow) but does it perceive or contemplate this? An Anishinaabe perspective would respond in the affirmative."[368]

The tendency to treat Earth as property and to place human beings as its 'masters' has not only been a dominant theme in modern, Western thought. As has been suggested recently, it was extended on a global scale in the colonial projects. This means that if we want to decolonize nature, as TJ Demos' recent book *Decolonizing Nature: Contemporary Art and the Politics of Ecology* suggests, we also need to decolonize methodology. We need to situate Western philosophy as one among many other philosophies.

Michi Saagiig Nishnaabeg scholar Leanne Betasamosake Simpson tells us that for the Anishinaabe, "'theory' is generated and regenerated continually through embodied practice and within each family, community and generation of people. Theory isn't just an intellectual pursuit. It is woven within kinetics spiritual presence, and emotion. It is contextual and relational… Theory in this context is generated from the ground up and its power stems from its living resonance within individuals and collectives."[369] As a white settler who presently resides in the

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[366] Ibid.,

[367] Ibid., 23.

[368] Ibid., 24.

[369] Leanne Betasamosake Simpson, *As We Have Always Done: Indigenous Freedom Through Radical Resistance* (Minneapolis: University of Minnesota Press, 2017), 151.

territories of the Anishinaabe, Huron-Wendat, Haudenosaunee, and the Mississauga of the New Credit, I want to avoid appropriating a worldview that is not my own; but I also want to be open to other onto-epistemologies to investigate the creative potentials that they might offer in the interpretation of art. My attempt to not universalize or essentialize any one body of knowledge by considering multiple is certainly a deficient tack. But I see it as a beginning of sorts—the start of acknowledging the shortcomings of the scholarly practices in which I was educated, and indeed, of my own scholarly work. By engaging with multiple worldviews, I hope to generate meaning in ways that do not reinforce perspectives that prop up colonial agendas.

To do so, I follow Jarrett Martineau, who in his Ph.D. dissertation, "Creative Combat: Indigenous Art, Resurgence, and Decolonization," uses bricolage as a decolonizing methodology. "Although the term bricolage has etymological and conceptual roots in Western discourse and the anthropology of Claude Levi-Strauss," he explains, "it has been detourned, remixed and indigenized to reflect a critical disposition toward colonial knowledge production that seeks to challenge and subvert given structures of power."[370] Bringing together multiple ways of knowing, Martineau employs bricolage then as a "tactical emergent design and strategic practice through which to engage multiple communities, traditions, events, socio-political phenomena, works of art, and discursive sites of analysis."[371] This approach summons Juanita Sundberg's call to create dialogues "between a diversity of epistemic/ethical/political approaches, or epistemic worlds," in order to avoid a universalist perspective and instead to enact a "pluriversal world."[372] Adopting bricolage as methodology is particularly suited to the

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[370] Jarrett Martineau, "Creative Combat: Indigenous Art, Resurgence, and Decolonization," Ph.D. Diss., University of Victoria, Victoria, B.C., 2015, 34.

[371] Martineau, "Creative Combat," 35.

[372] Sundberg, "Decolonizing Posthumanist Geographies," 15.

interpretation of artworks, which are necessarily polysemic texts, here engaged with poking holes in understandings of 'world.' I agree with Martineau when he states: "Art-making becomes a critical, decolonizing political praxis when it provides us with new ways of visioning the world, reclaiming our presence, and creatively transforming reality."[373]

In the following sections, I examinee four artworks that are revisioning the world through their stories about inanimate entities. The works discussed in this chapter strike me as emblematic of the ways in which art is telling new stories about the inanimate world, opening up new modes of thought and experience that push against the boundaries of how the world has been traditionally understood. They explore how the things in the world, in particular its ground materials, are both deeply entangled with and perhaps radically separate from human beings. While expanding ways of understanding the inanimate materials of the ground, the artworks never lose sight of the specific contexts, structures, and systems of the human sphere. This recognition is important for the decolonization of nature, for it is real systems and structures that confine nonhuman things to being externalities. In other words, as much as the artworks in this chapter are about ideas and imaginations of inanimate matter, they never divorce their 'characters' from social, political, and economic realities. They remind audiences, as Horton and Berlo express, "of their precarious position in a relational world where allies are essential to flourishing."[374]

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[373] Martineau, 5.

[374] Horton and Berlo, "Beyond the Mirror," 20.

III. The Fires of Humanature: *Darvaza*

Adrien Missika's 2011 video *Darvaza* opens with thin orange smoke softly billowing against an inky, black background. The smoke does not spread outwards to fill the screen, but rather remains steady as it twists and turns in on itself. Without a referent, the swirling vapours evoke a primordial mixing of gases, like an imaginary representation of the universe after the big bang or Earth's atmosphere before it was a life-producing planet. The video slowly reveals the source of the smoke: a deep pit in Earth whose ground is aflame. First shown against the blackness of the night, the emblazoned hole looks like a fiery portal to the underworld. As we view the pit from various angles and distances, the mythological undertones of this scene are heightened by what appears to defy logic: ordinary dirt or sand is ablaze in pockets, like a thousand tiny separate fires. The film moves from night into day and we now see that the burning pit exists in the middle of a vast blue-tinged rocky arid landscape (Image 12). In the daylight, the images are less abstract, but the phenomenon we see on screen is no less formidable. The film is composed entirely of these images. We are confronted with a scorched, dry earth that seemingly exists in a time before or after life.

Image 16, Still from Adrien Missika, *Darvaza*, 2011.

The empirical reality of Missika's referent complicates what at first appears to be mythological imagery—which, as curator Bénédicte Ramade suggested, seems more primal than nature itself.[375] Nicknamed the "Door to Hell", the fiery pit is in fact a gas crater in the Karakum Desert of central Turkmenistan and named after a nearby town, Darvaza, whose name means 'the gate.' As many were informed when the story about this crater went viral in 2014, the phenomenon was created by Soviet geologists in 1971. Thinking they had found a vast oil field, the scientists set up equipment to begin drilling on the land. But the ground that they chose was not as solid as they first thought. Harbouring a cavernous pocket of natural gas, it was unable to support the weight of the drilling equipment. The ground collapsed, forming the crater we see in the film, and natural gas started escaping from the pit. The scientists knew that the leaking of natural gas was a cause for concern: it could lead to a dangerous explosion and was fast becoming lethal to the local wildlife. Thus, the geologists decided to light the gas on fire, expecting that it would burn up within a few weeks' time. Almost half a century later, the crater is still steadily burning.

The entanglement of these two levels of meaning, the mythological and the historico-scientific, is a point of entry into the question of the Anthropocene, an era whose trace on Earth's strata connects us with distant pasts and projects an uncertain future. As an otherworldly scene of a wound in the earth, created by the human search for fossil fuels, the Darvaza crater functions as a metaphor for this new geological epoch. In the curatorial text for the exhibition *The Edge of the Earth* at the Ryerson Image Centre, Toronto, where the film was shown in 2016, Ramade notes how *Darvaza* presents a version of 'humanature,' photographer Peter Goin's term that signals the

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[375] Bénédicte Ramade, ed. *The Edge of the Earth: Climate Change in Photography and Video*, (London: Blackdog Publishing, 2016), 57.

indistinct boundaries between nature and culture.[376] Humanature, or Haraway's 'natureculture,' speaks prominently to the central image in this film: fire. It is primarily in fire that the two levels of meaning in the film intersect. And in both mythology and science, the story of fire tells us that we've always been naturalcultural.

The Prometheus myth from ancient Greek culture tells how human beings were born unto Earth with the skill of making fire. When Epimetheus forgot to grant human beings an essential quality or power that would give them a chance to survive on the planet, Prometheus had to steal fire and the skill of making it from the gods Hephaestus and Athena. Bernard Stiegler reads the Prometheus myth as revealing 'human beings'' fundamental lack ("default") and essential 'prostheticity': the 'quality' or 'power' given to them by the gods that is external to the species itself.[377] The human, so Stiegler's argument goes, emerges in the world with *techne* as an essential prosthesis. And the original techne, the prosthetic without which we would not be human at all, is the art of making fire.

Interestingly, a parallel argument has been made in the natural sciences, where research has shown that our ancestors, Homo erectus, had the ability to produce and contain fire some 1.6 to 2 million years ago.[378] According to some scientists, this use of fire by Homo erectus is directly connected to the evolution of Homo sapiens. It was, they suggest, the ability to cook food over the hearth of the fire that allowed for proteins to be more easily digested and thus for

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[376] Ramade, *The Edge of the Earth*, 57.

[377] Bernard Stiegler, *Technics and Time I: The Fault of Epimetheus*, trans. Richard Beardsworth and George Collins (Palo Alto, CA: Stanford University Press, 1998).

[378] J.A.J Gowlett, "The discovery of fire by humans: a long and convoluted process," *Philosophical Transactions of the Royal Society B: Biological Sciences* 371.1696 (2016): 2.

energy to be directed to the growth of the brain.[379] So, with some poetic licence one could say that human beings were 'born' from the warmth of the fire.

But fire has not only been seen to herald the birth of humans; it has also been suggested to foreshadow their apparent mastery of Earth. The Russian biogeochemist Vladimir I. Vernadsky, who was briefly discussed in chapter one, links human beings' mastery of fire with the formation of the noosphere, a concept that predicts the Anthropocene. To remind the reader, the noosphere—the sphere of mind or reason—describes the evolutionary age in which humankind becomes the planet's main geological agent. This begins when human beings learn how to 'master' fire. The creation and control of fire marks the first instance of human beings' capacity to harness energy. It starts the long history of inventions that strive to control nature, which lead to the contemporary reliance on matter-energies such as fossil fuels. For Vernadsky, the noosphere was an evolutionary process, one both inevitable and desirable. He believed that human beings would learn how to fully and successfully control Earth. Like Vernadsky, techno-optimists—who are today referred to as the 'New Prometheans'—believe that it is possible to "use humanity's powers to create a good Anthropocene."[380]

As hinted at in *Darvaza,* such mastery also foreshadows the downfall of humans. For *Darvaza* is also a story about the search for fossil fuels. And our dependency on fossil fuels is of course a leading cause of climate change. (One should remember here the sinister undertones of the Prometheus myth, and other world mythologies, which links the mastery of fire with a kind of treachery, be it theft or kidnapping or war.) Rather than taking the techno-optimist line, the

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[379] Andrew Y. Glikson, *Evolution of the Atmosphere, Fire and the Anthropocene Climate Event Horizon* (Dordrecht: Springer, 2014), 82.

[380] Michael Keary, "The New Prometheans: Technological Optimism in Climate Change Mitigation Modelling," *Environmental Values* 25 (2016): 7.

film asks us to acknowledge the radical entanglement of humans with the world. As Karen Barad has suggested, the world is not composed of "independent objects with inherent boundaries and properties"—ontologically discrete entities—but rather "phenomena".[381] What she calls "intra-action" names the process of the "mutual constitution of entangled agencies."[382] Individual entities materialize through their intra-action with other entities, and agency—or the ability to act—emerges from this relationship. 'Things,' including humans, nonhumans, inert matter, discourses, etc., are not discrete entities but material-discursive phenomena.

What the fire-origin stories tell us—in both scientific and mythological versions—is that the 'human being' is not a discrete entity but a phenomenon, produced through its intra-actions with multiple entities that have traditionally been categorized as 'natural' or 'cultural.' Similarly, in *Darvaza,* what appears to be a 'natural wonder' in the film turns out to be a human-made 'accident.' But so far off were the scientists' hypotheses about the amount of gas under the ground, the crater has now seemingly *become* a 'natural' 'wonder.' The crater raises the question: was the fire that lit the gas leaking from it 'natural' or 'cultural'? In its multiple layers of meaning, then, the film tells us that these two categorizations cannot be separated: the Darvaza crater is a phenomenon that cannot be disentangled from the human agents—the Soviet geologists, but also the tourists who today go to witness this 'wonder'—or the natural agents — the natural gas hidden beneath, the desert floor that was too thin to support weight of drilling equipment and so on. What is more, the crater is also produced by discourses on its image, be they mythological or scientific or artistic, of which Missika's film is part.

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[381] Barad, *Meeting the Universe Halfway,* 139.

[382] Barad, 50.

The crater's 'origin' story also reveals that Earth is never altogether predictable—the scientists that ignited the natural gas did not think that the earth would then burn for almost fifty years. This film shows how the earth is inherently creative. I turn to Sasha Litvintseva and Isabel Mallet's film, *The Stability of the System* (2016), to develop this idea further.

IV. The Creative Agency of Matter: *The Stability of the System*
A mathematical point, a single animated white dot against a black background, opens *The Stability of the System*, an experimental film that combines animation with documentary images. Existing at zero, zero, this point, we are told through voiceover narration, is dimensionless, timeless, formless, both inside and outside. At the same time, it carries within it all possible forms, all actions and possibilities of expression. Narrating itself in a monologue, the point describes its transition from nothing to existence, as its awareness of itself grows into a frustration with its nothingness: "full up and fed up of only being myself. I am drowning in my formlessness. My inwardly directed frustration of my situation leads me to the discovery that I am in fact surrounded. Time begins." As the point slowly becomes aware of the space around it, of the outside blackness, the stuff that is not itself, it discovers it loves this other "because it is not me." In and through its attachment to the other, the dot becomes a spiral as it begins to create time, space, and form: "We spin outwards. Around and around. In becoming form, we have made an image of ourselves. An image with a past, present and future. An image to be seen if eyes were open to see us." A moment of blackness before an image of a dark rocky landscape appears on screen. From nothing, matter.

This opening narration borrows heavily from Italo Calvino's short story collection *Cosmicomics.* In these works, an indeterminate narrator, Qfwfq, embodies a variety of forms:

from the point that contained all the matter of the universe before the Big Bang ("All in One Point") to the mollusc whose spontaneous formation of its shell prompts the "emergence of a spiralling constellation" of forms in the world ("The Spiral"). Qfwfq is, in other words, everything: the "universe in its synchronic and diachronic metamorphoses, the whole presenting itself in different fragments."[383]

The spiral is a common trope across world cosmologies. "From the Stone Age to the Chinese urns of the 3rd millennium BC, from Celtic and Maori motifs to Indian cosmic mandalas," the spiral is, as Christine Buci-Glucksmann tell us, "doubtless the commonest of immemorial ornamental patterns."[384] For many cultures, the spiral represents the image of time and the creation of the universe—a trope to which Calvino points. Makere Stewart-Harawira explains that in Maori cosmology, the double spiral "demonstrates the interrelationships of past, present and future, of time and space, of spirit and matter."[385] It is "at once an expression of the nature of Being and existence, of genealogical connection from the earth to the cosmos and back, and the vehicle by which our world is sung into being."[386] But the spiral is also a symbol for our current period of global warming. Stewart-Harawira elucidates:

> As a hermeneutic and traditional symbol, [it] also represents the cusp on which we find
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> ourselves at this critical juncture in time, the cusp of our own great Turning, towards an
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> urgent reconsideration of the fundamentals of our socio/politico/economic ontologies of

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[383] Serenella Iovino, "Hybriditales: Posthumanizing Calvino," in *Thinking Italian Animals: Human and Posthuman in Modern Italian Literature and Film*, eds. Deborah Amberson and Elena Past (New York: Palgrave MacMillan, 2014), 226.

[384] Christine Buci-Glucksmann, "Time Spirals: from the immemorial to the ephemeral," trans. Jonathan Pollock, *Pascal Dombis: Time Spirals*, exhibition catalogue (Hong Kong: The Cat Street Gallery, 2010), 15.

[385] Stewart-Harawira, "Returning the Sacred," 74.

[386] Stewart-Harawira, 74.

being; to a reconsideration, in fact, of the kind of world we are singing into being and the nature of our relationship to that world.[387]

We can view the opening of *Stability of the System* in this light as the film gestures towards a reconsideration of our relationship to the world by probing into the vibrancy of matter and the creative agency of nonliving things. After this opening animation, the film remains with the rocky terrain of the volcanic island of Lanzarote, part of the Canary Islands. The spiralling of the mathematical point seemingly gives birth to the material world. Here, a series of static frames of different rocks and other ground materials are suggestive of the adage that the formation of the universe can be found in a pebble.[388]

Like Qfwfq, who functions as a radical levelling force through which the living and non-living, the huge and the miniscule, are intertwined and given the same ontological status, the 'characters' in *Stability of the System* move from abstract concepts, as in the opening animation, to the natural matter of the island, which comprises the middle and bulk of the film, to the human, marked by a new narrator at the end. As such, these ostensibly very different things are in the film not just juxtaposed but shown to be entangled with each other. Just like Calvino's literature, Litvintseva and Mallet's film presents a "tangle of matters, forms, and signs" in an attempt to reveal the "realm of potentialities that lies 'out there.'"[389]

Stability of the System is mostly comprised of images of rocks and other natural features of Lanzarote (Image 13). The film encourages us to think about these things in their *thingness*—their shapes, their formation, their changeability, and their deterioration. The film pays tribute to

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[387] Ibid.

[388] Jan Zalasiewicz, *The Planet in a Pebble: A Journey Into Earth's Deep History*. (London: Oxford University Press, 2010).

[389] Iovino, "Hybriditales," 220-225.

the "thing power" of the volcanic rocks. Film images have a certain propensity for highlighting such thing-power, as they present us with things on screen in such a way that we are drawn to the object not as a device or prop or background but as a kind of being in its own right. In *Stability,* such an effect is created both by the numerous images of different kinds of rocks, which lead us to pay attention to the peculiarities of each specific rock, and by the juxtaposition of what appears to be 'natural' landscapes (e.g. vistas composed of back molten rock) with 'cultural' landscapes (e.g. images of plants being cultivated), which prompts us to compare the form of the two. In this case, the formations of the 'natural' materials are just as intricate as the 'cultivated' ones. This parallel tells us that rocks have a history, a story, and a set of relations that are both inside and outside of a human framework.

More than just an examination of the "thing-power" of things, *Stability of the System,* like Bennett's scholarly work, wants to consider things as active agents. At one point in the film there is a shot of the tide ebbing and flowing onto a beach; as it does so it forms small inlets in the mixture of sand and rocks that make up the beach. The next shot, a long shot of a large stretch of the island, reveals that the island itself has a similar shape to the one just seen being created by water and sand on a particular section of the beach. Such a graphic match begs the question: do the rocks and water and wind 'know' this shape? Is it just our eyes that find these patterns or is the island creating itself as form? Like the sightless mollusc in Calvino's "The Spiral," who through his increased sense of himself, and hence of otherness, falls in love with a female mollusc and from this act of love creates a beautifully coloured and patterned spiral shell, *Stability* hints at the creative agency of the island's matter. The variegated rocks in this film point to a world not drawn by human design, but to "an interstitial field of nonpersonal ahuman

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forces, flows, tendencies, and trajectories."[390] That this is a volcanic island only furthers the sense of the creative agency of the island: its forms can be seen as an expression of the outpouring of lava and molten rock from deep within Earth. For, as Jussi Parrika has suggested, the way in which magma fossilizes all that it touches makes it the first time-based art form.[391]

We could say that there are multiple materials and forces that are creating images in this film. Ultimately, the film wants to question its own being. It is not, it seems to contend, only an expression of human subjectivity; the film is also one that is entangled with the expressions of the allegedly inert matter that it films. Like *Darvaza*, the film invites us to view it in light of Barad's theory of intra-action: it is constituted by the intra-action of many agencies—human beings, camera technology, the lava rocks, the sunlight, the wind, and so on.

Image 17, Still from Sasha Litvintseva and Isabel Mallet, *The Stability of the System*, 2016

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[390] Bennett, *Vibrant Matter,* 61.

[391] Jussi Parrika, *A Geology of Media* (Minneapolis: University of Minnesota Press, 2015), 116.

This is most clearly the case in *Stability*'s last section. We are here positioned clearly from a human perspective: we now see the landscape from a moving car and the camera 'blinks' to mimic human sight. As the landscape moves by increasingly faster, a new voice narrates a monologue that borrows from Robert Smithson's dizzying description of his experience of his own land artwork, *Spiral Jetty*. In the voice over, as in Smithson's essay "Spiral Jetty", the expressions of the natural world merge with human physiological experience, to the point that the two become indistinct: "my eyes become combustion chambers churning orbs of blood blazing by the light of the sun" and "perception heaving, stomach turning" as the "sun vomits corpuscular radiations." As the images become increasingly blurry, so do the notions of 'subjects' and 'objects.' In his essay, Smithson describes viewing *Spiral Jetty* from a helicopter; surrounded by mud, salt crystals, rocks, and water for as far as he can see, Smithson experiences a sensation of losing his subjectivity, of merging somehow with the landscape. The end of the film attempts to recreate this as the landscape moves so quickly that is rendered formless; it is now just colour passing by as the voiceover recites Smithson: "I was slipping out of myself again, dissolving into a unicellular beginning, trying to locate the nucleus at the end of the spiral."

Near its end, the film weaves Smithson's tale with an evocative narration about the Ganzfeld effect—a temporary blindness that occurs when one encounters an undifferentiated visual field: a "black water of a lava wave swept by the wind", a "giant sheet of solid black" that spreads over the land and absorbs light and life "into vast clouds of electric dust, split summits, fiery lakes, sounds of thunder, whirlpools of rubble, tectonic collisions, contorting strata, the furious ocean, swallowed land…" While this narration contributes to the loss of subjectivity that the film evokes, it has a further significance.

For the black lava—that matter which will form into the rocks seen throughout the film—is both the source and result of some catastrophic force. According to Jeremy Jerome Cohen, the matter of the ground and catastrophe are intimately intertwined: "Rocks are the archive in which we read that we dwell intracatastrophe. They index the exterminations of remote epochs, extinctions that near again. They yield narratives of celestial fire, massive volcanic blasts, an atmosphere inimical to life, an Earth ripped by ice, ablaze, overheated, engulfed by sudden flood."[392] They also tell of human catastrophe. On Lanzarote, these rocks witnessed the genocide of the Guanches, the aboriginal peoples who have inhabited the Canary Islands since at least the first millennium BCE. With the Castilian conquest of the early fifteenth century, the Guanches were killed, converted, or forced into slavery. According to Mohamed Adhikari, this was the Western world's earliest overseas settler colonial conquest.[393] Adhikari recounts that "Not much more than a thousand native Canarians, nearly all of whom were enslaved, were alive by the end of the fifteenth century."[394] While the film never explicitly makes this link, the rocks that appear in film offer this story for those that want to listen. That the rocks may tell us something about the violent history of colonization is the focus of the next artwork discussed: Lori Blondeau's *Asiniy Iskwew*.

V. Rock Woman: *Asiniy Iskwew*

In her photographic series, *Asiniy Iskwew* (2016), Cree/Saulteaux/Métis artist Lori Blondeau stands atop large rocks or piles of rocks situated in various landscapes. She is posed statuesquely

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[392] Cohen, *Stone: An Ecology of the Inhuman*, 63.

[393] Mohamed Adhikari, "Europe's First Settler Colonial Incursion into Africa: the Genocide of Aboriginal Canary Islanders." *African Historical Review* 49.1 (2017): 2.

[394] Adhikari, "Europe's First Settler Colonial Incursion into Africa," 2.

and proudly; her high gaze directed outward beyond the frame points to the vast landscapes that surround her. Draped in a blood-red cloth, she appears monumental, solemn, defiant yet peaceful within the setting. *Asiniy Iskwew* pays homage to Plains Indigenous rock formations, "significant ancient sites created for sacred and rite-of-passage ceremonies, and for recording battles and histories."[395] The title of the series in English translates to "rock woman" and the images and the photos express what Keira Ladner calls a worldview in which "kinship is an expression of multiple intersecting relationships among all beings (human and nonhuman) from which flow mutual responsibilities and a social order."[396]

The series pays particular reference to the history of Mistasiniy ("big stone"), a 400-tonne buffalo shaped rock in the South Saskatchewan plains that was a sacred site for the Cree people, who used it as a gathering place for rituals and ceremonies. In the mid-1960s, the province of Saskatchewan decided to dam the South Saskatchewan River, redirecting it into smaller waterways nearby and creating a reservoir. Mistasiniy lay in the flood path of the new reservoir. As the provincial authorities wanted to turn the reservoir into a lake and leisure area, they made plans to destroy the rock. Resistance collectives were formed by the Cree people and their allies, but ultimately to no avail: the province dynamited Mistasiniy in 1966.

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[395] "Asiniy Iskwew," Scotiabank Contact Photography Festival https://scotiabankcontactphoto.com/archive/2017/public-installation/ryerson-university-devonian-square-asiniy-iskwew

[396] Keira Ladner, "When Buffalo Speaks: Creating an Alternative Understanding of Traditional Blackfoot Governance." Ph.D. Diss. Carleton University, Ottawa, 2000, 282-83.

Image 18, Lori Blondeau, *Asiniy Iskwew*, 2016.

Image 19, Lori Blondeau, *Asiniy Iskwew*, 2016. On display in Devonian Sq. at Ryerson University.

In 2017, three images from the *Asiniy Iskwew* series were adhered to two-billion-year old boulders from the Canadian Shield, which are situated in Devonian Square at Ryerson University, Toronto. As a meeting place next to a man-made pond, Devonian Square refers to both Mistasiniy's original site—a scared spot to gather—, as well as to its new post-demolition location, under the lake. In this exhibition, a palimpsest of times and spaces emerge, which speak to the deep history of Turtle Island, to the colonial history of Canada, and to the struggles Indigenous peoples, especially women, face today.

Many have placed *Asiniy Iskwew* in the larger context of the Indigenous struggle for recognition. The history of Mistasiniy is cast as metonymic of the violent erasure of Indigenous peoples and culture on Turtle Island, and Blondeau's images are read as an act of resistance to this history. They speak particularly to the violence faced by Indigenous *women* today. For, as Leanne Simpson notes, disappearance is especially an omnipresent threat for Indigenous women and queer persons.[397]

While such a metaphoric interpretation powerfully reminds us that the transgressions of Canadian history are not past, the relationship between Mistasiniy and these photographs could also be understood in a different register. If we consider the Cree history of Mistasiniy, we also hear how, to reference George Tinker's essay on Indigenous cosmologies and the limits of Western philosophy, the stones too "cry out" in these images.[398] This intuition is bolstered by Tasha Hubbard, who, in her Ph.D. dissertation on the kinship between Cree and buffalo persons in Indigenous art and literature, recounts the history of Mistasiniy. She explains that, for Cree people, Mistasiniy marks the site where a human person turned first into a buffalo person and

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[397] Simpson, *As We Have Always Done*, 176.

[398] George E. Tinker, "The Stones Shall Cry Out: Consciousness, Rocks, Indians," *Wicazo Sa Review* 19.2 (Fall 2004): 105-125.

then into a stone. For Hubbard, Mistasiniy is a reminder of the "kinship that moves beyond a simple blood relationship or lineage," one that does not exclude nonhuman beings.[399] There are many variations on the story, but Hubbard focuses on that of Barry Ahenakew, printed in Deanna Christensen's history of the Cree Chief Ahtahkakoop. In this narrative, a baby is mistakenly left behind as a camp moves. Hearing the baby crying, two buffalo brothers find the baby boy. One of the brothers wants to kill him in retribution for human beings' killing of buffalo but the other feels compassion for the lost boy. When the child is brought back to the buffalo leader they agree with the compassionate buffalo and stress that since both buffalo and human pray to the same Creator, they must treat each other with respect. The boy is then raised by the buffalo, and, later in life, chooses to stay with them when given the option to return to his human tribe. It is this choice that transforms the boy into first a buffalo and then into a buffalo shaped rock.[400] Ahenakew notes how the Cree people witness this transformation:

> It was heard all over, how mostos-awasis had lived with the buffalo and how they had seen him change form while they were hunting these buffalo. The Crees started gathering there, they camped there, and they came to see this big rock. They danced, they sang, and they prayed, for of course the buffalo was one of the gifts given by the Creator. And they held their Sun Dances there near to the place where the big buffalo rock sat.[401]

Along with the message about kinship across different kinds of beings, for Hubbard, the key elements of the Mistasiniy story are the possibility of transformation, the importance of the act of

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[399] Tasha Hubbard, "The Call of the Buffalo: Exploring Kinship with the Buffalo in Indigenous Creative Expression," PhD Diss. University of Calgary, 2016, 27.

[400] Hubbard, "The Call of the Buffalo," 38-40.

[401] Barry Ahenakew, "Ahtahkakoop Learns the Story of Buffalo Child," *Ahtahkakoop: The Epic Account of a Plains Cree Head Chief, His People, and Their Struggle for Survival 1816- 1896*, ed. Deanna Christensen (Shell Lake, SK: Ahtahkakoop, 2000), 45.

45. Quoted in Hubbard, "The Call of the Buffalo," 40.

remembering and the sacredness embedded within certain physical sites. Blondeau's photographic series touches upon all these meanings.

It is significant that the title of the series is *Asiniy Iskwew*—Rock Woman—, not Rock and Woman or Rock/Woman It suggests that rock and woman inhabit the same ontological plane. The photographs resonate with what Neal McLeod calls the "body poetics" of Cree poetic discourse. While McLeod is primarily referring to oral and written narrative when he describes 'body poetics' as a creative strategy of connecting living bodies to the living Earth, it could be extended to photographic representation. In Blondeau's series she is connected literally to the rocks in the photographs, and figuratively, to Mistasiniy, and hence to buffalo and the memories of these histories in which they merge into one another.

Blondeau's work can in this way be seen to engage in what Martineau has called a performance of indigeneity, which he fashions "as a counter-imperative and counter-presence to Empire." It, he argues, "creatively negate[s], refuse[s], and mobilize[s] alternative ontologies and imaginings against/apart from colonizing identities, subjectivities and normative categorizations of being."[402] That is, rather than reading these images through the lens of identity politics, which runs of the risk of confining Blondeau to the role of the resistant "other" who demands a platform on which to be seen and heard, it may be more fruitful to understand these images through the history of Mistasiniy, and thus as an expression of the kinship and solidarity between Blondeau, rocks, and buffalo. This would allow for an interpretation of Blondeau's work that, to the important assertion of Indigenous people's right to the land, adds that of the rights of the nonhuman beings involved in the story of Mistasiniy. It would acknowledge her images' positive claims of transforming the dominant ways of being and acting.

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[402] Martineau, "Creative Combat," Note 2, 9.

In harnessing Indigenous knowledge and cosmologies, which produce alternative ways of understanding the world, Blondeau's images take part in creating a counter-presence to Empire. In this way, her works share Martineau's ambition to "avoid the entropic recursion of modernist and colonial logics that seek to reduce the world and our lived experience of it to false binarisms and agonistic, oppositional identitarian categories" by considering "Indigenous creative practices that frame/claim life according to different coordinates" and that therefore "give form to imaginative possibilities."[403] As a white settler, without in-depth schooling in Cree cosmologies, I recognize that there are many ways that these images speak that are not available to me. But I think it is crucial not to reduce their meaning to being merely a reminder of the violent history of settler colonialism; they are not only an Indigenous woman's cry for recognition. Through an engagement with the historical significances of rocks, they also productively and creatively share and reinforce knowledge of Indigenous thought, within and beyond Indigenous communities.

VI. Fossilized Time: *Notes from the Anthropocene*

If the deep time of rocks is intimated in *Stability* and *Asiniy Iskwew,* the subject of prehistory, history, and 'posthistory' become central in the focus on fossils in Terra Jean Long's *Notes from the Anthropocene* (2014). Shot mostly in the badlands of Alberta, a province known for its plentiful dinosaur fossil findings and, as we saw in Chapter two, infamous for its tar sand industry, this 16mm essay film explores the relations between three kinds of fossils: dinosaur fossils, fossil fuels, and the future fossils of the Anthropocene. As an ancient artefact, the fossil is a material manifestation of time. The film probes how the deep time of the fossil, past and future, converge in and constitute the material conditions of the present. In the film, a tour of

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[403] Martineau, 12-13.

Drumheller, Alberta and its famous Royal Tyrell Museum doubles as a tour of the Anthropocene and the socio-economical system that has brought it about.

The film is inspired by W.J.T. Mitchell's speculative inquiry in his book, *The Last Dinosaur*. What, Mitchell asks, would a future alien race who discovers the remnants of human civilization make of our obsession with dinosaurs, found in museums, schools, amusement parks, children's bedrooms, and scientific labs? Whereas Mitchell embarks on a cultural history of human beings' fascination with dinosaurs, Long's film employs the dinosaur—a creature part scientific, part mythological, and part fantastic—as a crystalline figure through which to think 'geologically.' Via the dinosaur, then, the film refracts multiple entanglements of geological time. Three particular geological times intersect in the film: the Carboniferous period (359-299 MYA), whose sedimentary layers contain the fossil fuels on which we so depend; the Cretaceous period (145.5-65.5 MYA), during which the dinosaurs of Alberta lived; and the Anthropocene (dates TBD), whose future fossils can only be imagined.

Image 20, Still from Terra Jean Long, *Notes from the Anthropocene*, 2014.

The film questions how these ancient times inflect the present when it asks: what if in our various digging rituals, we are awakening these ferocious creatures from the deep past? The 'monster' that the film fears might be unearthed are not only dinosaurs (which, Long has pointed out, have been unfairly cast in this antagonistic role);[404] the film parallels the digging for dinosaur fossils with that of prospecting for fossil fuels. The burning of coal, oil, and gas: this is the fire that has made its mark on Earth in the form of the Anthropocene. It is the fire that both sustains and threatens our current way of life. And perhaps like a monster being disturbed from its hundred-million-year slumber it will wreak havoc in our world.

One image in the film in particular directly links the dinosaur and the fossil fuel industry: crosscut with a scene of the Devonian Reef exhibit at the Royal Tyrell Museum are images of an oil well that moves methodically up and down. Framed in a medium close-up, the pump-jack of the oil well resembles the head and neck of a dinosaur—perhaps the Parasaurolophus, one of Alberta's own. Indicators of the petroleum industry materialize in different forms throughout: as cars speeding down highways, truck stops and gas stations, signs on roadsides that warn of pipelines underneath, and the various plastic objects that fill the museum and its gift shop. Tellingly, there is also a shot that lingers on a museum sign that explains the prehistoric conditions that have created this oil rich ground and the three-billion-dollar industry it supports. Metaphorically the film suggests that the dinosaur is alive in the petroleum that is the material foundation of so much of our contemporary culture. Ancient matter flows through the material realities of our current civilization. Twin temporalities are at play here: human time—the time frame of late capitalism; and geological time—the hundreds of millions of years that it took for ancient plants to be compressed into oil.

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[404] Terra Jean Long, email message to author, August 15, 2018.

That human beings are also the 'monsters' is implicit; whereas once the dinosaurs were masters of the terrestrial realm, we now dominate Earth. The film, however, suggests a deeper connection between these prehistoric reptiles and the human being, through a reference to the r-complex of the 'triune brain.' The triune brain is a theory that the forebrain has developed in three evolutionary stages. These are named the reptilian complex (r-complex), the paleomammalian complex, and the neomammalian complex. The forebrains of reptiles and birds are dominated by the r-complex, characterized as the part of the forebrain that governs instinctual behaviours involved in aggression, territoriality, and ritual displays. The human brain is ruled by the neomammalian complex, but this is built upon the earlier two complexes. In this way, at the "bottom" of the human brain lies the r-complex. The metaphor of depth in the triune brain theory has been read as analogous to the triadic structure of the psyche, in which the id/unconscious corresponds to the r-complex, and so on. But its structure of depth as time also begs a geological reading. Since deep within the human brain lies the r-complex, Carl Sagan has suggested that "deep down" human beings are themselves dinosaurs.[405] The triune brain theory has since fallen out of favour in the scientific community, but it remains evocative. Building on posthumanist scholarship that has shown that we have never been really human, since our biological bodies are composed of numerous 'alien' entities, the triune brain adds an 'alien' temporality into the mix. Parts of us, this film tells us, may be as old as the dinosaurs; indeed, it points to the strange notion that we are made up of multiple times, from the ancient past to the deep future, just like the figure of the fossil.

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[405] W.J.T Mitchell, *The Last Dinosaur: The Life and Times of a Cultural Icon*, (Chicago: Chicago University Press, 1998), 201.

By referencing the r-complex, *Notes from the Anthropocene* suggests partly that the 'dinosaur part' of human beings emerges in the aggressive, territorial fossil fuel industry. But the film also evokes another integral feature of dinosaurs as it turns its focus to the 'ritual displays' that revolve around the consumption of goods, culture, and nature: the sudden extinction of dinosaurs. The carbon deposits from the burning of fossil fuels left on Earth's stratum are the key sign of the Anthropocene. Thus, in digging up fossils, we have unwittingly brought about a new fossil stratum that conjures our own extinction.

Here, the film asks a question closer to Jan Zalasiewicz's in *The Earth After Us* than to Mitchell's: what remains of our civilization will be found in the rocks? The film has an answer to this question: the plastic figurines of brightly coloured dinosaurs found in the museum gift shop, items that again link dinosaurs to the petroleum industry. In the film, the "tour" of the museum is interrupted by a museum attendant's voice: "The tour will continue after the gift shop." Maybe. Or maybe it is precisely here that the tour will end. This is to say that it will not be the fragments of human beings left behind but our *things*. The film highlights the plastic dinosaur toys, filming them row upon row in the gift shop. It then shows particular specimens isolated, filmed from underneath a clear platform against a white backdrop, as if Long is now the future scientist studying these remnants of a civilization long gone. Embossed on the bottom of each plastic souvenir: "Made in China." The reference to the globalized market demonstrates the Anthropocene as something that surpasses geology: "it is constitutive of social and technological relations and environmental and ecological realities" under late capitalism.[406]

In thinking about which human things will be the remnants of our civilization, *Notes from the Anthropocene* raises the question of its own materiality as a film. Like a fossil, film records a

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[406] Parikka, *The Geology of Media*, 46.

trace of a world that has passed. We are thus reminded that this film itself will become part of the

fossil layer. Media itself is material and will have its own 'life'—from the minerals and metals

extracted from Earth used to create our media apparatuses to the day they end up in a garbage

dump, slowly decaying as they become part of the newest strata of Earth: "The tools of

technology become a part of the Earth's geology as they sink back into their original state.

Machines like dinosaurs must return to rust or dust."[407] And perhaps our debris will generate new

fuels: "The day the earth's crust reabsorbs the cities, this plankton sediment that was humankind

will be covered by geological layers of asphalt and cement until in millions of years' time it

thickens into oil deposits, on whose behalf we do not know."[408]

VII. Diffractions of matter and time

Since this chapter was about the matters of matter, I want to conclude with some thoughts on the

photographic image and how understandings of it chime with the subject matters of the artworks

discussed. In doing so, I suggest that the form of the works discussed—moving and still

photographic images—carries significance in terms of the overarching project to envision the

world 'anew'. If Goya's painting may be suggestive of the idea that the quicksand is a fourth

actor in the scene, the medium of film has been understood to 'naturally' and with ease present

the objects of the world in a way that has ontological parity with the presentation of human

subjects. This is because the camera seemingly captures the world 'itself' in a way that is

indifferent to distinctions between subjects and objects. Such a connection to the 'world' has

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[407] Robert Smithson, "A Sedimentation of the Mind: Earth Projects," in *Robert Smithson: the Collected Writings*, ed. Jack Flam (Berkeley: University of California Press, 1996), 104.

[408] Italo Calvino, "The Petrol Pump," in *Numbers in the Dark and Other Stories*, trans. Tim Parks (Boston: Mariner Books, 2014), 175.

often been seen through the lens of indexicality, as the physical world imprints itself in light on the celluloid strip. But indexicality doesn't explain the affective force of cinema and photography's (re)presenting of the world that cuts across the analogical and digital. Indeed, no matter the material substrate, the powers of moving images lie in their ability to seemingly capture 'real' life in a way that appears remarkably familiar and yet simultaneously strange or new. This quality of cinema has led many theorists to propose that film has the potential to re-connect us with a world from which we have become 'detached.' Stanley Cavell for instance believes that cinema has the ability to help us overcome the philosophical position of scepticism. Gilles Deleuze thinks the film image can spark a renewed 'belief in the world.' And Siegfried Kracauer holds that cinema can 'redeem physical reality.' In differing degrees, these three theories about cinema's capacity to reconnect human beings with the world were influenced by the rupture of the second world war, a catastrophic event of such magnitude that, for these thinkers, ripped the world asunder, creating a stark division between human worlds and the world 'out there,' a division that may have led to, in the West, the exacerbation of environmental degradation. In what follows I suggest that Kracauer's theory of film can be read in ways that resonate with some of the themes of this chapter. While I largely draw on sections from his *Theory of Film*, much of what Kracauer says about the moving photographic image is equivalent to his understanding of the still photographic image.

"The cinema," Kracauer proclaims, "seems to come into its own when it clings to the surface of things."[409] Much of his book, *Theory of Film*, is devoted to outlining the unique affinities that cinema has to reality—the unstaged, the fortuitous, and the 'flow-of-life'—and to

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[409] Siegfried Kracauer, *Theory of Film: The Redemption of Physical Reality* (London: Oxford University Press, 1960)*, 285.

his thoughts on the various forms that cinema can take—fiction, experimental, documentary, and so on. Throughout, Kracauer meditates on how cinematic techniques are all geared towards bringing physical reality to the fore, in ways that surpass—for various reasons—everyday human perception.

It begins, for him, with the autonomous quality of the cinematic apparatus, which allows for a unique view of the world outside of human subjectivity. Quoting Lewis Mumford, Kracauer claims that "film may fulfil a timely mission in helping us apprehend and appreciate material objects: 'Without any conscious notion of its destination, the motion picture presents us with a world of interpenetrating, counterinfluencing organisms: and it enables us to think about that world with a greater degree of concreteness.'"[410] The autonomous and automatic nature of the camera also provides the crux for Cavell's theory of film. But unlike Cavell's, which ultimately is concerned with human subjectivity, Kracauer's theory opens up an avenue to thinking about objects as subjects themselves.

In a chapter entitled "The Establishment of Physical Existence," Kracauer is particularly interested in film's presentation of the inanimate objects that surround and support our everyday lives. He notices how in cinema the inanimate and nonhuman become protagonists as much as, if not more than, any human being in the scene:

> From the malicious escalators, the unruly Murphey beds, and the mad automobiles in
> silent comedy to the cruiser Potemkin, the oil derrick in Louisiana Story and the
> dilapidated kitchen in Umberto D., a long procession of unforgettable objects has passed

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[410] Kracauer, *Theory of Film*, 299.

across the screen—objects which stand out as protagonists and all but overshadow the rest of the cast.[411]

The film medium seemingly 'naturally' presents things on screen—human, nonhuman, living and nonliving—with a remarkable ontological equivalency. Moreover, film can render objects, which we may not acknowledge in daily life, with a renewed vitality. In everyday experience, he argues "streets, faces, railways stations" may "lie before our eyes" but "they have remained largely invisible."[412] On screen, however, we are drawn to look at these things that may pass us by in daily life: "film renders visible what we did not, or perhaps even could not, see before its advent."[413]

The last chapter in *Theory of Film* presents an argument for an ethics of cinema based on its realist disposition. Kracauer traces how the waning of religion and ideology occurred simultaneously as the rise of science and technology. This marks a re-balancing of an onto-epistemological orientation towards the world: ideological unity through religion is replaced by scientific reason. But even though the gaze of science is directed at the physical world, this privileging of science has not provided a clear picture of reality. It has instead turned the world into an abstraction. He argues that "we not only live among the ruin of ancient beliefs but live among them with at best a shadowy awareness of things in their fullness."[414] To explain how science veils the real, Kracauer quotes A.N. Whitehead: "When you understand all about the sun and all about the atmosphere and all about the rotation of the earth you may still miss the

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[411] Kracauer, 45.

[412] Ibid.

[413] Ibid., 300.

[414] Kracauer, 291.

radiance of the sunset."[415] Whitehead thus calls for a renewed habit of aesthetic appreciation that values the poignancy of the physical world. For Kracauer, cinema presents such an avenue for a renewed aesthetic appreciation of the world.

Accordingly, it is not just that film can show us the world as a kind of mirror image. Film can "diffract" the world, showing different views and revealing things unseen. The distinction between diffracting and reflecting was first explicated by Haraway and later developed by Karen Barad. Barad explains that even though both are optical metaphors, "reflection reflects the themes of mirroring and sameness, diffraction is marked by patterns of difference" and "diffractions are attuned to differences—differences that our knowledge-making practices make and the effects they have on the world."[416] Walter Benjamin, of course, spoke of the power of the photographic image to operate as an 'optical unconscious.' He elaborated on the political potential to reveal layers of reality not given to the human eye.[417] For Kracauer, this facet of the photographic image meant that cinema has the potential to challenge habitual ideas and attitudes about the world. He calls this cinema's capacity to 'debunk'—it can present us with images that directly question our notions of the physical world.[418] It is here that the fabric of conventions can be pierced. The culmination of Kracauer's theory is his suggestion that cinema can "literally redeem this world from its dormant state, its state of virtual nonexistence."[419]

Theory of Film has often been charged with the accusations of "naïve realism" and with an abandonment of Kracauer's previous concerns with cinema's relation to the social and

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[415] Ibid., 296.

[416] Barad, *Meeting the University Halfway,* 71-72.

[417] Walter Benjamin, "The Work of Art in the Age of Mechanical Reproduction" in *Illuminations: Essays and Reflections,* 217-252, trans. Harry Zohn (New York: Schocken Books, 2007).

[418] Kracauer, 306-308.

[419] Ibid, 300.

political. But his ruminations on the specificities and potentials of cinema reveals a deep interest in destabilizing an anthropocentric worldview. This interest can be seen as a reaction to global catastrophe. In her article, "'With Skin and Hair': Kracauer's *Theory of Film*, Marseille 1940," Miriam Bratu Hansen consults earlier versions of the book, in particular the Marseille Papers—Kracauer's extensive notes for his book on the "aesthetics of cinema," written two decades before its publication—, to disrupt some of the common criticisms levelled at the book.

For Hansen, Kracauer's book and his perspectives were highly shaped by the catastrophe of the second world war. The project was, even, "conceived in the midst of the catastrophe, under the threat of annihilation— 'during those months [in 1940/1941],' as Kracauer told Theodor Adorno in a later letter, 'that we spent in anguish and misery in Marseille.'"[420] As Kracauer (along with Walter Benjamin) waited in exile in Paris for either escape or deportation, he began his project of thinking about the relationship between film and the world. In the introduction to an early version of the book, he states:

 Film brings the whole material world into play; reaching beyond theatre and painting, it for the first time sets that which exists into motion. It does not aim upward, toward intention, but pushes toward the bottom, to gather and carry along even the dregs. It is interested in the refuse, in what is just there—both in and outside the human being. The face counts for nothing in film unless it includes the death's-head beneath. "Danse macabre." To which end? That remains to be seen.[421]

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[420] Miriam Bratu Hansen, "Introduction," *Theory of Film: The Redemption of Physical Reality* (London: Oxford University Press, 1960), xiv.

[421] Miriam Bratu Hansen, "'With Skin and Hair': Kracauer's Theory of Film, Marseille 1940," *Critical Inquiry* 19.3 (Spring 1993): 447.

This engagement with the world, for Kracauer, like the films discussed in this chapter, is directed downward, "gravitating toward the lower regions of existence, toward phenomena that elude intentionality and interpretation."[422] As Hansen explains, this "turn to materiality corresponds to the allegorical impulse to see the death's-head beneath the human countenance, to deflate the image of the sovereign individual."[423]

In its ability to 'redeem physical reality,' film confronts the viewer with a world that isn't just the projection of human beings, a world that is full of mysterious matter, a reality that exists beyond the brutality of human action and thought. There is lurking beneath the text a desire for a kind of secular re-enchantment of the world. This is evident in how he believes cinema can fulfil Whitehead's call for a new aesthetic appreciation. In redeeming the physical world, cinema does not function as a means to master the world; it rather grants a new sensory experience of different fragments of the world. In presenting the world anew or as strange, cinema has thus a privileged potential to disrupt "our fantasies of sovereign relations to the environment, a domination that renders nature 'out there,' a resource for recreation, consumption, and exploitation."[424]

Jeffrey Jerome Cohen states that "catastrophe is entanglement;" it is "a call to creativity that might best be answered through unexpected alliances."[425] The films and photographs discussed here answer this call to present the world—one imbued by climate change—through a combination of history and imaginative speculation, evoking stories from the human sphere and beyond, towards overlooked pasts and new futures. They are also a reminder that projects

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[422] Hansen, "'With Skin and Hair,'" 447.

[423] Ibid.

[424] Jeffrey Jerome Cohen, *Stone*, 9.

[425] Cohen, 65.

dealing with the climate catastrophe needn't confront the viewer with images of destruction or climatic mayhem; by directing their cameras downward, they provide the spectator a novel engagement with materials normally relegated to the category of mundane objects, raising questions regarding interrelationships between earthly (and Earthly) entities. Through the speculation about the creative agency of ostensibly inert materials and the way in which they are deeply entangled with different human histories, the films offer different ways of knowing and understanding Earth; I have read their unique onto-epistemological takes on the earth as an effort to counter discourses that bolster climate change and underpin the Anthropocene. In doing so, they make the world matter differently, bringing a renewed attention and affective force to, and hence a possibility of a renewed politico-ethical encounter with, a part of the world that normally remains far below our field of vision.

Lastly, the diffractive force of my case studies extends beyond the revisioning of how matter *matters*. As temporal media which told stories about inanimate materials, they may tell us something about historicity in the Anthropocene. Important to Kracauer was the photographic images' ability to capture time: the instances or the durations of 'the world' as it passes us by. Kracauer was thinking about moving images that unfolded in a similar way to life, seemingly transparently, in which the trajectory of past, present, and future unfolded linearly. Being experimental, the works I describe disrupt this straightforward temporality of the image. This is not peculiar, for such a strategy is common in experimental film and photo practice. But their playing with time and their evocations of multiple times—through fragmentation, juxtaposition, unexpected combinations of image and narration, animation and documentary, the use of archival images, the layering of images, and so on—lends weight to the characterization of these artworks as 'geological.'

There is a general consensus among scholars writing about the Anthropocene that this new epoch brings together Earth history with world history. "The Anthropocene requires us to think," Dipesh Chakrabarty writes, "on the two vastly different scales of time that Earth history and world history respectively involve: the tens of millions of years that a geological epoch usually encompasses…versus the five hundred years at most that can be said to constitute the history of capitalism."[426] Claire Colebrook concurs: "the Anthropocene does not only—as did Darwinian evolution—require us to shift our scale of narration away from human generations and history to species' emergence and deep time, it raises the problem of intersecting scales, combining human time of historical periods…with a geological time of the planet."[427] And "yet in most discussions of the Anthropocene, questions of geological time fall out of view and the time of human world history comes to predominate."[428] It is difficult to think this intersection of Earth history and 'world' history because, as Chakrabarty has outlined in detail, it disrupts notions of what history is and refigures how history has been written. [429] The artworks I have discussed in this chapter diffract time, bringing together deep times with human times, pasts with presents with futures; in doing so, these four works offer an artistic strategy for the expression of the complex temporality of the Anthropocene. Here, it is not just the background becoming foreground—as in Goya's painting, which brings humans and nonhumans together on a spatial plane; it is also a bringing together of the vastly different times of these two interrelated entities.

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[426] Dipesh Chakrabarty, "Anthropocene Time," *History and Theory* 57.1 (March 2018), 6.

[427] Claire Colebrook, "We have Always Been Post-Anthropocene: the Anthropocene Counter-Factual," in *Energy Humanities: An Anthology*, eds. Imre Szeman and Dominic Boyer (Baltimore: John Hopkins University Press, 2017).

[428] Chakrabarty, "Anthropocene Time," 6.

[429] See Dipesh Chakrabarty, "The Climate of History: For Theses," *Critical Inquiry* 35.2 (Winter 2009): 197-222.

CONCLUSION

Since 2008 B.C. schools, organizations, and business have come together to participate in "The Great British Columbia Shake Out," a province-wide coordinated earthquake and tsunami emergency drill. The Shake Out B.C. is a partnership with multiple national, provincial, and local government organizations, but it also has an international presence, mostly in countries located within the 'ring of fire.' On a set date once a year, communities all around the Pacific Ocean will 'come together' to rehearse the 'drop, cover, hold on' procedure. In addition to being supplied with earthquake emergency protocol documents and instructions on how to facilitate the great 'shake out,' organizations are offered a variety of Shake Out merchandise: t-shirts, magnets, pens, and posters. The somewhat amusing image of hundreds of thousands of people in geographically distant locales equipped with Shake Out paraphernalia and engaging in what to my ears sounds like a faddish dance craze becomes more macabre when we consider the reality of earthquake preparedness in the western province. Schools– elementary, junior, and high– are notoriously *not* earthquake proof. A recent report on the matter shows that while the provincial government is taking steps to rebuild and/or reinforce structures to bring schools up to earthquake safety standards, there are hundreds of schools in the lower mainland and Vancouver

Island alone that are at high risk of collapse under the pressures of an earthquake.[430] In their

current form, these schools will not stand the force of the 'big one': the 'drop, cover, hold on'

choreography becomes less a means of survival and more a dance of death.

The irony and contradictions of selling Shake Out merchandise to schools that in their

present state will certainly crumble if the big one hits are many. We should not be surprised

though; this is just a small, relatively obscure example but it speaks to the ways in which

catastrophe is being made profitable across the globe. Meanwhile, little money is being spent by

the government to implement real ways in which lives will be saved. This is not meant to belittle

emergency response protocol; but the 'big one' and the 'shake out' speak to the larger ways in

which catastrophe is imagined and dealt with across various contexts and worlds today: these are

ways that do little to actually remedy a potential situation and instead bolster ways of thinking,

knowing, and acting that function to bring about or exacerbate catastrophes that are trying to be

avoided.

The larger point, however, which this dissertation attempted to make clear, is that climate

change presents us with a catastrophe much more extensive and pervasive, much more

destructive and deadlier, than any imaginations of the 'big one.' But as I write this on my back

porch, on a warm summer morning, shaded by a canopy of foliage teeming with insects,

squirrels, and swallows, my cat chasing flies while cicadas sing and birds chirp alongside sounds

of airplanes and streetcars –my world, *life*, unfolding as it does on most summer mornings–, it is

hard to realize, to imagine, that an extensive catastrophe is underway, a catastrophe that while

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[430] Rafferty Baker and Tamara Baluja, "155 'high risk' B.C. schools still have no plans for seismic upgrades," CBC News, Sept. 20 2017, <https://www.cbc.ca/news/canada/british-columbia/155-high-risk-b-c-schools-still-have-no-plans-for-seismic-upgrades-1.4299742>

anthropogenic, exceeds the human sphere, a catastrophe operating in the interstices of human and Earth history.

The 'big one' is easy to imagine. We have references to these kinds of catastrophes; they are recounted in historical documents, testimonials, oral tales, and in literature, photography, and film, especially of late. Climate change as catastrophe is much harder to imagine both because it is anomalous and because it is bound up in a myriad of processes and systems, some of which challenge human faculties of comprehension. Since it is something never experienced before, it is accordingly very difficult to sense or to know as a lived experience. But the ability to generate knowledge about it is crucial for carving out a path for moving forward. We might wonder: what would an international coordinated effort look like to 'deal' with a catastrophe already underway? What systems could be put in place? What instructions could be given? What gestural rituals prescribed? What script could be followed to attempt to save as much of Earth as we can? Before we could ever possibly answer these questions, before we can learn how to live better within climate change, we first need to understand and be able to sense the complex catastrophic present.

I have argued in this dissertation that the aesthetic realm is a privileged space in which climate change catastrophe can be made visible, and more broadly, sensible. This is because artworks have been considered to be 'bundles of affect'; they offer us experiences that differ in intensity from our day to day life. As such they are sites in which the more indiscernible aspects of climate change can be brought to the fore. Through a set of case studies, my dissertation has considered artistic strategies that take different tacks in expressing and elucidating the indiscernible contours, relations, and violence that make up this quotidian catastrophe. Catastrophe aesthetics is, I have contended, a means through which novel experiences and new

relations with climate change can be forged; and in these new relationalities, different epistemologies of climate change can emerge.

My case studies were diverse in form and content. This was intentional. Given the extent of climate change, we need to match that extent with multitudinous imaginations about different aspects and versions of the present; we need to engage with the many different worlds these artworks and others present, in an effort to increase our 'power to be affected.' That being said, this dissertation presented only a handful of artworks from three different perspectives. In the timespan in which this project was conceived and written, the effects of climate change have become more apparent, and accordingly, the number of artists interested in creating work about climate change has increased exponentially. Phenomena such as species extinction, the unexpectedly fast rate at which polar ice is melting, land desertification, and the accumulation of plastic in the oceans have captured the attention of artists and scholars. There is thus much more work to be done in incorporating a plethora of new art works into the framework of catastrophe aesthetics. For now, however, I will sum up the main arguments about those works and groups of works that were included in this dissertation.

While Buckminster Fuller's Geoscope and World Game were imagined well before climate changed was named, they nonetheless responded to the possibility of imminent and profound global changes. Emerging just on the cusp of the environmental movement, these works are understandably anticipatory; Fuller believed that they were apparatuses that could help thwart an oncoming catastrophe. We know now that the catastrophe of climate change was already underway. And yet they were remarkably prescient. First, they understood this catastrophe to be of a complex, global nature; not only did they embrace a then-bourgeoning systems perspective that was gaining appeal across Earth sciences, they used such perspectives to

think natural systems alongside human systems and processes. These works put forth imaginations of the biosphere and noosphere in which these spheres were figured as profoundly interrelated. Their 'planetary' perspective thus merged the 'whole-earth' and 'one-world' discourses that Denis Cosgrove saw as distinct kinds of 'globalisms' operating at this time. In this way, the Geoscope and World Game exhibited the idea that human thought and action is enmeshed with many different kinds of nonhuman systems. Second, the Geoscope and the World Game suggest that an intellectual knowledge of the planetary system does not suffice. As immersive expanded cinema environments, these media experiments attempted to attune spectators to the *feeling* of the planetary: placing the spectator within a mini-world was a way to arouse a sense of the magnitude of Earth and the spectator's place on or within it; and adorning this apparatus with a screen that visualized data was a way of turning abstract scientific data into an aesthetic experience. Here, intellect and aisthesis – those two kinds of knowledge– came together. The creation of a heightened affective environment was essential in generating the 'planetary consciousness' that would become so influential in the decades that followed. These works were thus attempting to make visible and sensible the multiple interrelations that constitute Earth and the World as systems and that informed, for Fuller, an immanent global catastrophe. But catastrophe may here figure in another way too.

In Greek tragedy, it is the hubris of the protagonist that accounts for his/her downfall, leading to the denouement, or *catastrophe*, of the play. The Geoscope and World Game are fascinating, complex objects but their 'tragic flaw' may be that they are premised on Fuller's hubristic positioning of human beings as masters of Earth. The metaphor of 'Spaceship Earth' speaks to such a position. He assumes that human beings, while still a part of Earth's system, are nevertheless the highest in the chain of command and it is their job to organize and control Earth.

Such hubris is characteristic of a Promethean sensibility that many agree now is central to a 'worldview' that has led us into our present environmental catastrophe.

Prometheanism is also at the heart of the subject of Chapter two: the fossil fuel industries. Moving from the planetary stage of Fuller's works to the very human and local settings of deep offshore rigging in the Gulf of Mexico and the tar sands of Northern Alberta, this chapter examined two innovative interactive documentaries: Brenda Longfellow's *Offshore* and David Dufresne's *Fort McMoney*. They explore how the destructive force of the fossil fuel industry, which stretches across vast spaces and times, inflicts violence on various kinds of species and ecosystems, on humans and communities, and on entire ways of life. I use Rob Nixon's idea of 'slow violence' to understand such violence, which is a key feature of climate change catastrophe. My understanding of catastrophe extends the scope of 'slow violence'; it speaks to the all-encompassing shifts that Earth is currently witnessing, some of which are violent in nature.

Using interactivity, *Offshore* and *Fort McMoney* inventively generate affective responses to a kind of violence that for the most part –and this is the problem– escapes direct representation. As they are stories about oil –albeit *documentary* stories about oil–, I positioned *Offshore* and *Fort McMoney* alongside what Frederic Buell notes as a new direction in petro-fiction. If stories about oil have been dominated by what Buell names the twin motifs of exuberance and catastrophe, this new approach to oil, according to Buell, seems to reject exuberance. I suggest that in *Offshore* and *Fort McMoney,* the *melancholic* emerges to replace exuberance. This is firstly due to the fact that these documentaries document a series of different kinds of losses –the loss of land, species, humans, ecosystems, ways of life. But, I also showed how a melancholic imagination is found not only in the representational content, but in the

works' interactive web-based formed. They are defined by an overarching feeling of stasis, an unresolvable grief, which aligns with how melancholy has been theorized. I then argued that such a stasis does not signify here a position of giving up or defeat. Rather, this can be seen as an activist tactic. I suggest that these works are in fact engaging in an 'activist melancholy' – a kind of mode of inaction, which paradoxically emerges from the activity of a viewer, that refuses to 'come to terms' with the deep ongoing violence of the fossil fuel industries. 'Activist melancholia' may describe the narrative and formal choices of these works, and perhaps of a larger body of oil narratives in the era of climate change. While more work needs to be done to examine the motif of melancholy across a wider body of oil-themed cultural objects, I suggest that melancholy here implies an understanding of the present and of the future, which I sense is quite widespread, that does not hail the idea of progress.

That human 'progress' has been built upon the (ab)uses of Earth and its resources is central to the theme of Chapter three. Here, I turned to experimental film and photography which all have an interest in the geological and in thinking of inanimate matter as entities with agency rather than just as external 'resources' to be owned and consumed by human beings. In order to conceptualize these artworks' ways of doing so, I engaged with the developing philosophical field of new materialism, which, with the naming of the Anthropocene, has become a central area of study in the environmental humanities. What the different schools of new materialist thought share is the effort to move beyond the Cartesian dualisms of mind and body, subject and object, that have engendered ideas and practices that relegated, and continue to relegate, Earth and its materials to the status of property, indeed of commodities, which can be purchased, owned, and discarded when no longer valuable for human beings. Instead, new materialism understands materials in the world –human and nonhuman, animate and inanimate– to be necessarily

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entangled, involved in relations of agency, or for some, like Haraway and Barad, relations of co-constitution. While drawing on new materialist perspectives, this chapter also acknowledged the blind spots of their assumptions that Indigenous scholars and historical materialists have explored. I believe that Indigenous scholarship is especially important in the context of climate change as it presents ways of knowing, of acting, of thinking outside of hegemonic Western ontologies and epistemologies. But I hesitate to adopt any one theoretical perspective. In this chapter, I wanted to think with multiple different and sometimes contradictory theories in order to open up the artworks to new significances and new modes of experience.

In different ways, the films and photographic series I examined all assert that the matter of Earth *matters*. Rocks, dirt, fossils, and geological anomalies all had their own stories to tell. These were stories that revealed the interrelations between the human and the nonhuman, the fantastical and the mundane, the imaginations of future and the realities of past. Their stories brought together Earth's history with human history. Catastrophe figured more obliquely here: bound up in evocations of the Anthropocene and these entanglements of matter and meaning, it emerged as a creative force, an impetus for the production of new ways of knowing Earth and its materials. Part of these works affective 'power', I argued, lies in their use of the photographic image, which affectively connects us to the worlds on screen in what has been seen as a unique and particularly potent way.

As works that aim to disclose aspects of the catastrophic present, my case studies are part and parcel of the worlds that they depict. This means that they are not immune to the contradictions that imbue the present day. Inevitably, there are ways in which they could be accused of disrupting their own efforts in favour of an eco-politics. We could think, for instance, about the ways in which play has been co-opted by the powers that be; it is no longer a liminal

space but precisely the way in which transactions of our everyday and larger market forces take shape. Ludic capitalism is a term that has been coined to describe the appropriation and commodification of play by the global economic system. How might our understandings of the play-based works in chapter one and chapter two shift under this light? In a similar vein, we could consider the materiality of the images discussed throughout this dissertation: how have they been produced? What materials and chemicals are employed to bring them into being, what precious resources have been used, what is their carbon-footprint, and so on? Or we might wonder about these artworks' reception and dissemination: who is looking at these works? Where do they circulate? Are they accessible to a wide-variety of people or they primarily for gallery goers, artists, and academics of the Western elite?

Although answers to these questions would require another research project (the catastrophe of aesthetics?), acknowledging that there may be contradictions within the works is an effort to, as Donna Haraway puts it, "stay with the trouble."[431] For as climate change presents us with a mass of contradictions, we need to engage with the messy present and, in this case, the cultural artefacts produced therein, and not turn our attention only to the supposedly "transcendent and clean."[432] In an era where global capitalism threatens to thrive off the catastrophe underway, leading life most certainly towards darker days, we need to stick with efforts to elucidate this disturbing present and, while not ignore the role of art in hegemonic discourses and institutions, focus on the more productive aspects of these as creative attempts *to do* something.

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[431] Haraway, *Staying with the Trouble: Making Kin in the Chthulucene* (Durham, NC: Duke University Press, 2016).

[432] María Puig de la Bellacasa, *Matters of Care: Speculative Ethics in More Than Human Worlds*, (Minneapolis: University of Minnesota Press, 2017), 10.

This does not obviate the need to investigate the political strategies of artworks. In fact, something that has for a long time bothered me, when thinking about committed art, is the question of what such art can *do* in the face of such a catastrophe? Part of me knows that this is a silly hang-up; art serves a purpose that lies outside of instrumentality. But so much of art today, or at least the art that interests me, is trying to shed light on injustice, inequality, and atrocity. My case studies in this dissertation are cases in point. These are, intentionally or not, political works. But what purpose do they serve? How are their politics enacted? There is no easy answer. Often trying to answer this question leads us to the two pathways Fuller envisioned –utopian or defeatist understandings of art. But maybe there is a third way.

Over the course of writing this dissertation I have been increasingly drawn to ideas of *care* as it relates to global warming, species extinction, and other forms of ongoing environmental damage. Care, as theorized by scholars such as Maria Puig de la Bellacasa and Thom van Dooren, among others, provides a way to understand what certain art works *do* in ways that avoid overly idealist or pessimistic orientations to the catastrophic present. It would take a book length study to cover the complex field of care studies, even as it pertains to environmentalism; what follows is thus just an embryonic gesture towards thinking my case studies as instantiations of care. When doing so, I focus on Puig's and van Dooren's works because they are both particularly interested in care in the context of environmental catastrophe and in thinking about more-than-human worlds.

Care-full doings

In her recent work *Matters of Care: Speculative Ethics in More than Human Worlds*, Maria Puig de la Bellacasa presents care as a crucial mode of engagement with the world. Care, for Puig, is

about the creation of relations: "In worlds made of heterogenous…forms and processes of life and matter, to care about something, or for somebody, is inevitably to create relation."[433] Caring thus pertains to relations between humans as well as between humans and nonhumans. To emphasize care, to make care vital, is an effort to create and maintain "sustainable and flourishing relations, not merely survivalist or instrumental ones."[434] Importantly, in the context of widespread environmental catastrophe, "a world's degree of liveability," Puig offers, "might well depend on the caring accomplished within it."[435]

Care is a multidimensional doing and feeling; it is involved with affect, ethics, and labour. As van Dooren explains:

> As an affective state, caring is an embodied phenomenon, the product of intellectual and emotional competencies: to care is to be affected by another, to be emotionally at stake in them in some way. As an ethical obligation to care is to become subject to another, to recognise an obligation to look after another. Finally, as a practical labour, caring requires more from us than abstract well wishing, it requires that we get involved in some concrete way, that we do something (whenever possible) to take care of another. In short, Puig's work, care is an entry pointed into a grounded form of embodied and practical ethics.[436]

But an ethics of care is not, for Puig or van Dooren, about normative moral obligations. It is rather "about thick, impure, involvement in a world where the question of how to care needs to be posed. That is, it makes of ethics a hands-on, ongoing process of recreation of 'as well as

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[433] Maria Puig de la Bellacasa, "'Nothing Comes Without its World': Thinking with Care" *The Sociological Review* 60.2 (2012): 198.

[434] Ibid., 198.

[435] Ibid., 198.

[436] Thom van Dooren, "Care," *Environmental Humanities* 5 (2014): 291.

possible' relations and therefore one that requires a speculative opening about what a possible involves."[437] But care is an obligation nonetheless; it "is concomitant to life" and it "obliges in that for life to be liveable it needs to be fostered."[438]

The study of care has historically been led by feminist perspectives, which consider the practices and affective labour of care across a wide variety of contexts –from health industries to education to the domestic home. This research, as Puig tells us, is often "oriented by an ethico-political commitment to investigate the significance of neglected things, practices and experiences made invisible or marginalized" as care has often been devalued as 'women's work' by patriarchal regimes.[439] Thinking about practices of care can thus "be a way of getting involved with glimpses of alternative livable relationalities, with other possible worlds in the making."[440]

However, they both warn that idealizing care as something inherently good or subversively emancipatory should be avoided. Care is ontologically and politically ambivalent.[441] Care can be appropriated and commodified for less-than-good means. Today, caring for the self in various guises of 'self-care' –self-help, beauty, fitness, and health economies– has become a moral order and centrepiece of neoliberal individualism. Care can also be violent, where caring for some individuals and species comes at the expense of others.[442] Care is grounded in all of the "inescapable troubles of interdependent existences" and can offer no

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[437] Puig, *Matters of Care*, 6.

[438] Puig, "Nothing Comes Without its World," 198.

[439] Puig, *Matters of Care*, 170.

[440] Ibid., 170.

[441] Ibid., 8.

[442] Ibid., 9. Puig points to conservation practices in which certain species are purposefully killed in order to protect another, endangered species.

guarantee of a "smooth harmonious world."[443] Much in the way that I have understood my case studies here, for Puig, just because care can sometimes be "enlisted in purposes we might deplore," we should not give up on care; its meanings should instead be "debated, unpacked, and reenacted in ways that respond to the present."[444] Rather than positing care as either necessarily co-opted or inherently progressive, we have to understand care as a situated *doing* and examine concrete instances of care.

Care is an especially important concept within the era of eco-catastrophe. As Puig tells us, "Today, eco-political awareness of the wounded state of the earth and, its resources in a context of extensions of consciousness about naturecultural catastrophe and massive extinctions, the necessity of returning the surplus of life, puts one's requirement to rethink a naturecultural politics of care at the forefront."[445] If care is necessarily relational, bound up in the doings and feelings that produce and maintain webs of relationality, and if it is also a practical ethics, then care may be the mode through which the possibility of "transforming people's ethos in our everyday relations to Earth, to its inhabitants, and to its 'resources'" is opened up.[446] Puig considers care a "critically disruptive doing" with a transformative potential.[447] It can help to transform ways of knowing, thinking, and acting.

Much of Puig and van Dooren's understanding of care reflects what has been said in the introduction of this dissertation and throughout its chapters about art's affective capabilities of generating new ways of relating to, and new relational encounters with, the changing Earth. Puig

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[443] Puig, "Nothing Comes Without its World," 199.

[444] Puig, *Matters of Care*, 10.

[445] Ibid., 164.

[446] Ibid., 127.

[447] Ibid., 12.

and van Dooren are equally inspired by posthumanist and new materialist thinking about the entanglements of humans and nonhumans. But care adds some weight to thinking about why it matters that artists and scholars are engaged in catastrophe aesthetics.

If care is a tripartite mode of affect, ethics, and labour, it is rather easy to see how art fits in here. As a mode of *work*, art is a concrete practice of labour that, in the context of my case studies, is involved in examining and thinking about catastrophic climate change through the engagement with different aspects of Earth and its materials. As I've tried to show in this dissertation, all of my case studies work towards, albeit in wildly different contexts, disrupting dominant modes of thinking, doing, and art-making. They pursue a *care-full* engagement with the world that attempts to open up new understandings about the relations between various entities in various worlds.

But as 'bundles of affect', such work is also necessarily involved in the creation of relations between the work and the spectator. In their care-full engagement with the world and in the novel ways in which this engagement is presented, they entangle the spectator into this relation of care. Of course, a spectator could choose to not care and to cut these ties. We might say that it takes a *caring* spectator to fully instantiate the art as a work of care. Upon entering this relation of care with the artwork as care-full, the artwork may remind us or ask us to recognize an obligation to *look after*, in this case an obligation to look after Earth.

That is, as 'blocs of sensations,' certain committed artworks may also be 'bundles of care'. Understanding them through care, seems to me, to provide an answer to what art can *do* in a catastrophic time. That they will function as transformational objects or experiences is not a given, but what they do *do*, if they are care-full and careful enough, is to generate more care in the world. To care for something, someone, is a mode of sustaining life; care is a life affirming

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relation. But like climate change catastrophe, as I have proposed it in this dissertation, care takes time. Aesthetic 'caring' about climate change as catastrophe is a means of recognizing the vast devastation already done and currently underway; it is a way of acknowledging past and future losses and entering into a relation of care for these losses. But it also may be a means of engendering more ways of caring for a planet that is damaged but not yet dead.

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