

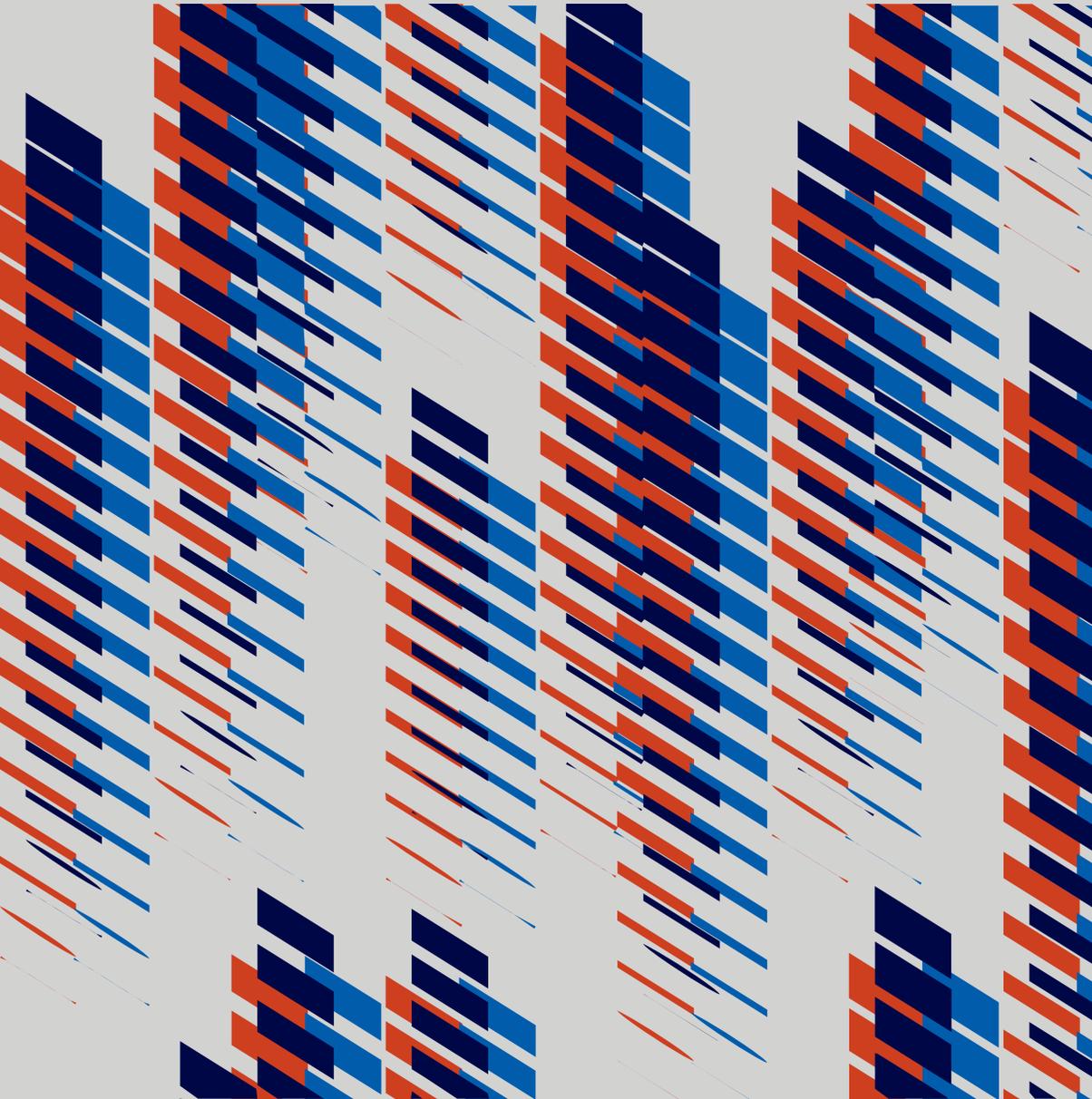
# English Literature

Theories, Interpretations, Contexts

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# **English Literature**

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# English Literature

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## **Table of Contents**

### HUMAN GENERATIONS AND THE ENVIRONMENTAL CRISIS IN LITERATURE, FILM, AND OTHER MEDIA

#### **Introduction**

Michael Fuchs, Roberta Maierhofer 7

#### **Memory Carriers and Intergenerational Kinship in Indigenous Climate Change Fiction**

Alexis Wright's *The Swan Book* (2013) and Cherie Dimaline's  
*The Marrow Thieves* (2017)

Teresa Botelho 19

#### **Multiscalar Temporalities in Postcolonial Climate Fiction**

Nadine Böhm-Schnitker 37

#### **Game Over for Climate Change? Communicating and Visualising Global Warming in Digital Games**

Carolin Becklas, Sabine Baumann 63

#### **Don't Look Up Climate Change Dooming Boomers, Nihilistic Teenagers and Underfunded Scientists Against/For the World**

Georg Gruber 83

#### **The Slow Apocalypse in *The Low, Low Woods***

Michael Fuchs, Anna Marta Marini 101





**Human Generations  
and the Environmental Crisis  
in Literature, Film, and Other Media**  
edited by Michael Fuchs and Roberta Maierhofer



# Introduction

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The two of us writing this introduction belong to different human generations. One of us is a (late) boomer with Gen Z children; the other is an (early) millennial with no intentions of adding another human being to this planet we call ‘Earth’ for “[e]very new life is a tragedy in waiting”, as the extreme metal band Cattle Decapitation puts it on their Anthropocene album *Death Atlas* (2019). Estimates suggest that at the dawn of the Industrial Revolution, 700 to 800 million people inhabited the planet (Thomlinson 1975, 44; United Nations 1999, 6), and the concentration of carbon dioxide in the atmosphere may have been as low as 260ppm (Wigley 1983). When the more senior one of us was born, three billion people lived on Earth (Livi-Bacci 2017, 25), and atmospheric carbon dioxide was below 320ppm (Sundquist, Keeling 2009, 28). About twenty years later, when the second one of us was born, the world population had increased to 4.5 billion (Livi-Bacci 2017, 25), and carbon dioxide concentration had risen to 340ppm (Sundquist, Keeling 2009, 28). According to the United Nations (2022), the human population on Earth surpassed eight billion on 15 November 2022 (the U.S. Census Bureau estimates that this threshold was only crossed on 26 September 2023 [Morse 2023]). On 28 April 2023, Mauna Loa Observatory momentarily recorded 425.01ppm (Lazurko, Raymond 2023), the highest CO<sub>2</sub> concentration since the Pliocene, when global temperatures were about three degrees higher than today (Martínez-Botí et al. 2015) and the sea level at least fifteen metres higher (Hashimoto 2019, 7). In one of our lifetimes, the world population has increased by more than 2.6 times, in



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the other case still by more than 75%, while CO<sub>2</sub> concentration has increased by about 32 and 25%, respectively.

We do not mean to suggest an overly simplistic connection between the number of human beings populating the planet and the environmental crisis (even if there seems to be a nearly linear correlation between atmospheric carbon dioxide and the world population since 1960 [Hofmann, Butler, Tans 2009, 2086]), nor do we mean to support or condone the ethically as well as morally dubious notion that the number of humans on the planet should be reduced (even if “[p]opulation is often the elephant in the room in discussions of climate change”, as Dipesh Chakrabarty has pointed out [2015, 50]), nor do we mean to construct a homogenous ‘human’ equally culpable for, and vulnerable to, the environmental crisis in our opening paragraph; nevertheless, the concentration of carbon dioxide in the atmosphere and the growing world population are two metrics that illustrate the anthropogenic impact on the Earth system. Human overpopulation emerged as a genuine anxiety in the 1950s, albeit dating back to Thomas Malthus’s *An Essay on the Principle of Population* (1798) (cf. Clark 2016; Charise 2020). As early as 1957, Murray Luck expected that by 2050, nine billion humans would populate the planet.<sup>1</sup> In his opinion, when imagining such a number (at a time when there were about three billion people on the planet), “the most pertinent question is whether or not the world of 2050 will be able to raise enough food” (1957, 904). He concluded that it would “although the present inequalities in distribution will be accentuated” (904). Luck feared that the competition for resources among nations would require governments to “become more and more pervasive, and more and more domineering”, meaning that “the precious freedoms of the individual will diminish” (906). He thus wondered, “Will it be worth while [sic] for our children and grandchildren against such terrific odds and against so grim a future?” (906).

Luck deploys the image of children and grandchildren for a reason: the child’s “innocence solicits our defense” (Edelman 2004, 2). How can you oppose the protection of *our* children, after all? Adeline Johns-Putra has identified this type of “parental rhetoric of posterity” as “one of the most prevalent tactics in contemporary environmentalist discourse” (2019, 4). Yet, as much as safeguarding our children’s future may evoke automatic, unhesitating, and unquestioning support among most people, this imaginary (but also materially real) child is an ambiguous figure. Rebekah Sheldon has explained that the child’s innocence, which “is worth protecting cannot be preserved

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**1** The United Nations expects the world population to reach nine billion by 2037 (Zeifman et al. 2022). Some estimates suggest that the world population may peak before hitting that mark (Callegari, Stoknes 2023; Dixson-Declève et al. 2022).

indefinitely, and so the child's relationship is defined, in part, by a melancholic anticipation of loss". The child's "rescue from harm", she continues, "appears tantamount to the future safety of us all – a future that is in any case already irremediably harmed" (2016, 4). Indeed, the environmental crisis has, as Jennifer Wenzel has observed, "destabilize[d] the straightforward, secular assumption that pasts and presents have futures, that things just keep going, that time and history keep unfolding" (Craps et al. 2018, 502). The children's future cannot be taken for granted any more; at the same time, the children of the future may look very different from the children of today.

Nevertheless, the child embodies the future in the popular imagination. Older generations, on the other hand, figure as the destroyers of the future. "Young people are being let down by older generations and those in power", none other than Greta Thunberg claimed in an op-ed piece for *The Guardian* a few days before the World Economic Forum's 2020 meeting in Davos. The "aging population threatens the non-old", Margaret Cruikshank compresses a pervasive cultural myth of the twenty-first century (2013, 25). She continues to explain that the elderly tend to be associated with "disaster metaphors" such as "flood[s]", "avalanche[s]", "tsunamis", and "icebergs" (26-7), suggesting that the older generations are the reckless, voracious, and insatiable architects of the impending (or ongoing) catastrophe that they will not (or barely) experience. Indeed, contemporary society is characterised by

a deep sense of unfairness across generations, grudging allocation of welfare for 'guilty' seniors, and a bitter sense of having to clean up someone else's mess [...] positions older people as a destructive force that threatens the integrity of the planet as a whole. (Jewusiak 2023, 159)

Of course, the discursive construction of 'the young vs the old' imagines homogenous groups that do not reflect how the inclusive gesture of faulting 'humanity' for the environmental crisis erases differences across history and geography (alongside various markers of social identity). While it is true that the stereotype of the elderly "as being incapable of engagement, or as passive or disinterested" concerning environmental issues "needs to be acknowledged [...] and overcome" (Haq 2021, 125), Americans' energy consumption dramatically increases between the ages of thirty and fifty-five and increases disproportionately once again after the age of seventy (Estiri, Zagheni 2019). In France, "baby boomers emit 20% more CO<sub>2</sub> than the average household" (Chancel 2014, 200); a study in China has shown that with increasing age, carbon emissions rise (Fan et al. 2021); and Italians born between 1940 and 1974 have the highest private transport fuel consumption (Bardazzi, Paziienza 2018).

No matter which age cohort might be to blame, we continue pumping greenhouse gases into the atmosphere. Their effects on the global climate are not a recent insight, with Svante Arrhenius (1896) noting the connection between carbon concentration and temperature more than a hundred years ago. Fast-forward to the year in which Murray Luck imagined that nine billion people would inhabit the planet, and Roger Revelle and Hans Suess warned that humans were “carrying out a large[-]scale geophysical experiment” by “returning to the atmosphere and oceans the concentrated organic carbon stored in sedimentary rocks over hundreds of millions of years” (1957, 19). The production of CO<sub>2</sub> due to fossil fuel consumption, James Arnold and Ernest Anderson concluded in the same journal issue, had

reached truly geochemical proportions and the rate of introduction of ‘new’ [...] carbon into the exchange reservoir by fuel consumption seems to exceed the natural production rate of juvenile carbon by two orders of magnitude. (30)

Rachel Carson’s iconic book *Silent Spring* appeared five years later. It announced that “[f]or the first time in the history of the world, every human being is now subjected to contact with dangerous chemicals, from the moment of conception until death” ([1962] 2002, 15). To be sure, Carson focused on the effects of pesticides on the human and nonhuman world, but the publication of *Silent Spring* was “an epochal event in the history of environmentalism” and “launch[ed] a new decade of rebellion and protest in which the idea of Nature under stress also began to be seen as a question of the quality of life” (Gottlieb 2005, 121). Writing amid the nuclear anxieties produced by the Cold War, Carson told a *Washington Post* reporter a few months before the publication of *Silent Spring* that she would not “equate the nuclear fallout hazard with that of poisonous insecticides, but [...] they are interrelated, combining to render our environment progressively less fit to live in” (quoted in Eiseley 1962, 18). By thus entangling early signs of the environmental crisis with the zeitgeist of the Atomic Age (whose artificial residue materially inscribes anthropogenic activities into the planet’s layers and thus provides one key marker for the Anthropocene [Zalasiewicz et al. 2015]), Carson made clear that the “mission of *Silent Spring*” was “nothing less than an attempt to create a new environmental consciousness” (Gottlieb 2005, 125).<sup>2</sup> In 1965, the U.S. President’s Science Advisory

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<sup>2</sup> As Ursula Heise has rightly pointed out (2016, 6-7), there have been different ecological crises that range from the local to the global, from the near-extinction of the American bison in the United States in the latter stages of the nineteenth century to the global concern about anthropogenic climate change today. However, these crises are all interrelated.

Committee Environmental Pollution Panel estimated that CO<sub>2</sub> concentration in the atmosphere in the year 2000 would be 25% higher than in 1950, which, they concluded, “may be sufficient to produce measurable and perhaps marked changes in climate” (quoted in Peterson 1969, 1164). By the end of the 1960s, Democratic Senator Gaylord Nelson (who was also the chairman of the first Earth Day) would declare the environmental crisis “the most critical issue facing mankind” because “nuclear war, hunger, decaying cities, and all other major problems one could name” pale in comparison with the gravity and long-term effects of this particular problem (quoted in Dowie 1995, 25).

In his book *The Long Thaw*, computational ocean chemist David Archer explains that humanity

has a kind of vested interest in time spans of centuries. I personally can visualize centuries. [...] I know people who knew people who knew the beginning of the last century. [...] Looking forward, a century is about how far I can really imagine also. Sixty years is grandchildren. One hundred is great grandchildren or great, great grandchildren. (2009, 5)

In this passage, Archer points at the difficulty, if not impossibility, of imagining timescales that stretch beyond three or four, perhaps five, human generations – which Kathleen Woodward (2020) has called ‘generational time’. We may be able to imagine future humans that we may still be in contact with, but “[g]lobal warming and many other human-driven changes to the environment are raising concerns about the future of Earth’s environment and its ability to provide the services required to maintain viable human civilizations”, Will Steffen, Paul Crutzen, and John McNeill have stressed (2007, 614). They continue to explain that “future generations of *H. sapiens* will likely do all they can to prevent a new ice-age by adding powerful artificial greenhouse gases to the atmosphere” (620; italics in the original).

At the same time, both the passage quoted from Archer’s book and the article co-authored by Steffen, Crutzen, and McNeill emphasise the human dimension of the environmental crisis; their anthropocentrism imitates how (if not perpetuates the idea that) human lifetimes and human (world) history overshadow aspects of geological time in discussions of the environmental crisis. This single-minded focus on human time helps explain and understand the predicament that humankind, in its role as “the dominant ecological force on the planet” (Ellis 2011, 38), has manoeuvred the planet into; however, “if we do not take into account Earth-history processes that outscale our very human sense of time, we do not quite see the depth of the predicament that confronts humans today”, Dipesh Chakrabarty has warned (2018, 6).

Unfortunately, “[p]eople can’t get their minds around the time spans involved”, resulting in “a hot topic” that nevertheless “lacks urgency”, the narrator in Margaret Drabble’s novel *The Dark Flood Rises* remarks (2016, 299). Indeed, the “derangements of scale” (Clark 2012) characteristic of the Anthropocene have made the world “un-thinkable”, as the subtitle of Amitav Ghosh’s *The Great Derangement* (2016) suggests (see also Thacker 2011, 1). Characterised by hyperobjects “that are massively distributed in time and space relative to humans” (Morton 2013, 1), the world today eludes human comprehension (or, perhaps more to the point, these hyperobjects make us acknowledge that understanding the world has always been an illusion). Adam Trexler considers these complications fertile soil for literary innovation, as the environmental crisis requires literature (and other media) to integrate “new things into preexisting genres”. “Climate change”, he continues, “changes the literary potentialities of setting, conflict, the organisation of characters, and the fundamental way that diverse characters and nonhumans interact in narratives” (2015, 234).

The five contributions to this issue discuss how film, comics, video games, and literature approach various issues and phenomena of intergenerational significance in the face of looming environmental catastrophe. In the opening article, Teresa Botelho focuses on indigenous literatures – more specifically, Alexis Wright’s *The Swan Book* (2013) and Cherie Dimaline’s *The Marrow Thieves* ([2017] 2019) – and how these narratives figure older generations not so much as adversaries burdened with guilt but rather as carriers of memory, thereby contributing to the larger project of spotlighting the “memories, knowledges, histories, and experiences of oppression that differ from many of the nonindigenous scientists, environmentalists, and politicians who are prominent in the framing of the issue of climate change today” (Whyte 2017, 153). *The Swan Book*, Botelho demonstrates, addresses issues of indigenous dispossession and climate change refugees in complex ways, while *The Marrow Thieves* tackles questions of living in a climate-changed world. Both novels, Botelho suggests, present alternatives to the Western concepts of time and experience, as intergenerational allyship and interspecies kinship become key to reconfiguring the human place on an increasingly inhospitable planet.

Nadine Böhm-Schnittker continues along a similar path and examines the different scales that become significant in Mahasweta Devi’s story “Pterodactyl, Puran Sahay, and Pirtha” (1989) as well as Amitav Ghosh’s novels *The Hungry Tide* (2004) and *Gun Island* (2019), focusing, in particular, on the interplay between generational time and deep time and the significance of non-Western systems of knowledge. In “Pterodactyl”, the appearance of the titular prehistoric animal in the 1980s effects a clash between the temporal scales of deep time and human time that seems to be beyond expression and comprehension but simultaneously spotlights the Earth-destroying progress of

modernity. *The Hungry Tide* and its sequel, on the other hand, not only entangle animal migrations with anthropogenic activities and present-day events with the geologic history of the Indian subcontinent (among others) but also try to express that which has long been silenced. In the end, Böhm-Schnittker highlights multiscalarity as one way in which the novel has responded to the representational challenges of the environmental crisis.

Carolyn Becklas and Sabine Baumann turn their attention to the video game *Eco* (Strange Loop Games 2018) and how it communicates the realities of climate change. They thus engage with the question of whether and how “playful simulations can take as their subject processes as large and protracted as climate change” (op de Beke 2021, 186). *Eco* is a survival game that may be played by one player or as an online multiplayer game - with the latter being the option suggested by the game’s creators, as it requires players to collaborate with other players to evolve as a civilisation. Alternating between different points of view that, quite literally, give players different perspectives to experience the different scales involved in comprehending the interplays between local activities and global phenomena and simulating various factors that impact the environment, *Eco*, Baumann and Becklas suggest, communicates the complexity of climate change effectively despite simplifying the climate system.

In “*Don’t Look Up* Climate Change: Dooming Boomers, Nihilistic Teenagers and Underfunded Scientists Against/For the World”, Georg Gruber explores the star-studded film *Don’t Look Up* (2021). The movie, Gruber suggests, simplifies the *longue durée* of global warming by transforming it into the momentary impact of a giant comet on Earth, which causes a mass extinction event. At the same time, as Gruber shows, *Don’t Look Up* paints a complex picture of the U.S.-American mediascape that is more interested in viewership numbers than reporting the reality of an impending extinction-level event. The storyworld of *Don’t Look Up* is populated by caricatures of greedy tech billionaires, power-hungry politicians and their incapable staff, scientists unable to communicate with the masses, disaffected youth, and entertainers engaging in their form of what Naomi Klein called disaster capitalism (2007). They combine to represent various ways of (not) responding to a crisis that threatens to annihilate life on Earth. As Gruber argues, *Don’t Look Up* may be a flawed movie; however, it grapples with the complexities of communicating the realities of global warming, the intricacies of a mediascape in which too many actors are vying for audience attention, and the problems of national political systems ill-equipped for confronting an issue of global scale.

Finally, Michael Fuchs and Anna Marta Marini’s contribution, “The Slow Apocalypse in *The Low, Low Woods*”, draws on Rob Nixon’s notion of ‘slow violence’ (2011) to discuss the limited horror comics series *The Low, Low Woods* (2020), written by Carmen Maria Machado

with art by Dani and colour by Tamra Bonvillain. Nixon conceptualises ‘slow violence’ as a transgenerational, transnational, and transspecies issue, for it is a type of “violence that occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all” (2011, 2). Fuchs and Marini place these concerns squarely on the Appalachian coal-mining industry and its long-term effects on people and the natural world, which *The Low, Low Woods* interweaves through strategies characteristic of the comics medium. In particular, the comics series demonstrates how the extractive industries capitalise on the notion of “cheap nature” (Moore 2015) to exploit the environment and (marginalised) human populations. Indeed, Fuchs and Marini highlight that the comics series entangles its critique of capitalism with a decided focus on the violence enacted to establish and maintain the dominance of (white) patriarchy in the region and beyond. However, they conclude on a cautionary note, as the comic’s anthropocentrism exaggerates human agency on a warming planet.

In combination, the five articles included in this issue showcase various intergenerational issues and phenomena at play in the environmental crisis. To be sure, the ecological dilemma that we find ourselves in is “the product of a social rift: the domination of human being by a human being. The driving force is a society based on class, inequality, and acquisition without end” (Foster, Clark, York 2010, 27). However, as Dipesh Chakrabarty has stressed, this is only part of the story: “It is, ironically, thanks to the poor [...] that we do not put out even larger quantities of greenhouse gases into the biosphere than we actually do” (2015, 49). This ambiguity speaks to the ‘super-wicked’ character of the environmental crisis (Lazarus 2009), which is

less a matter of unitary or even discernibly plural causes, and more the emergent effect of the combination of numerous interacting issues of a hybrid kind, comprising capitalism, population pressure, [...] deforestation, neo-colonialism, and cultural norms (such as those of patriarchy), along with such capricious material factors [...] as levels of methane from thawing ground in Siberia, soil degradation, the varying reflectivity of clouds... (Clark 2016, 7)

Roy Scranton has suggested that, in order to live and continue living on this human-altered planet, “we must first learn how to die” (2015, 28). “Learning to die as an individual”, he explains, “means letting go of our predispositions and fear”. “Learning to die as a civilization”, on the other hand, “means letting go of this particular way of life and its ideas of identity, freedom, success, and progress” (24). On the one hand, this means abandoning fossil fuels and the system of petrocapi-talism, which have driven large parts of the world; on the other hand, it means overcoming the differences and differentiations

between human groups (including generations). As if responding to Scranton, sociologist Giacomo Bazzani has promoted “low-carbon behaviors” as “a form of global and intergenerational pro-social behavior” (2023, 353). Such practice would allow us to connect “individual, fragile bodies” to a collective “project of staying home and [...] *making* home of a broken world” (LeMenager 2017, 225-6; italics in the original). One might be tempted to argue that this idea of inhabiting a broken world imitates, in particular, experiences indigenous peoples have been making since they encountered the power of ‘civilisation’, turning us white Euro-American scholars into the ‘dreamless ones’ of Cherie Dimaline’s *The Marrow Thieves*, recycling ideas that others had long before us. Be that as it may, we would like to echo Stephanie LeMenager’s notion (and countless others who have voiced similar ideas) that capitalism’s project of slowly cancelling the future (to draw on Franco Berardi [2013]) may produce an inhospitable planet. Still, there is hope for survival on this warming planet.

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# Memory Carriers and Intergenerational Kinship in Indigenous Climate Change Fiction Alexis Wright's *The Swan Book* (2013) and Cherie Dimaline's *The Marrow Thieves* (2017)

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**Abstract** The concept of anthropogenic climate change, in its most simplistic interpretation, implies that all humanity is collectively responsible for the present threats to planetary sustainability. This unquestioned discourse of collective responsibility also facilitates frames of understanding that isolate older generations and burden them as a whole, blaming them for the construction of a life model that has led to the present crisis, a discourse challenged by postcolonial and environmental justice literature and in particular by Indigenous fiction. A discussion of two novels, *The Swan Book* (2013) by the Waanyi Australian writer Alexis Wright, and *The Marrow Thieves* (2017) by the Métis Canadian writer Cherie Dimaline, scrutinises how they create alternative frames presenting older adults in scenarios of environmental devastation as carriers of memory that are agents in the construction of the spirit of resilience and resistance of young characters.

**Keywords** Climate change fiction. Environmental justice. Intergenerational gap. Indigenous literature. Dystopia.

**Summary** 1 Introduction: Climate Change and the Generational Gap Discourse. – 2 Indigenous Loss in Devastated Futures: *The Swan Book*. – 3 Memory and Intergenerational Survivance: *The Marrow Thieves*. – 4 Reconfiguring Anthropocene Temporalities.



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## 1 Introduction: Climate Change and the Generational Gap Discourse

Matthew Schneider-Mayerson has argued that most of the early popular climate fiction failed to respond to the many challenges of addressing the pending crisis by portraying it primarily as a problem “for human beings in general – the monolithic and flattened ‘we’ of *homo sapiens*” (2019, 945),<sup>1</sup> ignoring the unjust distribution of responsibilities, vulnerabilities, and impacts. He thus proposed a reflection on the influence of a simplified reading of the frames invoked in accepted and influential discourses about the looming emergency. This critical engagement implies scrutinising the uncritical use of the concept of the Anthropocene, the proposed term that identifies a geological age in which humans have become a dominant force shaping Earth’s climate and ecosystems.<sup>2</sup> This scientific proposition considers the collective agency of humans, seen as a species entangled and not separated from Nature, an ‘us’ that, in the words of Dipesh Chakrabarty “stumbled into being a geological agent” (2009, 210) through its collective actions and decisions, especially those related to the creation of an industrialised civilisation driven by fossil fuels.

But seen from a different temporal frame, this interpretation of collective human agency grounded in a deep history of species relations on Earth may seem to suggest, as Jason W. Moore argues, that all humans are to be blamed, retrospectively, for decisions they did not make, resulting in a dispersal of responsibility that elides “decisive questions of difference among humans, and how that difference is constituted through relations within the web of life” (2017, 595). This sense of collective blame, symbolised by the iconic slogan in Walt Kelly’s poster issued for the first Earth Day in 1970 – “We have

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1 Schneider-Mayerson’s article discusses only two American works that seem to corroborate that reading, namely Nathaniel Rich’s *Odds Against Tomorrow* (2013) and Kim Stanley Robinson’s *Science in the City* trilogy (2004; 2007; 2015).

2 Although the term has been widely accepted by geological scholars since it was first proposed by Paul J. Crutzen and Eugene E. Stoermer (2000), the dating of the starting point of this geological epoch has been far from consensual. Crutzen and Stoermer pointed towards the second half of the eighteenth century, coinciding with James Watt’s invention of the steam engine, although, considering this date “somewhat arbitrary”, they left open the possibility that “alternative proposals can be made” (2000, 18). Alternatives proposed since then vary significantly, from attributing its beginning to the Agricultural Revolution (Ruddiman 2003) to identifying the starting point of the Anthropocene with the post-WWII Great Acceleration (Zalasiewicz et al. 2011; McNeill, Engelke 2016). This hypothesis was recently validated by stratigraphers from the Anthropocene Working Group, who, in the summer of 2023, identified the chemicals and minerals in the sediments of Crawford Lake, in Ontario, Canada as evidence that the “golden spike” that marks the shift from the Holocene to the Anthropocene coincides with the 1950s acceleration of fossil fuel burning, widespread use of fertilisers, and the presence of radioactive plutonium associated with nuclear weapons tests (Voosen 2023).

met the enemy and he is us" (Moore 2019, 53) - has been systematically problematised by scholars from diverse fields (notably from postcolonial and environmental justice studies) who have raised pertinent questions not only about the different layers of responsibility for the crisis, but also about universalised visions of global threats. Chakrabarty's assertion that, in the long-term future, all humans will be equally vulnerable and that there will be no "life boats for the rich and the privileged" (2009, 211) may reveal itself to be accurate. However, all present evidence allows us to predict that now and soon, as Ursula Heise has argued, ecological risk scenarios will "superimpose themselves on and help reinforce existing structures of social inequality" (2008, 149).

Evidence of this uneven distribution of responsibility and risk seems irrefutable. According to a 2020 study by the Stockholm Environmental Institute, the carbon emission inequality between and within countries is staggering. 1% of the most affluent humans are responsible for twice as much carbon emission as those produced by the poorest 50% in the 25 years (1990-2015) studied (Karthä et al. 2020). Concurrently, the impacts of climate change already visible are affecting and will probably continue to affect mostly those who contributed less to the crisis and are less likely to be able to apply effective mitigation measures. Studies on the dramatic consequences of irreversible permafrost melting on Indigenous communities in the Arctic (Mardikian, Galani 2023) and of the effect of prolonged droughts on cycles of crop failures and rapid desertification patterns in Sub-Saharan Africa (Toulmin 2009) exemplify this reality.

Even when critical analyses do not embrace alternative terms such as Capitalocene, proposed by Moore, or Plantationocene or Chthulucene,<sup>3</sup> offered by Haraway, and accept that there may be different communicational intentions in the unquestioned use of a sense of 'we' as a global actor in public discourses, they cannot ignore the

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**3** The term Capitalocene, resulting from a critique of the Anthropocene mainstream rhetoric that can be traced back to Malm and Hornborg (2014), and first theorised by Moore (2017), does not question the core geological concept, namely the reading of humans as a geophysical force that disrupts the dualism between Man and Nature, but proposes an alternative reading of that collective actor and a different periodisation, that has as a point of departure the beginning of colonialism and the emergence of a "historical capitalism as a world-ecology of power, capital and nature, dependent on finding and producing Cheap Natures" (Moore 2017, 595). A similar teasing of the cultural and historical simplicities and generalisations behind the Anthropocene discourses is at the heart of the alternative terms Plantationocene and Chthulucene. While the former examines the legacy of a long series of "devastating transformations of diverse kinds, of human-tended farms, pastures and forests into extractive and enclosed plantations mostly relying on slave labour" and "other forms of spatially transported labour" (Haraway 2015, 162), the latter decentres humans from "the ongoing multispecies stories of becoming-with in times that remain at stake, in precarious times in which the world has not finished and the sky has not fallen - yet" (Haraway 2016, 55).

fact that this tendency to attribute an undifferentiated collective responsibility for the degradation of our shared environment also facilitates frames of understanding that homogenise particular generations and blame them as a whole for being the architects of a life model that has led to the present crisis. This suggestion of collective generational guilt, present, above all, in the Great Acceleration framing of the Age of the Anthropocene, which situates its inflexion point in the post-WWII age of economic growth, is frequently predicated on two entangled premises summarised by Gareth Davis, namely that “consumption now creates costs for future generations” and that therefore “mitigation by emission reduction requires the current generation to pay the costs of a benefit that future generations will receive” (2020, 267). Treating intergenerational justice as a transactional process assumes that all older people are a homogeneous entity, whichever way you define that category. In some media representations of climate action youth groups, these may appear to be directing their message towards a global generation of “greedy geezers” – a term first coined in the late 1980s (Fairlie 1988) to describe older citizen/voters who are accused of selfishly demanding short-term benefits “at the expense of longer-term social investment” (Greer et al. 2021, 40).

However, this stereotypical reading of intergenerational tensions obfuscates several pieces of counterevidence. It ignores that although voting pattern studies in many European countries show less inclination of older citizens to vote for Green Parties (Litchin et al. 2023), more senior citizens from high emission-producing countries have been active participants in protests usually associated with younger generations, such as the UK-based Extinction Rebellion and Insulate Britain, and have set up climate action groups, such as the American Grey is Green network and the Elders Climate Action.

On the other hand, several studies show that the intergenerational divide is a myth in many high-energy-consuming societies. A 2021 study of the attitudes across generations in the United Kingdom, for example, shows that, contrary to the expectations created by the “intergenerational moral storm” narrative (Gardiner 2006), the majority of baby boomers are slightly more inclined to feel that the climate crisis justifies significant changes to contemporary lifestyles (74%). In addition, there were almost identical levels of agreement across questions about individual readiness to make sacrifices to reduce the impact of fossil emissions (Duffy 2021). These results are not necessarily common to all major emission societies. Cross-generational surveys of urban residents in different continents reveal that while generational blame is a common thread, intergenerational

community-based and creative practices increasingly challenge that narrative<sup>4</sup> (Diprose et al. 2019).

Literature that represents scenarios of a world damaged by environmental threats has sometimes deliberately engaged the intergenerational blame motif. One of the most significant examples of that trend is John Lanchester's *The Wall* (2019), where the young protagonist, about to start his compulsory two-year stint as a 'Defender' of the protective wall that surrounds Britain, blames "the olds" for "fucking up the world" (55) and for being responsible for "the Change", the environmental disaster that had caused drastic sea rising levels and extreme weather phenomena across the globe. But when postcolonial literature addresses the complexities of these links of causality and responsibility attribution, it frequently adopts a different logic, pointing out how unfair it is to blame older generations with little to no agency for decisions that were, in fact, forced on them by the aggressive pressure of corporation-government alliances and from which they did not benefit. The Cameroonian writer Imbolo Mbue's novel *How Beautiful We Were* (2021) presents this different approach. Its intergenerational story develops over forty years and is set in a small village in a nameless African country that could stand for diverse national experiences. It depicts the devastating impact of oil spills on the environment, leading to the depletion and degradation of nature. Parents and elders are helpless as they witness their children dying every day due to the untreated toxic waste resulting from the oil spills. They had once naively welcomed the activity, convinced it opened an escape door from poverty.

Whereas contemporary postcolonial novels about environmental destruction, such as Mbue's, tell stories about the slow violence of petro-imperialism that render visible the environmental injustices hiding behind paradigms of generational guilt attribution, other works of fiction that respond to different patterns of dispossession and identity erasure tend to offer distinctive readings of intergenerational relations grounded in an affirmation of collective cultural memory. This is the case of works authored by Indigenous authors from English-speaking countries (United States, Canada, New Zealand, Australia) who write against a history of effacements promoted by states that have failed to "fully recognize the nationhood of Native collective existence... despite the longevity of the ties that connect these communities to place" (Gilio-Whitaker 2019, 24).

The following discussion will focus on how intergenerational interdependencies are woven in the construction of scenarios of both

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<sup>4</sup> The study covers three industrial cities in three continents - Jinja in Uganda, Nanjing in China, and Sheffield in the UK.

environmental and cultural loss in two Indigenous<sup>5</sup> novels - *The Swan Book* (2013) by the Waanyi Australian writer Alexis Wright and the young adult novel *The Marrow Thieves* (2017) by the Métis Canadian writer Cherie Dimaline, both set in future worlds already damaged by climate change.

In her discussion of Indigenous climate change literature, Shelley Streeby argues that the most relevant contributions to the genre by female Indigenous authors assume defiance of literary genre boundaries and approach the narrative through a creative investment in the deep associations between accumulated “place-based knowledge, and storytelling traditions [...] connecting ecological and climate change literature to a spectrum of cultural practices inextricable from activism” (2022, 203). While that may be true for the examples Streeby examines, namely the classic *Braiding Sweetgrass* (2013) by Robin Wall Kimmerer (Potowatomi Nation), the speculative novels that I will discuss in this article are set in a dystopian post-climate apocalyptic future and focus on the trauma of losing that knowledge and the impulse to recover what had been forcibly erased. These processes inform the intergenerational dynamics of survival in a hostile environmental and political world. This background explains why older generations tend to be represented as agents of change, rather than obstacles, in fictional worlds where the survival of Indigenous communities depends on the retrieval of collective knowledge and practices - understood here as the “webs of signification” that can explain “beliefs, relationships of kinship, relations with nature and ways of living” (Arias 2017, 1).

In both Streeby’s and Kimmerer’s novels, the catastrophic impacts of climate change are shaped by the temporalities of the experience of Indigenous communities. As Kyle Powys Whyte points out, Indigenous peoples do not always share the mainstream “imaginaries of dystopian or apocalyptic futures when they confront the possibility of a climate crisis” (2018, 226), since the linear narrative of climate destabilisation on which they are based contradicts their own experience of a history of constant change, marked by “different forms of colonialism, that have destroyed their “links with place and familiar ecosystems” (226). As a result, Indigenous peoples have already experienced the impacts of climate change that many non-Indigenous people dread, albeit caused by violent colonial human action that led to “ecosystems collapse, species loss, economic crash, drastic dislocation and cultural disintegration” (226) rather than global warming.

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<sup>5</sup> The adjective is used here as a general term to designate the identity of peoples who inhabited lands before the arrival of British colonisers. Its use or that of the alternative terms ‘First-Nations’ or ‘Aboriginal’, applied in the same sense in Canada and Australia, does not imply any sense of essentialist homogeneity, but a common pattern of historical experiences.

The destruction of this nature-based model of sustainability, which Paula Gun Allen described as acknowledging “the essential harmony of all things” and seeing “all things as being of equal value in the scheme of things”, allowing “all animals, and minerals (the entire biota, in short) the same or even greater privileges than humans” (1992, 56-7), is reflected in an approach to time that problematises linearity and interweaves past and current dystopian experiences. These “spiralling temporalities”, to use Whyte’s term for the Anishinaabe perspective on intergenerational time, provide a frame that allows Indigenous subjects who share that approach to consider themselves “as living alongside future and past relatives simultaneously as we walk through life” (2018, 228-9). A perspective that views past and present as interdependent and concurrent facilitates the construction of intergenerational kinships that accentuate the role of older generations as carriers of semi-lost knowledge and, thus, as potential agents of recovery.

These two motifs - the ever-present violence and effacement of the past in a future climate crisis that is not new for those who have suffered a similar experience of cultural and historical disruption and a loss of sustainability knowledge that can only be healed by intergenerational interaction - are at the core of the two novels under discussion, both set in landscapes of ecological disaster that are new for some humans but not for the Indigenous protagonists.

## 2 Indigenous Loss in Devastated Futures: *The Swan Book*

In *The Swan Book*, Alexis Wright’s third novel, the author revisits the theme of environmental degradation, conflict, and resource exploitation that she already approached in *Carpentaria* (2006) but deploying the mode of speculative fiction. The novel, set in Wright’s ancestral Waanyi land in the Gulf of Carpentaria in Northern Australia, roughly one hundred years from now, intersects a historical map of aggression and dispossession of sovereignty against those who had lived in those lands for 50,000 years before the arrival of the first Europeans and the radical damage caused by global warming and the ensuing wars. In this fictional future, climate change has already destroyed most of Europe, turning the Northern Hemisphere descendants of the colonial settlers into stateless and homeless nomads, suffering what had already been endured long before by guardians of Country, a term that for the aboriginal communities “describes conceptions of land and its complex interrelations with human and non-human beings, containing both their knowledge systems and the notion of reciprocal relations of care” (Gleeson-White 2016-17, 29).

The young Aboriginal Oblivia Ethyl(ene) is at the centre of the multi-layered novel, which Sefton-Rowston describes as a “pastiche of

metanarratives" (2016, 363), interweaving different textualities from the realist to the metaphoric, the allegoric, the mythic, and the folkloric. After suffering an act of sexual aggression, she falls into the underground bowels of a giant eucalyptus tree, where she remains asleep, forgotten by all, until she is rescued a decade later by an elderly European climate refugee, Bella Donna of the Champions, the sole survivor of a group of destitute exiles whom a black swan guided to the shores of Australia. The story of Oblivia, who was forgotten by everyone who knew her, and the aggression she suffered serve as an allegory for the traumas caused by the Australian policies of compulsory separation of children from their parents and communities, which were aimed to promote identity reconfiguration.<sup>6</sup> Bella Donna accommodates Oblivia, who refuses to speak to anyone, near a swamp that had once been a lake around which an Aboriginal community had lived for centuries. The once pristine lake has been damaged by climate change-driven sandstorms and by rotting junk and toxic waste dumped on it from the skies. Later in the narrative, Warren Finch, a member of the Brogla Nation, becomes the first Aboriginal president of Australia. His people have learned to accept anything offered to them, saying "yes, yes, yes to anything on offer - a bit of assimilation, a bit of integration, a bit of giving up your own sovereignty" (116). Warren claims the still silent Oblivia, whose first-person perspective dominates some chapters, as his wife without her consent. Oblivia's traumatic experience of Warren's attempts to change her, in a city where the only thing she recognises is the wild garden lurking through the cracks in the pavement, eventually leads her to escape towards the North in an attempt to return to her homeland. On this journey, she is guided by black swans who have become her kin. They communicate with her without any hindrance, as her silence is no obstacle to communication.

Besides the multispecies kinship symbolised by the protective tree that embraces Oblivia and keeps her alive and by the swans that are her constant companions, there are some interconnections with Indigenous cultural and historical experiences that the narrative addresses and that propose alternative views of climate change and generational responsibility. The most significant is how it presents the environmental devastation known as the 'Dust Cycle' as two juxtaposed disasters. The "caretakers" (9), the Aboriginal people who were responsible for the lake, experience the first dust storms, which

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<sup>6</sup> This policy, which began in 1869, with the passing of the *Aboriginal Protecting Act*, authorised the removal of Indigenous children from their parents. It lasted until the 1970s. According to the *Bringing Them Home* report (1987), the number of children from the Stolen Generations who were taken from their parents to be 're-educated' in state and church institutions is not precise, but it is estimated to have been around 100,000 (cf. Haebisch 2017).

transform the lake into a swamp, as a double invasion: first the sand and then the army, which dumps the rotting junk collected elsewhere on their ancestral home. It is the second incursion that breaks the sense of precarious autonomy they had experienced before, when “they felt secluded in their isolation, even invisible to the outside world” (8). Alarmed by this military presence, they temporarily flee into the bush. When they return, the first thing they notice is the “audacity of the floating junk” (10) in the lake that, as they are told, no longer belongs to them as their temporary flight has cancelled their Native Title.<sup>7</sup> But this combined attack on their land does not destroy the ancestral connection of the “stubborn” owners. They stay, “sticking to the earth of the ancestors, even though they knew well enough that the contaminated lake causes bellyaches, having to eye each cup of tainted water they drank from the lake, but drinking it anyway” (11).

Since the caretaker elders had no responsibility for the double crisis that destroyed most of the ancestral environment, it can be argued that *The Swan Book* interrogates the generational blame trope through the filter of a cultural experience of dispossession. The novel adds a second textual disruption to this paradigm by portraying the old European refugee who lands on the Waanyi territory. Although Bella Donna of the Champion may seem to have been designed to represent the typical Northern Hemisphere’s selfish and careless consumer of resources, her function in the narrative is not limited to that. Instead, she plays the role of a storyteller and memory creator who connects the local community to the global climate crisis and links the past with the present.

Welcomed with some curiosity by the local Aboriginal community, the strange woman “as old as the hills” (50), who owes her life to a swan, tells stories that make sense of what her audiences have already perceived but cannot contextualise. Through her, they understand that what was making their lives worse – turning what was left of their lake into a “parched paper” landscape filled with sand that they could not heal as the weather “flipped sides” shifting seasons (17-18) – was not unique to their land. Through her, they learn how “when the world changed, people changed” (6). She assumes some guilt when she describes her country of origin as one “where people of the modern world once lived happily, by doing more or less nothing, other than looking after themselves from one day to the next to fuel the stories of their life, but they were *finished now*” (25). Still,

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<sup>7</sup> This can be read as an allegory of the policy of government direct control in Aboriginal prescribed areas, introduced by the *Northern Territory Emergency Response Act* of 2007, which introduced several controversial regulations and control measures in Aboriginal lands under the pretext of stopping alleged patterns of family violence and child abuse. The Act was repealed in 2012.

when she explains the catastrophe that finished them, that nuance is drowned by the brutality of its effect:

One day some devil, not a person but a freak of nature, went to war with her people. *Old woman what kind of freak was that? Well? Swamp people wanted to know, had a right to know. She looked startled, as though she had been asked to describe the inexplicable, of what happened to people affected by climate change in wild weather storms, or the culmination of years of drought, high temperature and winds in some countries, or in others, the freezing depths of prolonged winters [...]. Listen to what I say: Cities, towns, homes, land as well as animals and crops, were flattened and could be no more.* (25)

From her, they hear that once “Mother Nature had become mother of catastrophe, of flood, fire, drought and blizzard” (6-7), “poverty people” like herself “had to walk herdlike, cursed from one border to another, through foreign lands and seas” (17), turned into “refugees marching onwards like deer would through winter steppes to nowhere” (27). And through her stories, they understand their attachment to their damaged place even better, saying to themselves that compared to these “new gypsies” like Bella Donna, they were luckier: “They had a home. Black people like themselves had somewhere, whereas everywhere else, probably millions of white people were drifting among the other countless stateless, millions of sea gypsies, looking for somewhere to live” (23).

For Oblivia, starved of cultural memories that only Aboriginal Elders could have passed on, Aunty Bella Donna opens horizons not only to the lost worlds she could not have imagined but to the interspecies connections that had always been part of her missing heritage. What Bella Donna had learned about swans, she passes on to the young girl as she tells her stories of the way they “fly, soaring above the swamp, crashing to the ground, taking flight again”, feeds them, talks and dreams of them, leaving a legacy that will help Oblivia reject the material emptiness of the city into which her President husband would drag her. It is guided by swans who never leave her side that she escapes the Northern urban landscapes to return to what is left of Country, in a gesture of fragile hope of a dreamed restoration of a land that still contains promises and that the recovery of knowledge that started with Bella Donna’s stories of interspecies kinship might heal.

### 3 **Memory and Intergenerational Survivance: *The Marrow Thieves***

In *The Marrow Thieves*, a young adult speculative novel set in Canada in the near future (around 2050), a land dramatically altered by the impacts of an apocalyptic environmental crisis, stolen pasts and recovered legacies are also mediated by elders, who act as agents of what Anishinaabe scholar Gerald Vizenor called survivance, understood as “an active sense of presence over absence, deracination and oblivion [...] the continuance of stories, not a mere reaction, however pertinent” (2008, 1). In an interview given shortly after the publication of the novel, Cherie Dimaline explains how her story about people who had already lived through an apocalypse, surviving another, was constructed by “putting together two different ideas: that Indigenous people’s survival has been based, in part, on the ability to keep dreaming/hoping and using story to walk culture forward, and the understanding that cultural survival is as imperative as physical survival, and, in fact, is intertwined” (Diaz 2017).

The fifteen-year-old Métis boy Frenchie narrates the novel’s future dystopian vision. The first-time readers encounter the teenager, he and his older brother are alone, running north from an undisclosed danger through a landscape where devastated cities that used to have a unique name have become instead a direction – “West City, Northern Metropolis, Southern Township” (Dimaline 2017, 12). When the true reason for their panicked flight is disclosed, they hide in a tree house in the forest near Southern Metropolitan City, which used to be Toronto. They are trying to evade the Recruiters, agents of Canada’s Department of Oneirology, whose job is to capture First Nation individuals and take them to Residential Schools. At this early juncture of the narrative, the novel highlights the intersections between past abuses against First Nation communities and the climate disaster futurities. Thus, it establishes the central roles of memory and storytelling.

Frenchie’s recollection of a conversation between his parents reveals that these twenty-first-century schools were based on the old residential school system:<sup>8</sup> “they used to try to break our people to begin with, way back” (15). Whereas in those days breaking the cultural identity and sovereignty of the First Nations meant kidnapping children from their parents and communities and forbidding them to use their language, sing their songs, and follow their cultural

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**8** Residential Schools, sponsored by government-supported religious institutions, were established after 1880 to isolate Indigenous children from their language and culture and force Euro-Christian values on them. In total it is estimated that around 150,000 Inuit and Métis children were forced to attend these schools and that around 6,000 of them died in their premises. The last school was closed in 1996, and Prime Minister Stephen Harper issued an official apology to the First Nations in 2008.

traditions, in the narrative the term is used to conceal an even more predatory and violent practice. In this post-apocalyptic world, where so much had been taken away by climate disasters, the majority of the population of Canada had lost their ability to dream, leading to waves of sadness and depression. The realisation that Indigenous people were still able to do it (and therefore to hope) had led the authorities, after concluding that this unique capacity hid deep inside the essence of their bodies, to create a process of medical bone marrow extraction that killed the unwilling giver but allowed the receiver to dream again, thus turning the Indigenous bodies into products that could be harvested and reinventing the Residential Schools as deadly laboratories.

Escaping North, hiding in the forests from bands of Recruiters, this fleeing-for-survival is also not new but an instance of the “spiralling temporalities” proposed by Whyte. Before Frenchie and his brother leave, their sick mother tells them that “[t]here were generations in our family where all we did was move [...] first by choice, then every time the black cars came from town and burned out our homes along the roadside. Now the cars are here again” (21). Thus, in the once popular town where they parted from their mother and where the lake that made it famous was sheer poison, blocked by a fence, “there were no Indians left anyway” (22).

When the Recruiters catch Frenchie’s brother, the boy’s desperate, lonely flight leads to an unexpected haven when a small band of survivors finds him. The group consists of four boys, two girls and two adults – Miigwans, a middle-aged Anishinaabe man who had escaped from a School but is haunted by the belief that his Cree husband had been taken, and old Minerva, who carries a powerful gift: the ancestral language of her people that she never lost. The group also heads northward, hoping not only to help each other survive but to find a home and heal, recovering the stories and memories stolen long ago.

As they follow their perilous paths, living as hunter-gatherers, evading not only the Recruiters but also the occasional informers ready to betray them, the cohesion of their informal kinship is enhanced by the transmission not only of practical knowledge but also of cultural and historical memories that the elders share with the youngsters, a tool of survivance without which healing and restoration cannot happen. Samuelson and Evans argue that “empowerment through reconnection to knowledge systems and ways of being (old-timey) both accounts for what has been lost to colonial infrastructures, while also creating conditions for a collective resurgence” (2022, 275), and this is the process the novel engages through the teachings of the old memory carriers.

While on the run and in permanent danger, the group establishes a teaching system. The youngsters are divided into two rotating groups to learn two different sets of practical skills needed for

nomadic survival (ancestral techniques of hunting and homesteading), but another kind of knowledge transmission complements this, this one feeding their dreams of a different future by bringing the erased past into their lives. From Miig, they hear “Story”, the assemblage of their nation’s half-forgotten historical experiences. As Frenchie explains, Miig’s job was

to set the memory in perpetuity. He spoke to us every week. Sometimes Story was focused on one area, like the first residential schools. [...] Other times he told a hundred years in one long narrative, blunt and without detail [...] Sometimes we gathered for an hour so he could explain treaties and others it was ten minutes [...] But every week we spoke, because it was imperative that we know. He said it was the only way to make the kinds of changes that were necessary to really survive. (36)

Through “Story”, the teenagers learned the impacts of the climate apocalypse on the planet and the Anishinaabe, when their slow cultural recovery was interrupted:

once we honored the pain, and left it on the side of the road. We moved ahead. We were back. [...] Then the wars for the water came. America reached out and started sipping on our lakes with a great metal straw. And where were the freshest lakes and the cleanest rivers? On our lands, of course. [...] The Great Lakes were polluted to muck. It took some doing, but by the time California was swallowed back by the Ocean, they were fenced off, too poisonous for use. [...] The Water Wars raged on, moving north seeking our rivers and bays, and eventually, once our homelands were decimated and the water leached and the people scattered, they moved on to the towns. (36)

After ten years, the water wars were ended by international treaties and agreements, Miig adds, but “the Anishinaabe were scattered, lonely and scared. On our knees again, only this time there was no home to regroup at” while “the rest of the continent sank into a new era”, plagued by rising waters, tectonic shifts, constant rains and diseases that killed half the population (37).

These Story interludes, which, like the personal Coming-to stories of the young characters, are presented as independent chapters, function, as Patrizia Zanella points out, as “narratives of continuity, and adaptability that provide the young protagonists with a sense of pride and hope” that prepares them “for their role of future ancestors” (2020, 179), a gathering of knowledge that braids the present with the past and claims the cultural sovereignty that has long been denied.

If the youngsters, whose numbers expand, receive this knowledge of what they could hardly gather by other means from Miigwans, it is from old Minerva that they receive the gift of words that had been taken away from them. It was their first introduction to Anishinaabemowin, one of the ancestral Indigenous languages the author described as “being shaped after the waters, the hills and the features of their landscapes” (Diaz 2017). These words that Minerva begins to pass on to the teenagers have a power that none of them suspects even when, like Frenchie, they repeat their sounds with reverence and enchantment: “Nishin. Nishin. Nishin.<sup>9</sup> I turned the word over in my throat like a stone; a prayer. I couldn’t add breath to, a world I wasn’t willing to release. It made my lungs feel heavy, my heart grow light” (Dimaline 2017, 51).

However, the secret power of the ancestral language, “the miracle of Minerva”, is only fully revealed when she is captured by the Recruiters and sings in her native language throughout the bone marrow extraction process, disrupting it by the use of a language that the wires could not transfer. And as “every dream Minerva has ever dreamed was in the language” (188), the extraction system fails, the computers burn, and the structures of the Residential School where she has been held collapse. This gesture of self-sacrifice (she lets herself be captured to distract the Recruiters from the rest of the group) turns out to be an act of powerful resistance. Language that carries dreams and memories is the key to survival and restoration.

That is why, at the end of the novel, after the group of runaways meets organised resisters that include members of other First Nations and non-Indigenous allies with whom they plan to reconstruct what had been broken, all understand that one of their most important tasks is to reconstruct the languages some elders still remember and to write down all the stories they can recall. Anchored in this belief is the idea that, once they have accumulated the lost knowledge not only of language and “Story” but also of the intimate relations with the land, they can dream of a hopeful future. In the future, the group will return to restore those Great Lakes, which had been poisoned during the water wars, to their former glory:

We have the knowledge, kept through the first round of these blasted schools, from before that, when these visitors first made their way over here like angry children throwing tantrums. [...] When we heal our land, we are healed also. (208)

So, they will be prepared to inherit the knowledge of their elders and become the memory keepers of the future.

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<sup>9</sup> In Anishinaabemowin, Nishi means ‘good’.

## 4      **Reconfiguring Anthropocene Temporalities**

Dystopic climate change literature by Indigenous authors reconfigures the customary timeframes of the Anthropocene and challenges the intergenerational oppositions that some climate crisis and risk discourses foreground. The two novels gesture towards what Grace Dillon identified as “the possibility of an optimistic future, by imagining a reversal of circumstances” (2012, 8) and suggest the presence of alternative frames for understanding time and experience. These frames identify continuity and interdependence rather than generational fault lines. They respond to the long-lived experience of cultural and environmental violence through a sense of kinship that transcends the human and encompasses nature in all its forms.

Seeing living time as overlapping, so that everyone is aware of being at the same time an ancestor and a descendent, and all living involving what was, what is and what will be, also grounds a vision of intergenerational memory, where cultural knowledge, always under threat of effacement and carried by elders, is seen as a source of survivance and renewal, turning older generations into allies rather than adversaries of the next generations. In this framework, the impending climate crisis is, as Inuit environmental activist and author Sheila Watt-Cloutier says, “yet another rapid assault on our way of life [...] which cannot be separated from the first waves of change and assaults that have come our way”, but one which, as the characters of *The Marrow Thieves* believe, they can survive, using the memories of their accumulated intergenerational knowledge to heal the land and themselves.

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# Multiscalar Temporalities in Postcolonial Climate Fiction

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**Abstract** In the context of postcolonial ecocriticism and environmental time studies, I analyse different but interrelated scenes of confrontations between human history, ‘generational time’, deep time and myth to highlight a trend towards multiscalar temporalities in Anglophone climate fiction. Co-reading Amitav Ghosh’s *The Hungry Tide* (2004), *Gun Island* (2019) and Mahasweta Devi’s “Pterodactyl, Puran Sahay and Pirtha” ([1989] 1995), I focus on the texts’ multi-generational character constellations and their specific confrontations with geological time to reveal the literary strategies to capture the “slow violence” (Nixon 2011, 2) of global warming.

**Keywords** Biosemiotics. Mahasweta Devi. Ecocriticism. Ethicology. Amitav Ghosh. *Gun Island*. *The Hungry Tide*. Multiscalar temporalities. New materialism.

**Summary** 1 Introduction. – 2 Mahasweta Devi, “Pterodactyl, Puran Sahay and Pirtha” [1989] (1995). – 3 Amitav Ghosh, *The Hungry Tide* (2004). – 4 Amitav Ghosh, *Gun Island* (2019). – 5 Conclusion.



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## 1 Introduction

In this article, I wish to explore the literary construction of different but intersecting temporalities of human time, “generational time” (Woodward 2020, 54),<sup>1</sup> deep time and myth in postcolonial climate fiction as central responses to the representational challenges set by the climate crisis. I situate my topic in the field of postcolonial ecocriticism as well as environmental time studies that, as Paul Huebener has argued, “can help us read culture with a thoughtful and transformative awareness of the implications of temporal power as well as the need for temporal justice alongside social and environmental justice” (2020, 24). The narratives under scrutiny here – Mahasweta Devi’s “Pterodactyl, Puran Sahay and Pirtha” ([1989] 1995), a 1989 novella translated into English by Gayatri Chakravorty Spivak, as well as Amitav Ghosh’s *The Hungry Tide* (2004) and its sequel *Gun Island* (2019) – entangle ecological, economic, ethical and social discourses and interconnect different temporalities such as human and deep time by drawing on a palimpsest of myths and narratives. I read them together because Devi’s long story paves the way for Ghosh’s novels, particularly with a view to their shared enmeshment of generational time with deep time and myth as a counterstrategy to collapsing and narrowing down time to a solely human perspective in the face of global challenges. Ghosh’s novels spell out the fate of generations across more extended periods than a single novel can cover. The seriality that connects *The Hungry Tide* with *Gun Island* is a strategy of facing the challenge of representing the long-term temporality of climate change.

As recently as 2019, Robert Markley has argued that “climate change exceeds humankind’s ability to comprehend or narrate it” (2019, 17) and Amitav Ghosh even goes so far as to consider the realist novel a problematic cultural form that – with its character construction, plot development and liberal ideologies – fosters binary notions between ‘humans’ and their ‘environment’ as well as a kind of agency that condones the exploitation of ‘nature’ (see Ghosh 2016, 7; also see Caracciolo 2021, 3). Since the novel abides by “conventions

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<sup>1</sup> One of Kathleen Woodward’s central questions in “Ageing in the Anthropocene” is “How do imaginative worlds and works – in literature, theatre, cinema and new media – disclose to us multiple dimensions of the possible relationships between ageing and climate change?” (2020, 52), while her more general aim is to “bring together the fields of critical age studies and humanistic studies of climate change” (51). She explores these interconnections based on Margaret Drabble’s *The Dark Flood Rises* (2016), a novel in which ageing, generations and climate change come to intersect symptomatically. I will attempt to spell out this interconnection further dealing with postcolonial climate fiction. I concur with many of Woodward’s insights and approaches and take her article as an indication that, with our viewpoints converging so clearly, we are on a similar lead here that is worthwhile pursuing in further detail.

that came to shape the narrative imagination in precisely that period when the accumulation of carbon in the atmosphere was rewriting the destiny of the earth" (2016, 7), Ghosh classifies the novel as an inept form to represent climate change in his 2016 monograph *The Great Derangement*. While there is something to Ghosh's general assessment, current climate fiction, including Ghosh's own, responds to the representational challenges of the Anthropocene, particularly the question of how to convey what Rob Nixon has termed the "slow violence" of climate change, a form of

violence that occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all. (Nixon 2011, 2)

Predating his critique of the novel in *The Great Derangement* by eleven years, Ghosh's 2004 novel *The Hungry Tide* already introduces narrative forms geared to altering problematic cognitive frames (see Lakoff 2010) of nature-culture relationships, and his *Gun Island* continues to play the gamut of different temporal scales (see Sze 2016) to imagine sustainable futures in both intergenerational and intertextual contexts. In an interview with Alessandro Vescovi, Ghosh aptly argued that

people can achieve deep insights through other forms of knowing, through forms of knowing that we wouldn't even recognise. And I think in fact the novel is one of those forms of knowing. (Vescovi 2009, 133)

Correspondingly, increasing attention needs to be paid to new narratologies in climate fiction as they wield performative cultural power to impact on ways of thinking and perceiving. While Erin James has laid the foundations for the emergence of econarratology in her 2015 *Storyworld Accord* and has extended the approach in her joint edition *Environment and Narrative: New Directions in Econarratology* published in 2020, Marco Caracciolo has recently contributed further to the field with his 2021 *Narrating the Mesh*. One of his central arguments is that

[e]xposure to formally sophisticated narratives could foster argumentative, ethical, and (in a broad sense) attentional skills that heighten our awareness of human-nonhuman connection and its underlying complexity. (Caracciolo 2021, 179)

Such sophistication, he claims, "involves nonlinearity, interdependency, and multiscalarity", while it avoids "the anthropocentric

tendencies inherent in narrative practices, and particularly in established Western genres such as the (realist) novel” (179).

Thus, he summarises central narratological strategies that indicate how narratives can help reframe our notions of ourselves in and as environment. Drawing on Dipesh Chakrabarty, I argue that multiscalearity makes “the Age-old Humanist Distinction between Natural History and Human History” collapse (2009, 201), and in line with Ursula Heise’s arguments, I’d like to draw attention to how

collective human temporality now has to be thought on at least three different scales: on the scale of a human history that has generated multiple inequalities between humans, on the scale of a humanity that has become an agent as a species, and on the scale of a geological power that transforms the planet’s physical nature. (2019, 278)

To complicate these intersections of different temporal scales further, I also draw on Katherine Woodward’s notion of generational time that interweaves “climate change and generational thinking” and “involves us affectively and cognitively” (2020, 54). Comprising

two, three, and four generations, perhaps even more, generational time is our singular way of understanding future time, linking us in altogether meaningful ways to others whose futures we care about deeply. (54)

The three postcolonial texts analysed in this article demonstrate a unique approach to temporal scales. Rather than existing independently, the texts interweave human time, deep time, and myth in a way that requires all three to be understood. This multiscalearity is intentional and creates a complex web of meaning. Generational time can serve as the temporal dimension that, in narratives, may help interweave temporal scales of imminent human concern and larger ones that exceed human experience, such as deep time. Generational time renders the impact of human histories on natural histories graspable and articulates them to convey the material interconnections of different time scales. Devi and Ghosh share a concern with the geological development of India as an aspect of deep time but entangle these large-scale histories with given historical events from human history that, in turn, are connected with a palimpsest of mythologies and narratives. Geology and myth thus come to be closely associated with the social histories of individual characters. These, in turn, are clearly defined by intergenerational relations.

In each text, I will focus on a crucial moment in which human history, myth and deep time enmesh different temporal scales to render processes such as climate change graspable in narrative fiction

and in order to tie them back to concrete individual and intergenerational histories. I suggest the approach of a multiscalar analysis to shed light on environmental “differends” (Lyotard [1983] 2011)<sup>2</sup> – in the sense of *impassés* between what cannot yet be said but must be said in a given discourse – articulated in narratives in which different temporal scales are shown to intersect. In other words, I consider multiscalarity a structural attempt at finding an idiom for what cannot be articulated otherwise or, as in the case of climate change, allegedly not be expressed in fiction. Against this background, I propose a two-fold thesis: Both Mahasweta Devi’s long story “Pterodactyl, Puran Sahay, and Pirtha” and Amitav Ghosh’s novels centre on the intersection of human history, geological time and myth and thus illustrate the human entanglement in different time scales without dissolving individual characters into universalised agents of the Anthropocene. Ultimately, then, postcolonial climate fiction calls for our deep adaptation (Bendell 2020) to the slow violence of climate change and requires new stances of reception defined by an ethical response to the differends caused by uneven socio-historical and ecological developments. The ethical question of how we respond to climate crises and whether these responses are just is crucially modulated by innovative scaling processes in these narratives. The narrative enmeshment of the human, the nonhuman and the more-than-human creates story worlds intimating material-discursive entanglements akin to David Abram’s sense:

The surrounding world, then, is experienced less as a collection of objects than as a community of active agents, or subjects. Indeed, every human community would seem to be nested within a wider, more-than-human community of beings. (2010, 276)

In increasing intensity, the three texts, ranging from Devi’s 1989 novella to Ghosh’s 2019 novel, perform such enmeshments of the human and the more-than-human, entangling the ‘human’ in several temporal scales and the natural history of postcolonial spaces (centring on the tectonic shifts of the Indian plate, one might call them

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**2** Lyotard defines the differend as follows: “In the differend, something ‘asks’ to be put into phrases, and suffers from the wrong of not being able to be put into phrases right away. This is when the human beings who thought they could use language as an instrument of communication learn through the feeling of pain which accompanies silence (and of pleasure which accompanies the invention of a new idiom), that they are summoned by language, not to augment to their profit the quantity of information communicable through existing idioms, but to recognise that what remains to be phrased exceeds what they can presently phrase, and that they must be allowed to institute idioms which do not yet exist” ([1983] 2011, 13). So, if the plight of climate change, its slow violence and its large time scales pose particular problems for fictional forms of communication, multiscalarity can be understood as a structural response to this communicational challenge.

'tects' rather than texts). In the words of Serenella Iovino and Serpil Oppermann, these texts create

a material 'mesh' of meanings, properties, and processes, in which human and nonhuman players are interlocked in networks that produce undeniable signifying forces. (2014, 1-2)

and come to be stories that matter, or even "storied matter" (1), turning their readers into co-performers of the "entanglement of matter and meaning" (Barad 2007). That performance amounts to a calibration of perception conducive to environmentally friendly ways of thinking and a new ethics of environmental reading.<sup>3</sup>

## 2 Mahasweta Devi, "Pterodactyl, Puran Sahay and Pirtha" [1989] (1995)

In Devi's novella "Pterodactyl", deep time is represented by way of what Adeline Johns-Putra calls "a jolt out of convention" (2021, 262); it is the shock of the intrusion of the pterodactyl into the otherwise realist world of a character constellation consisting of a journalist, more or less corrupt or inefficient administrative staff, and a particular Adivasi tribe living in India's Madhya Pradesh. Devi dedicated the texts in the collection *Imaginary Maps* to "all the indigenous peoples of the world" (1995, n.p.) and closely interconnects writing with activism. The story is set in the late 1980s and deals with the repercussions of India's Green Revolution, which began in the 1960s. The plot centres on the "'activist-journalist' (Puran) [who] travels to a remote Adivasi village in the tribal district of Pirtha in Madhya Pradesh, which has reported sightings of an impossible creature - the pterodactyl" (Farrier 2016, 455). In an interview with Gayatri Spivak, Devi stated that

[t]he pterodactyl is prehistoric. Modern man, the journalist, does not know anything about it. There is no point of communication with the pterodactyl. [...] Our double task is to resist 'development' actively and to learn to love. (1995, XXII)

The lack of communication addressed by Devi draws attention to the ethical problem entailed in the encounter between a prehistoric animal and a modern human. The silence between them indicates a

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<sup>3</sup> Environmental ethics clarifies the question "how humans should interact with the environment" and reflects on "the theoretical justifications of these directives" (Tirosh-Samuelson 2016, 106).

differend that demands a new idiom to represent the plight not only of the pterodactyl but also of the Adivasi and Puran. I'd like to follow Devi's notion to illustrate how the pterodactyl poses both a hermeneutic and an ethical conundrum in the context of Puran's well-meaning attempts to help the tribals. Drawing on Dominic O'Key, I will argue that the novella's "literary de-extinction of the pterodactyl [...] opens up literary form to a mode of non-anthropocentric thought" (2020, 85) and gestures towards "eco-political justice" (91).

Firstly, the pterodactyl embodies the idea of a chronotope, defined by Mikhail Bakhtin as "the intrinsic connectedness of temporal and spatial relationships that are artistically expressed in literature", so that time "thickens, takes on flesh, becomes artistically visible; likewise, space becomes charged and responsive to the movements of time, plot and history" (1981, 84). The appearance of the Jurassic animal in the late twentieth century is transformed into the shape of Pirtha on the novella's imaginary map as an aspect of "modelling" (Maran 2014, 147) and the "semiotization of matter" that may embody "the imprint of the organism or culture that has created it" (151). The pterodactyl alludes to the deep time of India's geological development after the supercontinent Pangea had divided into Gondwana and Laurasia at the end of the Triassic era. The Indian subcontinent then drifted from Antarctica northwards to Laurasia, and the time of the pterodactyl began. Since the animal is not endemic to India - its fossils are mainly found in what is now Europe - its incomprehensible appearance in the story's diegetic present of the late twentieth century performs a double displacement in space and time; furthermore, its silence illustrates how the plight of the Adivasi remains unrepresentable as in a differend that erases the voice of the tribals in the discourse of 'modern man'. Clearly, "[t]he subaltern cannot speak" (Spivak 1988, 308).

It is the 'modern man' Puran, however, to whom the pterodactyl reveals itself in another apparition that leaves him entirely baffled. As Dominic O'Key has highlighted, this encounter

reveals how [Puran's] humanitarianism is complicit with the slow anthropogenic violence of adivasi genocide and nonhuman ecocide. *Pterodactyl* thus opens out onto a plurality of human and nonhuman temporalities which trouble Puran's narrow anthropocentrism. (2020, 75)

The encounter thus serves to enmesh different kinds of differends in a complex entanglement of temporal scales and human-nonhuman interactions. The story represents something to us through a communicative *impassé*. Symptomatically, Puran can only come up with rhetorical questions as a first hermeneutic attempt at understanding the Pterodactyl. This is how the encounter is described and how the jolt out of convention is performed:

And, when the rain symphony was at its peak, then into Puran's room came the soul of the ancestor of Shankar's people, half claw scratching, half floating. It had crossed the passageway and entered the dead Dahi's house shrine, the inner shrine to the god of the house. [...] Filling the floor a dark form sits. From the other side of millions of years the soul of the ancestors of Shankar's people looks at Puran, and the glance is so prehistoric that Puran's brain cells, spreading a hundred antennae, understands nothing of that glance. (Devi 1995, 141)

This impossible meeting with deep time – also a prolonged generational time (“the ancestors of Shankar's people”, 141) – turns Puran into a character that becomes vectorised in intersecting temporalities. This clash of Puran's time with the prehistoric animal's time reveals a hermeneutic and communicative differend that might be ethically resolved by what Devi calls ‘love’ and what Lyotard calls ‘feeling’ ([1983] 2011, 13). So, we feel the ethical imperative of that encounter in the realm of affect as a marker of generational time. Puran's first attempt at understanding is cognitive, and it does not lead him to a concluding interpretation:

What does it want to tell? We are extinct by the inevitable natural geological evolution. You too are endangered. You too will become extinct in nuclear explosions, or in war, or in the aggressive advance of the strong as it obliterates the weak, which finally turns you naked, barbaric, primitive, think if you are going forward or back. (157)

Puran decides not to write about the pterodactyl after his sojourn in Pirtha; the encounter with deep time remains an experience articulated only by silence. The story ends with the insight into the ethical demand to ‘love’. Staging a Levinasian face-to-face encounter, Puran captures the ethical demand but becomes remote once more by leaving Pirtha on a truck and roads that stand for the destructive force of ‘modernisation’ and exploitation. In the face of the prehistoric, we can put the destructive character of modernity into a new perspective.

The pterodactyl's message requires a new form of communication and is passed down to the coming generation. David Farrier has highlighted that Puran, ‘the modern Indian’, meets

Bikhia, a young Adivasi man who is said to have witnessed the impossible creature and subsequently refuses to speak (in mourning, it is supposed, for the soul of the ancestors). Between the urgency of disaster and its normalisation there emerges a narrative rich both in times and untimely moments: the rapacious time of neoliberalism, the empty time of the nation, and the teleology of

development coexist with seasonal cyclicity, the ancestral time of inherited memory, and most significantly a revenant geologic or deep time. (Farrier 2016, 256)

Mahasweta Devi's novella "Pterodactyl, Puran Sahay, and Pirtha" weaves together different temporal scales and centres fundamental knowledge and responses in future generations, embodied by Bikhia. Only Bikhia is able to respond to the eco-gothic return of the pterodactyl with respect and care. Still, there is no idiom yet in which this return can be integrated into 'modern' discourse. Devi thus installs differends at the intersections of different temporal scales unfolding in dynamic and palimpsestic spaces that are affected by the tectonic movements of the Indian subcontinent from Antarctica to the Asian landmass. Nevertheless, the different historical inscriptions of these spaces are taken seriously in their specificity for humans, nonhumans, and the planetary. The pterodactyl is a migratory revenant of a chronotope that illustrates the importance of multiscalar readings. With that, Devi's novella proves paradigmatic for Amitav Ghosh's climate fiction by offering "a kind of postcolonial writing which interrupts the anthropocentric logics of the novel" (O'Key 2020, 90).

### 3 Amitav Ghosh, *The Hungry Tide* (2004)

Amitav Ghosh's *The Hungry Tide* takes a different, more consolatory and didactic tone with regard to the entanglements of human life and 'the environment' but uses very similar literary strategies as Devi to reveal such enmeshments. The novel is mainly set in the Tide country or the Sundarbans, a mangrove area in the Bay of Bengal. The ebb and flow of the tide provide a constant rhythm for the story that centres on Piya(li) Roy (see Gurr 2010, 74), an American cetologist of Indian descent. On her journey, she meets Kanai, a successful translator who travels from Kolkata and later meets his aunt and uncle, Nilima and Nirmal, in the Sundarbans. Piya visits the Sundarbans to explore river dolphins such as the Gangetic dolphin, the Irrawaddy dolphin, and *Orcaella brevirostris*. The constant ebb and flow in the tide country throws into relief that the ground the characters stand on is in motion and in a continuing process of change, as is the whole tectonic plate on which India is situated – different spatial dynamics are thus continually highlighted in the novel. This spatial setting that pits the Sundarbans against urban spaces such as Kolkata is interconnected with historical references of different scales. Human history, deep time and myths are intertwined in a way similar to the salt and fresh waters of the rivers that incessantly overlap and intermingle and thus form a chronotope that situates the characters in multiple temporalities.

One central turning point in human history that is recounted in the novel is the Morichjhāpi massacre of the late 1970s, a traumatic event that casts its shadows over the characters' present. Shakti Jaising elucidates that, "[i]n 1979, West Bengal's government violently displaced tens of thousands of mostly Dalit or lower caste refugee settlers from the island of Morichjhāpi in order to make room for a conservation project called Project Tiger" (2015, 64), which was launched by Indira Gandhi in 1973. These refugees' migrations resulted from both the Partition of India in 1947 and the Bangladesh Liberation War of 1971, and the novel thus straddles the "conflicting agendas of environmentalism, species preservation, state power, leftist politics, and refugee agency" (Jones 2018, 640). In Ghosh's novel, Nirmal's encounter with the settlers on Morichjhāpi triggers an imaginary confrontation of human history, deep time and myth.

The traumatic event on the scale of human history inspires Nirmal to develop an intergenerational teaching project, and the lesson symptomatically zooms in on the analogies between myth and deep time while both can be comprehensively captured by narrative. Narration thus proves *the* strategy to turn deep time into a comprehensible scale. Nirmal's thoughts render these intersections even more transparent.

*I decided, I'd tell them the story of the Greek goddess who was the Ganga's mother. I would take them back to the deep, deep time of geology and I would show them that where the Ganga now runs there was another coastline - a shore that marked the southern extremity of the Asian landmass. India was far, far away then, in another hemisphere. It was attached to Australia and Antarctica. I would show them the sea and tell them about its name, Tethys, in Greek mythology the wife of Oceanus. There were no Himalayas then and no holy rivers. [...] I would show them how it happened that India broke away suddenly, a hundred and forty million years ago, and began its journey north from Antarctica. (Ghosh 2004, 181, italics in the original)*

Later on, Nirmal imagines the following conversation between himself and his pupils:

*"And do you know how you can tell that the Sindhu and the Ganga were once conjoined?", «How, Saar?" "Because of the shushuk - the river dolphin. This creature of the sea was the legacy left to the twins by their mother, Tethys. [...] Nowhere else in the world is the shushuk to be found, but in the twin rivers, the Ganga and the Sindhu". (182, italics in the original)*

While the mythical Thetys dies as a consequence of continental drift, she leaves her river children, the river dolphin, the animal that Piya travels around the world to explore, a biological legacy. Human

history, Greek and Indian mythology, and the deep time of continental drift intermingle and enable as well as explain biological life forms adapted to the emerging environments. While some of these temporalities, deep time and myth, overlap as in a palimpsest and thus claim deep time for narrative appropriation and understanding, other scales intersect, too. Piya, as a representative of the values of 'the West', requires some time to adapt to the Sundarbans and needs to overhaul her value system that, despite her well-meaning care for animals such as tigers and particularly dolphins, excludes the plight of human refugees (see Ghosh 2004, 293-302). Thus, the novel throws into relief injustices and differends caused by a limited focus on a single scale or a single species. Similarly, Piya's cetologist and scientific perspective on the dolphins is modulated not only by the myth quoted above but also by the history of science since she looks for the river dolphins with guiding material from the eighteenth and nineteenth centuries. Thus,

the text traces the little known history of nineteenth-century Calcutta as a centre of cetacean zoology, locating its famed Botanical Gardens as the place where the Gangetic Dolphin was first identified by William Roxburgh. (Kaur 2007, 133)

Apart from Roxburgh (1751-1815) and his insight that "the freshwater dolphins of the Ganges delighted in the 'labyrinth of rivers, and creeks to the South and South-East of Calcutta'" (Ghosh 2004, 42), Piya draws extensively on nineteenth-century research of British naturalists and zoologists in colonial India. For instance, the illustrations of the river dolphins with which Piya tries to communicate her scientific interest to her local guides stem from Victorian times. Furthermore, she takes her cue for her theses on the animals' behaviour and habits from the findings of nineteenth-century naturalists such as John Anderson (1833-1900) and Edward Blyth (1810-73) (see 227-8). Her access to the object of her enquiry is hence duly mediated by the perspectives created in the nineteenth century, carrying its colonial (scientific) legacy into the very present of the novel:

In one of her backpacks, she had a display card she had chosen especially for this survey. It pictured the two species of river dolphin known to inhabit these waters - the Gangetic dolphin and the Irrawaddy dolphin. The drawings were copied from a monograph that dated back to 1878. They were not the best or most lifelike pictures she had ever come across (she knew of innumerable more accurate or more realistic photographs or diagrams), but for some reason she'd always had good luck with these drawings: they seemed to make the animals more recognisable than other, more realistic representations. (32)

This mediation serves not only as a reflection on the interdependences of different layers of human history but also on the perseverance of colonialist naturalist stances that continue to impact on current notions of ‘nature’ and ‘culture’ in the diegetic present (see 226-31). Central events of the novel are revealed to be the result of different time scales, and the novel advocates a multiscalar reading to reveal that single-scale interpretations always entail and create injustices and differends. The novel reflects on multiscalarity by enmeshing the individual fate of single characters in a longer perspective of human, generational and national history, as well as in deep time and myth, all of which can be telescoped into the narrative and are thus available for further working-through, which, for example, are mediated by the genre of the novel. In contrast to the genre’s power to train readers in environmentally inconsiderate stances that Ghosh laments in *The Great Derangement*, the novel, as an intertextually flexible genre, can equally achieve a form of awareness-raising based on its central strategies, mythopoesis and creative metaphors (see Caracciolo 2021, 144), which help to telescope otherwise ungraspable temporal scales and interrelations.

As such, *The Hungry Tide* attempts to find idioms to voice what has been silenced in a process akin to Lyotard’s differend, a fact that cues Jana María Giles to describe Ghosh’s novel as a “postcolonial sublime” (2014, 224). Revealing the complex interconnections of multiscalar temporalities is one of the novel’s strategies to articulate such differends since the single representation of one always silences the victimisation of others. Significantly, such differends, however, are shown to occur in interactions between different “biocultural creatures” (Frost 2016, 3), as Giles elucidates:

The political differend is exemplified not only by Fokir, but also by the Morichjhapi refugees, and the tigers and dolphins, threatened by development forces. (2014, 229-30)

The differends, as Giles shows, clearly run across established humanist human-nonhuman boundaries as well as across the divisions between the cosmopolitan middle-class characters and subalterns, such as Fokir or the settlers in Morichjhāpi that become silenced in the dominant discourse (also see White 2013, 515). The aesthetics of the novel, geared to find an idiom for those silenced, is thus part of its ethics, mediating and, to some degree, translating their plight.

The Sundarbans serve as a highly semanticised space to illustrate *The Hungry Tide*’s aesthetics. The fine negotiation of differences – for instance, between salt and fresh water – is a further case in point. The different currents are shown to intermingle but remain unique (see Dutta 2016, 38),

creating hundreds of different ecological niches, with streams of fresh water running along the floors of some channels, creating variations of salinity and turbidity. These microenvironments were like balloons suspended in the water, and they had their own patterns of flow. (Ghosh 2004, 125)

Ghosh wished the place “to have its own agency” (Vescovi 2009, 138), which links the novel’s construction of space to theoretical approaches such as new materialism, intimating, as it does, particular forms of intra-action that reveal the close entanglement of ‘people’ and ‘environments’. The spaces of the Sundarbans continuously change in both a temporal and a geographical respect. On the one hand, they are subject to “a rhythmic pattern of organisation that reflects nonvisual ways of knowing” (White 2013, 514), reflected in the alternation between “PART ONE: The Ebb: *Bhata*” and “PART TWO: The Flood: *Jowar*” (Ghosh 2004, n.p.); on the other, they are subject to constant vacillations between land and sea that Nirmal describes in his manuscript:

‘The rivers’ channels are spread across the land like a fine-mesh net creating a terrain where the boundaries between land and water are always mutating, always unpredictable. [...] There are no borders here to divide fresh water from salt, river from sea. The tides reach as far as three hundred kilometres inland and every day thousands of acres of forest disappear under water, only to re-emerge hours later. The currents are so powerful as to reshape the islands almost daily – some days the water tears away entire promontories and peninsulas; at other times it throws up new shelves and sandbanks where there were none before’. (7)

The Sundarbans are thus continually subject to a rhythm of palimpsestic rewriting, a constant pattern of erasure and re-construction that constitutes the agency of the space. Due to the novel’s multiscale, space and time create performative, rhythmic aesthetics, or, as Nandana Dutta has it, “a subaltern aesthetic of the border” (2016, 36).

Temporal and spatial interrelations are also captured in intergenerational relationships in *The Hungry Tide*. It is the question of what should be passed down to future generations in a time that is changing in social, economic and environmental terms that is of central concern in the novel. For instance, Moyna, Fokir’s wife and Tutul’s mother, strives for a good education for herself and her son to secure good job prospects in fields different from Fokir’s now unprofitable fishing. In the context of new economic requirements, she interdicts her son’s work with Fokir: “I had to put a stop to it [...] because Tutul has to go to school, doesn’t he?” (Ghosh 2004, 133). Moyna’s consideration also touches upon questions of sustainability and its focus on

how “the needs of both present and future generations” (Agyeman 2016, 187) can be met. With overfishing and the loss of biodiversity, Moyna responds both to environmental changes and the question of how human economic survival can be secured. In a similar vein, the Orcaella need to adapt to changing environments over different generations, and Piya keeps observing a “cow-and-calf pair” whom she believes to have “recognised her too” with the cow even making “eye contact” with her once (Ghosh 2004, 303). With all biocultural creatures under adaptational pressure, *The Hungry Tide* elucidates that the older generations do not necessarily have the requisite know-how to pass down to the following generations. In the novel, Piya finds the calf dead, a victim to a motor boat, as “the inexperienced calf had been slow to move out of its way” (346). The adaptive pressure on the Orcaella caused by human intervention is also addressed in *Gun Island*, in which Piya forms a close bond with Rani, another calf of the same dolphin (see Ghosh 2019, 100-2). Tutul, together with Kanai, Piya, Nilima, Moyna and Rani, is one of the characters that provide interfigural ties between *The Hungry Tide* and its sequel, which is a comment on the temporalities of contemporary novel craft in its own right. The rhythmic pattern between writing and rewriting is upheld in the further development of the story world.

#### 4 Amitav Ghosh, *Gun Island* (2019)

Amitav Ghosh’s sequel to *The Hungry Tide* continues many of its predecessor’s main concerns, among them its multi-layered temporalities as well as its palimpsestic spatialities mapped onto overlapping intertextualities. There are, as indicated above, several interfigural references between these two novels, and *The Hungry Tide*’s five-year-old Tutul becomes *Gun Island*’s young adult Tipu, a name he adopts due to his migrations between India and the US together with Piya (see Ghosh 2019, 55). Contrary to his argument that, in the modern novel, “the unheard-of [is banned to] the background” (Ghosh 2016, 16-17), Ghosh, in *Gun Island* even more strongly than in *The Hungry Tide*

extends the limits of the realist novel to decentre human centrality and expands what it means to be human, not as a self-enclosed entity but as a corporeal subjectivity that inevitably exists in tandem with its nonhuman environmental surroundings. (Samkaria 2022, 31)

Ashwarya Samkaria has highlighted trans-corporeal processes in *Gun Island* as part and parcel of an ecocritical strategy to decentre the ‘human’ (see 2022, 28). Stacy Alaimo’s notion of trans-corporeality

reveals that the duality between ‘humans’ and ‘environments’ is an unsustainable remnant of post-Cartesian thought that consolidated in and through the Enlightenment. Alaimo has shown that “the human is always intermeshed with the more-than-human world” and zooms in on the fact that “the human is ultimately inseparable from ‘the environment’” (2008, 238). Ghosh’s *Gun Island* performs this eco-critical insight through literary strategies of narrating the mesh, entangling, as it does, the different temporalities of history, myth, drama, and narratives of “Anthropocene mobilities” (Baldwin, Fröhlich, Rothe 2019, 290) of ‘humans’ and ‘animals’ alike, as well as of the slow violence of climate change.

Drawing on Andrew Baldwin, Lucinda Newns has argued that “the environment is ‘the very material substance through which mobility itself is mediated, experienced, and conceptualised’” (2022, 1099); as such, the environment can also be used “as a weapon” (1109), as is being done in migration policies today, for instance concerning deserts or the Mediterranean (see 1109). The Mediterranean serves as a central focus on migration in *Gun Island*. Temporalities and spatialities thus come to be closely enmeshed in the novel, sutured by migratory processes and trans-corporealities of biocultural beings inhabiting these spaces and times.

With its reference to myth, the novel not only taps into a flexible temporality but also into myth’s cyclical structure of return that becomes a structuring principle in the novel. The employment of myth, in particular the myth of Manasa Devi, “the goddess who rules over snakes and all other poisonous creatures” (Ghosh 2019, 6), is of key significance in *Gun Island*, and the novel centres on the goddess’s desperate pursuit of the so-called Gun Merchant. The novel’s focus on the severe effects of the venom of snakes and spiders on human bodies is not only to reveal the increasing endangerment of human life through the climate-change-induced migration of poisonous animals but also serves as a nodal point for the interconnection of myth, stories, semantics, climate change, trans-corporeality and environmental ethics. This narrative knot is expressed by the novel’s protagonist and narrator, Dinanath Datta, shortened to Deen, “a dealer in rare books and Asian antiquities” (3). While Deen mostly focuses on the Merchant’s perspective, he once takes the goddess’s point of view in the process of which he “seemed to slip through an opening, or a membrane” (166); this is prompted by the following reflection about the goddess’s persistence in her pursuit of the Merchant:

She was in effect a negotiator, a translator – or better still a portavoce – as the Italians say, ‘a voice carrier’ between two species that had no language in common and no shared means of communication. Without her mediation there could be no relationship between animal and human except hatred and aggression. [...] [I]f

he [the Gun Merchant], and others like him, were to disavow her authority then all those unseen boundaries would vanish, and humans – driven as was the Merchant, by the quest for profit – would recognise no restraint in relation to other living things. (167)

The goddess serves as a mediator between the human and the nonhuman. She is a third factor that ameliorates the differend between two parties lacking a common discourse, challenges the dualism between the two by introducing a triangular form of interaction, and serves as the entity that alone can secure an ethics not entirely dominated by a capitalist strife for profit. While this might seem like a retake on the feminine taming of predatory capitalism à la *Pretty Woman*,<sup>4</sup> *Gun Island* exceeds this notion by providing an environmental or ‘ethicological’ reflection on how to justify the protection of the environment, i.e. a form of meta-ethics (see Tirosh-Samuels 2016, 106).

Ghosh, I argue, is squarely situated in postmodernist environmental ethics, binding together an emphasis on “the performative aspects of language and its ability to transform human social experience” (107) with the discourse ethics of Lyotard as well as his notion of the postmodernist sublime. Such a postmodernist environmental ethics sets much store by “storied living” (107), complementing the ecocritical ‘storied matter’ mentioned above (see Iovino, Oppermann 2014, 1). Furthermore, “the context of certain narrative traditions” enables ethical judgement (Tirosh-Samuels 2016, 107), turning the particular mesh of intertexts into a trait of literary ethics. As such, it is vital to explore which narratives, or, more broadly, which literary traditions, come to be referenced in *Gun Island*.

The myth of Manasa Devi is firstly relayed with several versions of the story of the Gun Merchant, who, riddled by hubris, tries to escape the wrath of the goddess and does not bow to her deity until his son gets killed by a cobra (Ghosh 2019, 6). Throughout the novel, such a mythical story is revealed to be based on the historical journeys of a merchant, to the point that *Gun Island* puts history and myth on parallel trajectories to different symbolic forms of ‘truth’. Significantly, the novel’s intertexts are frequently available in several languages, interconnecting different cultures and religions. Deen, as a dealer in rare books, is a frequent visitor to Venice and, during one of those visits, goes to see “the *Hypnerotomachia* exhibition” in Venice’s Querini Stampalia Library (226). There, he comes across an incunabulum, frequently attributed to the Franciscan monk Francesco Colonna, in an English translation from 1592 entitled *The Strife of Love in a Dreame* (see 227). This Renaissance novel deals with a man’s quest

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<sup>4</sup> *Pretty Woman* (1990). Directed by G. Marshall. Written by J.F. Lawton. Starring R. Gere, J. Roberts. USA: Touchstone Pictures; Warner Bros.

for an elusive woman and his dream in a dream, “filled with fantastical creatures, sculptures and monuments, some of which are engraved with cryptic messages in Latin, Greek, Hebrew and Arabic” (227). These languages also impact on how to understand the story of the Gun Merchant because they modulate it in different cultural contexts, interconnecting these, in turn, with the Bangla encountered in the Sundarbans (see 178), while the spaces are interlinked in many ways, too (see 162, 256).<sup>5</sup> Venice, “the world centre of the book trade”, where “the first printed Quran, in Arabic script, had appeared” (226), serves as a cross-over space where all these cultures intersect. The reference to the incunabulum is hence of great significance because “[i]n this dreamt-of dream voices and messages emanate from beings of all sorts – animals, trees, flowers, spirits...” (227). The library in Venice serves as a kind of multi-voiced heterotopic (see Foucault 1986) mediator akin to Manasa Devi herself. Entranced by the exhibition, Deen, in turn, feels “dreamed by creatures whose very existence was fantastical to [him] – spiders, cobras, sea snakes – and yet they and [he] had somehow become part of each other’s dreams” (Ghosh 2019, 227). Complicating ontologies, the library makes audible “that roar which lies on the other side of silence” (Eliot 2000, 124), enabling a form of interspecies communication.

The multivocality of Venice is further corroborated by the novel’s academic, “Professoressa emerita” Giacinta Schiavon, “a giant” in the field of the history of Venice (Ghosh 2019, 25), who not only clarifies that the meaning of the word *bundook* means ‘Venice’, not ‘gun’ so that the Gun Merchant actually is a merchant of Venice (see 139; 151; also see Samkaria 2022, 29). She also delivers a concluding speech on a museum’s “acquisition of a very valuable seventeenth-century edition of *The Merchant of Venice*” in Los Angeles (Ghosh 2019, 125). Cinta reminds Deen that Venice, as “the most cosmopolitan place in the world”, served as the most plausible setting for Shakespearean characters such as “Shylock and Othello” (156; see also 152) and is defined by trade and migration alike (also see 140-1). Human trafficking, in particular, is addressed as part and parcel of colonial trade relations. Cinta refers to J.M.W. Turner’s “painting of a slave ship”. At the same time, Deen analogises “the indentured workers who had been transported from the Indian subcontinent” and highlights moneylending as the central practice financing human trafficking (303). With Venice Beach as complementary to Venice, Los Angeles becomes one more semanticised setting for the novel, interconnecting Italy and the US (see 142).

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<sup>5</sup> Lucinda Newns has captured the novel’s palimpsestic spatialities with the phrase “‘translocal’ ecology” that she considers to provide “an alternative environmental ethic” (Newns 2022, 1102), enabling “a more mobile form of ecological belonging” (1116).

Furthermore, the impact of India's and Bangladesh's colonial histories is added to these different but interrelated chronotopes, rooting them all in the seventeenth century. As Deen reflects, the shrine of Manasa Devi was most probably "built at some time between 1605, when the emperor Jahangir was enthroned, and 1690, when Calcutta was founded by the British" (23). The novel posits the seventeenth century as a central turning point pertaining to the fate of the climate, world literature, colonialism, processes of migration and racism:

Beginning with the early days of chattel slavery, the European imperial powers had launched upon the greatest and most cruel experiment in planetary remaking that history has ever known: in the service of commerce they had transported people between continents on an almost unimaginable scale, ultimately changing the demographic profile of the entire planet. But even as they were repopulating other continents they had always tried to preserve the whiteness of their own metropolitan territories in Europe. (305)

The L.A. conference celebrates the acquisition of *The Merchant of Venice*, a text whose publication coincides with the foundation of the East India Company in 1600 that was soon followed by the Royal African Company after the Restoration in 1660, thus evoking central dates that enabled human trafficking and colonial trade. During this event, Deen listens to a conference paper entitled "Climate and Apocalypse in the Seventeenth Century" (135), in which the speaker addresses the Little Ice Age of the period. The speaker continues to illustrate the simultaneous "crescendo in visions inspired by the bites of tarantulas" with "the beginning of the Age of Enlightenment", coinciding further with the erection of the Taj Mahal and "the Gun Merchant's shrine" (136). Historical events intersect with climate change, architectural achievements, spiritual convictions, and cultural production. Concluding his paper at the conference, the speaker challenges his critics by asking:

Couldn't it be said that it was in the seventeenth century that we started down the path that has brought us to where we are now? After all, it was then that Londoners began to use coal on a large scale, for heating, which was how our dependence on fossil fuels started. Would Jacobean playwrights have written as they did if they hadn't had coal fires to warm them? Did they know that an angry beast, which had long lain dormant within the earth, was coming to life? Did Hobbes or Leibniz or any of the other thinkers of the Enlightenment have any understanding of this? (137)

Fossil fuel exploitation, global warming, Jacobean writing and the material impact of these changes as storied matter coalesce here. The

seventeenth century is further understood as the origin of Enlightenment humanity and the corresponding dualist forms of framing 'nature' and 'culture' as separate entities; this philosophical legacy serves as a backdrop for "everything going wrong with the world - inequality, climate change, capitalism, corruption, the arms trade, the oil industry" (218). Tipu, who works in the "people-moving industry" (65), both cashes in on postcolonial and environmental forms of migration in the novel's present and, eventually, embodies the paradigmatic migrant, whose plight, together with Cinta's demise, concludes the story (see 307-12).

In *Gun Island*, processes of human migration are complemented by nonhuman forms of migration. Deen is terrified, for instance, when a brown recluse spider sits on his laptop, a species that migrates north due to global warming (see 215; 234), as Cinta further explains:

It is here because of our history; because of things human beings have done. It is linked to you already - you have a prior connection with that spider, whether you like it or not. (235)

The novel thus constructs co-migrations of humans and nonhumans on the basis of climate change (see also 230; 309), suggesting a deep-level interconnection between these processes as a result of human inscriptions into the planet. This interconnection is also reflected in what one may call the novel's biosemiotic ethicology. Cinta elucidates this when she argues that "Only through stories can invisible or inarticulate or silent beings speak to us; it is they who allow the past to reach out to us" (141).

Storytelling, she continues, might well be "the last remnant of our animal selves" (141), and thus not the distinguishing feature of the human as the only storytelling animal, but an evolutionary connection to the nonhuman, interconnecting different beings by way of storytelling. Instead, storytelling is a form of multiscalar, transhistorical communication. A new materialist view on 'storied matter' thus forms the basis of the interconnections between beings, phenomena, times and spaces. When Deen interprets the voices of biocultural creatures in a "dreamtime of the book" (228), he becomes further connected to the historical Gun Merchant walking the streets and exhibitions of Venice (see 152). In Venice, the Merchant borrowed signs from these cryptic messages that speak to Deen in the novel's present and to the readers in the graphic representation of the novel itself (see, e.g., 76-7; 228).

*Gun Island* also crafts further mediating intertexts for the Merchant, such as the "Odyssey, with a resourceful human protagonist being pitted against vastly more powerful forces, earthly and divine" (6) and, as was already indicated, William Shakespeare's *The Merchant of Venice* (1600) (see 125), making Ancient Greek, Indian, Jewish and European voices, cultures and spaces enmesh over time. The novel reflects on these references with its own theory of

intertextuality articulated by Deen. Not only does he argue that his whole journey “was launched by a word” – the word “*bundook*” with its various multilingual meanings (3); he also reflects on the genesis of this story:

The origins of the story can be traced back to the very infancy of Bengal’s memory: it was probably born amidst an original, autochthonous people of the region and was perhaps sired by real historical figures and events (to this day scattered across Assam, West Bengal and Bangladesh, there are archaeological sites that are linked, in popular memory, to the Merchant and his family). And in public memory too the legend seems to go through cycles of life, sometimes lying dormant for centuries only to be suddenly rejuvenated by a fresh wave of retellings, in some of which the familiar characters appear under new names, with subtly changed plot lines. (7)

The novel thus intertwines the pre- and postcolonial history of Bengal and a theory that explains intertextuality as a process with the power to (re-)activate the archives of cultural memory (see Assmann 1988). What is more, cultural, historical and deep memory (or the memory of deep time) come to be storied matter suffused with agency to reach out to us and impact us. Concerning *Gun Island’s* ecocritical strategies, this amounts to a new materialist biosemiotics that can be understood in analogy to human cultural memory and its recycling of meaning in different historical contexts. As bio-semiotician Timo Maran argues,

Through its shape, structure, patterns, and other properties, semiotized matter embodies the imprint of the organism or culture that has created it. Its inner semiotic potential remains, waiting to be launched into new semiotic and communicative relations. (2014, 151)

Maran’s words aptly describe the process in Ghosh’s novel, in which the mediator Manasa Devi reaches out to human beings over the centuries. This process’s close connection between time and space is another case in point. Manasa Devi’s shrine in the Sundarbans triggers an irreversible process for Deen, especially when he has already returned from this cross-border mangrove forest to his Brooklyn home. He claims:

It was as if some living thing had entered my body, something ancient that had lain dormant in the mud; [...] it was much older than me, some submerged aspect of time that had been brought suddenly to life when I entered that shrine – something fearsome,

venomous and overwhelmingly powerful, something that would not allow me to be rid of it. (Ghosh 2019, 113)

The logic of poisoning is employed as a metaphor to explain such biosemiotic, trans-corporeal communications. Aptly, the shrine is protected by a cobra invisible to Deen but visible to the younger generation of Rafi and Tipu. Tipu gets bitten by the snake (see 84), and when Rafi tries to save him by sucking the venom out of his wound, “it was as if the venom that had passed from Tipu’s body into Rafi’s mouth had created an almost carnal connection” (89). The trans-corporeal and spiritual quality of this process comes to the fore when Tipu claims that “they’re all over my body, they’re wrapped around my hands, they’re under my feet... but I’m not afraid of them; they’re trying to help me” (89). The transmission of the mythical creatures’ message is rendered plausible on different levels by a form of poisoning passed on from person to person, affecting them in different but related ways, by the impact of the cultural memory of re-activated myths and by biosemiotic forms of communication. In addition, poison on an industrial scale is also taken into the equation when the Sundarbans come under further environmental pressure due to the “chemical fertilisers” illegally released by a refinery, creating “oceanic dead zones” (104). Trans-corporeal interdependencies thus forcefully reveal the simple fact of all beings’ close enmeshments in one *ecosystem*.

Such an interconnection of species-specific ethics of temporal multiscalarity with corresponding chronotopes and cultural palimpsests seems to be one of the novel genre’s adaptations to the challenges of our times, first and foremost, the question of how we can address and represent the climate crisis in the novel without erasing the specific histories of biocultural creatures, defined as they are by economic, social, religious and other differences that impact on their lives and chances. Climate fiction thus proves highly aware of its ethico-logical function today.

## 5 Conclusion

Mahasweta Devi's "Pterodactyl" and Amitav Ghosh's novels *The Hungry Tide* and *Gun Island* enmesh characters in multiscalar temporalities, thus making human history, geological time, and myth intersect. Such multiscalar temporalities closely entangle the histories of different biocultural creatures, reveal the different needs pitted against one another on different scales and negotiate the ensuing differences. The narratological means to represent these entanglements show how adaptable the novel can be when it provides us with new understandings of 'ourselves as nature'. Multiscalarity can thus be understood as a narratological innovation that helps us reframe how we understand ourselves, reflect on, and possibly strive for environmental justice on multiple scales. Having an open ear for multi-generational voices across species and storied matter in that process is the ethical demand of our times. Situated in discourse ethics, the texts analysed here attempt to find new idioms to articulate the silenced voices across all living beings. To achieve that, they highlight the agency of matter, having imbibed central insights of material eco-criticism, and the importance of finding new forms of communication based, for instance, on the insights of biosemiotics. Decentring humanist notions of the human and the dualisms installed in the wake of the Enlightenment, they perform trans-corporeal enmeshments of beings and matter and suggest the ethics of the mesh, based as they are on expanded forms of perceiving and communicating. What needs to be perceived and communicated is rendered palpable on the level of generational time, with the youngest descendants of the respective families represented frequently being those who are most vital in the process of passing down biocultural memory and adaptational knowledge. Instead of narrowing down human perception, contemporary climate fiction seeks new ways of expanding it, training writers to narrate and readers to perceive the mesh. Becoming attuned to the "roar... on the other side of silence" (Eliot 2000, 124) may be a central prerequisite for developing notions of a climate-friendly form of co-existence.

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# Game Over for Climate Change? Communicating and Visualising Global Warming in Digital Games

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**Abstract** Digital games are increasingly used as innovative tools for climate change communication. Our study uses the example of *Eco* to analyse, with the help of a validated set of criteria, how commercial games communicate climate change and the science behind it, which options for action are suggested to the player and how the interplay of the three pillars of sustainability (environmental, social, and economic) is presented in the game. The paper's conclusions underline the potential for commercial, multiplayer survival games like *Eco* to act as educational tools for communicating complex environmental issues, bridging diverse player demographics, and fostering a deeper understanding of the challenges and solutions in addressing climate change and ecological sustainability. Our findings help test and advance existing concepts in environmental communication studies and sustainability studies.

**Keywords** Climate change. Digital games. Sustainability. Climate change communication. Audience engagement.

**Summary** 1 Introduction. – 2 Climate Simulations and Visualisations in Digital Games. – 3 Methodology. – 4 Game Analysis: *Eco*. – 5 Discussion and Conclusion.



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## 1 Introduction

The days when climate change could be dismissed as a dystopian scenario from a distant future seem long gone, as extreme weather events are increasingly becoming part of our daily lives – either as personally experienced phenomena or through their media coverage. Climate, however, defined as the average weather over a specific period, cannot be experienced, felt, perceived, and remembered by humans (Grothmann 2018). Thus, the perception of global climate change is necessarily an indirect one: knowledge about its validity, significance and consequences is mediated through representatives from science, politics, and media.

The inherent abstractness of the climate change phenomenon presents researchers, activists, and policymakers with an immense communications challenge. The question arises as to how the invisible can be made visible, how the highly complex stock of knowledge from the climate sciences can be communicated to a lay audience, and which media are best suited to communicating climate change and fostering public engagement. Communicators have, for a long time, assumed that a lack of information explains the lack of public engagement (the so-called information deficit model; Bak 2001; SturGIS, Allum 2004) – an assumption challenged by more recent studies, which attest that it is not necessarily because of too little available information that climate change communication has often been ineffective (Cooper 2011; Moser, Dilling 2011). Moreover, in the media, “dramatic, sensational, fearful, shocking, and other climate change representations” (O’Neill, Nicholson-Cole 2009, 375) have been dominant, even though numerous studies have documented that fear is often not what empowers action (O’Neill, Nicholson-Cole 2009, 375; Moser 2007). Due to this “perfect storm” of climate change communication, it may not come as a surprise that the communication of climate change has become a lively field of research (Schäfer, Ivanova, Schmidt 2011; Doyle 2011). In particular, the one-sided transmission of information in linear media, which turns the audience into passive recipients of information, the alarmist tone adopted, the lack of contextual information and a lack of understanding of who the target audience is have been found to be detrimental to effective climate change communication (O’Neill, Nicholson-Cole 2009; Moser 2010; Owens, Driffill 2008). Media types using multidimensional, serial storytelling have been identified as well-suited for complex, interactive and effective climate change communication (Krauß 2013). Thus, it is not surprising that video games, characterised by their high immersion and interactivity, are considered ideal for conveying the science behind climate change and engaging the audience in a meaningful manner.

For about 15 years, climate researchers, environmental activists and game development studios have recognised the potential of

digital games for Education for Sustainable Development (ESD). In the virtual realm, individual and collective actions can be tested in a safe space, making them well-suited for the playful experience of the most pressing problems of the twenty-first century.<sup>1</sup> With regard to climate change, digital games can serve as “a kind of intellectual and spatiotemporal prosthesis” (Chang 2013, 31), simulating experiences that overcome the abstractness of climate change and thus making anthropogenic climate change and the related risks “playable”.

This paper explores the visualisation and communication of climate change in digital games. It uses the game *Eco* to demonstrate that a reduced representation of the scientific models behind climate change can effectively communicate climate science and the interplay of the three pillars of sustainability (environmental, social, and economic) in gameplay. The case of *Eco* shows that a highly complex educational sustainability game can appeal to larger audiences and succeed in the gaming market. Notably, the game garnered significant support receiving a 1.05-million-dollar grant from the U.S. Department of Education (IES 2015), attracting over 4,000 backers on Kickstarter (2016), something that Hayduk (2021) and Cha (2017) have shown to be difficult for games, and gained popularity among YouTube’s Let’s Play community.

However, perhaps due to the privileged treatment of free, educational browser games in previous studies (see, for example, Neset et al. 2020; Ouariachi, Olvera-Lobo, Gutiérrez-Pérez 2017; Reckien, Eisenack 2013), *Eco* has received little attention in environmental communication studies so far. There is, however, a small qualitative study by Fjællingsdal and Klöckner (2019) which examines the educational potential of *Eco*. The study’s findings are promising: playing *Eco* can raise awareness about what actions can protect or upset an ecosystem’s balance and thus promote environmental consciousness. However, since the focus of the authors’ evaluation of the game is on the potential learning outcomes, the study says little about how communicative features and strategies, simulation techniques and game mechanics are employed to communicate climate change and to make complex information about climate and sustainability science more accessible to a lay audience. Furthermore, the authors touch upon the visual framing of climate change and the options for action recommended in the game. Those issues will be discussed in detail in our paper.

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**1** Despite these opportunities offered by digital games, it must also be mentioned here that their production, transport, and consumption have a substantial environmental impact. The extraction of mining materials necessary to produce physical games and gaming consoles is extremely harmful to the environment, as this process emits billions of kilograms of CO<sub>2</sub> into the atmosphere. Moreover, games played online require a lot of data usage contributing to “internet pollution”, which accounts for 4% of all global greenhouse gases.

Therefore, the objective of this paper is to provide answers to the following research questions: How does *Eco* communicate climate change? How are climate change and the science behind it simulated and visualised, and how do the game mechanics and images frame global warming? What mitigation and adaptation strategies are offered in the gameplay? How can the interplay of the three pillars of sustainability (environmental, social, and economic) be experienced in *Eco*?

Our analysis approaches *Eco* with a distinct lens informed by environmental communication studies and sustainability science, aiming to test and advance existing research in these two fields, in which in-depth analyses of commercially available games targeting a wide demographic are still rare.

## 2 Climate Simulations and Visualisations in Digital Games

Accurately modelling and predicting the earth's climate and weather has been challenging for decades for climate scientists and game designers. The IPCC report defines climate as "the average weather, or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years" (Intergovernmental Panel on Climate Change 2012, 557). Weather, however, describes a short-term state of the air and atmosphere at a particular time in a specific place. It is described as variable and measurable conditions such as temperature, humidity, precipitation, air pressure and wind strength. Unlike weather, climate cannot be measured directly. It is a statistic that consists of many measurements over a long period of time. Thus, the visibility of global climate change is not simply given but must be constructed and mediated. Both climate scientists and game designers use, albeit different, computer programs to simulate and model the (virtual) planet's climate.

At their most basic level, models in climate science use equations to represent the processes and interactions that drive the earth's climate. The program comprises different modules, for example, an ocean module, a soil module, and an atmospheric module. Like all models, climate models are simplified representations of reality. Therefore, they cannot fully represent the climate system and its changes but still provide valuable insights into the consequences of natural and human influences. Moreover, the models simulate only certain aspects of the real or imagined system under study, depending on the underlying hypotheses. This selection results in a particular view of the simulated world – a fact pointed out by the American simulation researcher Michael R. Lackner as early as 1962: "A Weltansicht (German for 'world view'; Authors' transl.) must be at least

implicitly established to permit the construction of a simulation language” (3). In digital games, the underlying rules and mechanics of the game shape the player’s experience and influence their perceptions. In other words, the interactions and choices offered in a game can lead players to adopt specific viewpoints or understandings without relying solely on explicit written or spoken language. Video games, therefore, make claims about “how something does, should, or could work” (Bogost 2007, 58) and are steeped in operations of power. Unlike climate representations in digital games, however, the data produced by climate models are under a high degree of legitimacy pressure, as these future projections influence international, national, and local political decision-making.

In the games market, the pursuit of more realism, especially of more realistic 3D virtual environments, is not new, especially since photorealistic environments have become a major selling point (Roberts, Patterson 2017). As a dynamic weather system is one key component of these virtual environments, game designers constantly push for better simulation techniques that allow them to model the weather and its behaviour more realistically. In newer games, weather phenomena are not only an aesthetic backdrop but also affect gameplay and mechanics. The rain mechanics<sup>2</sup> in the top-rated game *The Legend of Zelda: Breath of the Wild* (2017), for example, make the manoeuvring of the avatar increasingly more challenging, as he can no longer climb in the rain due to the ‘slippery’ virtual surfaces. In this case, the weather becomes an actor in Latour’s sense and shapes the gameplay experience. Detailed weather systems have been shown to enhance the player’s immersion (Roberts, Patterson 2017) and improve learning outcomes in virtual spaces (Hsiao et al. 2016).

As digital games simulate ever larger worlds and thus ever more complex ecosystems, not only the weather but also different climate zones and their different biomes are now emulated. Commercially successful games, such as *Horizon Zero Dawn* (2017), *No Man’s Sky* (2016) and *Red Dead Redemption II* (2018), simulate regions and even planets with different climates where plants and animal species adapted to that climate ‘live’, thus imitating our real world to a high degree. However, digital games are not limited to the simulation and visualisation of weather phenomena and different flora and fauna. They also integrate complex data from climate science into their gameplay and thus translate scientific knowledge into playable experiences. An illustrative example is the video game *SimEarth*,

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<sup>2</sup> Game mechanics refer to the rules, procedures, and interactions that define how a game is played. In the context of rain mechanics, this could involve rules governing how rain affects the in-game environment, such as altering visibility, influencing character movement, or impacting other in-game elements.

released by Maxis in 1990. The game was a pioneering title in the simulation game genre, enabling players to explore the consequences of their actions on a virtual planet's climate, geology, and ecosystems. Players had access to graphical representations of climate data, ecosystem health, population trends, and more. These graphs offered a dynamic way to monitor and interpret the state of the planet's systems, enabling players to make informed decisions as virtual stewards of the Earth. *SimEarth's* user interface elements bridged the gap between climate science and popular culture, helping players grasp the intricate dynamics of our planet's systems by making them visible through graphs and images.

By simulating the different systems (weather, climate, ecosystem) at play and their mutual effect on each other, climate change games have enhanced players' systems thinking (Waddington, Fennewald 2018). This capability enables players to perceive interrelationships rather than static snapshots, a crucial skill when analysing complex systems such as the evolving global climate. It is now common practice to use systems thinking and system dynamics concepts in teaching and improving comprehension of intricate, global environmental and sustainability issues (Berry et al. 2018; Sanneh 2018; Gregory, Miller 2014; Davis, Sumara 2006). In digital games, a system's behaviour is simulated so that it can be actively experienced.

Moreover, as the gaming population has become more diverse over the past two decades, collaborative games like *Eco* are increasingly seen as powerful tools to communicate climate change across diverse age groups, genders, and nationalities. According to a survey conducted in 2022, 36% of US video game players fall within the 18-34 age range, while an additional 6% are 65 years and older (The Entertainment Software Association 2022). Women have also become a significant part of the gaming community. In 2023, women accounted for 46% of gamers in the United States (The Entertainment Software Association 2023). Therefore, the varied composition of the gaming community and the unique affordances of digital games may offer an opportunity to foster a better understanding of complex systemic challenges, such as those linked with climate change.

### 3 Methodology

Ouariachi, Olvera-Lobo and Gutiérrez-Pérez proposed a set of criteria to describe and analyse the narrative content and ludology of on-line climate change games. To develop useful criteria which achieve consensus among experts from communication, education and climate change science as well as from game studies, they conducted a Delphi study (2017, 16-19), a systematic, multi-staged and interactive process to arrive at a group opinion or decision by surveying a panel of experts (Scapolo, Miles 2006). Thirteen experts from the United States, Spain and the Netherlands were asked to respond to several rounds of questionnaires. In this process, they were requested to review and modify a proposed set of criteria by Ouariachi et al. or make suggestions for new criteria. Three rounds were sufficient to reach a consensus among the experts, and the criteria thus obtained were tested through the analysis of fifteen games developed in Spain. The framework not only proved to be a valuable tool for comparing and systematising a larger sample of games but was also successfully used to analyse the communicative features of a single game (Ouariachi, Elving, Pierie 2018), which is why we identified it as a suitable method for answering our research questions.

Ouariachi, Elving and Pierie divided the validated criteria into four dimensions (18):

1. Identification: features that help identify and locate the game
2. Narrative: analysis of the narrative and fictional context elements
3. Contents: analysis of the information and messages transmitted about climate change
4. Gameplay: analysis of the game design and formal structures

Since we aim to shed light on how *Eco* communicates climate change and its science, we will devote special attention to the third dimension of the scheme developed by Ouariachi, Elving and Pierie. Here, we are specifically concerned with whether and how scientific concepts from climate and sustainability science are conveyed in the games, how climate change is visualised, and which courses of action are recommended in the game.

In doing so, the following criteria are decisive:

**Table 1** Criteria for content analysis according to Ouariachi, Elving and Pierie (2017, 21-2, tab. 1)

Criteria	Description
(1) Term used	The terminology used to describe the phenomenon being studied
(2) Existence of false concepts and misconceptions	Erroneous beliefs that are widely held in relation to climate change (e.g., ozone depletion as a cause)
(3) Explicit use of scientific concepts	Definition of climate change terms (e.g., greenhouse effect)
(4) Explicit use of information sources	Sources of information cited (e.g., source: NASA)
(5) Convergence with social networks	Links to social networks included (e.g., Facebook, Twitter)
(6) Message frame/climate change focus	Main approach to respond to climate change
(7) Message frame/main theme	The main topic being addressed
(8) Message frame/promotion of actions	Activities promoted in the game
(9) Message frame/causes	Attribution to the origins of climate change
(10) Message frame/consequences	Effects of climate change (e.g., glacial melting, desertification, etc.)
(11) Message frame/tone	Values and emotions given to the topic (e.g., alarmist, informative, etc.)
(12) Images	Visual representations

#### 4 Game Analysis: *Eco*

Since early 2018, *Eco* has been commercially available as an early-access version on Steam, one of the most prominent digital game distribution platforms. The game has received 11,046 user reviews on Steam, with 82% being positive, reflecting the game’s reception and significance within the gaming community.

*Eco*<sup>3</sup> is a survival game that can be played either alone or as an on-line multiplayer game. A shared game experience is recommended, however, as it is a “community-based game” (Steam 2023), in which players must collaborate to build a civilisation by developing laws, government, and an economy to determine the success of their world. Everything the players do affects the environment. Therefore, players must always be aware of the impact of their actions on the virtual ecosystem. As their virtual world is threatened by a meteor strike that would cause global destruction, players must build advanced

<sup>3</sup> *Eco* is an actively developed game, and its content and features undergo regular updates. As such, the game’s mechanics and content may evolve and change over time.

technologies within 30 in-game days<sup>4</sup> without destroying their planet in the process. They experience the challenges of conflicting goals while playfully finding a balanced strategy for survival.

Thus, *Eco* simulates not only the earth's ecosystem but also other systems, such as our real-world economic and political systems, integrating the ecosystem into a much bigger picture (criterion 7). Sustainable resource management, which is the careful extraction of resources and their use for various purposes, is one of the central game mechanics. The resources in *Eco* are finite, unlike in most of the so-called 4X games (explore, expand, exploit, exterminate). Hence, if a player hoards resources for themselves, other players cannot carry out important tasks, such as building a house or a solar generator. Due to the principle of a shared resource system, players can learn about and experience the tragedy of the commons in virtual space. According to the ecologist Garrett Hardin (1968), as soon as a resource is available to all people without restriction, everyone will try to gain as much profit for themselves as possible. However, this individualistic, egocentric approach eventually leads to the overexploitation of common resources. If a player overexploits on the server, does not share the resources with their fellow players and does not replant or renew them, the sense of community of the virtual community is damaged, as is the sensitive ecosystem, which will eventually collapse (criterion 9). The balance of the ecosystem is also significantly related to the global warming of the virtual planet. In *Eco*, however, global warming or climate change is never explicitly mentioned (criterion 1). Despite this linguistic omission, the game comprehensively simulates climate change (criterion 6). In *Eco*, the climate is influenced by the players' decisions, who can cause, intensify, or mitigate virtual climate change through their actions. The main cause of anthropogenic climate change is direct greenhouse gas emissions from using fossil fuels for industrial machinery and vehicles (criteria 3, 9). The smog produced is dispersed through the air and thus pollutes the surrounding region, negatively impacting the diversity of flora and fauna in the area. The subsequent loss of woodland has an additional negative effect on the CO<sub>2</sub> concentration in the atmosphere.

However, the consequences of global warming on the virtual planet are represented in far greater detail than the cause of climate change (criterion 10). Excessive greenhouse gas emissions result in a rise in the average global temperature, ultimately leading to rising sea levels. Virtual climate change also influences the biodiversity of the planet. If pollution levels rise, the diversity and growth of flora and fauna is negatively affected. Moreover, *Eco* simulates different

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<sup>4</sup> This is the default setting of the game. However, the specific time frame can be adjusted by the server administrator when setting up the game.

climate zones in detail, each with its own vegetation zones. The animal and plant world serves as food for the player. A player who does not eat enough calories can still roam the virtual planet but cannot do any physical labour. It is possible to feed the avatar on a vegan diet; however, the rules of the game determine that the consumption of animal products leads to a faster calorie intake and, thus, to more efficient, faster progress in the game. At first, this may seem surprising for a game like *Eco*. However, sustainability issues such as overfishing, loss of biodiversity, and abnormal changes in marine life can be simulated through hunting and fishing, which might remain hidden. Players can irrevocably wipe out entire animal species through excessive hunting and must also care for reseed plants. Foresight is key here, as trees take time to regrow in *Eco*, so players must be wise about their wood consumption and the timing of reforestation. Early in the game, as soon as the players melt down iron, heaps of slag are produced that contaminate the surrounding soil, forcing the players to deal with and reflect on the undesirable and environmentally harmful side effects of their production. Lag must be buried deep in the ground to avoid impending environmental damage. However, the land is limited, so underground dumps, houses, and factories must be built carefully. In addition, mining tailings and waste pollute the water. Due to this scarcity of resources, resource conflicts with other players can occur.

Such conflicts can only be prevented by skilful cooperation (criterion 8). The players must form groups in which everyone plays a different, equally important role. In *Eco*, there are different areas of expertise, called professions, in which the players can specialise so that the work can be divided among everyone. Each profession brings with it different skills that are essential for progress in the game. Since no player can fill all roles equally, everyone depends on the other players' skills. The hunter provides the meat the cook needs for a nutritious, balanced meal. The calories consumed in this way are essential for the performance of all in-game actions, which is why the meals benefit everyone. The blacksmith can thus produce iron ingots, which the engineer needs for new technologies, and so on. The rules and game mechanics programmed by the development team thus clearly favour cooperative actions over selfish individualism. According to *Eco*, an important key to overcoming sustainability issues lies in cooperation and the conscious use of resources. Should the players fail at both, virtual global warming is set in motion. However, the players are not helpless. Climate change can be slowed down in the game – for example, by limiting individual traffic, reducing industrial activity, reforestation, and even passing climate-friendly laws by the player-run government.

Furthermore, greater emphasis can be placed on expanding renewable energies and alternative vehicle drives. This creates conflicts

of objectives between economic upswing and mobility, on the one hand, and reduction of industry and traffic for the benefit of the climate, on the other. Due to the time constraint of 30 in-game days and the impending disaster of a meteor strike, players are compelled to swiftly traverse the tech tree,<sup>5</sup> as the development of advanced lasers is the only option to stop the meteor. In this context, technology emerges as a saviour, which may downplay the importance of holistic and systemic approaches to addressing environmental disasters – approaches that encompass policy and economic changes, behavioural shifts, global cooperation, and climate education. Therefore, *Eco* figures technology and industrialisation as a double-edged sword, emphasising their capacity to both trigger pollution and offer solutions to environmental disasters, mirroring our ‘real-world’ climate change discourse.

Due to the complexity of *Eco*, a Wiki page and a Discord chat help the players to find out in advance about the resources they need for a given product and, to some extent, about the effects of their actions on the environment (criterion 5). No external sources of information are mentioned in the game (criterion 4).

However, the status of their virtual planet is also visibly displayed to the players directly on their screens, in the sense of “eco-visualisation” (criterion 12), i.e., “the dynamic means of revealing the consequences of resource use, in order to promote sustainable behaviour, attitudes and decision making” (Löfström, Svanæs 2017, 939). The player encounters the nuanced dynamics of climate change through two distinct perspectives. The first-person viewpoint immerses the player in the immediate experience of environmental changes, providing a subjective lens through the eyes of the in-game character. This perspective allows players to witness, in real-time, the direct impact of their actions on the virtual ecosystem. When high temperatures are reached, for example, soil and plants visibly dry up, and dead animals lie on the barren ground. Polluted water takes on an abnormal, almost pink colour. This visual feedback makes it unmistakably clear to the player that the planet’s pollution levels are high. But *Eco* also introduces a second, more analytical viewpoint. Through an in-game geo-information system and line diagrams, players can track even the smallest changes in air and soil pollution. They can also relate this data to other data, such as the amount of player action per hour, to visualise more complex interrelationships.

*Eco* also uses “whole earth images” (Schneider 2016), which bear visual resemblance to the IPCC’s scientific images. The IPCC has

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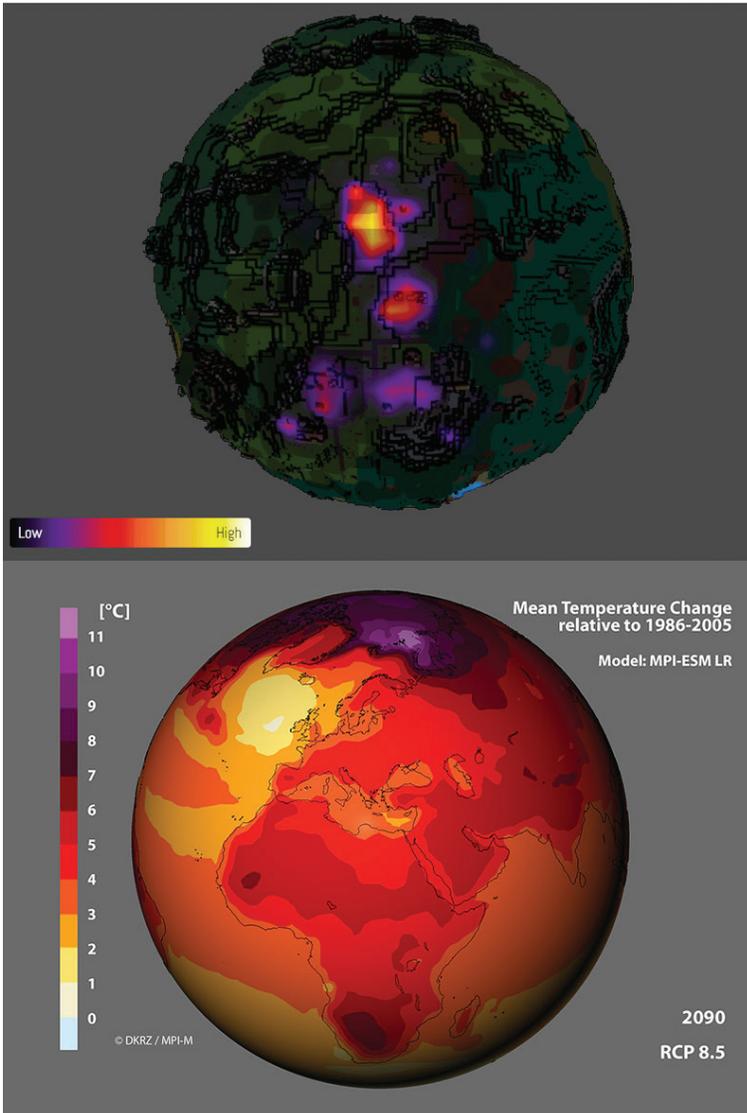
**5** A tech-tree in video games is a visual representation of available technologies and their dependencies, allowing players to unlock and explore new in-game abilities and advancements as they progress.

used coloured global maps, bar graphs and curves to aggregate the most complex scientific knowledge in the field of climate science since 2001. Schneider (2016) expounds on how the image of a blue planet that has turned red became one of the most widespread icons of climate change. The IPCC's climate report contains visualisations of different climate change scenarios that use false-colour coding to visualise cold, warm, and hot temperatures. The colour scale ranges from light blue for cold temperatures to purple for scorching temperatures. Schneider describes the emotional effect of this colour scale on the viewer:

Earth does not look like the living planet - Gaia - anymore, which the Blue Marble photograph portrayed so impressively. Instead, we can observe Earth transforming into a planet hostile to life or becoming a 'dead planet'. [...] The burning world's image bear [sic!], intentionally or not, elements of horror and shock that, if we like it or not, are attached to the image. (8)

Interestingly, *Eco* uses the same colour scale as the IPCC report but with reversed signs: a low level of soil pollution, for example, is indicated with purple, and a high level of pollution with a yellowish, almost white hue [fig. 1].

Due to this scientific presentation, anthropogenic climate change in *Eco* does not appear as an inevitable dystopian catastrophe but as a measurable and thus controllable scenario that can be prevented or slowed through cooperation as well as resource-saving and climate-friendly actions (criterion 11).



**Figure 1** Comparison between the 3D map of the virtual planet in *Eco* (top) and a visualization of the Earth's climate in 2090 by the German Climate Computing Centre (bottom). The latter is part of the German contribution to the Fifth IPCC Assessment Report of 2013. For more information and a full resolution image, see the website of the DKRZ (German Climate Computing Center): <https://www.dkrz.de/en/communication/climate-simulations/cmip5-ipcc-ar5/ergebnisse/2m-temperatur-en>

## 5 Discussion and Conclusion

*Eco* demonstrates the interplay of the three pillars of sustainability (environmental, social, and economic) and how gameplay can help develop mitigation strategies for conflicting goals. The game visualises and simulates the complexity and interconnectivity of several different systems and processes which occur in our real world but whose connections may often be too intricate, chaotic, or opaque to grasp fully. In *Eco*, the players are not only city builders, engineers, blacksmiths, and hunters but also producers of greenhouse gases and, ultimately, the reason for any occurring global warming. They must, therefore, constantly push for a balance in their virtual ecological, economic, and political system, which can lead not only to conflicts between the individual members of the community but also to conflicts of interest between rapid economic growth and environmental protection. Thus, *Eco* offers a virtual playground for developing and applying various strategies and solutions to problems over which players often have little or no decision-making power in everyday life. Especially young people and marginalised groups, who are often excluded from political participation and are therefore rarely perceived as autonomous political agents, may be able to experience themselves as architects of a sustainable future. In *Eco*, they experience a utopian version of our 'real world', in which they are encouraged to participate in environmental discourse and democratic processes. However, this utopian vision also lacks any traces of previous generations. In this virtual environment, the player is not confronted with 'boomer malfeasance', for example a Texas-sized island of floating plastic in the Pacific Ocean. Instead, at the beginning of their gameplay experience, players encounter a breathtaking landscape where nature thrives, lush forests stretch as far as the eye can see, teeming with vibrant flora and fauna, and crystal-clear rivers meander through picturesque valleys. While this may raise concerns about *Eco*'s feasibility and authenticity, the in-game ecotopia can also be seen as an opportunity to stop playing the 'blame game' and foster cooperation across different age groups.

The game also employs an elaborate climate model not only to communicate the scientific principles of, but also to illustrate its associated risks. *Eco* not only simulates a planet with different biomes and climate zones but also a pollution system that consists of air and ground pollution components. Prolonged air and ground pollution leads to sea level rising and an increase in baseline temperature, which has devastating effects on the environment and eventually on the virtual community who need food and drinking water. Players can also learn about the level of pollution, biodiversity and player population through statistics and a 3D map view of their planet.

In addition, *Eco* uses visual signals, such as thick plumes of smoke or discoloured water, to draw attention to environmental damage.

Despite this dense simulation of climate change and its consequences on the environment and humans, *Eco* works with a reduced representation of the climate system (criterion 2). For example, the game assesses the in-game air pollution by tracking the emission of CO<sub>2</sub>. Other direct and indirect greenhouse gases, such as methane or sulphur dioxide, are not integrated into the climate and environment model, nor are nuclear particles from nuclear sources. Moreover, causal chains remain opaque in some places, such as the connection between CO<sub>2</sub> rise and sea-level rise. *Eco* also does not include a representation or game mechanic for melting polar ice caps, despite the rapid loss of polar ice becoming a central aspect of our 'real-world' climate change discourse. And while the game is a comprehensive ecosystem simulator, it falls short in simulating short-term weather effects.<sup>6</sup>

However, this reduction does not necessarily mean that *Eco* communicates ineffectively. On the contrary, excessive scientific framing has been proven to be an unsuitable grounding for effective climate change communication (Moser, Dilling 2011). Instead, *Eco* draws on the representation of the three pillars of sustainability (environmental, social, and economic) and can thus contextualise climate change as a "super wicked problem" (Levin et al. 2012) – a multidimensional, global challenge – without being alarmist. Moreover, *Eco* encourages the development of solutions and ideas through cooperation, creativity, and scientific exploration, thus actively engaging the players with an issue instead of making them passive receivers of information. In their research on effective climate change communication, Moser and Dilling (2011) also emphasise the need to take greater account of the target audience and their values, attitudes, and opinions. A comprehensive knowledge of the target audience leads to more appropriate framings, images, messages, and messengers.

*Eco* appeals to different types of players and is therefore attractive to a larger group of gamers. Based on the player's focus of attention (world-oriented versus player-oriented) and their approach to the game (action versus interaction), the Bartle taxonomy of player types groups gamers into one of four classifications: achiever, explorer, socialiser, or killer (Bartle 1996). In addition to a specific game goal that must be achieved at a given time (achiever), but which can only be accomplished through joint agreements and cooperation (socialiser), *Eco* also offers a large world to explore (explorer). Furthermore, *Eco* draws on the tried-and-tested game mechanics and graphics of

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<sup>6</sup> Some weather mechanics (clear sky, light rain, heavy rain) will be included in the upcoming update (version 10), which, as of the current date, has not been released.

the classic game and top-seller *Minecraft* and can thus build on players' previous gaming experience. Both the targeting of different player types and the graphic and ludic reference to already established gaming traditions can explain why *Eco* was able to establish itself in the gaming market despite its serious themes.

Games on sustainability and climate change have grown and diversified exponentially over the last few years. In addition to board games such as *Keep Cool* (2013), serious games such as *The Climate Trail* (2019), climate simulations such as *SCIARA*<sup>7</sup> (2021) and commercial games such as *Civilization VI* (2019) have also taken up the topic. Due to their moderate scientific framing of climate change, the active engagement of the player with sustainability issues through game mechanics, contents, and visualisation without taking the moral high ground and the involvement of different player types, these games can serve as valuable tools for climate change communication. Therefore, it is necessary to focus on the educational potential of computer games in the sense of gaining concrete knowledge and skills. Our paper sought to highlight the importance of incorporating commercially available games into the corpus. This is significant because these popular games play a crucial role in shaping public perceptions and discourse surrounding climate change. Additional research is required in this area, extending beyond individual analyses to encompass historical and discursive contexts, as well as different hardware. Mobile gaming, for example, is underrepresented in the current research despite the many possibilities for new formats that it is opening, such as location-based games or augmented reality games. The same is true for virtual reality. How do these new formats tackle climate-change-related themes? How have climate change mechanics and imagery in digital games changed over the decades? What ideas about and framings of climate change and its consequences can be discerned in them? The answers to these questions may not only reveal our "knowledge about and attitudes toward life" (Geertz 1973, 89) over time but may also provide us with a better understanding of the pitfalls and potentials of digital games to make one of the most pressing problems of our time both visible and playable.

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<sup>7</sup> <https://sciara.de/>.

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# ***Don't Look Up* Climate Change Dooming Boomers, Nihilistic Teenagers and Underfunded Scientists Against/For the World**

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**Abstract** Representations of the global climate crisis have permeated popular culture for over half a decade. We passively watch the environmental crisis unfold in entertainment media as the ecological collapse continues to forge on, seemingly inexorably. Adam McKay's satirical apocalypse film *Don't Look Up* (2021) delineates generational differences in social/political activism and non-activism, participation in social media discussions about climate change, blaming others and taking responsibility for the climate emergency. This article shows that the film's allegorical climate apocalypse represents a satire of intergenerational (climate) crisis communication, misinformation, and denial in contemporary US-American news, popular media, and political discourse. The movie achieves this through intergenerational ideas and values and a satirical allegory that represents the climate crisis in various discursive fields.

**Keywords** Climate crisis in film. Climate crisis communication. Popular culture. Allegorical satire. Ecocriticism. *Don't Look Up*.

**Summary** 1 Introduction. – 2 Allegorical Climate Crisis: Dramedy Instead of a Slow Burn. – 3 Scientists vs the News: Satirising What the Audience is Dying for. – 4 Boomers Doom the World: Make Denial Great Again. – 5 Nihilism and Slacktivism: Gen Z Commodifying the Crisis. – 6 Metamodernity Encapsulated: With, Between, and Beyond Generations.



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## 1 Introduction

Representations of the climate crisis have permeated audio-visual popular media. For example, movies such as *Mother!* (2017, directed by Darren Aronofsky) explore climate change in subtle, metaphorical ways, while blockbusters such as *The Day After Tomorrow* (2004, directed by Roland Emmerich) transform climate change into spectacle and documentaries such as *An Inconvenient Truth* (2006, directed by Davis Guggenheim) provide scientific explanations of climate change. This fascination with representing environmental catastrophe in the media has been accompanied by a feeling of being overwhelmed and simultaneously being paralysed by the climate crisis. We are “spectators of ruin” (Morton 2010, 2) in an “Age of Spectatorial Complicity” (Estok 2014, 49). Adam McKay’s apocalyptical satirical comedy film *Don't Look Up* (2021) represents this spectatorial complicity as the central factor in aggravating the environmental crisis.

The film centres on a comet threatening to end life on planet Earth. This comet substitutes the slow, intangible effects of global warming on flora and fauna for an instantaneous and immediate event. The film’s satire of contemporary US-American political and popular culture foregrounds how these factors contribute to our spectatorial complicity. Thus, *Don't Look Up* is a story about the struggle of scientists, politicians, and ordinary people of all generations against the crisis-denying and -enabling structures in politics, media, and economy. Although the film never explicitly addresses climate change, its story is an allegory for it. The film’s protagonists, astronomer Dr Randall Mindy (Leonardo DiCaprio) and PhD candidate Kate Dibiasky (Jennifer Lawrence), struggle to raise awareness of “an extinction-level event” (*Don't Look Up*, 0:07'55”) unleashed by a comet approaching the planet. In their quest, they confront self-absorbed politicians, tech billionaires with illusions of grandeur, and a sceptical public distracted by news and popular culture. As such, the film mediates contemporary society’s anxieties and apocalyptic imaginations regarding global crises – notably the climate crisis. The film substitutes climate change’s temporally and spatially distant impact (for the average US-American) for an immediate doomsday event. The spectacle surrounding this near-future event allows the movie to explore science communication and denialism in political, economic, news, and popular media discourse – a variety of discourses where experts and opinion leaders influence the emotions and consensus of the masses. Accordingly, the film not only represents how these discursive fields portray, frame, and comment on the climate crisis but also the systems and individuals that manipulate them, resulting in misinformation, denial, and conspiracy theories. *Don't Look Up* juxtaposes its representation of crisis discourse in the mass media with intimate personal moments spanning across

generations. This oscillation between global and personal narratives, generations, discourse fields, and sentimentalities (satire and sincerity) contribute to the metamodern character of the film. Metamodernity is the successor of postmodernity and a burgeoning theoretical framework that aims to articulate a new cultural sensibility between, within, and beyond the modern and postmodern.

This article suggests that the allegorical satire of the climate crisis in Adam McKay's *Don't Look Up* (2021) enables social, cultural, and political commentary on (climate) crisis communication, misinformation, and denial in news, popular, and political discourse across generations. I will first analyse how Adam McKay's *Don't Look Up* (2021) represents the climate crisis through allegory and satirical humour. Furthermore, I will explore how the film bridges the spatial and temporal distance between the cause, impact, and solution of/to climate change through its allegorical representation. Additionally, I will discuss the communication of (the climate) crisis in the film's satirical representations of how US-American politicians, entrepreneurs, and news shape the understanding and emotional investment of the older generations while side-lining scientists and their findings. Furthermore, the movie highlights the younger generations' position between climate nihilism and the allure of social media, celebrity culture, and performative activism. Lastly, I will illustrate how the film incorporates the satirical sincerity of metamodernity in its oscillating representation of a global issue across generations, places, discursive fields, and modes.

## 2 Allegorical Climate Crisis: Dramedy Instead of a Slow Burn

To dramatise a real planetary threat, *Don't Look Up* employs a global extinction event unleashed by a comet approaching Earth. The film thus represents climate change in the mode of a satirical allegory and spectacle. An allegory is a stylistic device that “[in] the simplest terms, [...] says one thing and means another” (Fletcher 2021, 2). It thus allows for the representation of a complex, systematic subject matter as a more direct and concise one. In other words, as stated by Fredric Jameson, it is a “one-to-one narrative in which features of a primary narrative are selected (in the process rhetoric calls amplification) and correlated with features of a second one that then becomes the ‘meaning’ of the first” (2020, ch. 1). In the case of *Don't Look Up*, the narrative of climate change – as a slow and gradual destruction of our ecosystem through human action and inaction – is transposed to a cosmic existential danger approaching earth and humanity's inaction in preventing or mitigating it. The last part, humanity's inaction, is the common denominator in both narratives. Jameson

further states that the two dimensions of allegory are not separate; instead, allegory is based on “the interechoing of narratives with one another, in their differentiation and reidentification” (Jameson 2019, ch. 1). Thus, substituting “the violent effects of climate change [that] are so far removed from the causes thereof (both temporally and spatially)” (Hobbs-Morgan 2017, 78) for a global, immediate and indiscriminate extinction event erases the slowly unfolding environmental apocalypse from the popular imagination by drawing on an “apocalyptic genre [that] presents climate change via speculative images that foster an emotionally dramatised and scientifically simplified idea of climate change” (de Roo 2019, 63).

This allegorical representation of the climate crisis is not without its flaws. Firstly, the film’s attempted solution to the crisis – i.e., destroying the comet before it impacts Earth – is concrete, simple and allows for a return to the status quo.<sup>1</sup> By transforming the systemic problem of climate change into a singular and avoidable disaster, the film understates the severity of the problem. Colin Davis and Stephan Lewandowsky stress that this flawed allegory imagines “the impact of the comet [as] a discrete event in the near future that will affect everyone simultaneously”, even though “[c]limate change is more gradual, and its effects are unequally distributed across the planet” (2022, 323). Secondly, while the comet in the film is a natural phenomenon, climate change results from human activities. However, these differences allow the allegorical representation in the film to accentuate the political and economic structures that enable and facilitate inaction, denial, and disbelief in climate change (323). Ultimately, the analogy, albeit flawed, allows the film to focus its (climate) crisis representation on the cultural, political, scientific, and economic discourses.

*Don't Look Up* reframes the global issue to the dimensions of politics, capitalism, popular culture, and science communication by satirising the denial, scepticism, and existential angst present in its intergenerational discourse. While the representation of the global climate crisis in film and other media affects the general public’s opinion on the subject matter, its mode restricts its factuality. Kate Manzo has investigated the usefulness of representation of climate change in film and proposes that neither documentary nor science fiction films about the climate crisis

should [...] be held to higher standards than science itself, which is not expected to tell the whole truth and be perfect. Debates about

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**1** There are two projects to stop the comet in the film, but both fail: once because the President of the United States prioritises harvesting the comet for its resources over destroying it and once due to technological failure caused by a lack of thorough independent peer-review. Thus, the film critiques the potential of politics, economy, and technology to solve the climate crisis.

data interpretation, logos and so on are therefore inevitable. However such films can, and should be held to photographic standards of truthfulness, openness and honesty. (2017, 94)

While the discussion on the representability of the climate crisis in the media, as well as its depiction in *Don't Look Up's* narrative and marketing, have been debated by critics and scholars alike, they agree that the film depicts the societal responses to climate change communication in various discursive fields of US-American culture (Atik, Ozgun, Dholakia 2022; Fahy 2022; Doyle 2022; Davis, Lewandowsky 2022). Nonetheless, fictional filmic representations of climate change differ from climate science communication in that the former prioritises emotional investment over factual accuracy (Weik von Mossner 2020, 330). Furthermore, scholars postulate that climate change films create awareness and prompt short-term emotional investment yet fail to trigger long-term actions and behaviour changes (Sakellari 2015; Lowe et al. 2006). Nonetheless, representing the climate crisis in film defines, challenges, and articulates a collective understanding of the global threat (Fiskio 2012, 13).

### **3 Scientists vs the News: Satirising What the Audience is Dying for**

*Don't Look Up* satirises various discourses that are not limited to climate change. Instead, the target of satire is US-American culture and politics:

As a product of popular culture itself, the film critiques commodity culture through a focus upon the cultural products of late-capitalism (music, film, TV, social media) and celebrity culture – situating these as contributing to public and political disengagement from crisis. (Doyle 2022, 5)

The satirical mode of the film, in combination with the genre of apocalyptic fiction and the exaggerated narrative, performances, and cinematography, draw attention to climate crisis discourse in contemporary US-American culture. Thus, the film is a “climate change communication film, satirising political and societal responses to the scientific evidence of climate change” (Doyle 2022, 2) and the lack of individual and global action to save the planet. Therefore, the focus of the satirical attack is no longer on the crisis but on people’s behaviour and inaction (Doyle 2022, 5; Davis, Lewandowsky 2022, 323). Furthermore, it figures the global climate crisis as a “multi-generational problem” (Farber 2020, 293) by satirising the people epitomising the divide at each extreme – youth activism and Greta Thunberg

for Gen Z and climate deniers and Donald Trump for the Baby Boomers. This emphasis on binary extremes erases nuance yet situates climate change as a generational problem. The various discourse strands and their dominant characters also reinforce the generational differences and stereotypes surrounding climate activism and denialism. The older generations are represented as the political and economic elites, while the younger generations are represented as either climate nihilists or celebrity-obsessed slacktivists on social media.<sup>2</sup> The film's protagonists, however, as representations of the scientific community, are situated between these extremes and oscillating between them. This generational divide in the face of climate change reveals the film's metamodern sensibilities. Ultimately, the film critiques not predominantly crisis management and communication but the discourse and behaviour surrounding it.

The film's main mode of critique is satire. Satire is (1) a "literary art", (2) that "attacks its targets", (3) which are "discernible historical particulars", (4) its critiques are "to some extent humorous", and (5) it is an essentially "negative enterprise" (Marshall 2013, 7). Furthermore, Milthorpe defines it as "a mode that, by necessity, is responsive to the historical, biographical, or literary environments of its creation" and attacks "specific targets" who are "deserving of censure or praise" (2016, 3). Thus, satire critiques specific targets ranging from individuals to movements. Furthermore, this targeted critique is informed by the socio-cultural, literary, and historical context of its time of creation. Therefore, satire is a reactive mode employed in art influenced by the current *Zeitgeist* to humorously critique a target as it is "integrally dependent on the particular social and historical circumstances of its deployment" (Day 2011, 3). The film's satire primarily deploys the scientist characters' exaggerated difficulties in communicating their findings and creating awareness across political, news, and popular discourse fields, hoping to avoid catastrophe while critiquing the (lack of) actions taken by the USA in tackling the climate crisis.

As films can represent science in an accessible and easy fashion, they can similarly represent the system of science communication. The representation of science and climate change communication in *Don't Look Up* showcases that "the news media system not only obstructs effective science communication but harms the public understanding of science" (Fahy 2022, 2). The film uses montages of news broadcasts, YouTube clips, and social media reactions to represent

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<sup>2</sup> The term slacktivism - alternatively 'clicktivism' or 'armchair activism' - describes a form of online (token) activism devoid of "meaningful activation and mobilization" (Jacqumarcq 2021, 45) characterised by a lack "of willingness to devote significant effort to enact meaningful change" (Kristofferson, White, Pelozo 2013, 1149).

the intra-diegetic discourse on the allegorical climate change, where science rarely takes centre stage. Furthermore, the news media prioritises subject matter that further engagement and drama over ones that are existential threats to the audience. This reprioritisation is represented in the film in the first interview Dr Randall Mindy and Kate Dibiasky give on the national television programme *The Daily Rip*. The hosts, Brie Evantee (Cate Blanchett) and Jack Bremmer (Tyler Perry), reframe and joke about the comet as they try to “keep the bad news light” and to help “the medicine go down” (*Don't Look Up*, 0:39'40''-45'')

DR. MINDY: It's somewhere between six and nine kilometers across. So...

EVANTEE: It's big.

DR. MINDY: It would damage the entire planet. Not just a house, you know?

BREMMER: The entire planet. Okay, well, as it's damaging, will it hit this one house in particular that's right on the coast of New Jersey? It's my ex-wife's house. Can we make that happen? (*Don't Look Up*, 00:39'01''-19'')

Ultimately, the discovery of the comet and its existential threat to humankind is overshadowed by celebrity news. Climate scientist Peter Kalmus commented in *The Guardian* and linked his personal experiences to that of the fictional characters in the film, stating that:

climate scientists have faced an even more insurmountable public communication task than the astronomers in *Don't Look Up*, since climate destruction unfolds over decades – lightning fast as far as the planet is concerned, but glacially slow as far as the news cycle is concerned – and isn't as immediate and visible as a comet in the sky. (*The Guardian*, 29 December 2021)

According to this statement, the representation of news and journalism in *Don't Look Up* mirrors the practices of late-capitalist news agencies that prioritise entertainment, growing viewer numbers, and sales over existential threats and unpleasant stories. Yet, this satirical depiction of news media focuses on “immoral and reprehensible journalists” (Fahy 2022, 6) while neglecting to highlight that journalism has contributed to the education of the public in environmental matters (5). While the film's representation of science communication and journalism is exaggerated and limited in its perspective, it nonetheless points toward the potential problems in communicating (climate) crisis to all generations in contemporary US culture.

According to Hannah Little, the film employs a trifold of humour theories to entertain the audience and simultaneously satirise and

critique through exaggeration, contradiction, and analogy (2022, 2-3). The three theories, initially proposed by Billig (2005), are (1) “incongruity”, (2) “relief”, and (3) “superiority” (quoted in Little 2022, 2). The humorous incongruity in *Don't Look Up* is most evident in the form of language different characters use to describe the same subject matter, mainly the comet approaching Earth:

[DR. MINDY] A comet between five to ten kilometers across, that we estimate came from the, uh... from the... from the Oort cloud. Which is the outermost part of the solar system. And, um... And using Gauss's method of orbital determination and the average astrometric uncertainty of 0.04 arcseconds, we then asked... (*Don't Look Up*, 0:18'36"-58")

Scientists like Dr Mindy employ “technical, scientific language to express a pretty simple and serious concept: that a comet will hit the Earth and everyone will die” (Little 2022, 2). This language barrier is an actual issue in science communication. Still, in this scene it becomes a vehicle for ridiculing Dr Mindy as being unable to talk to people outside the ‘ivory tower’ of academia. The following comedic relief breaks the tension created by such incongruities through exaggerated performances, subversive cinematography, and vulgar language. This complementary oscillation is a result of a paradox that is resolved through rapid and sudden bursts of emotions:

[KATE] Well, maybe the destruction of the entire planet isn't supposed to be fun. Maybe it's supposed to be terrifying. And unsettling. And you should stay up all night...every night crying, when we're all 100% for sure gonna fucking die! (*Don't Look Up*, 00:39'47"-40'09")

These instances of humour alleviate the tension created by characters reframing, denying, or trivialising the approaching comet and the main characters, who function as the audience's emotional focalisers, becoming frustrated, angry, and desperate (Little 2022, 2). Lastly, superiority encompasses humour that leverages inferiority towards other characters. It works in a similar fashion to the previous concepts but portrays “politicians, media personalities and the population at large as characters acting in foolish ways” (Little 2022, 2). As a result, the audience “are encouraged to laugh at their stupidity” (Little 2022, 2). The humour in *Don't Look Up* capitalises on exaggerating the language and knowledge barrier between scientists and everyday people, as well as the ignorance and willing inaction against impending doom.

Along the way, *Don't Look Up* reinforces a specific ideology through its satirical attack and critique of ideologies, individuals, and

movements. Andrew Stott highlights satire's effectiveness in criticising politics and instigating change in politics and ethics as follows:

In the best instances, it takes its subject matter from the heart of political life or cultural anxiety, re-framing issues at an ironic distance that enables us to revisit fundamental questions that have been obscured by rhetoric, personal interests or *Realpolitik*. (Stott 2014, ch. 7)

However, this form, he continues, is limited in its effectiveness as it "reinforces and validates a discourse of power that relies on the systematic humiliation of targeted groups to secure its own sense of identity" (Stott 2014, ch. 7). Thus, the identity politics of the film contradict its intent of creating awareness and convincing climate crisis deniers to listen to climate scientists.

*Don't Look Up* subverts conventions of the satirical mode by not representing an average person's view on the political issue but instead that of scientists and celebrities. As a result, the film, as highlighted by Little (2022, 3-4), satirises not the ones in power through an outsider's perspective but rather reinforces the division between in-group and out-group of climate change supporters and believers, as it opts for an entitled viewpoint. The film's climate crisis-affirming ideology is paired with a bourgeois focus in both the narrative and the film's marketing, which over-emphasises individual agency and its impact.<sup>3</sup> While scholars agree that individual action is necessary to mitigate the climate crisis and generate collective change (Fraginière 2016; O'Brien 2015; Kent 2009; Brownstein, Kelly, Madva 2022), systemic issues inherent in neoliberal capitalism mitigate responsibility and action to individuals. Although the exaggerated representation of climate change discourse mirrors real-world experiences, the film's mode subverts the conventions of satire and thus adopts an alienating stance through its (self-)involved celebrities. Nonetheless, *Don't Look Up* aligns with the traditions of satire "that tend toward either an aesthetic enjoyment of satirical critique or the use of satire to reinforce moral or ideological instruction" (Stinson 2019). Ultimately, the film alienates a proportion of its audience - arguably the most important - by delineating strict in- and out-groups that are climate change-affirming (heroes) or -denying (villains).

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**3** The website *Don't Look Up Climate Platform* - a collaboration between the film and Count Us In which is "a global movement of people and organizations taking high impact steps to address climate change" (Count-Us-In.org, FAQ section) - for example overemphasises the impact individuals can have in fighting the climate crisis by small everyday actions, e.g., eating more vegetables, using sustainable transport, waste less food, etc.

#### 4 Boomers Dooming the World: Make Denial Great Again

The most powerful enemy faced by the film's protagonists, besides the doomsday comet, are political and economic elites personified by individuals belonging to the Baby Boomer generation. Politicians in the film are portrayed as corrupt, self-serving, and backed by tech billionaires. A populist president prioritises economic growth and popularity over scientific facts. At the same time, a tech entrepreneur is so removed from compassion and ethics that he created an algorithm to predict people's deaths.

The film's president, Janie Orlean (Meryl Streep), is a caricature of Donald Trump. Like her real-life inspiration, she starts as a reality television star, provides her family with positions in her presidential staff, and is an outspoken sceptic of science. President Trump voiced his science scepticism on numerous occasions, such as during the COVID-19 pandemic, but perhaps most infamously when he publicly contradicted California Natural Resource Secretary Wade Crowfoot when he remarked, "I don't think science knows, actually", in response to the impact of climate change on the 2020 wildfires in California. The Trump administration "built consistently on an anti-science discourse of which denial of anthropogenic climate change formed a key part" (Zehndorfer 2022, 121). His fictional counterpart in *Don't Look Up* takes a similar stance and weaponises science to further their own agendas and that of investors. Donald Trump and Janie Orlean prioritise the economy over the environment by heeding the word of entrepreneurs over that of scientists. Besides the behaviour and personality, the fictional president's campaign "Don't Look Up" and its rallies mirror Donald Trump's rallies throughout his candidacy and eventual presidency, including slogans on baseball caps, chants, and the overabundance of US-American iconography.

The actions taken by President Orlean to manage the approaching comet remind viewers of President Trump's crisis management during the COVID-19 pandemic and the climate crisis. In the first meeting, she is confronted with the nearing comet and its "99.78% certainty of impact on earth" (*Don't Look Up*, 0:20'16"); then she lowers the certainty to 70% and dismisses its significance as the midterms are coming up and "at this very moment, I say we sit tight and assess" (*Don't Look Up*, 0:21'45"-51"). Thus, the president postpones addressing an existential threat to the earth in favour of public perception and political schemes. Indeed, she even goes as far as calling the comet "a hoax" (*Don't Look Up*, 0:46'36", 0:55'52"), mirroring Trump's sentiment regarding both the global climate crisis (see Stelter 2020, 25) and the COVID-19 pandemic (6-9). Through its connection to real-world politics, Orlean's behaviour satirises believers in conspiracy theories, such as the anti-vax movement during the COVID-19 pandemic and climate change deniers. Nevertheless, this

strategic shaping of the narrative on climate change affects the general public's opinion on it. The Trump administration's contradiction of accepted science encouraged the public consensus to follow suit (see McGuire 2017). However, Orlean's character was influenced by a variety of US-American politicians representing both major parties. As such, the critique of politics does not centre on one specific party but rather the political system and political discourse, which strategically favours short-term plans that ensure power and maintain publicity over long-term crisis management and problem-solving.

Entrepreneurs trying to exploit (rather than avert) the crisis to make a quick profit embody neoliberal capitalism. Tech-billionaire Peter Isherwell (Mark Rylance) represents the self-proclaimed saviours of humanity and political donors in late capitalism. *Don't Look Up* communicates its critique of capitalism in connection to the climate crisis by "humorously [exposing] the interconnected failings of late-capitalist systems in both dealing with, and exacerbating, an extinction level threat" (Doyle 2022, 4). This critique also addresses the notion of a "good [...] Anthropocene", first suggested by Erle Ellis (2011, 42-3), according to which human endeavours and technological advancement can change the fate of the planet for the better.<sup>4</sup> However, instead of saving the planet, the people in power - politicians and CEOs alike - are preoccupied with financial gain and short-term success. Isherwell, the CEO of BASH - the fictional stand-in for tech corporations such as Apple, Microsoft, and Tesla - exploits the disaster for financial gain by harvesting the comet instead of destroying it. This economic exploitation of crisis "parallels the way in which powerful companies have sought to delay climate action so as to continue exploiting fossil fuels for profit" (Davis, Lewandowsky 2022, 323). Furthermore, the late-capitalist consumerism promoted by the fictional company distracts the public from the impending apocalypse through its marketing. Their slogans "For peace of mind" (*Don't Look Up*, 01:18'56") and "Life, without the stress of living" (*Don't Look Up*, 0:25'15") convey the idea of an escapist retreat from all problems of life, including the approaching comet. In this way, the film portrays a society focused on maintaining the status quo through escapist materialism. Technological advancement becomes intimately tied to furthering the goals of companies and CEOs, not the environment or humankind. Ultimately, humanity's technological progress cannot save the earth as the emphasis on financial profit and individualistic neoliberalism take precedence over environmental concerns.

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<sup>4</sup> For example, Simon Dalby critiques this idea in his article "Framing the Anthropocene: The Good, the Bad and the Ugly" (2015). He postulates that the Anthropocene is "neither good nor bad but [...] rather ugly" (16) due to the required changes in politics and economics and the resistance they are being met with.

## 5 Nihilism and Slacktivism: Gen Z Commodifying the Crisis

While older generations are sceptical towards climate change and/or worry less about a future transformed by it, younger generations tend to worry more about global climate change (Farber 2020). Members of Generation Z tend to convey their worries through either activism (see Greta Thunberg) or humorous resignation (personified by Yule, played by Timothée Chalamet, in *Don't Look Up*). The film's memetic representation of Gen Z/Millennial engagement with climate change and how they are perceived in broader discourses thus focuses on individual activism, internet memes, and celebrities.

Whereas Randall Mindy and Kate Dibiasky's attempt to appeal to the masses through mainstream news fails, their television appearance creates waves on online social media. The film depicts this dimension of discourse through montages of social media posts, reactions, videos, and internet memes.

The two scientists are reframed in a humorous and satirical fashion in internet memes. Dr Mindy, who manages to adapt to the constraints of news media coverage and thus the older generation, is transformed into a popular and famous scientist. Kate Dibiasky, however, is subjected to ridicule, a sentiment shared by Generation Z, who resort to humour and climate nihilism (see Kuppa 2018; Farber 2020). This reframing of the scientists happens in the movie's story and its visual presentation of internet memes. The intradiegetic internet community conceptualises Dr Mindy as both a respected, calm, and intelligent astronomer and a desirable man. By contrast, Kate's erratic outburst on the live TV programme is ridiculed. Her comparison to Charles Manson frames her as a crazy cult leader while also tapping into the stereotype of a woman who cannot keep her emotions in check. Yet, Dibiasky's appearance resonates with sceptical youth – personified by Yule and his friends – who idolise her and her unapologetic communication. While Kate is ridiculed for her emotional and direct way of addressing the existential threat on traditional news, she becomes simultaneously celebrated 'and' mocked by her age cohort on social media, indicating that responses to existential threats cannot be easily categorised by age only. As the comet's impact nears, she deploys her popularity to create awareness and prompt action. This course of action mirrors both Gen Z's humorous engagement with climate change and its most famous activist, Greta Thunberg. Yet, while social media and traditional media are separated in their form, functions, and users, they both fail to invoke practical activism.

The film's satirical representation of popular culture and media exaggerates familiar structures and processes. *Don't Look Up* satirises popular culture's and online activism's limitations in contributing to

social and political change by highlighting online movements, concerts, and celebrity fandom as distracting audiences from what 'really counts' and, accordingly, contributors to inaction. The "For Real Last Concert to Save the World" epitomises these limitations and its slacktivist contributions through entertainment content. While the concert attendees and the people participating in rallies and protests in the film's final act include all generations, the commodified and entertaining activism unifies them as consumers and fails to avert the disaster. The concert's main song, *Just Look Up*, illustrates this armchair activism with lyrics such as "Look up, [...] get your head out of your ass. Listen to the goddamn qualified scientists. We really fucked it up, fucked it up this time" (*Don't Look Up*, 1:44'14"-33"). The song and the concert may be considered a "last gasp attempt at making collective meaning out of impending disaster" (Doyle 2022, 5). Still, the commodification of the crisis and its attendant transformation into entertainment calls out the slacktivist stance for pointing at crises without affecting change. Ultimately, the younger generations' activism is not enough to avert the catastrophe as media spectacle, humorous, and sincere engagement fail to bring forth political and collective change.

## 6 Metamodernity Encapsulated: With, Between, and Beyond Generations

The film encapsulates metamodern ideas in its reconciliation of polarities and thus signals the coming of a generation (Vermeulen, Van Den Akker 2010, 5) that oscillates between the past and the present. *Don't Look Up* employs a variety of strategies in both its narrative, character design, and cinematography to express a plurality of emotions, ideas, and structures in US-American discourse on climate change. Through its metamodern aspects, the film positions itself as an intergenerational product - simultaneously with the old and the new, between the old and the new, and beyond the old and the new (see Vermeulen, Van Den Akker 2010). Such a plurality of positions connected to the climate crisis modifies the anxiety and fear of younger generations as well as the popular and political discourse that re-frames and denies the crisis.

Metamodernity reconciliates polarities and, as such, foregrounds ambivalence in contemporary society, as irony and sincerity no longer cancel each other out. In the metamodern world, the strict binary systems and opposites in the social and cultural domains are not rejected but reconfigured as ambiguities and layers of meaning (Storm 2021). The film's fusion of genres and modes and the depiction of involved characters whose strategies and ideologies constantly seem to alternate between extremes encapsulate this aspect

of metamodernity. *Don't Look Up* oscillates between various themes such as sincerity and irony, hope and nihilism, personal and political, to underline that both the individual and the collective, the ironic and the sincere, must work together to address this pressing issue.

The film thus consists of two main narrative layers. Its macronarrative focuses on the existential threat of the comet and how scientists, politicians, and the media are struggling to respond to and possibly avert it. On the other hand, a multitude of micronarrative zeroes in on the private lives of individual characters and montages of global citizens, flora, and fauna. Politicians, journalists, and tech billionaires try to convince people that the comet is not a significant threat to the survival of humankind. However, this strategic rhetorical reframing fails to persuade people when they can see the comet with their own eyes without relying on scientists, news anchors, or politicians as mediators. This part of the narrative allegory highlights the problem with climate change, as its effects cannot be perceived immediately or globally. However, once the crisis becomes tangible, science communication becomes ineffective. At this point, the scientists resign to their fate and prioritise family and friends over the future of the planet; they no longer look up. This second interpretation of the film's title – to 'not' look up and focus on one's immediate surroundings – introduces these micronarratives, which the film's final minutes spotlight. Ultimately, the constant oscillation between the macronarrative and the micronarratives accentuates the global threat of the comet and the inconsequential individual in averting the climate catastrophe.

In its final moments, the film shifts focus by depicting the total annihilation of life on Earth in a montage. This sequence combines the fictional story and its speculative imagination of a doomsday event with documentary footage of nature, animals, and people. The destruction of the planet is shown from orbit in various wide shots as well as from Earth in close detail, putting the viewer in the position of a character experiencing the annihilation of life. The montage incorporates stock footage of various animals to represent the fauna affected. These animals include polar bears, an icon of the climate crisis, and bees, another species extremely affected by climate change and a potential indicator of it (Cunningham et al. 2022). Humans are both shown in open and closed spaces, in nature and civilisation. Additionally, humankind is shown in both public and private spheres. The humans seen in public spaces are strangers to the audience. At the same time, the main characters and their friends and family are placed in a domestic setting, increasing the emotional investment in the well-being and fate of the humans through recognition. However, the sequencing of these different images entangles them to the point that they become practically indistinguishable before ending in a cut to black.

This final montage positions seemingly inconsequential and intimate moments as the important aspects of daily life. Thus, while the satire critiques various elements of US-American society, the film's final moments accentuate the beauty of nature, the importance of the mundane, the beauty in horror, and the importance of family; or in the words of Dr Mindy, "We really did have everything, didn't we?" (*Don't Look Up*, 2:05'58"). Furthermore, the ending sequence displays the grand and the intimate, nature and humankind, extra-diegetic and intra-diegetic, professional footage and amateur footage, destruction and life, hope and despair, drama, and comedy. This montage accentuates the metamodern character of the film – and thus the intergenerational aspect of it – and expands the representation of the climate crisis from the fictional to the real through referentiality, homage, and heightened verisimilitude. Therefore, the film points to a new generation of climate discourse: a satirical sincerity that permutes all generations. At the same time, the film's ideological positioning alienates those segments of the audience it tries to convince of the severity of the issue at hand, while its exaggeration of individual responsibility glosses over systemic problems that individual actions cannot solve. Ultimately, Adam McKay's allegorical climate change satire addresses the difficulties in communicating climate crisis science, enforcing political action, and collective action across generations in contemporary US-American politics, news, and popular culture.

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# The Slow Apocalypse in *The Low, Low Woods*

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**Abstract** The comics series *The Low, Low Woods* is set in the fictional former coal-mining town of Shudder-to-Think, Pennsylvania. While the mines have long been abandoned, their variegated effects, from poverty to environmental destruction, still haunt the region. This article suggests that *The Low, Low Woods* identifies a convergence between the exploitation of the natural world, a coal industry on the brink of collapse, and a fragile form of (white) hypermasculinity that promotes a violent and race- as well as class-specific idea of local identity that two teenage, queer women from ethnic minority backgrounds begin to challenge.

**Keywords** Extraction. Ecocriticism. Ecogothic. Ecohorror. Comics. Trauma. Intersectionality. Appalachia. Mining. Coal.

**Summary** 1 Extraction, Gothic, and Fiction. – 2 Female Trauma across Generations. – 3 Labour, Health, and Community. – 4 Slow Apocalypse and Rhizomatic Networks.



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## 1 Extraction, Gothic, and Fiction

The human transformation of Earth's surface as well as subsurface environments has exceeded natural processes of geological change. Jan Zalasiewicz, Colin N. Waters, and Mark Williams have emphasised that 'anthroturbation' - which is how they refer to the human penetration of the planet's layers and the resultant geological transformation - effects "deep subsurface changes" that are "of long duration even geologically" (2014, 3). Extractive practices such as mining and drilling have "imprint[ed] signals on to the geological record" (3), which is one of the reasons why "[e]xtraction needs to be part of any and every account of our neoliberal present and of the politics required to address its inequalities and injustices" (Szeman 2017, 445).

Although the extractive industries rob raw materials such as gold and iron from the earth, energy production is the engine that drives anthroturbation. For the longest time, energy was "the great not-said" in the domain of culture, in no small part because of the availability of "abundant cheap energy" (Wenzel 2017, 11), which produced a "fiction of surplus" based on "the belief that there will always be plenty of energy to go around" (Szeman 2011, 324). Faced with dwindling natural resources as well as the environmental destruction and social disintegration caused by the extractive industries, a growing number of cultural products and practices has, however, begun to address the inequalities and injustices produced by extractivism. Matthew Henry refers to this type of cultural products, which "render visible the socioecological impacts of extractive capitalism and problematize extraction as a cultural practice", as 'extractive fictions' (2019, 403). More specifically, he explains, extractive fictions address "energy at *the point of extraction*" and thus "permit readers insight into the uniquely local dimensions of extractive capitalism" (406; italics in the original).

Although Henry is correct to emphasise the local specificities of the extractive industries' impacts and effects, they are nevertheless "local manifestation[s]" of a hyperobject that is decidedly "*nonlocal*" and "involve[s] profoundly different temporalities than the human-scale ones we are used to" (Morton 2013, 1; italics in the original). Combining Henry's definition with ideas from world-systems theory, speculative realism, and object-oriented ontology, Sharae Deckard has developed the notion of extractive gothic, which focuses on how "the infrastructures undergirding extractive regimes" produce "eerie distortions of more-than-human environments" by connecting the vertical imagination of mining and drilling with deep time (2023, 133). In so doing, the extractive gothic articulates the "temporalities that reach far beyond the human" and "the chthonic elements of all that which lies below" characteristic of the Anthropocene gothic (Edwards, Graulund, Höglund 2022, X).

The comics series *The Low, Low Woods* (2020), written by Carmen Maria Machado with art by Dani and colour by Tamra Bonvillain, identifies a concurrence between the extractive industries and a fragile form of (white) hypermasculinity that has destructive effects on the natural world and marginalised human populations. *The Low, Low Woods* was published as part of DC's Hill House Comics imprint, which was curated by horror writer Joe Hill and features five limited series, with a sixth comic originally published serially within the other comics, two pages at a time. DC advertises the imprint as a collection of "cutting-edge horror comics" that "will terrify readers with a smart, subversive and scary lineup" (2019). As limited series, the Hill House comics combine typical features of serial(ised) storytelling (such as cliffhangers) with the coherence and finality of more traditional storytelling forms.

*The Low, Low Woods* draws on a tradition in the Anglo-American imagination that figures the natural world as an Other to civilisation. In so doing, Anglo-American culture has attempted to contain the (not only) imagined threats of the wilderness - thereby making it known (or, rather, creating the illusion of knowing it). After all, fear of the natural world, as Dawn Keetley and Matt Sivils have explained, was "born out of the failure of humans to control their lives and their world. And control, or lack thereof, is central to the Gothic" (2018, 3). In this context, Jennifer Schell has concluded that the ecogothic is "very critical of human beings and their destructive attitudes toward the natural world" and "regard[s] environmental problems with a complicated mixture of anxiety, horror, terror, anger, sadness, nostalgia, and guilt" (176). *The Low, Low Woods* critiques the universalism implicated in the construction of humanity's destructive activities by singling out resource extraction (as a symptom of fossil fuel-based capitalism) and (white) patriarchy as drivers of environmental collapse. The comics series does so by combining the long-term ecogothic hauntings produced by coal-mining and white patriarchy with momentary eruptions of visual(ised) ecohorror.

Set in the fictional town of Shudder-to-Think, Pennsylvania, *The Low, Low Woods* focuses on teenagers Octavia Jackson (Vee) and Eldora Lourdes Alvarez (El), who try to navigate the various mysteries and hauntings as well as traumas of the region, including their own. Shudder-to-Think is a former coal-mining town whose main street is adorned with a banner saying "EVERYONE'S GOAL IS TO MINE MORE" (Machado, Dani, Bonvillain 2020, nos. 1, 3).<sup>1</sup> The slogan's visual design and wording (problematically) evoke the phrase *Arbeit macht frei* ('work liberates you') that welcomed Jewish prisoners to

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<sup>1</sup> *The Low, Low Woods* is not paginated. We provide issue numbers for referencing purposes here.

Auschwitz, suggesting that the comics series critically investigates the tension-loaded notions of social and economic progress driven by fossil fuel-based energy and gaining freedom through the violent oppression of particular groups, who are trapped in a certain way of living. In this way, the comic situates itself in the U.S.-American gothic tradition, as it questions the “narrative of social, economic, and technological progress” that defines the self-image of the United States by highlighting the “fear, failure, despair, nightmare, crime, disease, and madness” that are all-too often concealed, if not erased entirely from, the dominant national narrative (Crow 2014, XVIII). This aspect also echoes in the implied role that the slogan – through its prominent display in the town – plays in forming Shudder-to-Think’s communal identity by anchoring it in coal-mining, providing “a shared sense of identity rooted in place and body of work” (Cory, Wright 2023, 6). Although coal might be the glue that holds together the local community, such imagined communities, intertwined as they are with a selective discourse of fossil fuel-based progress, produce “unimagined communities” that “inconvenience or disturb the implied trajectory of unitary national ascent” (Nixon 2011, 150). Such unimagined communities, in turn, haunt the national (and/or local/regional) psyche, as they tend to “appear and disappear suddenly and mysteriously”, as Renée Bergland has remarked in the context of the role of Native American spectres to the U.S. national identity (2000, 1).

Appalachia occupies an ambiguous role in the U.S. imagination: a region rich in resources that purportedly produces “the most authentic of Americans” (Satterwhite 2010, 70) who are, at the same time, frequently stereotyped as backward country-folk who are hostile towards strangers and have deep-seated misgivings about anything that might be considered ‘different’ and/or ‘new’. Indeed, while challenging essentialist conceptualisations of Appalachianess, Emily Satterwhite outlines traits usually associated with Appalachians: “white, God-fearing, patriotic, straight, humble, simple, rural folk” (70). Most of these generalisations do not apply to the main characters in *The Low, Low Woods*, Vee and El. They are members of ethnic minorities (El is brown and Vee is black), queer (“I don’t get [...] the idea of loving a guy”, El asserts at one point [Machado, Dani, Bonvillain 2020, no. 1], while Vee is in a secret relationship with blonde high-school darling Jessica), and question what roles society traditionally assigns to women (“I don’t get being a wife or mother”, El remarks early in the story [no. 1]). Perhaps most prominently, though, El is unwilling to accept the local myth of “environmental dementia” (no. 1) that purportedly only afflicts women and leads to women forgetting things. In *The Low, Low Woods*, this focus on characters representing groups that are traditionally excluded from Appalachian identity is not a matter of defining what Manuel Castells (2010, 9-10) has called an “identity for resistance” that is positioned in opposition

to the hegemonic identity and reconfigures the value system while nevertheless insisting on difference; instead, what emerges at the end of the comics series is a “project identity” that seeks to transform society by giving the oppressed the choice to reclaim their (horrifying) pasts in an attempt to shape a more just future.

The significance of the past to the unfolding mystery is introduced in the comic’s opening panels. When the two teenagers wake up in a movie theatre one night, not remembering anything about the film they (might have) watched, El (who is likely to spend the rest of her life in Shudder-to-Think) wants to understand what happened while Vee (who expects to leave the town for college in the near future) would prefer not to know. However, as the two teenagers begin to uncover the town’s dark secrets and its haunted history (which are sometimes literally hidden underground), the comic’s readers come to grasp that the people of Shudder-to-Think might “still t[ell] the old stories [...] in the spirit of local community celebration”, but that the “‘handing-down’ of cultural knowledge from one generation to another” (Miller, Hatfield, Norman 2005, XII-XIII) aims at maintaining violent, white, patriarchal, capitalist structures.

In a review of the comic’s first issue for *AV Club*, Caitlin Rosberg rightly notes that *The Low, Low Woods* is pervaded by a sense of dread

that comes with the day-to-day existence of anyone who isn’t male, the fears large and small that come with interacting with men who feel entitled to the bodies of women, but also their time and attention – extracting a long death instead of a quick, violent one. (2020, paragraph 2)

On the one hand, Rosberg’s observations emphasise the “insidious trauma” (Brown 1995, 107) resulting from the “ongoing, everyday forms of violence and oppression affecting subordinate groups” (Craps 2010, 54); on the other hand, this type of ongoing violence not only concerns humans, as the natural environment in and surrounding Shudder-to-Think also dies a slow death. Rob Nixon has referred to the drawn-out violence inflicted upon the nonhuman world and the related increasing impoverishment of already oppressed human populations as ‘slow violence’, explaining that it (largely)

occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, [...] a violence that is [...] incremental and accreditive, its calamitous repercussions playing out across a range of temporal scales. (2011, 2)

*The Low, Low Woods* illuminates these processes, as the comic identifies a convergence between environmental destruction, a coal industry on the brink of collapse, and a fragile form of (white)

hypermasculinity that coalesce in a particular type of “carbon-heavy masculinity” (Alaimo 2016) which promotes a violent and race- as well as class-specific notion of what it means to be a Shudder-to-Thinker. However, the combination of their inquisitiveness, witchcraft, and the extractive industries’ unintended effects on the natural world allow El and Vee to take control of parts of their lives while also effecting change on other women’s lives.

## 2 Female Trauma across Generations

The comic’s opening scene establishes the central mystery driving its plot. El and Vee wake up in a movie theatre as the film’s end credits begin to roll. Whereas El is certain that “[s]omething happened to us” (Machado, Dani, Bonvillain 2020, no. 1), Vee instantly tries to allay her friend’s fears, but fails to do so. Josh, who works at the theatre, acts strangely as the two teenage women are on their way out. The comic’s visuals emphasise his odd behaviour: in one panel, in particular, the angle in combination with the shape of Josh’s ear, the half-open mouth that shows his predator-like teeth, and his facial structure create an animalistic image. Overall, the comic’s first three pages not only raise the question of what happened to El and Vee but also strongly imply that they were raped. Toward the end of the first issue, the verbal narration connects El and Vee’s experience to a longer history of female victimisation and forgetting in the town and the environmental toll that the extractive industries have taken:

[I]t was just your regular piece-o-shit coal-mining town where people died the way God and the company intended: hacking up pieces of lung or crushed beneath ten tons of rock. | The men were always sick from the mines; that’s just how it was. [...] But the women got sick, too, in their own way. | They would forget things: wake up in strange places. People joked that you knew a girl had hit puberty when someone found her standing in a stupor in the church parking lot. | Some women had it happen so many times, they forgot their own names. [...] Something in the air, maybe. Or the water.<sup>2</sup> (no. 1)

The sarcastic opening of this passage explicitly links the town’s health issues with fossil fuel capitalism, where the company plays a nearly divine role by deciding on the fates of the people living in Shudder-to-Think. Indeed, the unnamed company is a spectre, “*never present as such*” (Derrida 1993, 14; our translation; italics in the

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<sup>2</sup> We use vertical bars to indicate movements between panels.

original) but haunting the past, present, and future of the region. The company's god-like role, to draw on Fredric Jameson, "inserts the corporation [...] into the very heart of local and regional culture, about which it becomes difficult to decide whether it is authentic any longer" (1994, 204).

By initially stressing how men got sick or even died because of their jobs in (or close to) the mines, the brief retrospective narration quoted above might at first appear to try to justify the male population's violent behaviour. However, the serial progression from one panel to the next, in fact, accuses patriarchy of inexcusable violence - perpetrated on women and the nonhuman world over several generations. The verbal narration is supported by one of the comic's key visual strategies, as the colour palette changes and images become less detailed and more abstract to indicate past events that connect to the present. A feminine shape in front of a church and a woman sleeping in what seems to be a yard accompany the passage quoted above, culminating in a close-up of a female crotch (covered by a slip), suggesting an interconnection between violent masculine sexuality and female forgetting in Shudder-to-Think. Later in the comic, El reveals that upon returning home from the movie theatre, she discovered that her "underwear was turned inside out" (Machado, Dani, Bonvillain 2020, no. 2), drawing the reader's attention to female genitalia as the locus of exerted horror. Instead of a female tool of power that elicits masculine dread in the tradition of the *vagina dentata* (see Creed 1993), her genitalia represent the site where men inflict trauma on the female body. Even though *The Low, Low Woods* locates this particular type of violent male sexuality in Shudder-to-Think, the comic also connects it to a larger history of patriarchal violence by intertextually incorporating Kate Chopin's novel *The Awakening* (1899). El remarks that the book is "about a woman who is a wife and mother" and who "realizes how much of her life she's missed out on, how much she will continue to miss out on because she's a woman in the world and that's just how things are" (Machado, Dani, Bonvillain 2020, no. 1), reflecting El's fears of missing out on so many potential experiences and events in her life due to the perceived impossibility to leave the former coal-mining town.

The page outlining the health issues and hinting at the structural violence in Shudder-to-Think mentioned above illustrates how *The Low, Low Woods* deploys its media specificities to tell a story about different types of trauma. These verbo-visual strategies also come to the fore when El visits a retirement home with her dog to bring some joy to its inhabitants and meets an unnamed African American woman who suffers from black lung disease. As the elderly woman tells El about her past life in Shudder-to-Think, the panel configuration and colouration seemingly tries to separate her past experience from the present moment. However, the traumatic experience of losing her

child to a sinkhole that has opened up in her yard is a borderless panel, suggesting that the past bleeds into the present. This type of verbo-visual storytelling is what Hillary Chute has described as characteristic of the comics medium, as it “offers a unique spatial grammar of gutters, grids, and panels” that allows for the creative distribution of distinct timespaces across the comics page and thus “place[s] pressure on traditional notions of chronology, linearity, and causality” (2016, 4). As the horror of past environmental catastrophe and the related human tragedies show their impact on the present moment, a “sense of haunting [...] structures the layout” (Round 2014, 60; see also Burger forthcoming) of these (and many other) pages in *The Low, Low Woods*.

It takes El and Vee (and readers) a while - and requires the help of a witch and what might be described as magical mushrooms - to come to understand that Shudder-to-Think’s male population drugs the women in order to rape them. This type of sexual violence has been defining the female experience in (and of) Shutter-To-Think for generations. *The Low, Low Woods* repeatedly highlights this multi-generational dimension of patriarchal violence in the town. For example, El asks Vee early in the comic, “Do you remember that story your grandmother told us? About how women around town used to forget things?” (Machado, Dani, Bonvillain 2020, no. 1). That the town’s women forget about their horrifying experiences draws on the idea of a traumatic event not being “available to consciousness until it imposes itself” (Caruth 1996, 19). A general assumption underpinning traditional trauma research is that the victim’s mind protects itself (and the victim) from confronting the traumatic event, which compulsively finds expression in “nightmares and repetitive actions” (19) and “overwhelms the individual” (Whitehead 2004, 3) through “vivid sensations and images” (Brett, Ostroff 1985, 417). However, while “trauma precludes its registration” because “the observing and recording mechanisms of the human mind are temporarily knocked out” (Felman, Laub 1991, 72), the women of Shudder-to-Think are kept from accessing their horrifying memories. Some townsfolk discovered that the water sourced from up in the mountains, nearby a former sanatorium, “was special in that it ran away memory” (Machado, Dani, Bonvillain 2020, no. 5). Whereas traditional trauma theory “removes agency from the survivor” (Balaev 2014, 6), *The Low, Low Woods* acknowledges that the women have little to no agency in the moment of violence, but trauma becomes a vehicle that allows women to assert agency, as they have to fight to recover and reclaim their memories and traumatic experiences.

### 3 Labour, Health, and Community

While *The Low, Low Woods* never makes the link explicit, the nearly magical powers of the water surrounding what once was the sanatorium Sunblind Ridge – and later became a mountain resort called Heaven on Earth before turning into a (not-so-)secret place where teenagers meet to party – are implicitly connected to the environmental impact of mining. What becomes more explicit in the course of the comics series is how Sunblind Ridge and Heaven on Earth epitomise the social issues and exclusionary practices that characterise the region. The sanatorium was “a place for people of fragile nerves and constitutions. Women, mostly. Homosexuals, sometimes. Transsexuals”, the witch explains (Machado, Dani, Bonvillain 2020, no. 5). Heaven on Earth, on the other hand, was where you would spend the summer “if you had money” and “[i]f you were the right kind of person” (no. 2). “[M]ost of those folks”, Vee disapprovingly notes, “would shit a brick if they saw me or El [t]here” (no. 2). While this remark highlights the racial tensions that have defined the region, her emphasis on the fact that the only role in which they might have been tolerated in Heaven on Earth would have been as waitresses not only foregrounds racialised stereotyping but also classism.

If one accepts that “race matters, gender matters, class matters, and that all of us have complicated identities” (Engelhardt 2003, 4), the subplot centring on El’s dire future showcases how these dimensions intertwine. El’s teacher impresses upon her to submit her college applications because she fears that El fails to “understand [her] options” (Machado, Dani, Bonvillain 2020, no. 2). El, however, is convinced that she knows what her options are: “[M]y mom is a waitress and my dad is on disability. I wish you got how few options I actually have” (no. 2). “I just – I can’t fucking afford it”, she tells Vee later, “Do you not understand how shitty it’ll be to get accepted somewhere and then realize you just can’t afford to go? [...] What’s the point? All of that work, all of that hope” (no. 2).

El’s story does not simply question the idealisation of education as a means to escaping one’s social milieu, though; rather, it exposes the classist assumptions underpinning this very idea – that one can afford to leverage the liberating powers of education – and the intersectional forces of oppression at work in her particular case. *The Low, Low Woods* highlights that El’s is not a singular, exceptional story for (and of) someone coming from a working-class background and living in a (former) coal-mining town, either. “Why did anyone stay?” El wonders at one point, before stressing that outsiders “don’t understand how bad things are. They don’t have the means to leave. They can’t bring themselves to abandon everything they know” (no. 2). Indeed, the ones who leave – such as the investors behind Heaven on Earth – can afford to do so, while the working-class community of

Shudder-to-Think remains immobile. Visually, El's melancholic ponderings about why people do not leave the town are supported by vacated, derelict, and barricaded buildings that commemorate not so much their past inhabitants as Shudder-to-Think's more prosperous times, when coal was more important. In one of the most telling panels in this context, a poster suggests that "THE SUN SETS" and "THE WIND DIES DOWN" but "COAL NEVER STOPS" (no. 1). Since Shudder-to-Think's mines shut down years prior to the (main) events unfolding in *The Low, Low Woods*, the comics series confronts its readers with the limits of aspects of the natural world that were once considered cyclical or even inexhaustible: fossil fuels, air, water, possibly even life itself.

Writing about the Cumberland (a region in the south-eastern part of Appalachia), Allen Batteau notes that "[a]fter years of boom and bust, of decaying coal camps juxtaposed with the ostentation of hillbilly millionaires, of environmental destruction amidst the scenic beauty of the Cumberland, many of the mountain people began to realize that coal was as much the curse of their land as its blessing" (1990, 4). As a gothic narrative, *The Low, Low Woods* focuses on coal's destructive side, as mining has scarred the people of Shudder-to-Think. In the scene at the retirement home mentioned earlier, the elderly African American woman begins to cough when she throws a treat in the direction of El's dog. The terrified expression on El's face in combination with the sound produced by the elderly woman – which seems to elude representation – and her nearly monstrous look indicate that the disease has effectively de-humanised her. Her monstrous appearance, to riff on Jeffrey Jerome Cohen, asks the coal industry why it has created her (1996, 20). Any monster, Cohen suggests, is "a double narrative [...] that describes how the monster came to be and [...] what cultural use the monster serves" (13). As a body expressing fears and anxieties, the elderly woman does not become the epitome of how capitalist societies tend to treat their senior citizens (in particular those from ethnic minorities) but rather symbolises a seemingly omnipresent ecoprecarity (Nayar 2019) that has resulted from fossil fuel-based capitalism. "Black wracking", the woman calls the disease and sardonically adds, "The Shudder-to-Think specialty" (Machado, Dani, Bonvillain 2020, no. 2). She tells El, "I shouldn't even be alive. [...] The mines took my husband and my child. [...] Some days, I think I survived | – just to show that coal that I could" (no. 2). The implied notion of survival as an act of resistance against the coal industry's will evokes Gerald Vizenor's concept of indigenous people's survivance as "renunciations of dominance, tragedy and victimry" (1999, VII).

However, based on her brief appearance, the elderly black woman does not oppose the notion that her life is tragically expendable and dehumanised. As such, the monstrous female figure manages to

“keep patriarchal society functional” (Cohen 1996, 13) – despite embodying the horrifying results of the entangled powers of patriarchy and fossil fuel capitalism and their violent practices. Indeed, part of Shudder-to-Think’s identity seems to be based on turning a blind eye. Toward the end of the story, the witch reveals that the water’s power to make people forget was and is an open secret among the male population: “Men had their ways” (Machado, Dani, Bonvillain 2020, no. 5). When she curses some of the perpetrators and turns them into skinless creatures that largely live underground, “[t]here was talk about the missing boys” and “[h]ow they’d been careless. The lesson was not, ‘*Don’t do what they did*’. It was, ‘*Don’t get caught*’” (no. 6; italics in the original). As for the abused women, the witch was concerned that “giving them back their memories [...] would destroy them” (no. 5). Reflecting on her surroundings in Appalachia, the witch muses,

It’s beautiful here, isn’t it? This town? This patch of wilderness? The trees, the wildlife? The way the light catches against the mountains? [...] I wanted that for them. What I made were monsters. Half-things. Women who were also rabbits. Trees that were also women. Women who collapsed into sinkholes. (No. 5)

#### 4 Slow Apocalypse and Rhizomatic Networks

*The Low, Low Woods* thus symbolically entangles the natural world with women’s bodies, acknowledging that “[h]umans are not [...] separate from and superior to the world around them [...]. Rather, humans and nonhumans together are part of the total ecology” (Engelhardt 2003, 3). This “recognition that one’s bodily substance is vitally connected to the broader environment” (Alaimo 2010, 63) allows us to “think across previously segregated species, categories and domains” (Braidotti 2019, 42). Women’s bodies and the natural world have long been connected in the Western imagination; as Carol J. Adams observed, there is “an overlap of cultural images of sexual violence against women and the fragmentation and dismemberment of nature and the body in Western culture” ([1990] 2010, 65-6). Indeed, what women and the nonhuman world have in common in *The Low, Low Woods* is, first and foremost, a shared vulnerability. This aspect becomes most explicit in the sinkholes that not only open up all across town due to the underground mines but also appear on (and in, as well as from) women’s bodies. The deformations of female bodies are horrifying, with Jessica’s mother figuring as the symbol of years of abuse and exploitation.

The comic establishes a symmetry between her and her daughter: whereas the first issue concludes with a splash page showing how a

sinkhole opens (in) Jessica's body, her mother appears toward the end of the third issue, also on a splash page. The different points of view as well as the panels' aesthetics affect the comic reader's perception of the deformed figures. Seen from a disembodied, third-person perspective, the former illustration includes Vee, who looks at Jessica simultaneously in shock and with sympathy. In combination with the colouring, Vee's response makes Jessica's body appear not so much horrifying as nearly magical and dreamlike. She is still young and beautiful, and the deformation of her body seems contained, highlighted by the circular emanata surrounding her hole. Her mother, seen from Jessica and Vee's point of view as they enter her room, is terrifyingly disfigured and seems to decay while she continues living, highlighted by the bugs and her seemingly necrotising flesh. The sinkhole has effectively overtaken her body; she is, as Jessica puts it, "a wound in the earth" (Machado, Dani, Bonvillain 2020, no. 3).

This becoming-wound evokes how mines have "scarred the planet", to draw on the subtitle of Timothy LeCain's book (2009). This mass destruction has prompted John Gray (2003) to refer to our species as *Homo rapiens*, but this generalisation risks equating the rape of the natural world (a problematic phrase that we nevertheless use on purpose here) with the rape of women. Greta Gaard has rightfully warned that

[c]omparable with metaphors of 'mother nature' and 'virgin forests', rape is a poor metaphor for what it represents - the lived experiences of individual women, children, genderqueers, and entire cultures. The shame and self-loathing, the acute sense of violation that accompanies rape is experienced by humans, not mountains, much as we know. (2018, XV)

In other words, *The Low, Low Woods* addresses men raping women and men exploiting and destroying the natural world, but the comics series does not suggest a hierarchy of suffering nor does it hastily equate the violence inflicted upon women and the nonhuman world in an overly simplistic manner. Nevertheless, they are interconnected; violence is a key ingredient of a white male-dominated, capitalist society.

While "[w]e [traditionally] defend ourselves from [the] fearsome side of inter-connectedness through separation ideologies and practices (war, religious fanaticism, racism, and sexism)" (Amorok 2007, 29), *The Low, Low Woods* identifies a potential for resistance in these entanglements. "There's a metaphor in there somewhere. How we're all connected, maybe manifestations of the same organism", notes Vee (Machado, Dani, Bonvillain 2020, no. 3). The interconnected processes of forgetting and remembering play a key role in this context. "Forgetting is easy", muses El, "We do it as automatically as breathing. Remembering - well, that's another matter entirely. It's as difficult as

drowning yourself. Maybe even more so" (no. 1). This early reflection encapsulates the difficulty of remembering but also the potential power that resides in remembering. Whereas Kate Chopin's Edna Pontellier ends up committing suicide by drowning herself in the Gulf of Mexico, the witch reveals that mushrooms growing in and around what used to be Heaven on Earth can counter the effects of the water. Vee describes the mushrooms as "weird because they're basically dicks" (no. 3), associating them with the symbolic force of the phallus, which the female characters leverage to allow the women of Shudder-to-Think to reclaim their pasts - if they want to - and to take their stories into their own hands: "Sometimes, you've got to write your own fucking endings", the final panel of the fifth issue announces (no. 5).

The supernatural power of the mushrooms indicates that "[a]gency is distributed among multifarious relations and not necessarily knowable in advance" (Cohen 2013, XXIV). While "the evacuation of agency from nature underwrites the transformation of the world into a passive repository of resources for human use" (Alaimo 2010, 143), acknowledging the presence and force of nonhuman agencies "matter[s] for political, ethical and emotional action" (Haraway 2003, 27). Edna Pontellier - whom *The Low, Low Woods* repeatedly evokes - is not heroic; she is a victim of patriarchal society; likewise, survivors such as the elderly black woman in the retirement home are "pathologised as victims without political agency" (Craps 2010, 56). However, El, Vee, and Jessica overcome their victimisations through their entanglements with the nonhuman world. El and Vee deploy the mushrooms to recover women's pasts, which acknowledges that "'the environment' is not located somewhere out there, but is always the very substance of ourselves" (Alaimo 2010, 4). The crucial dimension here is that El and Vee do not force these horrifying memories on the women of Shudder-to-Think, but rather allow every single woman - and the 'half-things' roaming the forests - to decide for herself whether she wants to know.

A three-page sequence in the final issue illustrates how El and Vee, with the help of the witch, collect mushrooms and water and prepare two vials for each woman of Shudder-to-Think - one vial to remember and one to forget. Remembering, of course, comes with the horrifying recognition of what happened in the past, even returning some of the witch's 'half-things' to their human form. Jessica arguably comes to epitomise this process earlier in the final issue, after El and Vee have found her - apparently unaware of where she is and what has happened - and a group of men at the former site of Heaven on Earth. El offers Jessica one of the mushrooms, which she eats. Vee's retrospective narration remarks, "I'd never heard anyone scream like that. And I haven't, since that night. | It was grief and rage and something bigger. Older. Primordial. | Like the earth itself had been waiting to cry out" (Machado, Dani, Bonvillain 2020, no. 6). Jessica's body becomes

a wound as her pain fractures the earth, swallowing nearby men and skinless monsters. The pain the women of Shudder-to-Think have experienced for decades assumes a planetary scale in this scene, as the traumatic experiences of Shudder-to-Think's women become interconnected with centuries of patriarchal oppression of various human groups around the world and with the scars inflicted upon the planet through extractive practices, which have been accumulating over human generations and which also have implications for the deep future. Forgetting, on the other hand, may allow the women to simply not know, but it may also be accompanied by sadness, sorrow, and desolation because of having decided to ignore one's past while simultaneously being aware of what had been a defining feature of Shudder-to-Think over generations.

Although the comics series might at first seem to end on an empowering note, one should remember the witch's words of warning: "[H]umanity has always had witches and witches have always had potions, and yet the fucked-up bullshit never ceases" (no. 6). Indeed, the comic's final two pages highlight the bodies that are hidden beneath the surface and the monsters that are still lurking underground, waiting to break free. *The Low, Low Woods* thus suggests that there is still a long road ahead until society will have liberated itself from the shackles of the entwined oppressions imposed – and various types of violence perpetrated – by white patriarchy and capitalism. The concluding splash page taps into a long tradition of associating sites of industrial production with infernal images, thereby returning us more explicitly to the question of anthroturbation. In this context, the witch's cautionary warning suggests that

[t]he challenge that we face is [...] of conceptualising the earth and our place within it in ways that do not continue to repeat and reproduce the very same anthropocentric values and assumptions that have created the crises we seek to overcome. (Grech 2022, 3)

Here, the anthropocentrism espoused by *The Low, Low Woods* – which focuses on Shudder-to-Think's female human population rather than 'the environment', despite their interconnections – might become a cautionary warning itself: while the women may assert their individual agencies as well as their collective agency by deciding to remember or forget their traumatic experiences, the unleashing of the planet's geopower (in the form of the sinkholes) is little more than a side-effect of the witch wanting to punish the men and providing respite to the women. In other words, the planet's agency emerges from the unwanted effects of anthropogenic activities, which could be said to be the story of the Anthropocene.

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