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Bee and Tree Temporality in The History of *Bees* and *The Overstory*

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Abstract

The loss of biodiversity through a rapidly changing climate means humans can no longer assume their longevity on Earth; a crisis that has prompted a wave of literary imaginings. This article examines Maja Lunde's The History of Bees (2015) and Richard Powers' The Overstory (2018). Through comparing these authors' contrasting treatment of temporality, I argue that both novels perform crucial cultural work in destabilising myopic perspectives on human and environmental paradigms and depict human and more-than-human experiences of time. My article investigates how extensive scales and multiple temporalities can be imagined in literature. By illustrating the complexity of scale and time, Lunde and Powers combat narrow, anthropocentric depictions of nature in favour of holistic, multi-faceted depictions of nature. Lunde's and Powers' treatment of time illuminates methods that diversify perspectives of human citizenship in, and relationship to, a more-than-human world. Through examining each narrative's multi-layering of temporalities, this article explores how The History of Bees and The Overstory each capture the complexities of ecological life in an attempt to enlarge and redirect attention to both the minute and cosmological layers of time.

Keywords: *Ecocriticism; Anthropocentrism; Temporality; Deep Time; Multilinearity*

'Time alters what can be owned, and who may do the owning.'

— Richard Powers, *The Overstory*

Introduction

The lifespan of a honeybee ranges from three to four years; humans often live up to 85 years; the lifespan of a chestnut tree ranges from 500 to 800 years. The great quandary in layering these contrasting timespans is how to adequately signify, contrast and make comprehensible the minute and often incomprehensible and abstract scales that comprise life on Earth. Climate change discourse provokes consideration of temporal and scale disparities when comparing vast geological processes with the lifespan of a human. Contemporary literary ecocriticism investigates the narrative methods authors use to illustrate time and scale in novels. Novels that wish to engage with climate change bear the burden of articulating humanity's relationship with the environment in such a way that engages with scientific factuality and empathic imagination in relation to the depictions of time.

Maja Lunde and Richard Powers respond to this burden by exploring human expediency and its effect on ecological longevity, where it becomes clear that humanity's management of time

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lies at the crux of environmental exploitation. Lunde, in her novel *The History of Bees* (2015) and Powers, in his novel *The Overstory* (2018), make comprehensible the extent and depth of geological crisis *and* the long duration of geological time. Both authors do so through distinct multilayering of human and more-than-human lifespans as well as through employing multilinearity. By exploring each of these novels and their depiction of time and scale, I expose the myopia in anthropocentric representations of the environment in order to accentuate the importance of human and environmental interconnection. Within *Literature as Cultural Ecology: Sustainable Texts* (2016), Hubert Zapf emphasises how the value of temporal illustrations in narrative lies in their power to translate the complexity of, and offer a response to, climate change. Zapf's analysis is noteworthy as he indicates the importance of narrative elements that depict 'appropriately complex forms of literary response to new historical-geological phenomena such as climate change and the Anthropocene' (2016, 144). By encouraging replacement of 'linear plot' and 'anthropocentric framing' through the implementation of 'nonlinear, multi-scalar, and pluralized complexities,' Zapf prioritises the negotiation between local and global scales as well as human and more-than-human temporalities in narrative (2016, 144). I suggest that in Lunde's focus on bee lifespan and Powers' focus on tree lifespan, in narratives that parallel more-than-human lifespan with human lifespan, each works to visualise the effects of climate change through human and geological measures. Through an analysis of Lunde's and Powers' novels and their representations of climate crisis, I respond to contemporary ecocritical scholarship's call for a decentralisation of the human and a comprehension of extensive time spans.

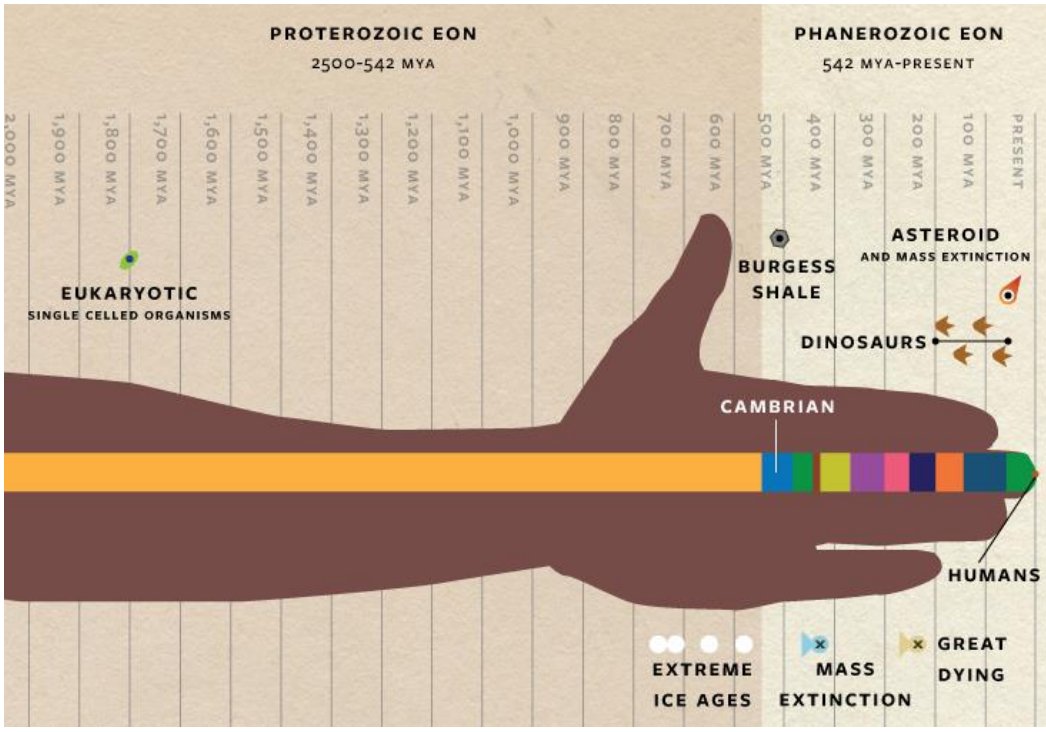
Ecocriticism reviews how, over time, human behaviour has demonstrated the prioritisation of the human over the environment which has led to the exploitation of natural resources. Ecocritical scholarship articulates that recognising human and environmental interconnectedness facilitates 'human freedom and flourishing in which non-human life is fully recognised' (Clark, 2019, 37). Clark's claim is exemplified in how Lunde and Powers explicitly recognise human and more-than-human relationality through their treatment of scale and time in narrative form. Lunde distinctly integrates the contrasting lifespans of bees and humans in her novel that has a broad temporal framework, reaching from 1852 to 2098. Rather than concentrating on singular bee or human experiences, Lunde shifts between three discrete times and locations and thus illustrates human and environmental interaction that continues across time and over generations. By focusing on human reliance on bees and the global effects of their disappearance, greater attention is given to the intricate biology of bees and what facilitates their healthy functioning rather than their material benefit to humans. Lunde's focus on the effect of human activity upon the environment over time develops a deeper and wider illustration of climate change, where the layering of multiple lifespans and storylines across the narrative confronts the complexity of depicting time and scale.

Within a broader exploration of deforestation that exposes the incongruence between human expediency and the vast lifespans of trees, Powers depicts moments when his human characters' sense of time is stretched so that it comprehends the slow intricacies of ecological time through a more-than-human lens. The novel explores 'the politics of speed' when considering the junction between human and tree lifespan (Nixon, 2013, 10). In his discussion of speed, Rob Nixon confronts this junction by accentuating the importance of articulating the incomprehensibility of climate change through comprehensible means. Nixon raises the argument that '[t]o intervene representationally entails devising iconic symbols that embody amorphous calamities as well as narrative forms that infuse those symbols with dramatic

urgency' (Nixon, 2013, 10). Within *The Overstory*, Nixon's argument that prioritises the importance of depicting 'iconic symbols' of 'slow violence' is clear: Powers depicts the contrasting speeds of human productivity and the slow time of trees to illustrate the 'slow violence' in, and urgent response needed to remedy, deforestation (Nixon, 2013, 10). Powers works to reorient human perceptions of the environment through focusing on the complexity of time and specifically the incongruence between contrasting experiences of tree and human time. Powers' literary comprehension of the vast scale of tree and environmental time explicitly accentuates the value in cultivating an understanding of how to sustainably relate to the environment. Through analysing multilinear movement between time and location alongside the contrasting representations of human and more-than-human lifespan in both *The History of Bees* and *The Overstory*, I will illuminate Lunde's and Powers' distinct means of illustrating how an understanding of time alters the orthodox framework which, thus far, permitted a misunderstanding of human and more-than-human interaction.

Both authors employ *longue durée* timeframes within their novels so as to construct a greater narrative framework of deep time. French historian and member of the modernist Annales School Fernand Braudel provides a useful perspective on the conceptualisation of time in daily human life in contrast to larger life spans in the scheme of history. Braudel established the term *longue durée* in his chapter 'History and the Social Sciences: The Longue Durée' within his larger body of work *On History* (1980). According to Braudel, rather than articulating an expansive 'history of events' in social, cultural, and literary narratives, we often prioritise 'a short time span' that is 'proportionate to individuals, to daily life, to our illusions, to our hasty awareness' (1980, 27). Here, Braudel establishes a juxtaposition between the frenetic events that occupy a small-scale time span and the drawn-out qualities of an extended time span like that of geological deep time (1980, 27). Deep time considers and measures time in a deeper planetary sense, reaching far beyond the Anthropocene, and works to challenge myopic scales of reference. Braudel's analysis is essential when investigating temporality in Lunde's and Powers' novels, as both authors challenge the notion of time as 'proportionate to individuals' and instead conceptualise larger time spans that are proportional to planetary changes (1980, 27). By conceptualising life in a *longue durée* and deep time framework, I argue that Lunde and Powers represent how the 'thousand explosions of historical time can be understood on the basis of these depths… [of] semi-stillness' (Braudel, 1980, 27). Braudel's *longue durée* framework speaks to the tension established in climate change discourse between the vast temporal scale of deep time and the microscopic scale of human lifespan. Lunde's and Powers' emphasis on the dramatic effect of human activity upon the environment is crucial, seen in Lunde's focus on the importance on collective human capacity for ecological restoration and Powers' focus on reorienting how humanity perceives the environment, shifting from a position of domination to a place of interdependence. It is vital for narratives to depict temporal and scalar complexity in a context of climate change. My analysis exposes the strategies Lunde and Powers employ to construct these complexities.

Figure 1



Note. An image illustrating the extensive scale of deep time, where humanity is situated on the sliver of a fingertip within this timeframe. From The Greatest Animal War, by K. Scott, 2014, Nautilus https://nautil.us/issue/17/big-bangs/the-greatest-animal-war. [In the public domain].

The History of Bees is a novel driven by the stimuli behind, and consequences of, a changing climate, concentrating on the disappearance of bees as a result of overuse of pesticides and overall environmental exploitation. Lunde weaves three characters' stories in fragmented and dispersed events over the course of 247 years: Tao in 2098 China, George in 2007 USA, and William in 1851 England. By alternating between three contrasting epochs and locations in the form of a speculative future, contemporary context, and the past, Lunde depicts the disappearance of bees and the global consequences that eventuate in an apocalyptic future. Rather than focusing on an isolated period of time, Lunde's *longue durée* timeframe envisions a larger referential scale. By exploring a future set in 2098, Lunde echoes the focus of contemporary climate change discourse on what the coming decades hold for Earth's climate.[2] Lunde strategically opens and closes with Tao's story in order to anticipate climate change's imminence and offer methods of deterrence. Set in the aftermath of 'The Collapse' (referring to the global event of Colony Collapse Disorder), bees have disappeared and, under Government orders, Tao and other labourers must desperately hand-pollinate trees. Following Tao's story, Lunde depicts William's struggles as a biologist attempting to design a modified beehive, so farmers can, without harm to themselves, remove honey from the hives.

[2] Arias, P.A., et al. 2021: Technical Summary. In *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Masson-Delmotte, V., et al (eds.)]. Cambridge University Press. In Press.

George, William's descendant, continues using the beehive designs on his apiary farm in his attempt to oppose industrial beehives. In 2007, Colony Collapse and the sudden deaths and disappearances of bees have commenced. The novel concludes in Tao's time when bees have returned, a fragile depiction of the conception of a natural bee colony.

Lunde's novel is situated before, during, and after 'The Collapse' worldwide, where the gaps of time between each story are bridged through causal links that connect the characters. The legacy of beekeeping acts as a tangible symbol of continuing environmental cultivation and care, where Lunde envisions the 'persistent continuation of life that exists on expansive… temporal scales' through the causal links between each character's story (Jennings, 2019, 207). Lunde offers a potent reminder that without bees — the symbolic representatives of all ecological life within the novel — humanity cannot survive. The use of multilinearity and chronologically succeeding storylines illustrates a continuum of time where consequences of human activity upon the environment are gradually revealed. By framing the novel through the manifestation of 'The Collapse' as well as its aftermath, Lunde concentrates on the factors leading to, and progressive effects of, environmental exploitation. Rather than viewing environmental emergency as a distant menace, Lunde productively explores temporally distinct storylines that make the occurrence of climate change perceptible and immediate.

Multilinearity operates as a means of illustrating causality in narrative, where Lunde weaves connections between her three storylines to highlight the consequences of human activity upon the environment. In her analysis of narrative devices that are utilised as literary responses to climate change, Hope Jennings critiques narratives that have a 'conflicting tendency to assert human centrality within extinction narratives while also erasing a specific history of human responsibility for the worlds and species they have destroyed' (2019, 196). Jennings' claim accurately accounts for the tension within human-centric stories that fail to resist a myopic narrative that portrays human experience as the exclusive concern. Lunde's novel responds to this narrative predisposition and broadens her narrative scope by exploring 'human responsibility' for 'The Collapse' and further critiquing human egocentricity (Jennings, 2019, 196). Upon beginning his design for the beehive, William asserts: 'It should be man-made, because only humans could construct proper buildings…[giving] humans, not nature, control' (Lunde, 2018, 116). William's introspection reveals that he perceives human architecture to be the pinnacle of creation and 'control' (Lunde, 2018, 116). William's intention is to 'adapt' the natural functioning of the hive: 'The bees build diagonal honeycombs by nature, but I don't want to let them build as they like' (Lunde, 2018, 149). Here, our response to William's focalised narrative is shaped by Lunde's triple storyline since Tao's story has already foregrounded the knowledge of the future disappearance of bees. In Tao's storyline, it is revealed that human-made beehives disrupt bees' natural behaviour, create stress and, when combined with other harmful handling, instigate their death. As the novel moves to other time frames, we are prompted to question the cost of William's approach and come to see the problematic attitudes that George inherited from William. Through establishing William's narrative in the past and then progressing to George, his descendent, Lunde illustrates a literary model of 'responsibility,' ultimately critiquing 'human centrality' through a symbolic generational metamorphosis (Jennings, 2019, 196). This metamorphosis sees George shift from a place of self-absorption, evident in his preoccupation with continuing his family's beekeeping legacy, to responding to his son's appeal to modify procedures to assist in the survival of bees. The generational character transformation that

appears through multilinear storylines is a crucial means of illustrating causality in narrative, and thus a mode of depicting human responsibility in climate change.

Lunde overtly witnesses to ecocriticism's concern for representing the abstract quality of climate change in her construction of a storyworld that captures the temporal dispersion of ecological destruction. By positioning three storylines within a *longue durée* timeframe, Lunde illustrates the distribution of ecological destruction over a broad stretch of time. Lunde depicts interaction between bees and humans on different continents and over time where, through explicitly revealing how Colony Collapse Disorder (CCD) affects Tao's dystopian future, Lunde provides a 'visual translation' of climate change where the urgency that is foregrounded at the novel's opening reaches its apogee (Mertens & Craps, 2018, 140). Through dual focalisation that encompasses both George and his son Tom's narrative perspectives, Lunde illustrates what Mertens and Craps assert to be an essential element of eco-narratives: that authors deal 'with the double role humans have' of 'simultaneously being an individual and a carbon footprint' (2018, 151). This image of the 'double role' is exemplified in Lunde's focalisation of characters in discrete times and locations, soliciting a dynamic understanding of global accountability in readers (Mertens & Craps, 2018, 151). Tom acknowledges: 'It's my farm too', and also appeals to his father to 'change operations before it's too late'. Again, Lunde establishes a vision of both the local and the global in Tom's explicit acknowledgement of his familial responsibility and implicitly through recognising the far-reaching consequences of CCD. Rather than investing in the narrow vision of a family legacy that is destructive to both William and George, by contrast, Tom declares:

> 'The bees are dying, Dad. We're the only ones who can do anything about it.'
>
> 'We? You and I.'
>
> 'Human beings. We have to implement changes… WE have to change operations before it's too late' (2018, p. 288).

Tom's appeal crystallises how George does not see himself as an agent in ecological action. Here, Lunde illuminates the importance of collective action and extends individual accountability to consider the crucial need for humankind to 'implement changes' (2018, 288). Tom's resolution is actualised in Tao's story, when it is revealed that Tom wrote a book that described the causes behind, and potential solutions to, Colony Collapse Disorder. In 2098, Tao reads Tom's book and radically acts upon his 'vision' to encourage sustainable practice (Lunde 2018, 327). Rather than operating progressively without reference to the past, Lunde emphasises the importance of reaching back in time in order to holistically situate and scale human responsibility in an extensive, deep time framework. Within a context of environmental catastrophe that manifests in a global phenomenon of bee disappearances, the passing of time, its very perception, and the causal links that bridge the past, present, and future in Lunde's novel, work to articulate the distribution of climate change through time.

In attempting to illustrate the temporal complexity of climate crisis, specific attention must be given to the cumulative effect of human activity on the environment. Lunde attends to this necessity by threading her three temporally dispersed storylines together, bridging past, present, and future through emphasising the causal links between each story. The novel's three storylines offer a palpable vision of the 'persistent continuation of life,' a vision that addresses ecological life's power and endurance (Jennings, 2019, 207). Lunde achieves this vision

through concentrating on how each of the central character's children offer hope for the future. By contrast to Lunde, Powers envisions the endurance of ecology through focusing on the longevity and resilience of trees in the face of ecological degradation. Ultimately, both authors employ temporality as a narrative tool to illustrate the 'persistent continuation of life' (Jennings, 2019, 207). Unlike the storylines of William and George where their respective children carry on the legacy of beekeeping as a metaphor of continuing environmental cultivation and care, Lunde destabilises Tao's familial legacy through revealing that Tao's son, Wei-Wen, died due to an anaphylactic attack from a bee sting. Here, Lunde establishes a simultaneously grievous and hopeful truth: Tao's son, Wei-Wen, has died, and yet bees have returned. His death acts as the catalyst that sees Tao actively promote collective human responsibility for human and natural life. In her search for answers to Wei-Wen's death in Shanghai's abandoned district, Tao invites a young boy and his father to return home with her. Lunde juxtaposes the death of Tao's son with the hope symbolised in the boy's opportunity at a new life: 'his voice came in waves, eager, chattering about practical details with a newfound energy. He'd rediscovered a future' (Lunde, 2018, 324). Here, Lunde explicitly rejects a narrative of self-interested survival and rather invites the possibility of 'social justice and environmental praxis' through a symbolic act that sees Tao come to terms with her son's death and yet offer life to another child (Jennings, 2019, 206). By stretching her narrative beyond the scope of a single human lifespan to incorporate a *longue durée* timeframe, Lunde responds to ecocriticism's call for scalar literacy that depicts the local and global aspects of climate change. Through the expansion of narrative time that stretches beyond the scope of a single human lifespan to incorporate a *longue durée* timeframe, Lunde addresses the complexity of temporally representing climate change. Such a depiction proves the novel's capacity to overcome anthropocentric narrative modes and instead illustrate how time is bound up in representations of climate change.

The History of Bees and *The Overstory* employ salient narrative strategies that expand the arc of narrative to include both minute and vast lifespans. These novels resonate with contemporary ecocritical debates on the representation of climate change by challenging anthropocentrism and rather mutually focusing on the lives of bees, humans, *and* trees. Lunde's placement of three temporally distinct storylines works to illustrate causality and specifically the effects of human activity upon the lives of bees. Similarly, Powers frames his narrative through an exploration of causality and human effect upon trees through deforestation and yet rather than focusing on human response, Powers concentrates on the myriad ways of viewing the passage of time. Within *The Overstory*, Powers explores the junction between tree and human temporality and depicts moments when human comprehensions of time and scale are dramatically extended. Both authors employ methods that fundamentally broaden and deepen human means of viewing the environment and the intricacies of Earthly time that comprise the diversity of human and ecological experiences. *The Overstory* spans the mid-nineteenth century to the modern day and follows nine characters whose connections with trees facilitate a broader appreciation of, and reverence for, forests and the environment. Powers makes explicit that current deforestation rates that are synchronised with an increasing human population, and which incentivise speed, are not sustainable. Powers emphasises this reality through focusing on the complexity of time in the deep time of trees, extending far back before human existence, in juxtaposition with the minute lifespan of humans. Within the novel, time is either condensed or stretched in accordance with illustrations of human or tree temporality. Dr. Patricia Westerford and Ray Brinkman's storylines illuminate this narrative

strategy. In both storylines, Powers emphasises that Patricia's passion for the inner workings of trees and Ray's bed-bound circumstances facilitate their unique capacity to stop, listen, and observe the immense intricacies of ecological time divorced from the regular events of heightened human activity. Analysing *The Overstory* exposes how novels are capable of staging the passage of time through both human and planetary perspectives.

Powers engages with 'the politics of speed' and thus the complexity of temporality and scale through foregrounding the slow growth and deep lifespan of trees (Nixon, 2013, 10). By concentrating on the biological intricacies of trees, Powers accentuates the contrasting speeds of existence in the more-than-human world. One of many illustrations in which Powers lengthens story time is when Patricia, a scientist, spends an afternoon exploring a forest of aspen trees where she recounts: 'she begins to see hidden things… Tangled roots spill from the banks of a rivulet. She studies them, the exposed edge of a network of underground conduits conducting water and minerals across dozens of acres' (2018, 163-164). By 'stud[ying]' the 'hidden things' in the complexity of the water system that nourishes the aspen forest, Patricia's observations enact a 'slowed scene': 'a scene in slow motion in which narrative time exceeds story time' (Powers, 2018, 164; Courtney, 2013, 183). Sensory experience facilitates a reorientation of perspective where, through Patricia, Powers captures a comprehension of the dissonance and yet coexistence of extensive time scales and the details in a moment. Patricia continues to narrate:

> The oldest downed trees are about eighty years. She smiles at the number, so comical, for these fifty thousand baby trees all around her have sprouted from a rhizome mass too old to date even to the neared hundred millennia. Underground, the eighty-year-old trunks are a hundred thousand, if they're a day (Powers, 2018, 165).

Powers illustrates Patricia's comprehension of an intricate and vast ecological scale where the observance of one tree's '[t]angled roots' is paired with the image of 'fifty thousand baby trees' whose collective age reaches far back in time (2018, 165). Powers exposes his strategy of measuring the details of life within the cosmic passage of time through Patricia's self-reflection that 'she has stopped… to see one of the oldest, largest living things on earth… The thing is outlandish, beyond her ability to wrap her head around… trees like to toy with human thought like boys toy with beetles' (2018, 165). Patricia is struck by the scalar tension between ecological longevity and human brevity where, through comprehending the intricate lives of trees, Powers compels readers to focus on the implications of treating the environment simply as an exploitable resource.

Concentrated complexity is paired with vast imaginings of time in *The Overstory* where, through the measuring of time, an anthropocentric framework is expanded to incorporate measurements and frequencies of time and scale that extend beyond that of the human. Through the dislocation of time in both extended and condensed lapses, Powers initiates a comprehension of the complexity of time on an ecological scale. In an attempt to explain the process of photosynthesis to her class, Patricia facilitates an experience of the 'ecological sublime' that is 'marked by an event or encounter with something so vast that it escapes all attempts to apprehend it fully' (Kainulainen, 2013, 111). Patricia 'must shepherd them back over that ultrafine line between numbness and awe' (Powers, 2018, 156). Here, Powers indicates his comprehension of 'scale and scalar literacy' by representing 'elusive agencies and distant or invisible wrongs, happening at counterintuitive scales… in ways that are engaging,

credible and pertinent' (Clark, 2019, 84). Comprehending tree time becomes the mission of each character in Powers' novel, where Powers implicitly emphasises such an understanding to be 'pertinent' to readers (Clark, 2019, 84). Within *The History of Bees*, Lunde similarly confronts the challenge of depicting 'distant or invisible wrongs, happening at counterintuitive scales' through employing multilinearity as a means of illustrating the consequences of human activity upon the environment as it occurs as well as its cumulative effects into the future (Clark, 2019, 84). Alongside navigating the complexity of 'scalar literacy,' through Dr. Patricia Westerford, Powers also focuses on how the comprehension of tree time and scale reorients human interaction with the environment (Clark, 2019, 84). Patricia's research into the resilience of forests leads her to realise that 'futures… will depend on the inscrutable generosity of green things' where Powers confronts the tension in human use of environmental resources (2018, 156). Patricia 'addresses the cedar' and 'lets the gratitude spill out': 'Thank you for the tools. The chests. The decking… We're sorry. We didn't know how hard it is for you to grow back' (Powers, 2018, 170). Narrative temporality offers a means of tangibly depicting how human-tree interconnection is soured through unsustainable exploitation due to its capacity to exemplify both human and ecological time. Powers' attention to contrasting the concentrated time of humans and deep time of trees productively demonstrates his interest to go beyond anthropocentrism to comprehend more-than-human experience.

Powers emphasises that the intellectual perception of deep time, made concrete in the comparison of human and tree lifespan, demonstrates a radical comprehension both of the complexity of time itself, and how it is perceived by humans. Earlier in the novel, Ray Brinkman, an intellectual property lawyer, is urged to consider, '[s]hould trees have standing?' and questions: 'What can be owned and who can do the owning?' (Powers, 2018, 312). Such contemplation provokes an extreme physiological reaction in Ray where Powers depicts Ray succumbing to a brain aneurism: 'From enlightenment to the dam burst in Ray Brinkman's brain takes thirteen seconds' (2018, 387). The span of 'thirteen seconds' is placed within the longer time scale of Dorothy's 'nightly ritual…: blow-dryer becoming electric toothbrush becoming water coursing into the ceramic basin' (2018, 387). Powers contrasts the external linear passing of time in Dorothy's 'ritual' with the metaphoric and literal destabilisation of Ray's mind (2018, 387). In a moment of 'enlightenment' where Ray comes to understand the 'standing' of trees, he concludes: 'Time alters what can be owned, and who may do the owning' (Powers, 2018, 387, 312, 389). Powers emphasises just how radical and complex this recognition is through juxtaposing Ray's intellectual 'enlightenment' with the consequent aneurism where the metaphor of the 'dam burst' is actualised: 'A thing in his brain collapses and everything that was once as safe as houses collapses like an over-dug mine. Blood floods his cortex, and he owns nothing' (2018, 389-390). In this moment of climax, Ray reaches an intellectual and physical impasse that symbolically exposes the profundity in confronting the deep time of trees. Framing climate change through human comprehension of the continuity of time on multiple planes proves to be an adequate tool Powers employs in approaching the complexity of ecological temporality.

Historian and ecocritic Dipesh Chakrabarty illuminates a central problem within conceptualisations of time in relation to the environment due to the incongruent chronologies of species and human histories in the Anthropocene. What complicates the scalar disparity further is the role of humanity in climate change. Chakrabarty establishes that 'humans are

biological agents, both collectively and as individuals… But we can become geological agents… when we have reached numbers and invented technologies that are on a scale large enough to have an impact on the planet itself' (Chakrabarty, 2009, 206-207). The notion that humans are 'geological agents' within the *longue durée* of geological time potentially compresses human and natural history — hence this article's focus on narrative methods of illustrating deep time (Chakrabarty, 2009, 206). Ecocriticism warns of the danger in this compression, where the intricacies of human and more-than-human life are muted and where the magnitude of climate change is minimised. I argue that literary visualisations of human and ecological temporality have the potential to facilitate multiple layers of scale that make comprehensible both the great and the small. Within *The History of Bees*, Lunde reorients human perspective to comprehend the more-than-human world and the complexity of time and scale through concentrating on the transnational connections between discrete human lives and their interaction with bees. Lunde mobilises the concept of humans as 'geological agents' within George's storyline, when Tom advocates their mutual responsibility to actively protect bees (Chakrabarty, 2009, 206). Similarly, in *The Overstory*, in order to depict Chakrabarty's concept of humans as 'geological agents,' Powers places individual human stories within an expansive vision of all Earthly time (2009, 206).

Powers depicts both the intricacies and the magnitude of ecological time through two visions: in Ray and Dorothy's vision of the chestnut tree in their backyard, and in the narrator's vision of a 24-hour day. The chestnut tree comes to symbolise Ray and Dorothy's shared manifestation of a daughter they never had and operates as a tangible site of an ecological lifeforce defined by its temporal vastness. The tree facilitates their mutual 'ability to see, all at once, in all its concurrent branches, all its many hypotheticals, this thing that bridges past and future, earth and sky' (Powers, 2018, 587). In Ray and Dorothy's experience of 'see[ing]' the tree which facilitates their mutual capacity to 'see, all at once… this thing that bridges past and future', Powers illustrates the concept of deep time (2018, 587). Rather than depicting time as 'proportionate to individuals' and their 'hasty awareness', Powers depicts the capacity for comprehending a timespan that is 'proportionate' to the scale of ecological life (Braudel, 1980, 27). This is dramatised through the image of a 24-hour day where Powers simultaneously decentralises an individual human life span and expands the arc of narrative by envisioning Earth's lifespan:

> Say the planet is born at midnight and it runs for one day. First there is nothing. Two hours are lost to lava and meteors. Life doesn't show up until three or four a.m… life is only single cells… Nine p.m. brings jellyfish and worms… By eleven, dinosaurs have shot their bolt, leaving the mammals and birds in charge for an hour… Anatomically modern man shows up four seconds before midnight. The first cave paintings appear three seconds later… By midnight, most of the globe is converted to row crops for the care and feeding of one species (2018, 591-592).

Here, Powers envisions a deep time continuum where planetary change occurs and explicitly mobilises the concept of humans as 'geological agents' by illustrating humanity's momentous footprint (Chakrabarty, 2009, 206). Powers facilitates a new understanding of time in relation to trees in Ray and Dorothy's highly abstract vision that displays how humanity perceives the environment; one that is both 'slow' and 'fast enough' where an anthropocentric metric of time that relies on linearity and visible markers of progression is reimagined (2018, 587).

When investigating temporal representation in narrative, Clark's emphasis on the importance of illustrating 'counterintuitive scales' proves productive in its capacity to depict the seemingly incomprehensible scale of deep time in a way that both translates its complexity and yet highlights the power of human agency (2019, 84). In Lunde's illustration of interlinked human stories over time and in Powers' illustration of the effect of human existence on Earth, both authors make explicit the role of human agency in affecting change for good or for evil by positioning humanity within a grand scheme of time. Within *The Overstory*, Patricia's reflections on the visibility of trees and human blindness augments Ray and Dorothy's ability to perceive tree time: 'No one sees trees. We see fruit, we see nuts, we see wood, we see shade… We see a cash crop. But trees – trees are invisible' (Powers, 2018, 529). Here, Powers exposes an element of his novel's purpose in making that which is 'invisible' visible; accomplished through each character's concentrated reckoning of trees and of human standing within deep time (2018, 529). Through detailing the intricacies of deep time and through exploring the tensions between human and tree time, Powers' novel productively responds to the complexity of depicting climate change. It is vital to firstly generate a rich understanding of the deep time of trees in order to develop an empathic appreciation for the environment as a whole. Powers' novel exemplifies how human perceptions towards the environment engineer behaviour, where a comprehension of ecological temporality facilitates the confrontation of human responsibility within a framework of climate change.

In his exploration of how climate has been culturally perceived over time, Matthias Heymann recognises that environmental narratives require a carefully negotiated depiction of personal human experience that articulates the 'crucial dilemma of the climate change problem: it is abstract, largely invisible, and hardly touches people emotionally. Obviously, it is difficult to mobilize people and politics, if the issue at stake does not capture the imagination and stir emotions' (Heymann, 2017, 1549). Heymann clarifies that the chief tension in environmental discourse is that of negotiating local and global imaginings of ecological processes and representing ecological relationality to human experience. Literary portrayals of climate change are critiqued by their capacity to capture extensive scales in a representation of human and environmental life. My analysis highlights how Lunde and Powers diversify their narratives through expanding singular human stories to incorporate the lives of the more-than-human world: of bees and trees respectively. Both authors explicitly respond to Heymann's call for the incorporation of personal human scales and experiences in an articulation of climate change through their distinct methods of treating time and scale in each novel. While Lunde moves between three temporally disparate storylines where each character's story hinges on the presence and absence of bees, Powers moves between discrete storylines where each character reflects on the position of humanity and of trees in the timeline of existence.

Ecocritical discourse is saturated in the notion of time due to the sense of urgency provoked by the need for global human response to a changing climate. My comparative analysis of Lunde's and Powers' novels, as examples of environmental novels that deploy temporality as a means of comprehending ecological and geological complexity, reveals how fiction is an indispensable device for creating productive imaginings of an Earth that is shaped by climate change. Human-centric conceptions of time rely on speed and a certainty in, or expected state of, the future. Our sense of time is born out of a species that is immensely reliant on environmental resources which thus informs the treatment of such resources. Within each

novel, Lunde and Powers create moments when characters encounter deep time through the lives of the more-than-human, through bees and trees. The expediency of human lives creates a temporal tension in a context of climate change as the phenomenon is simultaneously delayed and immediate. I argue that Lunde and Powers confront this tension through envisioning the intricacies of environmental time. By attending to slow and deep time, Lunde and Powers explore alternative temporal configurations that subvert anthropocentric perspectives and myopic scales of reference and offer rich visions of slow and deep Earthly time. A deeper need exists within the exploration of temporality, of comprehending the multidimensional experiences of time in a more-than-human world so that humans might empathically relate to our environment and thus interact sustainably with its resources.

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