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*Catastrophic Modes, Formal Realism and Non-Human Futurity*

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Toward the end of 2019, I began working on a book provisionally called *Catastrophic Modes and Planetary Realism*. I could scarcely imagine what awaited us as the year turned. Writing about catastrophe amidst a pandemic, colossal climate upheavals, violent extremisms, and a gothic mediascape populated by ghouls and conjurers vanishing away truth with every click, has frequently felt as absurd as crafting a treatise on swimming when everything around you is about to be engulfed by a tsunami. Yet writers throughout history have persisted in giving form and language to existential anxieties that catastrophes bring to the fore. Here is a voice from our contemporary moment, an excerpt from Don De Lillo's *The Silence*:

All I want to do now is go home. Jim and I. If we have to walk, fine, yes, in daylight. Will the sun be shining? Will the sun be in the sky at all? Who knows what any of this means? Is our normal experience simply being stilled? Are we witnessing a deviation in nature itself? A kind of virtual reality? .... I write, I think, I advise, I stare into space. Is it natural at a time like this to be thinking and talking in philosophical terms as some of us have been doing? Or should we be practical? Food, shelter, friends, flush the toilet if we can? Tend to the

simplest physical things. Touch, feel, bite, chew. The body has a mind of its own. (113)<sup>1</sup>

The dialectic between the contemplative and the practical in this excerpt breaks down even as it makes an overture toward the latter to signal our shared precarity during end times. For writers and thinkers, contemplative thought and expression are as basic to their existence as food and shelter, their practical lifeboat.

I'd like to begin by sharing excerpts from two works. 300 years separate the first from the second:

“It was now the beginning of August, and the plague grew very violent and terrible in the place where I lived, and Dr Heath coming to visit me, and finding that I ventured so often out in the streets, earnestly persuaded me to lock myself up and my family, and not to suffer any of us to go out of doors; to keep all our windows fast, shutters and curtains close, and never to open them.”<sup>2</sup>

“I have no idea how Eustis got sick. But when he abruptly flew back to New York and missed opening night on February 20<sup>th</sup>, I knew something was wrong. Texas was thought to be outside the danger zone that month, but retrospective modelling suggested that the virus likely had been infecting at least ten people a day since the middle of the month...By the end of February, there was probable local transmission in thirty-eight states.”<sup>3</sup>

The first passage appears in Daniel Defoe's 1722 publication *A Journal of the Plague Year*. The second excerpt is from a long essay called *The Plague Year* by the non-fiction writer and journalist, Lawrence Wright, that appeared in January 2021 in the *New Yorker*. This latter is an episodic public history of the pandemic since it struck the country in late January 2020. Constituted of 21 journal-like entries, it is an exercise in

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<sup>1</sup> Don DeLillo, *The Silence*, New York: Scribner, 2020.

<sup>2</sup> Daniel Defoe, *A Journal of the Plague Year: Being Observations or Memorials of the Most Remarkable Occurrences as well as Publick as Private which happened in London during the Great Visitation of 1665*.  
<https://www.gutenberg.org/files/376/376-h/376-h.htm>

<sup>3</sup> Lawrence Wright, “The Plague Year,” *New Yorker*, January 4 & 11, 2021, p.37

factual reporting with personal case studies, a step-by-step account of the cascading disaster as it unfolded throughout 2020.

Defoe's *Journal* is a verisimilitude of factual and eye-witness reporting, an imaginative foray that deceived readers at the time into thinking it was a work of non-fiction – reportage in real time - even though it was published in 1722, nearly fifty years after the bubonic plague struck London in 1665. The novel features extensive numerical tables of the sick and the dead, and a detailed exposition of extant medical research on pestilential contagion. Defoe's work appeared so authentic to the reading publics that popular journals at the time featured his novel alongside medical treatises by Richard Mead (Fellow of the Royal Society), Thomas Phayer (who wrote a treatise on plague in the sixteenth century), and Nathaniel Hodge (author of *Loimologia* on the 1665 plague and the primary source of Defoe's text). As Richard Mayer notes, "There is no reason to believe that Defoe's *Journal* was perceived any differently from the works by Bradley, Mead or Hodge".<sup>4</sup> Things changed somewhat in the nineteenth century as distinctions between the factual and the fictional gained literary currency. Defoe's first major biographer, Walter Wilson, wrote in his *Memoir of the Life and Times of Daniel Defoe* (1830): "Defoe has contrived to mix up so much that is inauthentic with the fabrications of his own brain, that it is impossible to distinguish one from the other; and he has given the whole such a likeness to the dreadful original, as to confound the sceptic, and encircle him in his enchantments." John Richetti calls the *Journal* a "pseudohistory," "a thickly factual, even grossly truthful book" in which the "imagination flares up occasionally and dominates those facts."<sup>5</sup> The critic widely credited with the view that Defoe's work ought to be seen as a novel rather than a historical treatise on plague is Everett Zimmerman. In 1975 he wrote: "It is the

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<sup>4</sup> Mayer, Richard. "The Reception of *A Journal of the Plague Year* and the Nexus of Fiction and History in the Novel," *English Literary History* 57 (1990): 529-556, p. 532

<sup>5</sup> Mayer, 541-542

intensity of the focus on the narrator that makes *A Journal of the Plague Year*...more like a novel...than history”.<sup>6</sup>

While the form, mode, and even the title of Wright’s *New Yorker* essay is inspired by Defoe’s paradigmatic fictional journal, it is Wright’s novel *The End of October* (2020) that exemplifies almost every feature of what novel theorists call “formal realism” after Ian Watt’s classic study of Defoe’s *oeuvre*: novels that not only offer a strong verisimilitude of a recognizably plausible texture of life, but also the novel’s correspondence with an extra-diegetic world that serves as a plausible documentary evidence of the novel’s thick description of quotidian worlds.

What, I ask, now constitutes the ground of formal realism when the very meaning of quotidian is shot through with geophysical phenomena – pandemics, floods, wildfires – appearing at a scale and intensity that upends notions of the ordinary and the everyday. Both Defoe’s *Journal of a Plague Year* and Wright’s *The End of October* offer rich possibilities for thinking about this problem.

The protagonist in *The End of October* is Henry Parsons, an infectious diseases expert and viral immunologist who works at the CDC in Atlanta. He is alerted to a viral outbreak in an internment camp in Indonesia and is sent to investigate it. The pandemic’s unfolding in the novel draws extensively from experiences of virologists and epidemiologists who tracked the outbreak of SARS, H1N1, H5N1, MERS and Ebola. References to the 1918 Spanish flu and comparisons with the genetic structure of the coronavirus that caused it, factual details about the spread of SARS in 2004, and the abysmal state of pandemic preparedness in the US, are uncanny. As is this

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<sup>6</sup> Zimmerman, Everett. *Defoe and the Novel*, Berkeley: University of California Press, 1975. 124

description of the virus that causes the pandemic: “a spiky round ball, tinted in red and green, looking like a Christmas ornament” (108).

What makes *The End of October* so striking is the same quality that marks Defoe’s *Journal*: deep, thorough research, his reporting skills bringing alive a contemporary world of pestilence, war, and social collapse that cuts to the bone. There is one significant difference though. The ground of verisimilitude in each work is fundamentally different. Defoe’s *Journal* emulates genres of factual reporting of his era and captures in graphic detail the bubonic plague that ravaged London in 1665. Wright’s novel is about *what could plausibly happen*.

This is formal realism in a speculative mode – signaling a near future. Defoe’s work is also speculative but in a spectral mode - a ghost from the past haunting the present. We learn only toward the very end when an editorial voice intervenes to tell us that the narrator H.F is already dead and buried.

In uncanny ways, *The End of October* resembles a pandemic simulation exercise that generates a catastrophic scenario based on available scientific data, epidemiological variables, the history of global public health, and geopolitics. Ironical as it may seem, given that the United States has the highest Covid death numbers in the world, the country’s biosecurity regime was unusually active between 2001 and 2019 in leading the world in preparations, mobilizations, and simulation exercises on pandemics. Some of these simulations include *Dark Winter* (2001), *Atlantic Storm* (2005), *Clade X* (2018), and *Crimson Contagion* (2019). The most widely discussed simulation exercise is *Crimson Contagion*.<sup>7</sup> According to the report available on the website of the Department of Health and Human Resources, officials at the National Security Council in the White House were briefed about the outcome of *Crimson Contagion*. The simulation’s

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<sup>7</sup> Details of this simulation exercise appear in [https://www.governmentattic.org/38docs/HHSaarCrimsonContAAR\\_2020.pdf](https://www.governmentattic.org/38docs/HHSaarCrimsonContAAR_2020.pdf)

sobering results drove home just how underfunded, underprepared, and uncoordinated the federal government would be for a life-or-death battle with a virus for which no treatment existed. The recommendations offered in this simulation exercise went unheeded. The United States was after all ranked first in the 2019 Global Health Security Index among 195 countries with a score 83.5 in terms of its pandemic preparedness.

In Wright's novel, the coronavirus, Kongoli, is far more virulent than the Covid-19 or the influenza virus featured in the simulation exercise, *Crimson Contagion*. The outbreak of Kongoli reveals a mortality rate close to forty percent. It eventually plunges the world and the United States into a horror whose intensity exceeds what we have experienced so far – complete social breakdown, governmental collapse, and a raging world war conducted with bio- and cyberweapons. And yet the story is deeply plausible when we read of school closures, lack of ventilators, looting of ATMs, racial savagery, and mass death. Much like pandemic simulations, Wright says, “I am merely extending trends I see in the world to certain logical conclusions... I made some lucky guesses, but for the most part, what people are reading as prophecy is just what experts told me would happen.” Expertise, briefing books, scenario exercises – “all of that stuff was on the table. It was there for anybody who was interested, and I was interested”.<sup>8</sup>

I'll return to Wright's novel later and offer some provisional thoughts about the significance of its “double-text” story – that is, its formal capture of data modeling

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<sup>8</sup> Horton, Adrian. “It's Unnerving: Lawrence Wright on the Eerie Prescience of his Pandemic Novel,” *The Guardian*, 6 May 2020. <https://www.theguardian.com/books/2020/may/06/lawrence-wright-end-of-october-interview-pandemic-novel>.

and pandemic simulations - toward the latter half of my presentation on formal realism.

In the first half of this paper, I'd like to situate my contemplation of formal realism in the context of the book I'm currently working on - an intellectual and novelistic history of catastrophe. Catastrophes reveal the loss of an assumptive world and cracks in the moral scaffolding of a society, exposing us to anomie – from *a nomic* – lack of a moral law. While humans typically adapt to substantial changes in their habitus over time, sudden and systematic destruction of their assumptive worlds by natural disasters, pandemics, tyrannical political systems, and technologies such as the atomic bomb, leaves us unmoored in unprecedented ways. The rift in one's psychic apparatus ramifies across political and moral realms. As Karl Jaspers noted in 1965 in *The Atom Bomb and the Future of Man*, “the fact of the atom bomb is monstrous enough to put politics in a different state of aggregation.”<sup>9</sup> The moral stamina this calls for in Jaspers' words, is “endurance in the tensions of insolubility.”<sup>10</sup> Traversing the arc from the nuclear era to our age of global warming gives the idea of catastrophe a new existential intensity.

An assumptive world, to paraphrase Jeffery Kauffman, is an ordering principle that assures the stability of an intelligible and livable reality.<sup>11</sup> It is what has characterized the 11700 years of what geologists call the Holocene era – one that has lasted until the 1940s before the gigantic increase in carbon dioxide emissions began to upend four of the nine planetary boundaries that make life viable on earth.<sup>12</sup>

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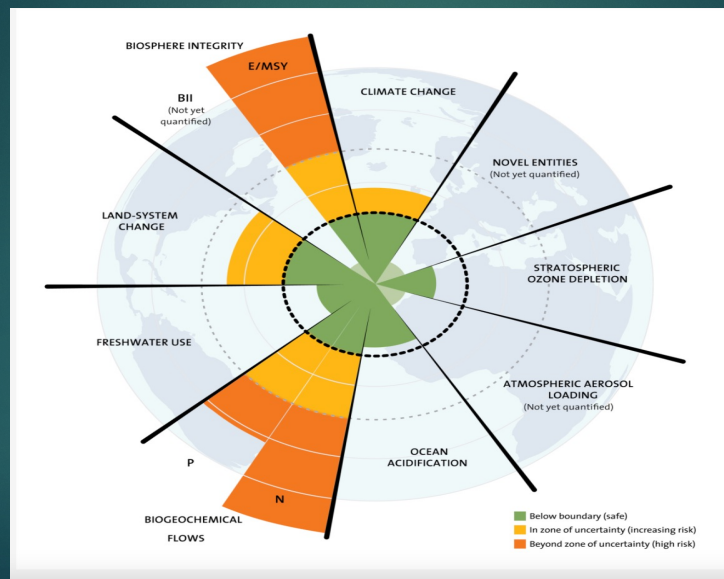
<sup>9</sup> Karl Jaspers, *The Atom Bomb and the Future of Man*, University of Chicago Press, 1961, p. 28.

<sup>10</sup> Jaspers, p.12

<sup>11</sup> See Jeffrey Kauffman ed. *The Loss of an Assumptive World: A Theory of Trauma and Loss*, New York: Brunner-Routledge, 2002.

<sup>12</sup> <https://www.stockholmresilience.org/research/planetary-boundaries/the-nine-planetary-boundaries.html>

# Nine Planetary Boundaries



Scaled to global systems, catastrophes have deep epistemological and moral consequences that can only be grasped in forms, genres, and modes that we have at our disposal. However inadequate these may seem.

In thinking about catastrophe as form, genre, and mode as we literary historians are wont to do, it bears noting that grand concepts often make their leap into the wider world after a long gestation in the entrails of highly localized cultural forms. Such is the case with *catastrophe*. Its etymology, derived from the Greek prefix *κατα* 'kata' (meaning "down") and the verb *στρεφειν* "strephein" (meaning "to turn") is derived from theatrical form connoting a sudden downturn and reversal of fate for key protagonists in a drama. Early usages of *καταστρέφω* have a variety of connotations, both negative and positive. When *καταστρέφω* came into English, after first passing through Latin and French, the connotation was no less ambivalent. Any overturning or denouement in drama – whether tragic or comic – was called catastrophe. An



etymological reference in the sixteenth century to Edmund Spenser's *The Shepheardes Calendar* notes, "This tale is much like to that in Aesop's fables, but the catastrophe and the ende is farre different."<sup>13</sup> Spenser's first use of the term "catastrophe" occurred in 1579, and it merely connoted a dramatic change – not necessarily a tragic one - that brought something to a conclusion.<sup>14</sup> An etymological reading of Shakespeare's *King Lear* did away with this formal understanding of catastrophe as an event that leads to a dramatic denouement at the end of a theatrical work. *King Lear* begins with a catastrophe and the entire dramatic action follows in its wake. Lear, notes Alan Rosen, "endures four acts in the aftermath of the catastrophe...making the play one long catastrophe."<sup>15</sup> This reading of catastrophe as tragic downfall and its aftermath helped expand the concept. *Catastrophe* became unmoored from its theatrical form and took on a wider connotation that resonates to this day – an unexpected disaster that causes large-scale disruption of everyday life over a prolonged stretch of time. Philologists point to 1748 when the OED signals the first use of 'catastrophe' in this wider sense in George Anson's travelogue, *A Voyage Around the World*. With Britain's voyaging out into unknown realms as part its colonial expansion across oceans, the term 'catastrophe' gathers an added charge in the travel writing of that period. While its settler colonial hunger for new territories already wreaked havoc in the lives of indigenous peoples of North America, Australasia, the Pacific, and the Caribbean throughout the eighteenth century, the English language circumscribed its use of 'catastrophe' to the experience of its own intrepid voyagers such as Anson and Captain Cook. Anson uses the word to express his fear at the

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<sup>13</sup> Onions, C.T. ed. *The Oxford Dictionary of English Etymology*, NY: OUP, 1966, s.v. catastrophe.

<sup>14</sup> Jeff Jeske, *Storied Words: The Writer's Vocabulary and its Origins*, NY: iUniverse, 2004, p.63.

<sup>15</sup> Alan Rosen, "Ends and Means: 'Catastrophe' in the Context of Dramatic Form and Theory," *Samuel Beckett Today*, 2, 1993, pp 327-334, p 328.

separation of his ship's crew due to the "fury of the seas and winds" which he characterizes as catastrophic<sup>16</sup>

The coupling of catastrophe with natural disaster persisted in Europe throughout the colonial period and well into the nineteenth century, when the eruption of the Tambora volcano in Indonesia in 1815 changed the earth's climate to cause large scale famines and epidemics across continents, and whose reverberations can be found not only in the poetry of Shelley and Byron, but also Mary Shelley's *Frankenstein*.<sup>17</sup> The peaking of the Little Ice Age in the 1700s and the Lisbon earthquake of 1755 catalyzed some of the most influential writings in philosophy, literature, and political thought that defined the Enlightenment era. The earthquake's impact on the writings of Rousseau, Leibniz, Kant, Pascal, and Voltaire is well documented. The German philosopher Werner Hamacher writes, "Under the impression exerted by the Lisbon earthquake... the metaphors of ground and terror completely lost their apparent innocence; they were no longer figures of speech."<sup>18</sup> The earthquake became a potent site of inquiry into larger metaphysical questions about destiny, will, religious faith, the nature of evil, God's agency, fate, and moral responsibility. "The earthquake of Lisbon," wrote Adorno, "sufficed to cure Voltaire of the Theodicy of Leibniz."<sup>19</sup> Who can forget Kant's words in his third critique: "we readily call these objects sublime because they raise the forces of the soul above the height of vulgar commonplace and discover within us a power of resistance of quite another kind

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<sup>16</sup> George Anson, *A Voyage Round the World in the Years MDCCXL, I, II, III, IV*. 5<sup>th</sup> ed. London: John and Paul Knapton, 1749, p.293, emphasis added.

<sup>17</sup> Gillen Darcy Wood, *Tambora: The Eruption that Changed the World*, Princeton UP, 2015

<sup>18</sup> Werner Hamacher, "The Quaking of Presentation," in *Premises: Essays on Philosophy and Literature from Kant to Celan*, Stanford UP, 1996, p.263.

<sup>19</sup> Theodor Adorno, *Negative Dialectics*, NY: Routledge & Kegan Paul, 1990, p.361.

which gives us courage to be able to measure ourselves against the seeming omnipotence of nature.”<sup>20</sup>

The Lisbon earthquake is widely considered to be as significant to the transformation of European thought and culture as the Nazi-era holocaust. It is telling that the idea of catastrophe as an earth-shattering political and cultural experience (not a natural one) was vivified in Europe only during the twentieth century with the two World Wars, and eventually the Holocaust when Europe’s four-centuries old imperial hold on the rest of the world appeared to be weakening. Vast swathes of non-European races experienced catastrophic conquests, slavery, and genocides over four centuries of colonial rule from the Americas and the Caribbean to Africa, Asia and the Pacific. But these scarcely impinged on the catastrophic thinking of the imperial powers.

In fact, during the period of high colonialism from the late eighteenth and to early twentieth centuries, the term ‘catastrophe’ was less visible in the English language, while terms like ‘crisis’ and ‘disaster’ gained in importance.<sup>21</sup> ‘Crisis’ was indexed to cataclysmic changes in the balance of power in Europe, and ‘disasters’ to natural calamities such as floods, volcanoes, and epidemics.

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A different order of knowledge and perception underwrites aesthetic forms contending with catastrophes in our contemporary moment. As someone interested in the global aesthetics of the novel, I’ve been tracing its incipient mutations in the face of technological, epidemiological, and climatological shifts so unprecedented in scope and scale as to render our familiar humanistic assumptions inoperable. In the book

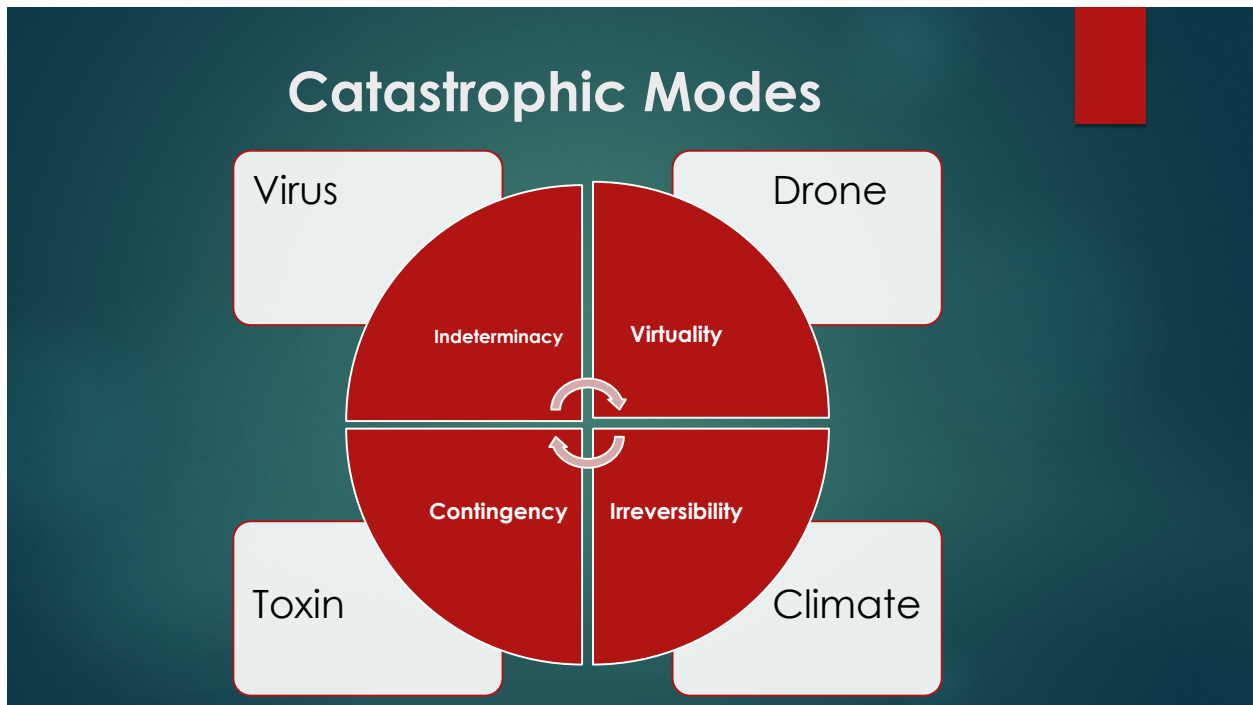
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<sup>20</sup> Immanuel Kant, *The Critique of Judgement*, translated by James Creed Meredith, Oxford: Clarendon Press, 1952, pp110-111.

<sup>21</sup> See Reinhart Koselleck and Michaela Richter, “Crisis”, *Journal of the History of Ideas*, 67:2, 2006; and Elinor Accampo and Jeffrey Jackson, “On Disaster,” *French Historical Studies*, 36:2, 2013.

I'm currently writing (*Catastrophic Modes and Planetary Realism*), I conceptualize “catastrophe” not in apocalyptic, salvific, or other secular theological registers, but through an attunement to four modes of world-altering threat where the logic of probability found in the mathematical modeling exercises of mega forces (financial markets, pandemics, climate change) is inadequate to the enormity of what might ensue in a decade, a century, or even a few thousand years. I call these four modes: indeterminacy, contingency, virtuality, and irreversibility. The term “mode” features in the full range of its philological, philosophical, and grammatical connotations as patterned arrangement, manifest form, resonance, orientation, and mood. These modes are made manifest through a novelistic *oeuvre* on four iconic contemporary scenarios of catastrophe: viral pandemics, nuclear and industrial accidents, drone warfare, and climate change.

See image below:



I think of climate change in the ‘irreversible’ mode where certain planetary thresholds once crossed cannot be reversed; and the nuclear threat as ‘contingent’ – something that has happened and could happen if a set of conditions come together to trigger it. As non-inevitability or accident, contingency represents the extent to which a particular state of affairs hinges on a finite range of very specific actions whose fallout could be catastrophic, as in industrial accidents and nuclear war. I think of drones in the ‘virtual’ mode, as a technology that is catastrophic in its optical derangement and deepening virtualization of threat that literally takes the human out. In war zones, drones reassemble the human as a technogenic lifeform that can be annihilated at will. The drone subject is machinic. As soon as it enters the sensor operator’s virtual vision, it gets recoded as a potential target that can be eliminated by the press of a button. Yet in the target’s inability to strike back at the enemy above, there is a strange derealization of violence, a fundamental non-reciprocity that violates most norms of military combat. One drone operator writes, “It’s almost like watching an NFL game on TV with its tiny figures on the screen compared to being down there in the field in

the mud and the blood in the rain.”<sup>22</sup> The viral mode is indeterminate. Viruses are seen to exist in a state of indeterminacy with the respect to the forms they generate, what the epidemiologist Kilbourne calls “a swarm of diverse creatures caught in a process of permanent variation.” When scientists talk of the catastrophic potential of viral indeterminacy, their concern is not about “an identifiable actual disease, but the *event of emergence itself*: pathogens may suddenly enter human populations through zoonotic spillover or change unexpectedly through genetic mutation.”<sup>23</sup> Unknown variables proliferate and make it impossible to predict with any degree of accuracy who the virus will target, where and how quickly it will spread, which vaccine technologies will be effective against it, and whether the body’s natural defenses will be activated early enough to stall its transmission.<sup>24</sup>

Most of us around the world have sheltered in place for nearly two years in the face of a global viral invasion that, as epidemiologists tell us, will reappear in other forms the more we disturb natural habitats. One struggles to remember a previous catastrophe that shuttered the entire world and simultaneously exposed the fragility of our planetary-scale entanglement with non-human forces. Pandemics, we read daily, will reappear in other forms the more we disturb natural habitats. Since the late 1950s approximately 350 new diseases have emerged, according to research by the UCL ecologist Kate Jones. Chikungunya, dengue, encephalitis, hantavirus infection, Lyme disease, malaria, Rift Valley fever, West Nile virus, SARS, MERS, and Zika are all either new or spreading to new places. This same period from the marks the Great Acceleration, a thesis offered by climate scientists and members of the Anthropocene Working Group, Will Steffen and Jan Zalasiewicz, that traces the correlation between

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<sup>22</sup> Cited in Hugh Gusterson *Drones: Remote Control Warfare*, Cambridge Mass: MIT Press, 2006, p.75

<sup>23</sup> Sven Opitz, p.396, emphasis added.

<sup>24</sup> See Lakoff A. “The generic biothreat, or, how we became unprepared” *Cultural Anthropology* 23:3, 2008, pp. 399–428

socio-economic vectors of development and dramatic changes in the earth system.<sup>25</sup> As habitat destruction, invasive species, pollution, population growth, and overhunting escalate to destroy the web of life, we create the conditions for new viruses and diseases such as Covid-19.

We are not talking of an imagined future of science fiction here, but a cataclysmic capsizing of human life-worlds in real time. How equipped is the good old realist novel to capture such capsizing? To think of realism as a catastrophic mode runs counter to all theories of the novel thus far. Sublime allegories of survival and various forms of speculative and fabular textuality typically mark the catastrophic imagination. But as Bruno Latour notes in his 2013 Gifford lectures, it has become almost impossible for us to experience the sublime now that humans have become a “geophysical force” rivaling volcanic eruptions or erosion.<sup>26</sup> How, I ask, might we reimagine realism in the face of the impossibly vast finitudes that various probability modeling exercises throw in our face?

The issue we confront today is one of temporality, form, and magnitude of human experience, and the problem of their plausible representation in mainstream novels. “The scale of human observation and experience,” notes evolutionary biologist, D’Arcy Wentworth Thompson, “lies within the narrow bounds of inches, feet and miles, all measured in terms drawn from our selves or our own doings. Scales that include light-years, parsecs, Angstrom units or atomic and sub-atomic magnitudes, belong to other order of things and other principles of cognition.”<sup>27</sup> When Ian Watt wrote in his celebrated treatise of 1957, *The Rise of the Novel*, that the realist novel was

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<sup>25</sup> “The Great Acceleration,” <https://www.anthropocene.info/great-acceleration.php>

<sup>26</sup> Cited in Bruno Lessard, “Metaphysics of Abstraction: Speculative Photographs in the Anthropocene,” *Resilience: A Journal of the Environmental Humanities*, 7:2-3, 2020, p.22

<sup>27</sup> D’Arcy Wentworth Thompson, *On Growth and Form*, NY 1992, p. 17.

the aesthetic equivalent of a more “dispassionate and scientific scrutiny of life than had ever been attempted before,” he was not talking of timescales associated with geological and evolutionary phenomena that are inassimilable to the relatively miniscule scale of modern human history. Nor was he thinking about quantum, molecular, or nano scales. The alignment of science and literature that Watt envisioned was less about a deeper engagement with scientific breakthroughs than with a particular mode of apprehension of the world: dispassionate, objective, deliberate, and detailed. This investment in a factual and rational everyday matrix was not meant to accommodate implausible shifts in scale that threatened the collapse of a newly forged rational and demystified novelistic universe. Concepts such as non-linearity, irreversibility, and tipping point, could not be part of his conception of formal realism in ways that I argue it can now be. I’ll have more to say about this when I return to Lawrence Wright’s novel later.

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As paradigms of concord begin to shatter, narratives of end times gain prominence as humans scramble to make some sense of the chaos. Frank Kermode has explored the power of such narratives in his book, *The Sense of an Ending*, written under the shadow of the nuclear bomb. Terms like apocalypse and megadeath gained traction throughout the 1950s and 1960s as the world witnessed the magnitude of atomic devastation in Hiroshima and Nagasaki. Kermode’s essays were composed at the height of the Cold War and in the aftermath of the Cuban Missile crisis and Kennedy’s assassination. Among the insights in this volume, his philological recovery from Biblical sources of the temporal category *Kairos* bears mention here. Kermode retrieves for the nuclear age this Greek theological term connoting an intemporal or out-of-time intensification through divine radiance that dramatically transforms the past even as it makes us aware of the abyss of end times. Opposed to *chronos* or



ordinary duration, *kairos* in Kermode's reading migrates to the secular realm and undergoes a lexical shift in modernity as epochal consciousness. Such a consciousness emerges when, in his words "the foundations of life quake beneath our feet."<sup>28</sup> We see it in Karl Jasper's reflections above on atomic age. Epochal consciousness confronts the abyss of end times. It is a propulsive force that urges moral endurance and redemption. Such a consciousness is tied to the idea of collective human progress and perfectibility over time. It is also profoundly anthropocentric.

While the existential threat to our planet due to runaway global warming may seem the obvious ground for thinking catastrophe now, my larger claim is that the term's semantic churn merits a deeper probe into why cognate words such as *crisis* or *disaster*, and even the notion of *epochal consciousness*, are no longer adequate to capture the scale, temporality, intensity, and the novelty of what we confront. The divide between *chronos* and *kairos* breaks down. We can no longer fall back on the idea of Kairos as God's time, of an epochal consciousness which is the secularization in the nineteenth century of a political theology that defined the idea of crisis as indelibly linked to moral progress – each crisis seen as a possibility for revolution and dramatic political and social change.<sup>29</sup>

This ground has disappeared in the twenty-first century – primarily with the climate crisis. We can longer think in terms of progress and enhancement of human civilization, but entropy, or what Bernard Stiegler calls "negentropy" – that is, life in a mode of repair; scrambling to recoup whatever exists.<sup>30</sup> Negentropy connotes recouping energy in interaction with other life forms. This is not extinction or total annihilation.

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<sup>28</sup> Frank Kermode, *The Sense of an Ending: Studies in the Theory of Fiction*, Oxford UP 2000[1966], p. 47.

<sup>29</sup> See Koselleck and Richter, "Crisis" *Journal of the History of Ideas* Vol 67, No. 2, 2006, 357-400.

<sup>30</sup> Bernard Stiegler, *The Neganthropocene*, Open Humanities Press, 2018.

Rather, as Timothy Morton writes, “The end of the world is now the *end* of endings, the end of *telos* and the beginning of futuralities” that are nonhuman.<sup>31</sup> In this sense, thinking about catastrophe is distinctly different from apocalyptic thinking, catastrophism, and even epochal consciousness.

Lawrence Wright’s *The End of October* registers this fundamental shift in the moral and aesthetic lexicon of catastrophe in our time. Even though the novel depicts a heroic protagonist – the virus hunter Henry Parsons who single-mindedly pursues the origins of the lethal Kongoli virus and cracks the mystery at great personal loss – the human is no longer perceived as a sovereign agent nor is the novel saturated with visions of progress and moral uplift. The anthropocentric fallacy is foregrounded repeatedly in the novel. In an episode on a submarine while trying to escape the deadly virus, Henry Parsons is shocked by a large clattering sound coming through the sonar and thinks they are in danger of being torpedoed by the Russians. The sound, he learns, is caused by a dangerous shrimp. The captain explains to Henry:

We think humanity has the best weapons, but the snapping shrimp has a claw that closes so fast that it creates a shock wave that kills its prey. The noise you hear is the air bubble popping when the claw snaps. They create a microburst of heat that is about the temperature of the sun. (320)

Another passage from the novel that depicts a conversation among White House officials about the dangers of cyberwarfare and the nonhuman scale of infrastructural paralysis:

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<sup>31</sup> Timothy Morton *Hyperobjects: Philosophy and Ecology After the End of the World*, University of Minnesota Press, 2013, p?

Imagine the damage you could do if you controlled the valves and meters of utilities all over the country. The water plants, the nuclear facilities. Many of them were governed by those same Triconex systems, which were designed to keep Saudi utilities safe. They'd be blowing up transformers and generators, knocking off power for months or even years. Russian subs sniff around undersea cables. They could cut off the internet or compromise it to the point that it becomes unusable. Pretty much everything this country runs on could be brought to a halt. (122)

The exchange highlights the extent to which our techno-scientific and socially engineered systems have overtaken our ability to control them and their runaway impact on the earth system. We find ourselves in the realm of the nonhuman as we take the measure of our limits in controlling what we have created. Anthropocene, as this new geological phase of our earth system is provisionally called, is profoundly technospheric. The scientist credited with popularizing the idea of the technosphere is the geologist and environmental engineer, Peter Haff. Here is how he conceives it:

The technosphere includes the world's large-scale energy and resource extraction systems, power generation and transmission systems, communication, transportation, financial and other networks, governments and bureaucracies, cities, factories, farms and myriad other 'built' systems, as well as all the parts of these systems, including computers, windows, tractors, office memos and humans. .... The technosphere represents a new stage in the geologic evolution of the Earth. It is a global system whose operation

underpins the Anthropocene and therefore merits special attention in our attempts to understand the role of humans in a nascent geologic epoch.<sup>32</sup>

The idea of a risk society proposed by Ulrich Beck (1992) is pertinent here. A risk society is a new iteration of the biopolitical, one dedicated to managing life by constantly modelling scenarios of future threat within a globally networked financial, bioinformatic, and natural systems. Such a society is governed by identifying mechanisms that may help large populations acquire immunity against probable catastrophes when systems are stretched to their very limit. The emphasis here is less on the intrinsic intensity of a threat than its potential to engulf the entirety of the globe. It has now become impossible to distinguish between natural and man-made catastrophes. We are witnessing an annihilation of humanist worlds as we have known them since the eighteenth century even as the human has gained a monumental nonhuman agency. “In little over two generations – or a single lifetime,” notes climate scientist Will Steffen, “humanity...has become a planetary-scale geological force...many biophysical indicators have clearly moved beyond the bounds of Holocene variability. We are now living in a no-analogue world.”<sup>33</sup>

There is another strand of intellectual and social thought that resonates with Haff’s conception of technospheres. This strand is of particular significance in thinking about pandemics, probabilistic modeling, and formal realism. I signal here the shift in the discourse of biopolitics from Foucault’s notion of ‘progress’ society to Ulrich Beck’s idea of ‘risk’ society or what he calls catastrophic society in the post-War era.

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<sup>32</sup> Peter Haff, “Humans and Technology in the Anthropocene: Six Rules,” *The Anthropocene Review* 1.2 (2014): 126-136, p.127

<sup>33</sup> Will Steffen, et.al, “The Trajectory of the Anthropocene: The Great Acceleration,” *The Anthropocene Review*, 2:1, 2015, 81-89, p. 92, 94.

Foucault's conception of biopolitics emerged at an historical conjuncture when, as he put it, "death was ceasing to torment life so directly." The rise of biopolitics in his account, as we might know, is fundamentally linked to advances in the medical sciences and the gradual emergence of a more democratic social fabric when life ceases to be at the mercy of disease and death, and its preservation becomes a key matter of governance. This is what Foucault calls the "progress society." He roughly dates this around 1850 when vast populations no longer perished from cholera, typhus, smallpox, measles, scarlet fever, diphtheria, and meningitis. Where medical science is concerned, this period also marked the emergence of the 'germ theory' of disease, as against paradigms such 'miasmatism' (illness caused by bad odors), and the theory of humors (imbalance of body fluids).

In such a "progress" society, life ceases to be at the mercy of not only disease but also a supreme sovereign – either God or an absolute monarch – and the 'fact of living' emerges as a site of the political power, management, and governance. This is the period that sees the rise of life and health sciences, various institutions of regulation and discipline such as schools, prisons, hospitals, bureaucracies, and the emergence of public health measures, hygiene, and sanitation. We know this history well.

Foucault's idea of "progress" society undergoes a major shift in the post-War era – around the 1950s with the cybernetic revolution connecting biological and information systems. The notion of threat/pathogen as something external to "life" or *bios* is transformed into the idea of 'risk' within a generalized system where *bios*, and human life in particular, are seen as coextensive with other microbial, inorganic, and machinic entities. The rise of molecular biology, post-Darwinian genetic science, Lynn Margulis's microbial theory of evolution (endosymbiosis), and the emergence of what we now call artificial intelligence, paved the way for this shift. Niklas Luhmann's work on systems theory in sociology; Deleuze-Guattari's ideas of the machinic, the control

society and the assemblage; Donna Haraway's conception of the cyborg; Derrida and Michel Serres' work on parasitism and perturbation of the bounded body; Bernard Steigler's work on technics, time and negentropy; Bruno Latour's actor-network theory and and Katherine Hayle's extensive *oeuvre* on posthumanism and nonconscious cognition, all mark this shift.

Within such a paradigm, and in the context of pandemics in particular, viruses and bacteria are understood as belonging to the same evolutionary scheme of things as humans – entities that are mostly benign and only occasionally pathogenic. The mode of “indeterminacy” I mentioned earlier became prevalent in the 1990s. It designates a fundamental limit to the capacity of knowing disease since it characterizes microbial life as inherently unstable. Simply put, the term indicates that the matter of concern is no longer an identifiable actual disease but the event of *emergence* itself: pathogens may suddenly enter human populations through zoonotic spillover or change unexpectedly through genetic mutation. Due to the emergent properties of disease, one not only does not know when the next pandemic will occur or where it will originate, one also does not know what form it will take. The ontology of emergent life generates what Brian Massumi calls a “general crisis environment” – a sense that a catastrophic outbreak is just around the corner.<sup>34</sup> The ‘self/enemy’ or militaristic metaphor of threat makes little sense here as there is no putative invasion from outside. We are part of a biotic and machinic system of feedback and feedforward loops. Viruses and bacteria are in us and all around us. We have 100 trillion microbial cells and only 30 trillion human cells in our body. They only become pathogenic under certain conditions. This is why Donna Haraway offers an informatic reading of the immune system as coded, fluid, and networked. As she says, “disease is a subspecies of

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<sup>34</sup> See Brian Massumi, 2009:154, “National enterprise emergency: steps toward an ecology of powers.” *Theory, Culture & Society* 26(6): 153–85.

information malfunction or communications pathology.” Illness is a “misrecognition or transgression of boundaries of a strategic assemblage called self.”<sup>35</sup>

The idea of a risk society arises in this context. A risk society is a new iteration of the biopolitical, one dedicated to managing life by constantly modeling scenarios of future threat within a globally networked financial and bioinformatic system. Such a society is governed by identifying mechanisms that might help large populations acquire immunity against probable catastrophes when systems collapse. The emphasis here is less on the intrinsic intensity of a threat than its potential to engulf the entirety of the globe. As Beck writes: “Risk Society is a catastrophic society. In it the state of emergency threatens to become the normal state.”<sup>36</sup> The divide between *chronos* (the routine everyday) and *kairos* (the exceptional event) becomes unsustainable.

Beck portrays risk society as an uncontrolled science experiment. By uncontrolled he means that we have no spare planet on which we can conduct a nuclear war; no second atmosphere which we can heat and observe the results. We live in a “no-analogue world,” as Will Steffen noted earlier. This means that techno-scientific society is, on the one-hand, hyper scientific and, on the other, radically unscientific in so far as it has no standard against which it can measure and assess what it has done.

How, I ask, might we reimagine formal realism in the face of the impossibly vast finitudes that various scientific modelling exercises throw in our face? Coronaviruses are so small that 10 trillion of them weigh less than a raindrop. As of June 2023, 420.81 parts per million of carbon dioxide appear in our atmosphere. The last time

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<sup>35</sup> Donna Haraway, “Biopolitics of Postmodern Bodies,” in *Simians, Cyborgs, and Women: The Reinvention of Nature*, Routledge 1991, p.212

<sup>36</sup> Ulrich Beck, *Risk Society: Toward a New Modernity*, Sage Publications, 1992, p.79.

the planet's air was so rich in carbon dioxide was millions of years ago, before the Stone Age. The annual rate of increase in atmospheric carbon dioxide over the past 60 years is about 100 times faster than previous natural increases, such as those that occurred at the end of the last ice age 11,000–17,000 years ago.

The mode of realism adopted in Wright's *The End of October*, offers an impetus to argue that digital modelling and simulations now constitute the ground of formal realism in the twenty-first century in the way that newspapers, bureaucratic reports, medical case histories, and print inventories of population and public health constituted the ground of formal realism in the eighteenth and nineteenth centuries. Further, the calculation of the extent of risk through various modelling exercises that have exponentially grown in our digital era, has scarcely any room for individual experience or for practical judgement. These models only tell us what will happen in general. The mysterious historicity of the singular life dissolves in risk modelling. In recent decades we have witnessed a global shift from standard statistical models to Bayesian models, to chaos theory in physics, and to catastrophe theory in mathematics. These theories, widely used in the non-human sciences dealing with mega phenomenon (geology, evolution, meteorology, astrophysics), have recently begun to factor in the "human" as a planetary force. Applications of Bayesian theory have grown exponentially in many probability models where relevant statistics are difficult, if not impossible, to obtain. These are stochastic models aimed at capturing the spiralling effects of random variables. A stochastic model typically has a random probability distribution or pattern that can be analysed statistically but not predicted precisely. In the context of both the Covid pandemic and climate change, we daily witness the tremendous authority accorded to such stochastic models. The realm of everyday experience becomes indistinguishable from its representation in newsrooms, laboratories, digital models, proxy data, and simulation exercises.



The ground of the “real” shifts in risk modeling as it does in theories of formal realism. Data sets and simulations become our documentary evidence and realist forms. The speculative novel and the simulation exercise can be both perceived as working at an intermediate level of abstraction between phenomena, the phenomenological, and mathematical forms of representation.<sup>37</sup> The science studies scholar, Elena Esposito, accords the novel form the same epistemic status as digital simulations. In her words, they both “make [ing] available to human experience a cascade of events that unfold on multiple scales, inhuman and nonhuman.”<sup>38</sup> There is an emerging scholarship on models and simulation as animated social theory and as a mode of world-making.<sup>39</sup> Scientific models, notes Joseph Rouse, are “transformations of the world...[they]transform the available possibilities for acting... by materially enabling some activities and obstructing others, and also by changing the situation that some possible actions or roles lose their point, while others acquire new significance”.<sup>40</sup>

In the context of my discussion of formal realism in Wright’s novel, it behooves us to note simulations are seen to provide not a mimetic representation of the real world but a doubling of reality, or what Niklas Luhman calls “*Realitätsverdopplung*”.<sup>41</sup> They add worlds to the world. They function not only as “a means of prediction but also as a technology of premediation, producing a series of present and plausible futures in

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<sup>37</sup> See Nersessian, Nancy, “Model-Based Reasoning in Distributed Cognitive Systems,” *Philosophy of Science*, 72:5 (2005).

<sup>38</sup> Sven Opitz, “Simulating the World: The Digital Enactment of Pandemics,” *European Journal of Social Theory*, 20:3, 2017, pp?

<sup>39</sup> Edwards, Paul, *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming*, Cambridge: MIT Press, 2010, Opitz 2017

<sup>40</sup> Rouse, Joseph “Understanding Scientific Practices: Cultural Studies of Science as a Philosophical Program,” *Science Studies Reader*, Ed. Mario Biagioli. London: Routledge, 1999, 449-50

<sup>41</sup> Luhman, Niklas, “The World Society as a Social System,” *International Journal of General Systems*, 8.3 (1982): 131-38. 1982, 131

order to map the space of contingency”.<sup>42</sup> We also see a dramatic transformation in ontologies of the *real* in simulation exercises. The *real* is not empirical where every data set derives from sensory experience. Nor is it mimetic in the sense of providing an adequation or verisimilitude of an outer stable reality. It is not simulacral either in Baudrillard’s sense, where the very ground of the real has disappeared. What we witness is a fundamental *doubling* of the real, a hypothetical real of a magnitude (often catastrophic) that could be a logical outcome of the contingent realities of the present.

In other words, simulations and, concomitantly, novels like *The End of October*, generate not a phantasmagoric scenario of apocalypse, but a mode of realistic apprehension that purports to take uncertainty, indeterminacy, complexity, and vast finitudes into account. Instead of inviting us to contemplate end times in an apocalyptic mode, we are urged to recognize that these vast finitudes, these sublime indices are all around us. “Think of the sheer numbers with which global warming is thrust on us,” writes Tim Morton, “like something from a book of records, global warming is spectated as the biggest, the most, the hugest.” “Earth and actually existing beings,” continues Morton, “that live here are bathed in a giant sea of numbers . . . I need no special props, no *deus ex machina*. I don’t need the apocalypse...the trivially mathematized fact of hyperobjects’ longevity is all the help I need”.<sup>43</sup>

In novel studies today, the ground of formal realism is no longer mimesis, if by this we mean the reassuring intermediate world of embodied experience, human-scale reality to which our perceptual, cognitive, and affective apparatus is attuned. We move into the realm what Peter Boxall calls the “prosthetic” imagination, and what I call the “speculative” where the novelistic world, much like the world of big data, acquires an

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<sup>42</sup> Opitz 2017, 409

<sup>43</sup> Tim Morton *Hyperobjects*, 137

artificial life that shapes our phenomenological apprehension of the world.<sup>44</sup> This artificiality is not a deficit of reality but its doubling in a highly formalized speculative mode where we can see nested scales of the real from the everyday to the vast nonhuman futures. Rendering risk invisible and tolerable to the general public through purported management by scientific, technological, and political expertise has only intensified our everyday consciousness of the unimaginable and inexperienceable. The epistemic stakes of the *real* in anticipating catastrophes in novels such as Wright's *The End of October* is that they seriously address and give flesh to the incalculable and the inexperienceable that lie at the heart of realist epistemologies underpinning modeling and simulation exercises. As Wendy Chun writes, "if we are convinced of their verisimilitude, we may act in such a way that their predicted results can never be corroborated by experience".<sup>45</sup>

In this era of increasing indeterminacy, we enter a realm of speculative experience marked by what Derrida calls the *undecidable*, the experience of that which, though "foreign and heterogenous to the order of the calculable and the rule" must nevertheless deliver over to a range of "impossible decisions".<sup>46</sup> Here is deconstruction morphing into a planetary ethic – an attunement to a catastrophic mode that can no longer derive consolation from the secular theology of end-time narratives. We are urged instead to act within an immanent realm of vast nonhuman pasts and futures.

This is what novels like *The End of October* bring to the fore when epidemiologists discover the origins of the virus Kongoli in an extinct woolly mammoth discovered by

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<sup>44</sup> Peter Boxall, *The Prosthetic Imagination: A History of the Novel as Artificial Life*, Cambridge University Press, 2020

<sup>45</sup> Wendy Chun, "On Hypo-Real Models or Global Climate Change: A Challenge for the Humanities," *Critical Inquiry* 41.1 (2015): 675-703, 678

<sup>46</sup> Derrida, Jacques, "Force of Law: The 'Mystical Foundation of Authority,'" in *Acts of Religion*, ed. Gil Anidjar. trans. Mary Quaintance, New York: Routledge, 2002, 252

paleobiologists in Siberia that is then reengineered in a lab for use in biological warfare. Such literary works also challenge the trope of mastery one often finds in the scientific modeling exercises. Risk calculation is a Promethean enterprise, one that holds on to the illusion that we are masters of the earth. An exchange between Henry Parsons and his renegade colleague, Jurgen Stark, in *The End of October* is apposite here: “Jurgen gave him a quizzical look. ‘I make no apology for our work here. Playing at God is the only choice we have if we want to save the earth. Consider what humanity has done to the planet.’” (368) Jurgen refers to a secret bioweapons project that he and Henry Parsons were both involved in before the latter abjured it on ethical grounds and moved to the kind of epidemiological research that he hoped would benefit humankind rather than destroy it. Jurgen, in contrast, is a radical misanthrope and an environmental fascist. He loves the planet so much that he would rather destroy all humans with nature’s weapons (viruses) than have them destroy the earth system. Wright’s novel reminds us with that although we humans think we are dominant within our ecological niche, many other niches exist that overlap with our own, and they operate by entirely different rules over which we have less and less control.

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