

**Promising the Future:
Environmental Temporalities in Contemporary Picturebooks**

by

Charis St. Pierre

A thesis submitted in partial fulfillment of the requirements for the degree of

Master of Arts

in

English

Department of English and Film Studies

University of Alberta

© Charis St. Pierre, 2023

Abstract

This thesis considers how time is described and experienced in a small selection of popular picturebooks. Ecocriticism argues the importance of considering temporal modes of life which operate outside human scales of movement, progress, and capital. As such, this thesis begins by considering whether picturebook narratives grounded in linear or cyclical ideas of time allow for a more useful response to ecological concerns. It then takes up a phenomenological methodology to ask how the material picturebook format mediates the experience of time passing by correlating the time of the character(s) to the time of the reader. Finally, it considers three explicitly environmental picturebooks, showing how the futures they advocate are grounded in temporally impossible hopes of returning the world to a past state. Taken together, these explorations of picturebook temporality suggest that time is represented most accurately—and environmentally usefully—when focus is placed on sustainable present processes rather than specific hopes of future stability. As such, the project concludes by advocating that environmental picturebooks focus less on idealized destinations or specific future goals, and more on the sorts of sustainable processes here and now which will serve children regardless of their climate future. It moreover suggests that the most realistic and useful depictions of picturebook temporality happen during reader interaction, when time is not represented as a stable line, cycle, or spatial schema, but rather kept in flow, inviting the reader to collaborate with the narrative in real time.

Acknowledgements

Thanks are due to many people for their input and assistance in this project. I'm particularly grateful to my supervisor Roxanne Harde for her direction and confidence in my work, and to my committee members Sarah Krotz and Lynne Wiltse for their time and guiding questions. This project was generously funded by a SSHRC Joseph Armand Bombardier Canada Graduate Scholarship, and a Sarah Nettie Christie MA Scholarship from the department of English and Film Studies. I'm also grateful to many writing and conversation partners over the past two years, especially Renee Beausoleil, Rachel Burlock, Danika Skakum, and Kristin Rodier. Most of all, thanks to Josh St. Pierre for his unending love and support.

Table of Contents

<i>Introduction</i>	1
Picturebooks as Time Socialization Stories: Primary Corpus	3
Methodologies	7
Ecocritical Time Studies	7
Chapter 1 Methodology: Escaping Clock-Time	10
Chapter 2 Methodology: Temporal Phenomenology.....	18
Chapter 3 Methodology: Environmental Futures	22
<i>Chapter 1: Timekeeping in the Anthropocene</i>	24
Human Timekeeping: <i>The Very Hungry Caterpillar</i>	24
Calendar Time.....	27
Critique of Temporal Universality.....	31
Linear Time.....	34
Critique of Temporal Progress.....	37
Nature's Timekeeping: <i>Tap the Magic Tree</i>	39
Cyclical Time.....	41
Critique of Temporal Stability	46
<i>Chapter 2: Passing Time</i>	50
Picturebook Phenomenology	51
The Spatialization of Time in <i>The Very Hungry Caterpillar</i>	54
Time Reduced to Space	54
Quantity and Quality.....	56
Time as Duration.....	58
The Enactment of Time in <i>The Very Hungry Caterpillar</i>	59
Motor Memory vs. Recollection	60
Delay	62
Qualitative Difference.....	63
The Virtual.....	65
Darwin and Becoming	71
Unstable Futures	72
Processes of Divergence	74
Life.....	75
<i>Chapter 3: Promising the Future</i>	79
<i>Look After Us: Frozen Futures</i>	81
Uncovered Futures	85
<i>The Mess That We Made: Backward Futures</i>	88
Rewound Futures	92
<i>The Lorax: Reset Futures</i>	96
Unsustainable Futures	99
Reset Futures.....	105
<i>Conclusion</i>	112
<i>Works Cited</i>	114

List of Figures

<i>Fig. 1</i>	26
<i>Fig. 2</i>	40
<i>Fig. 3</i>	61
<i>Fig. 4</i>	81
<i>Fig. 5</i>	82
<i>Fig. 6</i>	89
<i>Fig. 7</i>	91
<i>Fig. 8</i>	96
<i>Fig. 9</i>	97
<i>Fig. 10</i>	99
<i>Fig. 11</i>	112
<i>Fig. 12</i>	114

Introduction

It is a strange thing to parent in the Anthropocene. I have spent the last seven years wedged between two literatures: an ecological nonfiction of tipping points and apocalyptic warnings, and a colourful collection of picturebooks set in a present which looks more like an idyllic past, complete with stable icecaps and vibrant coral reefs. The disconnect between these genres has, at times, been haunting. To read the bleak timelines of warming—90% of coral reefs threatened by 2030; up to 200 million climate refugees by 2050; Southern Europe in a dust bowl of permanent drought by 2080 (Wallace-Wells 96, 7, 56)—is to plot them compulsively against the growth of my own individual offspring, who will be 12 and 14 years old then; in their early 30s; their 60s. How should a parent communicate these climate realities? My pediatrician's chart of developmental milestones doesn't state when to introduce impending existential horror.

Increasingly, I found that my questions of how best to parent during a slow, unending ecological crisis, were *temporal* in nature. My usual habits of timekeeping seemed to come up short in synchronising the needs of my children with the needs of the planet. The tension between preserving childhood innocence and preparing my children for a fast-approaching future wasn't the only disconnect. I also struggled to plot my little ones within the realities of a long geological epoch. The urgencies of social acceleration and technological progress clashed with the patient milestones of childhood development. The instantaneous destruction of fires and floods conflicted the simplistic rotation of seasons and holidays our family annually observed (there is no ritual, yet, to welcome "wildfire season"). I tucked them in to bedtime stories of smiling ducks and bunnies while a province away my hometown flooded. In all of it I felt an unsettling fluctuation between fast and slow, change and stasis, safety and urgency. I resonated with one op-ed, in which a mother writes: "I have come to associate the clock with guilt—mom guilt and climate guilt" (Teer). She explains: "If the Earth is a house that's burning, there is no

fire escape. I can hear the smoke detectors blaring as I try to rock my babies back to sleep, patting their backs in the age-old rhythm of reassurance” (Teer). At such a moment, is children’s literature meant to be the fire alarm, or the patted back?

This project emerged as an outgrowth of such question, at the intersection of ecocriticism, temporality, and children’s literature. It takes up a small selection of popular picturebooks, asking what they say about the passage of time, and what resources they might offer for comprehending temporality in the face of a changing climate. It will do so according to what Paul Huebener terms “ecocritical time studies” (*Clocks* 24). Multiple ecocritical theorists argue the importance of considering temporal modes of life that operate outside human scales of movement, progress, and capital (e.g., Nixon; Rose; Haraway; Gaard). Ecocritical time studies takes up these concerns, “equipp[ing] us to articulate, question, resist, embrace, and reshape the functioning of time as a form of power within our daily activities” (Huebener, *Clocks* 25). By understanding time not as a neutral medium, but as a form of power which renders intra- and cross-species relations in and out of sync, ecocritical time studies asks who is given agency through our temporal structures, who is denied it, and how we might approach time otherwise.

In extending these questions to early children’s books, I have chosen to take seriously Alice Curry’s critique that children’s literature is “unlikely to come up with a solution to ecological crisis. Yet, [it’s strength] lies in rejecting existing ideologies to make room for new, and different, world orders” (42). As such, I am less interested in whether the selected books solve aspects of climate crisis than examining the temporal ideologies they propagate. How do early picturebooks teach time? Do they attune to the realities of how time passes in the natural world? Are they teaching a temporal worldview which will later need to be unlearned? As such, before turning to how time operates in explicitly environmental texts, this project will consider two books that deal with timekeeping itself: Eric Carle’s *The Very Hungry Caterpillar* (1969),

which introduces the days of the week, and Christie Matheson's *Tap the Magic Tree* (2013), which introduces the seasons. By first analysing picturebooks that teach time directly, this project considers what temporal and phenomenological frameworks might be most useful for environmental action. The final chapter then moves on to consider temporality in three picturebooks with explicitly environmental messaging: Rod Campbell's *Look After Us* (2021); Michelle Lord and Julia Blattman's *The Mess That We Made* (2020); and Dr. Seuss's *The Lorax* (1971). Building on the theory of the first chapters, I argue that while each of these picturebooks seeks to develop environmental consciousness in child audiences, all three draw from temporal assumptions which will not serve children in the face of ecological destruction.

Picturebooks as Time Socialization Stories: Primary Corpus

Huebener argues that cultures engage in various “time socialization stories,” which “indoctrinate young people into the shared forms of social time that shape the functioning of society and that serve as measurements of individual productivity, success, and belonging” (*Canada* 20). Time socialization stories make up the culturally sanctioned attitudes for imagining and indeed experiencing the flow of time (Huebener, *Canada* 20). Picturebooks, especially those concerned with the topic of timekeeping, are an obvious place to consider the time socialization stories our culture adheres to. To unpack these socialization stories involves considering the timescales at which these books operate, when and to whom they are oriented, and the ways human temporality falls in or out of sync with the various, multifaceted temporalities of other-than-human beings.

In asking these temporal questions of picturebooks, I take seriously that children's literature is not only reflective of a culture, but aspirational about the future a culture wishes to produce. Children's books—especially those about the environment—trend toward showing the

world one might wish for, rather than dwelling in the inevitabilities of our world's current destructive course. This aspirational focus is especially relevant given Perry Nodelman's assertion that "children's literature is not so much what children read as what producers hope children will read [. . .]. The actual purchasers of children's books are and always have been, overwhelmingly, not children but parents, teachers, librarians: adults" (*Hidden* 4). As a vehicle for future environmental hopes, then, children's literature suggests what today's adults are hoping for. It therefore allows readers to ask in what temporal conceptualizations such hopes are grounded.

While children's stories sometimes make explicit claims about time, more often the time socialization stories they offer are simply an aspect of the structure of narrative. Huebener writes that "every narrative tries, in some sense, to socialize us into a particular form of cultural time, to draw us into a set of assumptions about how we should understand or experience time" (*Clocks* 2). Literary conventions about the rhythm and flow of narrative always carry a temporal valence. From an ecological perspective, environmental humanities scholar Pamela Banting argues that "our everyday sense of narrative, which relies on the linear notion of cause and effect, emerged from the relative stability of the Holocene epoch, and it is ill-equipped for the chaos of the Anthropocene" (Huebener, *Clocks* 4). Our narrative conventions moreover tend to be concerned with the pace and scale of *human* activities, particularly in mediums like novel and film.

When it comes to narrative forms, however, picturebooks can be an especially fruitful subject of study, as the medium stretches from fiction to nonfiction, including poetry, repetitive formats, wordless-books, and various types of "novelty" features (flaps, peek-throughs, etc.) which complicate a linear reading process. Along with this diversity of narrative structures, the genre features a resounding cast of other-than-human protagonists, offering the possibility of unexpected rhythms and relationships. The corpus explored in this thesis, for example, will

include the cyclical narrative of a tree in *Tap the Magic Tree*, and the repetitive, non-plot-based appearance of animals in *Look After Us*, along with multiple other-than-human subjects from caterpillars to trees to the fantastical creatures of Seuss's *Lorax*. Huebener writes that through narrativizing these sorts of other-than-human characters and processes, literature can identify "escapes from human temporality," and make visible "the limitations of the ways in which we have domesticated time" ("Timely Ecocriticism" 339). This project can therefore attend to the time socialization stories these narratives and characters make possible.

Because my research question is concerned with how time is communicated during our present moment, my primary texts were selected largely based on readership and popularity. The corpus is fairly small, and emphasises texts which remain contemporary regardless of publication date. *The Very Hungry Caterpillar* (1969) is an obvious starting place to investigate picturebook time, as it recurs in the top five children's books purchased every year, making it among the most prolific children's books to deal with timekeeping ("Children's Picture Books"). *The Lorax* (1971), likewise, seemed a necessary environmental text to include as it has been ranked by the National Education Association and School Library Journal among the best picturebooks of all time, and has inspired multiple spinoff books, toys, and a major motion picture ("Teacher's Top 100;" "Top 100"). While both these texts were written earlier than the others, their enduring popularity (which shows no signs of waning) gives them lasting relevance in an investigation of picturebook temporality.

The other three texts—*Look After Us* (Campbell, 2021), *Tap the Magic Tree* (Matheson, 2013), and *The Mess That We Made* (Lord and Blattman, 2020)—are more recent publications, all widely available at brick-and-mortar book retailers. Matheson and Campbell's texts were chosen due to the popularity of their authors. *Tap the Magic Tree* is representative of much of Matheson's work, which uses interactive formats to engage with themes of change in nature over

time. Of her corpus, I chose *Tap the Magic Tree* because the changing seasons are a common theme in picturebooks generally. Campbell is known for his lift-the-flap baby books, particularly the wildly popular *Dear Zoo* (1982). When I saw he had recently released a similarly formatted text on the topic of animal endangerment, I therefore wanted to include it. *Look After Us*, *The Very Hungry Caterpillar*, and *Tap the Magic Tree* are all available as board books marketed in the 0-2 range. Of these, *Look After Us* is available only as a board book, while *The Very Hungry Caterpillar* and *Tap the Magic Tree* also have hardcover editions. As such, of all the books I consider, *Look After Us* aims youngest, designed exclusively for an infant and toddler audience.

The least obvious selection for this thesis is Lord and Blattman's *The Mess That We Made*, a recent hardback released from Flashlight Press (2020). I chose this text because it is exemplative of a whole genre of recent "save the planet" picturebooks (e.g., *Our Planet* (McAnulty); *Save the Ocean* (Stahl); *Heal the Earth* (Lennon et al.); *The Story of Climate Change* (Barr and Williams)). Like others in this area, *The Mess That We Made* uses the format of introducing a large-scale problem, invoking sadness, then offering solutions through which child audiences can save the day. Of the many books in this area, I found it a particularly beautiful example in both artwork and poetry, with an especially well-executed message. The book's cumulative approach to environmental damage highlights complex interdependent relationships between causes and effects, attending to them at various scales. Moreover, I appreciated that the story limited its scope, focusing on ocean garbage patches. It is common for environmental picturebooks to advocate picking up litter as an action-item through which children can care for the earth, which can at times read as patently absurd given the scale of environmental damage being discussed. In this case however, because the scope of the text is focused on garbage patches rather than "the environment" generally, such a strategy reads as

more practicable. All these factors make *The Mess That We Made* a useful and relatively fair case study in offering one critique of the wider “kids save the planet” genre.

Methodologies

Ecocritical Time Studies

As a methodology, ecocritical time studies asks us to reconsider timekeeping itself: what is highlighted and what is occluded through our usual processes of time measurement. Human timekeeping tends to emphasise stability, with time running at an objective and uniform pace, and beings and processes progressing at constant rates. Ecocritical time studies seeks to challenge these taken-for-granted assumptions about time, in order to attend to ecological temporal factors which can be overlooked by our usual habits of timekeeping.

One key ecological consequence of timekeeping is the disconnect between the slow, intermittent *speed* of environmental destruction, and the limitations of human attention spans. Rob Nixon argues that the “slow violence” of climate change conceals it from our everyday consciousness, masking the urgency of the situation. While natural disasters are becoming more frequent—even taking the form of seasonal weather—the shifts that the earth’s climate is currently undergoing have been decades and centuries in the making, easily fading to the background of everyday awareness. While dramatic symptoms like floods and wildfires shock, their causes—fluctuations in CO₂ and average temperatures—are invisible to human senses, and only made apparent when translated into graphs and statistics plotted over time (Adam 11). “How,” Nixon asks, “Can we turn the long emergencies of slow violence into stories dramatic enough to rouse public sentiment and warrant political intervention?” (3). It is therefore worth asking what forms of timekeeping might best bridge the disparate speeds of environmental and human processes.

Speed is just one temporal factor in which humans are out of sync with the environment; the temporal concerns of climate destruction are also a matter of divergent *scales* of processes which are increasingly out of alignment (Nixon 2). Our species, existing for less than 300,000 years, with individual lifespans of less than 100, has difficulty conceptualizing epochs that stretch for tens of millions of years, and biomes which require centuries to diversify. Most notably, the human processes of resource extraction and industrial growth simply don't sync up with the ecological processes on which they depend. The periods in which humans are using up natural resources are profoundly out of sync with the timespans required for those resources to sustain themselves (Huebener, *Clocks* 1). Moreover, human technologies from bulldozers, to single-use-plastics, to nuclear waste, leave impacts on the landscape which will last a dizzying span of centuries. The difference in timescale between the epoch of decay embedded in the petroleum of a plastic straw, the few minutes such a straw is in use before disposal, and the two centuries it will remain on the planet before decomposition, is so dramatically divergent in scale it's nearly impossible to comprehend. As such, (re)conceptualizing time in a way that can properly map short spurts of human activity within the longer timespans of other-than-human processes is a vital consideration.

It is not just humans that are out of sync with natural temporalities; climate change is rendering other-than-human beings out of sync with each other. Changing temperatures are altering long-established seasonal and phenological rhythms of plant and animal life (Dimick). As seeding and migration patterns are disrupted, food chains are juggling out of alignment. Purple martins, for example, are continuing their usual spring migration from Brazil to Canada to breed, but are now arriving to find that the insects they've come to feed on have already finished their spring population boom and grown scarce; "the culprit," explains Huebener, "is the fact that spring has been arriving earlier than it used to" (*Clocks* 60). Other species are relocating further

from the equator as temperatures shift, a dizzying prospect for fauna, and worse still for flora. Huebener warns that in North America, “the habitats of trees are shifting north more quickly than the trees can spread their seeds” (*Clocks* 4). How should humans keep time in the face of such crises? Our habits of uniform timekeeping, where a date is given the same number simultaneously for all people in all places, can hardly help us in conceptualizing the multiplicity of interdependent temporalities inhabited by other living beings.

Along with troubles of speed, scale, and synchronicity, a final temporal problem in meeting the challenges of climate change is that by many estimates humans are already too late (Bastian 24). There is a delay between the release of greenhouse gasses and the damage they cause, as ecosystems slowly adjust to the rippling effects of increased temperature. Elizabeth Kolbert warns that “the warming that’s being locked in today won’t be fully felt until today’s toddlers reach middle age. In effect, we are living in the climate of the past, but already we’ve determined the climate’s future” (Kolbert). This temporal disconnect leaves humans in the impossible predicament of being called to “prevent that which has already happened” (Huebener, *Clocks* 5). Having recognized our environmental predicament too slowly, and been slower still to address it, now even as pundits continue to debate the existence and extent of the crisis, scientists warn that our window to act is shrinking, perhaps already closed. How should one keep time when time has already run out? During such a moment, timekeeping itself becomes a deeply existential concern.

Given these temporal difficulties, our processes of timekeeping are never simply neutral. Ecocritical time studies therefore employs various methodologies in order to critique unhelpful temporal assumptions and suggest alternatives. Especially relevant to my project are analyses of “clock-time,” temporal phenomenology, and critiques of (reproductive) futurity. My project will begin by considering the two explicit timekeeping stories—*The Very Hungry Caterpillar* and

Tap the Magic Tree—in contrast to clock-time, in order to ask what temporal assumptions the books reinforce. I have then chosen one of the texts to zoom in on, *The Very Hungry Caterpillar*, to ask whether a phenomenological approach might complicate these initial temporal assumptions. A phenomenological analysis allows me to move past the narrative implications of the text, and ask what the reading process itself might add to its temporal message; in particular, phenomenology can highlight how elements specific to the picturebook medium carry a temporal valence. I will then direct all of this theory toward my selected environmental picturebooks—*Look After Us*, *The Mess That We Made*, and *The Lorax*—supplemented with a consideration of the role of the child in securing environmental futures. While the child as a promise of futurity is a recurring topic in ecocriticism and in Queer Theory, my analysis will concentrate on the wider temporal assumptions which ground the child's role in future hopes. Drawing from these broad methodological approaches—each taken up through ecocritical time studies—will therefore uncover the various temporal messages being propagated by my selected picturebooks. For the remainder of this introduction, I will outline the three central theoretical frameworks that ground my larger project: an analysis of clock-time; temporal phenomenology; and critiques of (reproductive) futurity.

Chapter 1 Methodology: Escaping Clock-Time

As a starting place in considering the time socialization stories offered by picturebooks, chapter one begins with an age-old question: is time a line or a circle? Which framework might be most useful in meeting the temporal challenges of ecological crisis? This chapter takes up *The Very Hungry Caterpillar*, a linear story, and *Tap the Magic Tree*, a cyclical one, to consider how each might meet the above temporal challenges of synchronicity, speed, scale, and timing. I ask what presuppositions of temporal universality, progress, and stability are implicit in each book's

temporal messaging, and whether the forms of time measurement they offer their young audiences will be of use in meeting the temporal challenges of ecological catastrophe.

Ecocritical time studies approaches such questions by contrasting them to the “default” western conception of timekeeping—what’s known in the humanities as “clock-time”—arguing that the clock is insufficient and misleading as the sole basis of measuring time. Grounded in the logic of repetition without change, clock-time understands temporality as objective: “invariable, standardised and universally applicable” (Adams 14, 40). From the perspective of the clock, time can be neutrally calculated and observed. Today when we ask “what time is it?” we are taking for granted that, so long as the clock consulted is accurate, the answer we are given will tell us something *true* about time. However, this entire conceptualization of how time works has in fact required a meandering technological and scientific journey which lasted for many centuries before the various artifices that underly it could be properly occluded from view, and render their conclusions as simply fact. Ecocritical time studies therefore implicates clock-time as scientifically misleading, and as one culprit in the unhelpful ecological assumptions which have led to the current climate crisis.

While today we understand clocks as neutral observers recording the passage of time, the clock as we now use it is quite new to human history. While seasons, weeks, and even hours have been measured by humans for thousands of years, it is only in the past three centuries that the pendulum clock first allowed humans to measure time precisely right down to the minute or second (Huebener, *Canada* 35). It took a century longer for this accuracy to be replicated in electric clocks, and longer still to produce the atomic clocks deemed most accurate today. At each stage of this development, the span during which one could be considered punctual could therefore shrink accordingly. In taking up this long process of clockmaking, humans assumed that time itself was a stable, uniform, universal force, and that any fluctuations they found were

mere technological failures of measurement which, when overcome, would reveal objective calculations.

However, the very way the clock works actually complicates such claims of pure objectivity. Clocks don't measure time itself, they represent temporal movement through spatial movement. Specifically, they provide a uniform motion by which we can observe *change*, so that we can relate this change to the passage of time (Adam 70). Michelle Bastian points to Aristotle, who argued, "our capacity to perceive time is interlinked with our capacity to perceive change; in order to experience time, one first has to be able to notice a change and then make a comparison between two different moments, 'before' and 'after' the change" (27). The clock's contribution to timekeeping is therefore its ability to move with precise uniformity. With this in mind, Bastian suggests that clocks could simply be understood "as devices for providing communities with continuous and predictable 'befores' and 'afters'" (27). As such, clocks might be better understood not to tell us anything about time directly, but only about space, through which we then *infer* a temporal conclusion.

Moreover, as clocks became more precise the objectivity they were assumed to provide had to be understood in contrast to the previous basis of human timekeeping: the movements of the earth. Time had previously been calculated through measuring the daily rotation of the earth in reference to the sun, via sundials, and the yearly cycle of the earth in its orbit, with the corresponding seasons. The earth, however, is not perfectly uniform in these motions. Its orbit of the sun is not entirely circular, but slightly elliptical based on the gravitational effects of the other planets (Buis). As such, days can be up to 30 seconds longer than 24 hours in June and December, and 20 seconds shorter than 24 hours in March and September. Moreover, the daily rotation of the earth on its axis can wobble by fractions of a millisecond each day. This discrepancy is caused by numerous factors such as adjustments of the earth's mantle, and the

redistribution of water on the earth's surface due to seasonal processes of snowpack and groundwater or (more recently) melting icecaps (Buis). By the end of the 19th century, clocks became precise enough to distinguish some of these irregularities in the earth's movements, and were therefore able to tell time "more accurately" than the earth itself (Huebener, *Clocks* 32). Such discrepancies became a matter of debate: Should we align our clocks to the abstract, precise time of clocks, or adjust our clocks to account for the irregularities of the earth's orbit—what was then known as "true" time or "mean" time? Huebener explains:

"True" time, quite simply, is the time that the sun would project onto a sundial, while "mean" time is a mathematical product intended to average out the irregularities of the earth's motions. In other words, true time takes the measure of the actual sun, while mean time takes the measure of an imaginary sun that moves at a more constant rate (*Clocks* 32).

Unsurprisingly, "mean" time—and mathematical precision—eventually won out.

The attempt to globalize and therefore universalize timekeeping was also a culturally and historically contingent affair. The division of the world into standardized time zones was a slow process, begun in England in 1848, and carried on by railway companies in North America in the early 1880s (Huebener, *Canada* 42-43). Greenwich England was established as the prime meridian at a Washington DC conference in 1884, and the 24 global time zones we know today were decided in the decades that followed (Huebener, *Canada* 42-43). Other conventions of synchronization, like Daylight Savings Time, were not adopted until the 20th century. These attempts to decide "universal time" have always been matters of debate, developed piecemeal and not entirely democratically (Huebener, *Canada* 48). While we now take these conventions as simply given, they are altogether recent, built through processes of social need as much as any appeal to pure objectivity.

Clock-time therefore reveals our assumptions about time itself—what time is and how to keep it. Clock-time presupposes that the seconds we count must be consistent and uniform, even if that renders our seconds out of sync with the motions of the planet on which we live. It moreover sees time as universal, affecting the globe equally and calculably, obscuring the historical and often arbitrary processes of through which we have translated our hours into a shared system. The result is an assumption that (clock-)time:

goes on indefinitely, day after day, year after year. It pulses to a metronomic beat, its motion precise and invariable. It is not subject to the natural processes of entropy, growth and decay. The time of the clock is quantified and standardised, unaffected by context and seasons. These features make clock time predictable, applicable in a uniform way irrespective of time and place (Adam 70).

Clocks have allowed humans to conceive of time as a precise, uniform dimension, abstracted from earthly processes of variation. The precise movements of gears, pendulums, and eventually atomic processes, displaced the movements of the earth and sun as the standard consistent motion by which to calculate the passage of time. Our technological improvements in clockmaking allowed these abstract and precise systems of calculation to transcend the earthly, natural cycles by which humans first learned to count our days.

When asking what forms of timekeeping picturebooks should teach, an ecocritical time studies approach will therefore seek out socialization stories that resist these claims of universality and objectivity. Our deference to the clock as something objectively given is grounded in a set of disputable philosophical assumptions about what time is and how to calculate it. Barbara Adam points in particular to the “all-pervasive heritage of Newtonian science,” which provided the theoretical tradition that underlay clockmaking in modernity (36). Newtonian physics is based on a predictable mathematics of motion, acceleration, and rates of

change (Adam 39-40). The Newtonian universe is a system of interchangeable parts—a so-called “clockwork universe”—where all matter already exists and is rearranged following predictable universal laws.

While these grounding temporal assumptions continue to persist today, for a number of reasons science has already demonstrated their insufficiencies. Notably, in Newtonian physics time is “reversible;” its mathematics can calculate the forces needed to move matter into one configuration, as well as the opposite equation of forces needed to set things back the way they were. Because Newtonian physics conceives of the universe as collections of interchangeable parts undergoing mechanical-style interactions, the flow of cause-and-effect can be calculated in either direction. Unlike in life, then, time in Newtonian mathematics can run both forward and backward.

Moreover, Newton’s laws of physics do not leave adequate room for the unpredictable change and movements of *living* beings. Adam writes that the mathematical precision of the Newtonian universe is only viable because it overlooks living processes, along with a myriad of other natural forces which aren’t straightforwardly quantifiable:

That is to say, if one excludes friction, if one excludes gravity, if one excludes electro-magnetism, if one excludes interaction, if one excludes context and boundary conditions, if one excludes life, if one excludes knowledge, if one excludes any kind of human activity, emotion, interest and frailty, if one excludes all that, then one is left with a universe of perfect symmetry (Adam 40).

In its quest for perfect accuracy, Newtonian science privileged abstract and mathematical laws over the complicating realities of life itself. It is this simplified, calculable universe which birthed the clock, and grounded our preference for clock-time over the irregularities of earth-

time. As the upcoming picturebooks demonstrate, the assumptions of this Newtonian worldview continue to configure our understanding of time today.

As well as failing to account for the effects of living processes, Newtonian physics and its underlying worldview of temporal objectivity has proven insufficient given the theories of relativity. It turns out that time itself is not uniform. This was the major disruption introduced by Albert Einstein which shook physics in the early 20th century: both speed and gravity can alter the pace of time. A person whose motion approaches the speed of light, or who is closer to gravitational pull, will experience time moving more slowly than a person who is not subject to such forces. The disruption of gravity to the flow of time already affects us more than we may realize: farther from the earth's surface, time moves slightly faster than lower down (Huebener, *Clocks* 27). While we normally only think of such disruptions as the stuff of science fiction—the extreme gravity of black holes, for example, pulling characters' temporalities out of sync—technology is now precise enough to detect temporal misalignments at different elevations right here on earth. Huebener writes of precise strontium clocks placed at different altitudes: “Even if two of them are synchronized, their different rates of ticking mean they will soon be out of synch. They will never agree” (*Clocks* 28).

This principle is actually at play every time we use GPS. Because time moves more slowly on the earth's surface than for satellites in orbit, GPS systems have to mathematically account for discrepancies in the pace of time itself in order to pinpoint precise locations. Every time we use google maps, this discrepancy in time is being mathematically accounted for; without adjusting for relativity, our GPS would become slowly out of synch by a factor of ten kilometers a day (Ashby 3). What does it mean if our clocks are so accurate, they must account for fluctuations in not just the earth's movement, but fluctuations in time itself? At its most

precise, clock-time may in fact be *too* accurate for patterning the synchronicity of us material beings.

In reality, then, timekeeping is never a neutral, objective act. Today we align human culture and systems to a precise, uniform clock-time that is always an abstraction from the material cycles of the earth. The worldview suggested by our mechanized timekeeping is in allegiance to a convenient mathematical abstraction rather than material reality. Since the 19th century, we have privileged the uniform motion of clocks above the wobbling motions of our planet. Beyond planetary variations, technologies like GPS must also calibrate themselves to account for the relative variability of the pace of time itself. The very method of timekeeping presupposed by numerical dates and ticking clocks seeks to abstract from the material realities of our planet in a promise of universal objectivity that is never fully realized, since (as Einstein has shown) time itself is not a constant thing.

While temporal compensations due to gravity or the movements of the earth are slight, other divergences by which we must accommodate time to fit our material realities are more obvious. Leap years remind us that the daily spinning of our planet does not neatly align into its yearly orbit of the sun. Daylight Savings Time demonstrates that our hourly conventions about when to begin each morning are fully arbitrary, and can be adjusted through human consensus to better meet the needs of the varying seasons. Such adjustments are reminders that the precision of our clocks can occlude the material realities of keeping time on a planet wobbling through space. As such, we must consider the cultural baggage that underlies our preferences for the mathematical precision of clock-time, and the ways it may distance us from our reality as planetary beings.

These cultural presuppositions about what (clock-)time *is*—made up of neutral and objective, numerical, linear, universally applicable units—are therefore the default time-

socialization stories to watch for in children's literature. In introducing a culturally loaded form of timekeeping as though it is objectively given and universally applicable, children's books can reinforce a long lineage of modernity's assumptions about time. Given the above insufficiencies of clock-time, chapter one will therefore examine whether the linear and cyclical formats of the primary texts reinscribe or complicate the objectivity of the clock, drawing out the ecological significance of each temporal approach, and suggesting alternative modes of timekeeping which might better serve humans in a period of climate crisis.

Chapter 2 Methodology: Temporal Phenomenology

While chapter one approaches broad themes of temporal paradigms and their implications, chapter two by contrast has a narrower focus. This chapter reanalyses the first text, *The Very Hungry Caterpillar*, from a different methodology: temporal phenomenology. Rather than considering how the book explicitly teaches the weekdays and how time functions in the narrative structure, chapter two considers how these broader themes are complicated through the embodied process of reading. Doing so allows me to better analyze how the picturebook medium—specifically the novelty board book—is impacting the story's temporal message.

As a methodology, phenomenology considers lived experience in the first person, seeking to describe subjective experience aside from questions of ontology. Phenomenology is useful when considering temporality, as it doesn't concern itself with any sort of "objective time" (of the kind critiqued in chapter one). Rather, phenomenology is concerned with time as it is lived and experienced bodily. In phenomenology, temporality *requires* subjectivity; just as we bring the "here" to space, we bring the "now" to time (Dreyfus). By looking at the subjective, first-person experience of reading, a phenomenological consideration of *The Very Hungry Caterpillar* may therefore offer an account of how time passes which operates outside of the usual linear,

stable frameworks discussed in chapter one. In doing so, chapter two will attend to not just what the book says *about* time, but how the book *works* to highlight the real-time experience of time passing.

Phenomenology is a useful methodology for an ecocritical project, as much ecocritical theory takes place against the backdrop of the “new materialism” and “new vitalism.” While this theory isn’t always engaged directly, discourses on processes, dynamism, (Deleuzian) becoming, and openness to the new, are regularly taken as the positive elements which ecocriticism should be seeking out in literary texts. While appreciation for growth and change is at one level obvious given the environmental failures of current systems, the nuts-and-bolts of this theory can be easily taken for granted. In order to ask “what are picturebooks teaching kids about time,” it therefore seemed necessary to delve into some of the specific temporal underpinnings of this theory, asking how time operates in the phenomenologies on which it is based. In doing so, I found that the specific features of the picturebook medium, and of *The Very Hungry Caterpillar* in particular, are actually a useful case study in tracing ecocriticism’s various phenomenological allegiances to “becoming” and “the new.”

For the purposes of chapter two, I follow the phenomenological method of a leading scholar of temporality in the new materialism: Elizabeth Grosz. Grosz’s reading of Henri Bergson and Charles Darwin (and to a lesser extent Gilles Deleuze and Friedrich Nietzsche) offers a conceptualization of time that is particularly fruitful for environmental considerations. Specifically, her work strives to undo any nature/culture dualism in our temporal considerations, and to disrupt conceptualizations of time which are stable and frozen, allowing for a more realistic temporal framework that remains open to the new, difference, and processes of becoming.

Given our current environmental predicament, Grosz insists that: “While we have rarely, in the humanities and the social sciences, looked beyond the human, we will have to do so with increasing insistence in the near future, as the existence of the human is increasingly imperiled, or imperils itself” (“All Too Human” 19). This involves breaking down strict divisions between what is nature and what is culture, and rather seeing the cultural as an outgrowth of nature, following the same processes. Specifically, Grosz calls us to leave behind all presuppositions that culture is generative while nature is static and inert (*Time Travels* 47). Instead, she seeks to establish a temporal framework in which “‘The real,’ ‘being,’ ‘materiality,’ ‘nature,’ those terms usually associated with the unchanging, must themselves be opened up to their immaterial or extramaterial virtualities or becomings, to the temporal forces of endless change” (Grosz, *Time Travels* 5). Grosz believes that it is through this attention to the material natural world as a thing already in flux, in which culture and humanity are always embedded, that one can properly attend to the environmental crises we now face.

From the outset, then, Grosz calls for a temporal conceptualization that rejects misnomers of stability. She argues that understanding nature as timeless and unchanging is rooted in “commitments to upholding the values of predictability and stability” (Grosz, “Thinking the New” 39). The conceptual framework underlying this stability results not just in connotations of temporal predictability (as critiqued in chapter one), but of frozenness. Such a conception is both misleading—part of what got us into our environmental mess—and entrapping—closing off possibilities for change.

Grosz’s antidote to such temporal misconceptualizations begins with Henri Bergson. Bergson was a French philosopher at the start of the 20th century who is perhaps best known now through his influence on Deleuze. Bergson was concerned with an account of temporality that remained properly open to the real flow of time; in Grosz’s words, “What Bergson offers is a

philosophy of movement” (*Time Travels* 94). Rather than questions of essence and ontology, Bergson sought to keep time in motion, insisting that its ceaseless flowing duration is the very quality that makes temporality temporal. In Grosz’s estimation, Bergson’s temporal framework provides an affirmation of “life, time, the future, and the new” (*Time Travels* 9).

Along with Bergson, Grosz’s temporal conceptualization draws on Darwin, whom she presents as a corrective to the mechanistic determinism of a Newtonian worldview. As stated above, in Newtonian science it was possible to imagine a universe grounded in unchanging laws and mapped out in predictable ways. The result was modes of knowledge that were foremost causal and probabilistic (Grosz, “Thinking the New” 42). In contrast, ever since Darwin, Grosz writes that “Physics has been forced to accept that certain of its well-known presumptions (entropy, to mention the most obvious), need reconsideration in the light of biology (which breaches the principle every minute of the day)” (“Thinking the New” 42). In Darwin’s work, time is open-ended and dynamic, free from teleological essentialism, dependent on chance, and irreversible in its flow (Grosz, *Time Travels* 17-18). Darwin shows that time is forward-facing through processes of variation, differentiation, and excess, and need not have any regard for progress or direction in the movement of its history. The result is a temporality that emphasises openness and becoming rather than determinism.

Taken together, Grosz offers a temporal and political conceptualization which is more invested in *processes* than results. She advocates “a politics of surprise, a politics that cannot be mapped out in advance, a politics linked to invention, directed more at experimentation in ways of living than in policy and step-by-step directed change, a politics invested more in its processes than in its results” (Grosz, *Time Travels* 2). She suggests that drawing on Bergson and Darwin may allow us to disrupt, realistically and hopefully productively, the stability assumed in our everyday temporal depictions.

In chapter two, then, I follow Grosz's lead in applying a Bergsonian and Darwinian phenomenology directly to *The Very Hungry Caterpillar*, investigating what temporal experience the book offers to its readers. By demonstrating how elements of Bergson's and Darwin's temporal commitments are evident through the book, I argue this textual analysis reveals a framework which could prove integral in understanding and meeting the present moment of climate upheaval.

Chapter 3 Methodology: Environmental Futures

Finally, in chapter three I turn to three explicitly environmental picturebooks, putting the previous theory into practice by asking if the temporal frameworks these books rely on are actually sufficient to ground environmental change. If chapter one considers whether one views past history as a line or circle, and chapter two considers the present "now" of how time passes, chapter three turns toward the future, asking how its picturebooks offer hope for the world that is to come. Following a more traditional close-reading format, chapter three demonstrates that environmental hopes for the future in all three texts are predicated on nostalgic visions of the past, and the temporal trajectories offered to inaugurate such futures are deeply misleading. By applying the temporal theory of the previous two chapters to these environmental texts, I suggest that children's literature might be better served by turning toward temporal processes that honour the actual flow and duration of time rather than the promises of frozenness and stability which these picturebooks encourage.

In addition, chapter three focuses explicitly on the figure of the child as an ecological marker. The role of the child in environmental literature—both literature for adults and for children—is widely critiqued (e.g., Edelman; Sheldon; Seymour; Beauvais). This is especially relevant in Queer Theory's challenge to "reproductive futurism" (Edelman), the assumption that

children—and the imperative of reproducing cultural norms through childbearing—are the future, and therefore our culture’s ultimate priority. Lee Edelman writes “the figure of this Child seems to shimmer with the iridescent promise of Noah’s rainbow, serving like the rainbow as the pledge of a covenant that shields us against the persistent threat of apocalypse now—or later” (18). When such hopes are carried directly into children’s literature, they are further complicated. In communicating the urgency of environmental crisis without extinguishing hope for the future, it is common for environmental literature to place extraordinary weight on children to fix our planet. This is usually accomplished via impossibly huge or vague calls to action (save the oceans!), or through simplistic individualistic tasks (recycle! plant a community garden!) that in actuality can have very little impact at the scale they are presented to solve. In an attempt not to disempower children with the scope of our environmental predicament, such messaging tends to become *too* empowering, expecting results that are outside the abilities of any demographic, let alone kids (Beauvais 176). These environmental calls to action can moreover place the child’s potentialities fully in the future, treating them not as current persons but future persons, left simply waiting for their time to come (Stirling 34). By attending to the role of the child, as character and more importantly as (implied) audience, chapter three takes up these broader themes of futurity and the child, and applies them to three children’s books directly.

Using ecocritical time studies, temporal phenomenology, and ecocritical theory on the role of the child in representing futurity, this project offers various perspectives on how time is taught in a few popular picturebooks, and how these teachings might—or might not—serve their young readers. Finally, the project concludes by advocating for environmental picturebooks that focus not on stability and idyllic destination, but on processes that can embody the lived reality of time in flow.

Chapter 1

Timekeeping in the Anthropocene

Introduction

In this chapter, I examine two popular conceptions of time—linear and cyclical—asking which might better meet the temporal challenges of climate change. I do so by considering two popular children’s books that present two common forms of counting time: Eric Carle’s *The Very Hungry Caterpillar* (*TVHC*), which introduces the days of the week (and a linear depiction of time); and Christie Matheson’s *Tap the Magic Tree*, which introduces the seasons (and a more cyclical depiction of time). To unpack the distinct cultural assumptions implicit in each work, this chapter will broadly divide into two sections: human timekeeping and nature’s timekeeping. I will show that while both paradigms privilege different theoretical convictions, they nevertheless risk similar ecological dangers if married to assumptions of temporal uniformity, objectivity, and stability. I therefore argue that the modes of timekeeping displayed in both *TVHC* and *Tap the Magic Tree* are cultural artifices which cannot account for the irregular and unpredictable flow of time, and thus leave humans ill equipped to meet our current climate crisis.

Human Timekeeping: *The Very Hungry Caterpillar*

TVHC offers readers a linear journey through the seven days of the modern week. Written and illustrated by Eric Carle in 1969, *TVHC* remains a children’s staple today. It has sold over 50 million copies, and recurs in the top 5 children’s books purchased every year, making it among the most prolific children’s books to deal with timekeeping (“About Eric Carle;” “Children’s Picture Books”). *TVHC* introduces a very human mode of timekeeping through following the ravenous journey of a single caterpillar from hatching, to cocoon, to butterfly. The

caterpillar's journey is therefore linear, with a set starting point, progressing to a clear destination.

The linear flow of the narrative in *TVHC* is amplified by the artwork, which shows the caterpillar moving from left to right throughout the story. Carle is known for his use of vibrant color and simple shapes. The artwork in *TVHC* is collage, made of cut tissue paper which has been painted with acrylics ("About Eric Carle"). The book uses a great deal of negative space; most spreads are devoid of background, featuring the caterpillar and his foods against a crisp, white page. The artwork's perspective positions the viewer level with the caterpillar, who remains more-or-less in profile as he proceeds, right-facing, through a span of eating and eventual transformation. On the first pages the egg from which the caterpillar emerges is on the left-hand panel, but by the end of his hungry week the caterpillar is on the right-hand page, until he transforms to fill both pages as a butterfly.

To state the obvious: in this text the caterpillar moves through time. *TVHC* is not a collection of atemporal caterpillar facts, but a narrative journey. As such, readers can attend to the manner of how this time passes and is catalogued. In the next chapter I will return to *TVHC* with greater focus on how the materiality of the book object and its novelty features complicate its straightforward linear timekeeping. For this chapter, though, I focus on the narrative itself. Specifically, I ask what happens when you map the growth and transformation of a caterpillar onto the days of a human week.

Correlating the caterpillar's journey to a human week is not an altogether precise process. The story's references to time begin as vague, grow more specific, then become vague again. The caterpillar's journey starts at night, in "the light of the moon." The image of the moon is anthropomorphised, with round eyes and a slight smile. An indeterminate length of time passes

in the turn of the page, until “One Sunday morning,” at the rise of the smiling sun, the tiny caterpillar emerges with a “pop!” And so begins the caterpillar’s search for “some food.”

The caterpillar does not eat his meals as wholes. Rather, he punctures his way through a growing array of foods across the bulk of the remaining pages. “On Monday,” readers are told, “he ate through one apple. But he was still hungry.” In this central portion of the book, the initial caterpillar is still visible in the sunlight on the left-hand page, while on the right a series of five pages of increasing widths are laid out as flaps. Each page features a fruit with a hole punctured through the page at its centre. The text explains, “On Monday he ate through one apple. But he was still hungry.” When the apple page is turned, readers see the caterpillar on its reverse emerging from the punctured apple; the next page reads “On Tuesday he ate through two pears, but he was still hungry.” The caterpillar likewise progresses through Wednesday’s three plums, Thursday’s four strawberries, and Friday’s five oranges. The *interactive* nature of these punctured pages, progressing in size, day, and fruit-quantity in accordance with the caterpillar’s appetite, will be considered in more detail in chapter two.

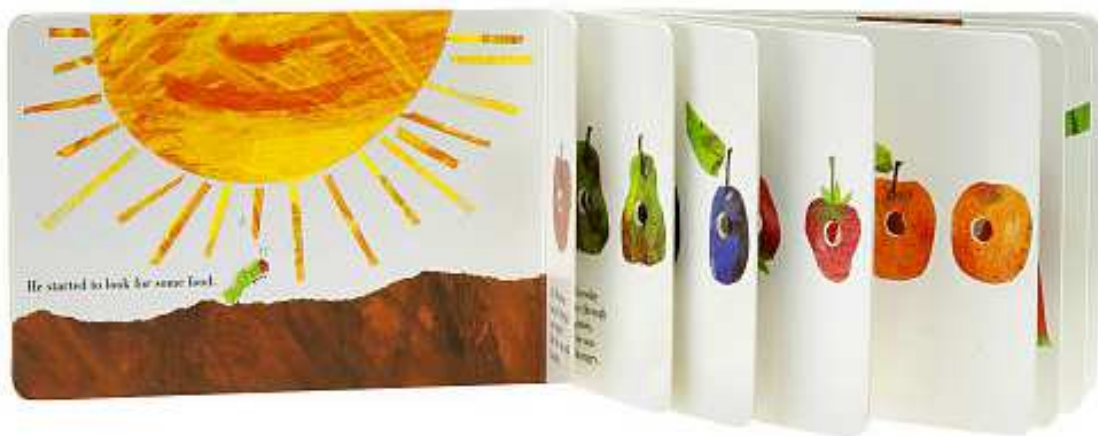


Fig. 1. (Little Bookworm).

Here, enough to say that the caterpillar proceeds all the way to Saturday at which point he feasts on a massive array of foods not typically suited to a growing larva (cake, ice cream, pickles, cheese, salami, lollipop, pie, sausage, cupcake, and watermelon). At this point, the tiny and very sickly-looking caterpillar has acquired a stomach-ache. With the page turn comes a return to nature. “Again,” it is Sunday, and the punctures from Saturday’s previous spread are now five holes through a “nice green leaf.” The caterpillar, still appearing every bit as tiny as before, is said to feel much better. With another page-turn, readers learn that his appetite is quelled. The caterpillar is no longer hungry, nor little. Dominating the left page, he looks back at us, a “big, fat caterpillar.” On the right, his silhouette is enveloped in brown. The text explains that he built a cocoon around himself, and stayed inside for an imprecise span of “more than two weeks.” Finally, in the last spread he emerges, “A beautiful butterfly!”

The temporal movement of the narrative, then, is correlated to a certain sort of progress. Before hatching it is night, but the actions of the living caterpillar occur in the daylight. Readers do not know which Sunday the caterpillar’s hungry week begins, but the progression of the week itself is carefully correlated and named. This journey of consumption eventually places the character on the right-hand page, seemingly full circle, as “again” it is Sunday. Then, the mystery of the caterpillar’s transformation occurs imprecisely over a span of “more than two weeks,” until a butterfly fills the reader’s vision as the destination to which the caterpillar has been ravenously progressing. In this manner, children are taught the names and order of the days of the week as the centerpiece of a larva’s life-journey.

Calendar Time

My first question when considering timekeeping in *TVHC* is how much cultural baggage is smuggled in when teaching a child the days of the modern week. The story is a process of

translation, transposing an ecological cycle into human temporal language. There is no scientific nor ecological reason to do this; the caterpillar stage of a butterfly's life-cycle is not set as seven days in length, but tends to be anything from two weeks to months depending on the species (Brock and Kaufman 13). In this, as well as in its physical appearance, the insect depicted in *TVHC* does not seem to correspond to any actual species of butterfly (Team Eric Carle).

Likewise, there is no reason to begin the caterpillar's journey on a Sunday nor to make the days map so neatly to foods; Carle's purpose in this section is pedagogical and stylistic, seemingly more concerned with introducing the week to readers than teaching anything about caterpillars. In doing so, however, the days on which events occur are presented as purely objective. "On Monday" is stated as a simple fact. Teaching the weekdays with this sort of temporal certainty easily distracts from the reality that there's actually nothing particularly objective about our human practices of categorizing and classifying time.

Like other aspects of clock-time, the seven-day week is a culturally loaded system of categorizing time. There is nothing inherent in the flow of time which suggests days should be split into 24 equal units of hours, or clustered into groups of seven as weeks. All such systems of classification are arbitrary human inventions, coming out of cultural and religious histories rather than scientific objectivity. The seven-day week comes from a Hellenistic tradition, and from the Genesis seven-day creation story, both likely adopted from Babylonian astrology and based on the planets visible to the naked eye (Huebener, *Canada* 4). The English names of the weekdays are therefore derived from the Latin names for the sun, moon, and visible planets or their corresponding gods in Roman and Germanic mythology (Green 245). In contrast, Indonesians once used a five-day week, and ancient Egyptians followed a ten-day cycle (Huebener, *Canada* 3-4). Such systems are equally viable, and it is only the historical contingencies of cultural conquest which determined which process of categorization we use today. Our seven-day system

has obvious imperfections; our week doesn't align symmetrically within the 365 days of the year (nor did a five- or ten-day system), but rolls through its own cycle landing on a different starting point each year. While January 1 may one year land on a Sunday, the following year might begin on a Monday, then Wednesday, etc. In fact, Eviatar Zerubavel notes that of all our systems of timekeeping, "the week is the only major rhythm of human activity that is totally oblivious to nature, resting on mathematical regularity alone" (qtd. in Huebener, *Clocks* 68). As a process of categorization, then, the seven-day week is a matter of cultural preference rather than objectivity or even pragmatism.

The arbitrary nature of the weekdays is true of human calendars generally. The months of the current "Gregorian" calendar have only been in place since the 16th century, and are named for Latin numbers and figures in Roman history and mythology. Other calendars—most notably the Islamic calendar—follow the cycle of the moon in which months are 29 ½ days, making lunar years 11 to 12 days shorter than solar years. Moreover, each month in the Gregorian calendar has a disparate number of days which follows no set rhythm; one must simply memorize which months extend to day 31. While grounded in deep religious and cultural traditions, then, such systems of time categorization are scientifically arbitrary. To introduce the days of the current week as a neutral fact ("On Monday"), is to draw from yet also occlude this long cultural heritage of naming and categorizing time.

These processes of categorizing time into rolling lists of names and numbers which are then taken to be universal affect how time is experienced. We can imagine, for example, how differently we might experience our days if a week measured five days, or ten. This otherwise-arbitrary choice is conditioning our patterns of work and rest, and our habituation into what feels to be a short or a long time. Our calendars also make choices as to when newness occurs (Sunday/Monday; January; the first of each month; etc.), and when to conceptualize a time-

period to have closed, based only on these otherwise arbitrary systems of categorization (Huebener, *Canada* 61). All such conventions could be organized differently. As one counter-example, Huebener points to the Pikangikum First Nation, who instead of recounting years by number, traditionally measures the past in relation to significant happenings: “Events that would have occurred many years in the past are described not through a numbered sequence, but in relation to the relative ages of the people in question, significant events such as local marriages or the First World War (several Pikangikum enlisted in the military), or the lifespans of deceased relatives” (Huebener, *Canada* 186-187). One can imagine how time would be experienced differently within such a system. What better way to embed oneself into the milestones of one’s community, than to have such milestones form the units of timekeeping itself?

On this point, Bruno Latour argues that correlating events to abstract dates has a flattening effect on human experience. When we construct timelines of what “happens” based on an event’s correspondence to a series of uniform numbers, we can occlude the causal forces at play. Latour contrasts this to “historicity,” writing, “calendar time may well situate events with respect to a regulated series of dates, but historicity situates the same events with respect to their *intensity*” (*Never Been Modern* 68, emphasis mine). To flatten events into a timeline of otherwise uniform names and numbers has far less explanatory power than when such events make up the milestones of one’s timekeeping in the first place. One can imagine, for example, the difference between being told you were “born in 1946,” and being told you were “born the year after WWII ended;” the latter is an invitation into a larger causal story, ripe with questions, which the first relegates as secondary to the abstract facts of the situation.

Elsewhere, Latour connects this numerically arranged history to the way in which causal forces are always abstracted in a modern scientific worldview. In rendering the “material world” an inert background on which only human actors can express true agency, he argues that the

agencies at work in the forces of nature are always downplayed. Grounded in a Newtonian worldview, matter follows mechanistic laws without any agency in itself: “Nothing, literally, *happens* any longer, since the agent is taken to be the “simple cause” of its predecessor. All the action has been placed in the antecedent” (Latour, *Facing Gaia* 71-72). When we keep time according to abstract calendar sequences, we may in fact be occluding the historicity of events in their relative intensity, and moreover distracting from the *agency* at work in the causality between one event and another, including the agency of the material natural forces at work in the world.

It is worth asking, then, what might read differently in *TVHC* if the timeline of events were laid out in a different manner than through correlation to the named days of the modern week. The caterpillar’s journey could have been sequenced in relation to itself (“on the first day;” “on the second day;” etc.), or to some other environmental process (e.g., temperature, season, plant growth), all of which would be more relevant to the character’s world, and might properly indicate the temporal causality between events. The story could moreover have measured time in terms more familiar to its child-audience—the time it takes for daycare days to transition to at-home days, for example, or for milk to turn bad in the fridge. Such options may not be narratively “better,” and certainly wouldn’t sound so universally true, but they could avoid the seeming objectivity of introducing the timing of a caterpillar’s journey through reference to a thoroughly human convention.

Critique of Temporal Universality

All of this to say that the named weekdays are not neutral facts but a cultural convention, and in the case of *TVHC* not a particularly useful one. Carle is arguably relaying the timeline of his story at its least relevant scale, as the week has nothing to do with a real caterpillar’s

transformations. Readers are not even told during which season the story takes place—a relevant piece of information, as in temperate biomes caterpillars tend to hatch in the spring. Instead, the timekeeping of the book is a decontextualization. Whether or not it's Sunday is actually irrelevant to any caterpillar's transformation process, but whether it is spring is highly necessary. In other words, Carle is adhering to a scale of time that has nothing to do with *timing*.

Moreover, to catalogue the caterpillar's journey according to the days of the modern week implies the week's universality. In discussing "Settler Time," Mark Rifkin argues that the application of this sort of calendar system simply takes for granted that everyone is occupying the same "now," uniformly and universally (16). What sort of cultural dominance is implied in stating that such-and-such a day *is* Monday? Rifkin argues, "in the absence of recourse to a sense of time as simply marching forward in universal synchrony, with everyone occupying a singular now, there must be a way of thinking the plurality of time" (16). Factual claims such as "On Monday," "On Tuesday," etc., impose a felt-objectivity that obscures the deep arbitrariness of human calendars, with all their names and numbers. Rifkin states: "The supposedly objective givenness of simultaneity, of an unmediated mutual now, depends on a historicist conception of time as an unfolding, universal line of development" (19). Rifkin connects these assumptions of universal simultaneity to philosophies of modernity and progress which are deeply rooted in settler and colonial dominance.

When considering how assumptions of temporal universality are rooted in colonial modernity, it is of note that *TVHC*'s weekday-precision is limited to the caterpillar's period of consumption. Readers don't know which day it is that the egg hatches, nor when the caterpillar enters his cocoon; the timing of the beginning and end of the caterpillar's narrative is left ambiguous. What the caterpillar *eats*, however, —both fruits and man-made products—is precisely temporally catalogued. This portion of his journey is mapped not just in sequence or

quantity, but is plotted onto time itself. In a sort of primitive consumer analytics, Carle is suggesting which types of activities humans tend to record.

In *TVHC*, then, the weekday calendar appears to be taken as neutral, and understood as equally applicable to humans and caterpillars both. This is the same domineering assumption that applies the settler calendar to Indigenous nations, and even stretches modern systems of yearly dating back into pre-history, cataloguing eras of the planet which span long before humanity even existed. The multiplicities of possible timekeeping are massively occluded through such presuppositions. Rifkin highlights the damage of this assumed temporal universality by contrasting it to Indigenous modes of timekeeping:

What possibilities are there for temporal multiplicity under the conditions of settler dominance? In seeming to grant temporal equality or recognition, the sense of shared time can efface collective forms of becoming and ways of being-in-time that arise out of Indigenous histories, territorialities, and ordinary experiences of peoplehood (Rifkin 16).

A seven-day week sourced in Babylonian astrology, named for ancient gods, plotted to the months of Roman history, and counted in sequence from the (imprecise) date of Jesus' birth is far from the neutral system of measurement modernity might assume. Echoes of these anthropocentric, western, industrial presuppositions are reinforced when something as un-human as a caterpillar's growth is temporally mapped to a western human week, and stated as something neutral and objective.

In introducing a culturally loaded form of timekeeping as though it is objectively given and universally applicable, *TVHC* is therefore playing into a long lineage of modernity's assumptions about time. In contrast, Rifkin writes:

If one suspends the use of the homogeneous successions of clock time as "an absolute reference," frames of reference would refer to qualitatively differentiable processes of

becoming that have no inherent, neutral means of being articulated to each other, instead requiring complex processes of translation in order to be made mutually intelligible (Rifkin 79).

How curious it is, then, to teach our thoroughly arbitrary human weekdays through the journey of a caterpillar. From the cradle, it assumes that temporality is something objectively and universally applicable, not specific to species nor place, but simply given, by which all of us must learn to count our days.

Linear Time

Aside from the categorization of the human week, an analysis of *TVHC* must attend to the loaded cultural implications of the linearity of the caterpillar's journey. There is of course cyclicity in the caterpillar's story, looping from Sunday to Sunday, with Saturday marked by excess. Despite this cyclicity however, there is clear progression and destination at work, indicated by the left-to-right layering of the days. In each of the days of the week, the caterpillar is only visible on the left-hand page, until Saturday is complete and he collapses in excess on the right. Even during the process of transformation, while in nature a chrysalis hangs upside-down, Carle's caterpillar faces left-to-right, progressing on his linear journey. Similarly, the life-cycle of the caterpillar itself does not conclude cyclically with the laying of eggs and promise of a next generation. Rather, his narrative transformation signifies destination. The caterpillar on the second Sunday punctures five holes, grown as he is from the tiny larva that could only manage a single apple. He then concludes his journey as a new being, utterly transformed.

It is easy to make too much of a distinction between linear and cyclical time. Huebener warns that all societies contain elements of each, as does *TVHC* itself (*Canada* 12). Rather, one can think of the distinction between linear and cyclical time as one of emphasis. Cyclical time

highlights repetition, whereas linear time implies direction, and is thus future-oriented. Maria Nikolajeva points to this distinction as one watershed of children's literature itself: some stories remain in an idyllic and stable present; others tell tales of there-and-back-again; and still others, what she calls "collapse" stories, imply a linear and irreversible destination. In "collapse" stories, characters—if they return at all—come back irrevocably changed (Nikolajeva). To speak of linear time, then, is to focus on destination and transformation, something clearly evident in a tale where a caterpillar becomes a butterfly without any reference to a generational life cycle through which the sequence will repeat again.

Adam argues that linearity is a trademark of modernity which has shifted how humans conceive of the world (37-38). She writes:

The assumptions associated with the linear perspective, Newtonian science, and neo/classical economics, in conjunction with the rationalised time of calendars and clocks, form a powerful, mutually reinforcing conceptual unit. As such, this conceptual conjuncture constitutes the deep structure of the taken-for-granted knowledge associated with the industrial way of life, creating the by now accustomed semblance of certainty and control. It fulfilled this function successfully until environmental hazards started to cumulate and scientists began to be lost for answers (Adam 97).

According to Adam, the idea of time marching forward without repetition toward some prefigured *destination*, implies that the earth is a closed system unaffected by external factors, within which nature is an infinite and stable resource against which human culture can develop and excel (80). Of course, like our looping calendars some things do repeat—namely the cycles of the natural world—but against this stable backdrop human culture can shift and grow. In Latour's words, "the moderns indeed sense time as an irreversible arrow, as capitalization, as

progress” (*We have Never* 69). Rifkin refers to such a conceptualization as “compulsory heterotemporality,” the idea that time is a straight and singular line uniformly unfolding (39).

As such, economic progress is intimately tied to linear depictions of time. In such a worldview, where time moves ever forward at a uniform rate, time can be predictably calculated and commodified. Economic systems therefore employ a linear temporality which stands opposed to “rhythmicity, seasonality, time-scale and intensity of change, [the] importance of timing and variability over the life-course, [and which disregards] the centrality of reproduction and regeneration” (Adam 65). That is to say, all the features of temporal cycles in *nature* are discounted by the linear temporalities of economic growth.

Modernity thereby considers time a quantifiable resource, independent of natural temporal phenomena, proceeding steadily toward the future. Bringing this linearity together with the other features of temporality discussed above, Huebener writes:

Normative structures of time such as clock time, the Gregorian calendar system, and the linear notion of progress intertwine with powerful social emphases on punctuality, productivity, acceleration, temporal universality, and particular forms of temporal framing through which shorter durations are often seen as more real than longer durations, and through which the prized concept of first-ness and the more ambivalent concept of newness are claimed by certain people and denied to others (Huebener, *Canada* 24).

Indeed, the promises of advancement, growth, and progress which capitalism requires are only possible when one conceives of time in such a way: a straight line, forever marching on.

Critique of Temporal Progress

What does it mean, then, for Carle to teach the sequence of a caterpillar's life within a framework of linearity and growth? Other caterpillar children's stories, such as Lois Ehlert's *Waiting for Wings* (2001), present the species in terms of a reproductive life cycle. Not so in *TVHC*. Carle's decision to end the caterpillar's journey with transformed destination rather than cyclical reproduction is perhaps an element of the caterpillar's anthropomorphisation, as typically connotations of linear progress rely upon a division between nature as stable, and culture as progressing. Sarah Dimick describes this attitude toward nature as "the sense that there will be more, that whatever is happening now will happen again, a dilation of time that makes the future an endless iteration of the present" (716). It is in contrast to these stable natural cycles that human activity can advance and transform.

However, even for humans these connotations of progress and growth must eventually break down given the limitations of the natural world. Apalech Clan member Tyson Yunkaporta argues that "tangible reality only exists in defiance of linear time" (41). For Yunkaporta, time is made up of endless cycles of regeneration. In his kinship system, "every three generations there is a reset in which your grandparents' parents are classified as your children, an eternal cycle of renewal" (Yunkaporta 38). In such a system, your great-grandchildren will become your own parents, meaning that sustainability and equity toward future generations is a particularly live concern (Yunkaporta 52).

Yunkaporta contrasts this cyclical temporality of renewal to the western linear conception of time, which for him does not connote industrial progress, but instead entropy and breakdown. This is because in linear time, "all things must have a beginning, middle and end" (Yunkaporta 45). To make this point, Yunkaporta takes the city as an emblem of western linear progress, arguing:

A city is a community on the arrow of time, an upward-trending arrow demanding perpetual growth. Growth is the engine of the city—if the increase stops, the city falls. Because of this, the local resources are used up quickly and the lands around the city die. The biota is stripped, then the topsoil goes, then the water. It is no accident that the ruins of the world’s oldest civilisations are mostly in deserts now. It wasn’t desert before that. A city tells itself it is a closed system that must decay in order for time to run straight, while simultaneously demanding eternal growth” (Yunkaporta 50).

Such an example brings the ecological stakes of linear time to the forefront. Temporal conceptualizations which focus on cycles of renewal can better stress sustainability and intergenerational equity; linear projections cannot. Yunkaporta puts it succinctly: “We are the custodians of this reality, and the arrow of time is not an appropriate model for a custodial species to operate from” (51).

Along with the objectivity and universality of time, then, the linearity highlighted in *TVHC* gives reason to pause. As a time socialization story, the book depicts growth as linear progress, a quantified process of consumption with a set destination. It moreover uses human categories as labels for time itself, assuming they universally affect everyone; even caterpillars can be neatly subsumed by their system. In a book which teaches children to keep time, these assumptions carry dangerous environmental stakes.

As Rifkin and Yunkaporta indicate, these temporal presuppositions are not simply given, nor culturally neutral, but involve connotations of industrial progress and colonial dominance typical of modernity. Rifkin goes so far as to argue, “the emergence and recognition of modernity as a specific sort of temporal experience appears intimately connected to the decimation of Native peoples” (8). One must take seriously, then, the unnaturalness of applying a human week to an insect as though such a thing were objective fact, and the connotations which

underly mapping this creature's consumption to a timeline of linear growth. These sorts of temporal claims, shaped by the philosophical commitments of western modernity, are morally and environmentally loaded, not least because of their seeming neutrality.

Nature's Timekeeping: *Tap the Magic Tree*

To contrast the human classifications and linear trajectory of *TVHC*, I now turn to a popular children's book which treats time quite differently: Christie Matheson's *Tap the Magic Tree*. *Tap the Magic Tree* introduces the seasons of the year through another other-than-human being, an apple tree. It moreover does so without once naming the seasons according to human classifications (Spring, Summer, Fall, or Winter). Instead, this story simply shows the effects of this yearly environmental cycle on the apple tree through a series of 17 page-turns. And, unlike *TVHC*'s trajectory of linear progress, the temporality highlighted in *Tap the Magic Tree* is cyclical, beginning and ending with a bare tree in early spring. Indeed, it's final line offers an invitation to full temporal repetition: "Magic! It begins again."

Tap the Magic Tree therefore offers a useful foil to *TVHC* in the toddler book genre. It shows a timekeeping based on natural processes, avoiding the universalization and implied objectivity of classifying time according to human conventions, and circumventing any connotations of linear progress. At first glance, this sort of cyclical temporal structures holds ecological promise, offering a paradigm of balance and stability that might combat the teleological impulses of unsustainable capitalism (Yunkaporta). Nevertheless, I will argue that *Tap the Magic Tree* presents its own temporal complications. Namely, the book suggests that underlying its cyclical processes nature is ultimately stable and balanced, reinforcing a dangerous dualism between nature and culture, and hiding the realities of flux that actually compose the natural world.

Tap the Magic Tree introduces its temporal cycle as something magical. In the first spread, readers are presented a simple tree which (like the artwork in *TVHC*) is shown against a stark white background. Beside it, the text promises “There’s magic in this bare brown tree. Tap it once. Turn the page to see.” When the page is turned, readers see the same tree again, this time with the addition of a single green leaf. The story progresses in this way, inviting readers to tap, rub, jiggle, blow, shake, clap, etc., then (as the cover promises) “turn the page to make a change.” Through this interactive process, the tree grows leaves, blossoms, then apples. The apples fall, and the leaves change colour then fall in turn, until the tree is bare in the snow. Finally, through two page-turns of “Okay. Be patient. . . . ;” “Wait! Don’t go!” spring comes once more, this time with a bird and nest of eggs tucked between tree’s branches.

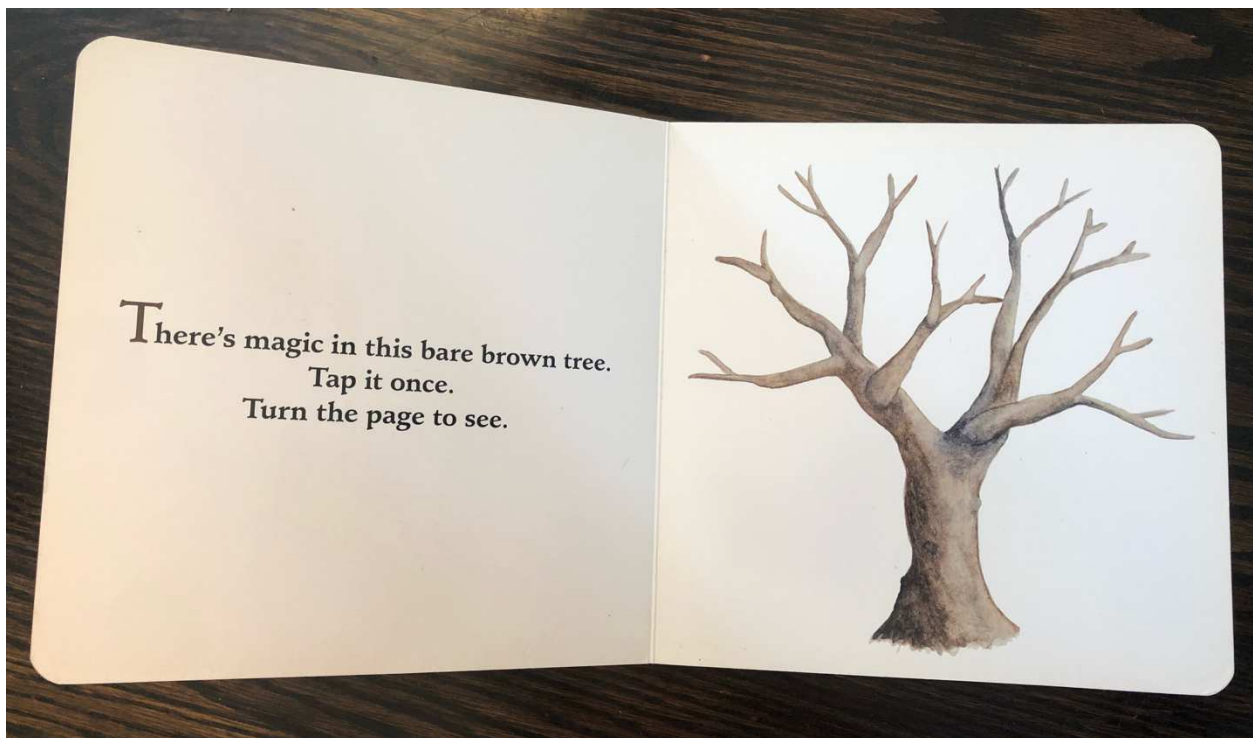


Fig. 2.

Time in *Tap the Magic Tree* is therefore something which happens *to* the tree. The book is not remotely anthropomorphic, and unlike Carle’s caterpillar, Matheson’s tree is not given verbs, personal pronouns, or any agency at all. Indeed, while the tree exhibits the usual features

of time passing—sprouting leaves and fruit in turn—it does not actually grow. The tree on the final pages is completely identical to the tree at the start, the cycle of time entirely stable in its effects. The only difference between the final images and the first is the addition of the bird's nest: the very symbol of reproductive cyclicity which *TVHC* was notably lacking.

Unlike the caterpillar proceeding left-to-right through time, then, the tree stands passive to the cycles of time around and within it. All temporal agency is instead granted to the reader, through tasks and (more obviously) page-turns. The reader is the subject of every address. The tree is caught in a cycle, but it is up to the reader to keep this natural cycle in motion. Such a temporal depiction implies a stability to time and its processes, a stability which can occlude the dangers of climate change we now face. Indeed, it is only by turning from the narrative itself to the role of the reader that *Tap the Magic Tree* can present a conceptualization of time outside of these unhelpful notions of stability.

Cyclical Time

Tap the Magic Tree exhibits all the features usually associated with cyclical time. Typical of natural forces—day and night; the rotation of the stars; the seasons of the year—cyclical time rolls through predictable loops, provoking a series of ecological processes, but leaving the world underlying them ultimately unchanged. This cyclical ideal constitutes what might be called “natural timekeeping,” privileging environmental processes as the markers and units of time's passing rather than abstract numerical categories such as hours and weeks. The ideal of natural, cyclical time is one which children's literature (through a plethora of similar books on nighttime and the seasons) helps both articulate and maintain. In this natural ideal, time is consistent in its rhythms, and stable in its temporal processes; so stable, in fact, that the cycles themselves can be used as an accurate mode of timekeeping.

It is important to note that “cyclical time” in nature does not consider one temporal cycle, but many. Nature exhibits a dizzying plurality of divergent processes of growing, eating, hunting, mating, building, eroding, and dying, all coexisting at multiple scales. As much as children’s literature trends toward the revolving cycles of sunsets or seasons, to speak of “cyclical time” could be to speak of any one of these timescales, or a million more. In Haraway’s words, our current epoch “entangles myriad temporalities and spatialities and myriad intra-active entities-in-assemblages” (101). *Tap the Magic Tree* only offers the temporal cycle of one natural being, and indeed only a portion of it. Rather than an annual loop of seasons, the book could instead have focused on the daily movement of day to night (as does Matheson’s book *Touch the Brightest Star*), or on the tree’s entire life cycle from seed to sapling to subsequent generations (as do other picturebooks like *Little Acorn* (Joyce) or *If You Hold a Seed* (MacKay)). Natural temporal cycles tend to layer in this way, loops within loops, each operating at a different temporal scale. As such, properly attending to the cyclical temporalities of other-than-human beings often means choosing which temporal scale to highlight, and ignoring interference caused by other temporal cycles, assuming each of them, too, will ultimately trend toward stability.

Caught in a seasonal loop, then, the tree in *Tap the Magic Tree* can continue its processes round and round without obvious end, and without lasting impact on the tree itself. This depiction of cyclical time implies a “balance of nature,” the idea that when left alone, nature will tend to sort itself out. When a process comes full circle, everything is set back just as it was, ready to “begin again.” Ecologist John Kricher argues that our modern worldview takes for granted that the natural world trends toward balance (16). Species multiply to the limits of their food supplies, then die down again when food becomes scarce. Water flows from mountains to seas, evaporates, and is carried to the mountains once more. Forests cycle through new to old growth, are eventually laid bare by fire, and new growth begins again. At all sorts of timescales,

ecosystems seem to fluctuate through cycles of growth and decay to eventually maintain equilibrium.

However, while maintaining equilibrium is often true of ecosystems in the short-term, Kricher argues that the “balance of nature” is actually an illusion based on the limitations of human lifetimes. Extend the timeframe of reference long enough, and no species, ecosystem, climate, or biome will remain stable. The earth has proceeded through multiple epochs and extinction events, none of which has left it identical to the world before. Sediment cores from the Andes, for example, reveal that “more or less every given moment in the past 2 million years represents a unique state” (Huebener, *Clocks* 59). Even the sun, Adam reminds us, is not a continuing resource; it too is subject to a cycle of eventual implosion and decay (76). While within the pages of *Tap the Magic Tree* the annual cycle appears stable, then, this stability breaks down when considering the specificity of all the other cycles on which the tree depends. To plot the flowering of an apple tree at the end of Holocene epoch is to invoke a specific array of triggers and forces, temperatures, soil compositions, evolutionary mutations, weather patterns, and geographical habitats, which did not occur in eras past, and will not last indefinitely. Indeed, the very orbit of the earth which dictates the flow of seasons on which *Tap the Magic Tree* relies is an unstable affair when viewed at a long enough timescale. While over a single year the state of an apple tree might appear constant, if viewed in terms of longer temporal cycles—even without complicating factors like human-caused climate change—the same species of apple tree will eventually have no way to survive.

It’s not just lengthy timescales that disrupt the myth of natural stability; the belief that nature is balanced also requires the earth to be a closed system. Temporal stability implies that while disparate parts of our planet might jostle to various rhythms, the matter and energy of the earth as a whole remains constant. Such a presupposition renders elements like air, water, sun,

and soil into “resources,” which the earth will renew and regenerate through its various ongoing processes (Adam 76). It is just such underlying assumptions that can make climate change so difficult to comprehend. Increased carbon dioxide in the atmosphere can only warm the earth if the earth is vulnerable to heat absorption and emission in the first place. If we’ve taken for granted that the earth follows contained cyclical processes, the idea that the planet’s energy as a whole can rise becomes difficult to comprehend.

While it is therefore tempting to see cyclical time as a solution to the dangers of human linear timekeeping, the stability suggested by cyclical time contains misleading presuppositions of its own, which don’t correspond to the realities of the physical world. Kricher writes that “no professional ecologist that I know would now say there is a balance of nature” (83).

Nevertheless, even among conservationists, balance, stability, and the claim that “nature knows best” remain common rallying cries. Believing that nature trends toward balance and stability, this environmental rhetoric suggests that if humans would cease their meddling, we could expect the world to revert to some earlier idyllic state. Despite the realities of five planetary extinction events and counting, many conservationists continue to assume that the earth—like the tree in *Tap the Magic Tree*—is capable of some sort of “frozen moment” (Huebener, *Clocks* 59). Huebener writes that it is as if “just prior to the advent of human interference, ‘the Earth’s species were briefly, and for the first, last and only time, not only where they ought to be, but also where they ought to remain’” (*Clocks* 59). Drawing a firm division between natural cycles and human activity, the implication is that humans alone upset nature’s perfect order, which without us could carry on in relative harmony.

As such, the stability of cyclical temporalities can also reify an unhelpful division between nature and culture. In Kricher’s words, “because culture provides humans with the ability to greatly alter nature, and because such alterations often result in extreme change to

ecosystems, it is understandable that humans view themselves as having disturbed nature's natural balance" (92-93). This attitude takes nature to be something separate from human activity, balanced in and of itself, in which humans then interfere. But the very idea that human activity is "interference" takes for granted that nature has some natural ideal in the first place; in Huebener's words, "we forget that there never was a perfect ecological past" (*Clocks* 3). In reality, if one looks beyond the stable timescales assumed in stories like *Tap the Magic Tree*, the planet has never been truly stable, but carries through grand geological cycles of evolution and extinction, no epoch fully returning to the features of the one before. Our species is unquestionably upsetting the natural orders that came before, rapidly and perilously, but we are not the first species to have done so. We are part of this world. Given our current enmeshment in the natural processes of our planet, it is no longer useful to pretend humans should simply leave things alone, nor that we can return the world to a previous balanced state. In real life, no "magic" can return us to a former state to simply "begin again;" in the real world of changing epochs and open systems, cycles never reset so perfectly.

While *Tap the Magic Tree* appears to present a form of timekeeping grounded in nature, then, the stability the book implies is more a human invention than a true feature of natural processes. While at first glance cyclicity may appear to be a healthier and more natural conceptualization than linear time, cyclical temporalities of the sort featured in *Tap the Magic Tree* can lead to false confidence. One may be tempted to assume that, if properly left alone, nature will sort itself out in the end. It's true that the world would carry on well enough without our species, but not through a return to some idyllic "before." Recognizing that the stability implied by cyclical time is a myth therefore brings us face to face with reality: humans can and have upset the natural conditions that long sustained us, and those conditions will not simply return. Nevertheless, letting go of preconceptions that nature is balanced could also serve as a

sort of reassurance. The natural equilibrium which birthed us was only ever one small snapshot of geological time. There have been other pasts, and will be other futures; indeed, the anthropocentric power to change natural cycles for the worse might also hold the promise of changing them for the better.

Critique of Temporal Stability

To talk of change over time need not be a return to linear time. Rather, I turn to one final Indigenous scholar, who can help us better conceive of cyclical time without the connotations of balance and stability which models like *Tap the Magic Tree* imply. Blackfoot scholar Leroy Little Bear argues in favor of cyclical time. He writes: “Native people think in terms of cyclicity. Time is not a straight line. It is a circle. Every day is not a new day, but the same day repeating itself” (Little Bear, “Aboriginal Rights” 245). As in the arguments above, Little Bear agrees that a cyclical philosophy avoids the unhelpful singular, linear categories and classifications of western time (“Aboriginal Rights” 245). Moreover, Blackfoot temporality can wholly escape the troubles of the named weekdays seen in *TVHC*, since in Blackfoot the repeating day doesn’t have any such names at all: “There is no need to give each day a different name. Only one name is needed: ‘day’” (Little Bear, “Aboriginal Rights” 245). As such, in the Blackfoot worldview the cyclical understanding of temporality focuses more on *process* than on destination. “Repetitive patterns do not lead to goal orientation as they would in a linear view. Rather, they focus on the process. Implicit is the belief that if the process is followed, a product will happen” (Little Bear, “Aboriginal Self-Government” 186). Such a temporal system indeed avoids the pitfalls of universality and progress implied in linear forms of western human timekeeping, but can it also avoid the connotations of stability that, as in *Tap the Magic Tree*, are so often bound up in cyclical ideas of time?

Here, Little Bear offers an important distinction regarding cyclical temporalities: for the Blackfoot, the repeating cycles of time are *not* stable, but in constant flux. He writes:

The idea of all things being in constant motion or flux leads to a holistic and cyclical view of the world. If everything is constantly moving and changing, then one has to look at the whole to begin to see patterns. For instance, the cosmic cycles are in constant motion, but they have regular patterns that result in recurrences such as the seasons of the year, the migration of the animals, renewal ceremonies, songs, and stories. Constant motion, as manifested in cyclical or repetitive patterns, emphasizes process as opposed to product. It results in a concept of time that is dynamic but without motion. Time is part of the constant flux but goes nowhere. Time just is (Little Bear, “Jagged Worldviews” 78).

Little Bear elsewhere connects the Blackfoot idea of constant flux to energy waves in physics, and to animate forces within both human and other-than-human beings. Nothing remains still. He writes, “all of creation consists of energy waves[;] everything is animate[;] everything is imbued with spirit” (Little Bear, “Land”). Time is therefore not something affecting otherwise stable materials, matter itself is energy in motion; like the “magic *in* this bare brown tree,” natural beings do not stand still. In such a paradigm, cyclical processes are not maintaining the stability of nature—just the opposite—they are a consequence of nature’s constant dynamism. In a universe of constant flux, all manifestations, human and other-than-human, are ultimately temporary. “Nothing is certain,” writes Little Bear; “The only certainty is change” (“Preface” xi).

In the Blackfoot cyclical paradigm, then, humans are not what throws nature out of balance. Nature is always already moving. Rather, it is humans who must maintain stability in the midst of flux. Little Bear writes,

If we don’t recreate balanced conditions through ceremonies, and songs, the flux could waver enough to alter our environment and, like the dinosaurs, that would be the end of

the world for us. It's not that the world is going to end, or that the Earth is going to disappear, it's just the conditions for our continued existence are no longer going to be there. So, if we want to continue to survive, then we must renew those energy combinations, those conditions, that make for our existence" (Little Bear, "356000 Ways" 20).

Far from the hands-off approach to a stable nature assumed by simplistic western ideas of cyclicity, the Blackfoot notion of cyclical time *requires* human intervention. Little Bear explains that "ceremonies, the telling and retelling of creation stories, the singing and re-singing of the songs, are all humans' part in the maintenance of creation" ("Jagged Worldviews" 78). It is in this role, responsive to a universe of constant flux, that humans might seek to maintain and renew the natural cycles which have thus far offered the conditions of our existence. This is just the sort of temporal conceptualization which might call us to appropriate action when confronting the shifting realities of a changing climate.

And indeed, it is possible to read *Tap the Magic Tree* in just such a way. Perhaps, through its invitations to tap, rub, and kiss, the book is less highlighting the neutral passage of time than the human role in maintaining stability in the world. The tree itself is bound to change; the magic is within it. It is therefore up to the reader to intervene and lead this dynamic being through cycles which will stabilize rather than harm it. That is, it's up to us to blow and clap into being the external environmental forces which might channel the tree's dynamic changes toward thriving. So long as the cyclical temporality *Tap the Magic Tree* depicts is not simply given—so long as the imperative to interact with the tree is taken up—Matheson is perhaps offering readers a contemplation of the necessary human role in maintaining cycles of renewal during a time of flux and upheaval. The cycles that ground our ecological equilibrium *could* carry on—but only when humans do our part to properly renew them.

Conclusion

When faced with the realities of a changing climate, how one learns to keep time is a pressing concern. This analysis of *TVHC* and *Tap the Magic Tree* has shown that the ecological ramifications of timekeeping are less about whether time is linear or cyclical, and more about the underlying cultural assumptions either mode might imply. There are vast differences between models of time that stress linear objectivity and universalized classifications, and models that stress stability and repetition. Nevertheless, both models—lines or circles—can contain cultural baggage which renders humans ill equipped to meet the present climate moment. Books like *TVHC* and *Tap the Magic Tree*, designed to introduce timekeeping to young children, are caught up in deep cultural histories of what time is and what it is for. Attending to the connotations they draw from and reify can illuminate the sort of presuppositions that have led to our present moment, and what sort of futures we envision. Without dismantling the assumptions about time that underly our timekeeping—be they connotations of uniformity and progress, or of stability—humans will be left at a disadvantage in accounting for the irregular and unpredictable flux of time, and thus ill equipped to meet our current climate crisis.

Chapter 2

Passing Time

Introduction

The previous chapter laid out the environmental troubles of grounding temporality in ideas of objectivity, linear progress, and stability, arguing that both *The Very Hungry Caterpillar* and *Tap the Magic Tree* can propagate these unhelpful assumptions. This critique raises the obvious question: How should one think of time instead? Rather than just critiquing how popular picturebooks engage in “bad” representations of time, in this chapter I want to consider how a picturebook could more accurately represent the real flow of time. To do so, I will return to *TVHC* once more, focusing not just on the narrative text, but on the temporal experience of moving through the book as a material object. Most obviously, I will ask what the physical process of turning pages is saying about the passage of time.

While chapter one focused on *timekeeping*, analysing the underlying assumptions involved in various systems of measuring and recording time, what it failed to account for properly is how time operates as a force in *motion*. As such, using a phenomenological methodology this chapter will attend to how time operates in the moment of flow. Attending to the lived experience of the passage of time aligns with Leroy Little Bear’s call to focus on temporal *processes* rather than pre-set temporal destinations. Moreover, focusing on time’s flow highlights the interactive features of the primary text. Indeed, I will argue that through interacting with *TVHC* as a material object, readers animate time, keeping it properly in motion by correlating the real duration of the reader to the narrative experience of the caterpillar.

To guide this phenomenological work, I follow key theoretical points laid out by Elizabeth Grosz, particularly in her reading of Henri Bergson and Charles Darwin. Grosz has spent the recent decades of her career studying temporality. Her work offers a solid

phenomenological account of the lived experience of the passage of time, an account which moreover makes room for the profound environmental stakes of temporality. Following Grosz's lead, this chapter will argue that an interactive reading of *TVHC* exhibits key elements of duration and of becoming, elements which will prove vital for conceptualizing temporality during a time of climate crisis. Specifically, readers are invited to join the caterpillar in sensory-motor reactions, delay, and a perseverance of the past analogous to "the virtual," all of which are central to Bergson's understanding of lived duration. The book moreover suggests an enactment of possibility and "the new" which corresponds to Darwin's criteria of becoming. Like in *Tap the Magic Tree*, then, it is the role of the reader in guiding *TVHC* through time which offers the text's most useful environmental messaging. Therefore, while the linear narrative of *TVHC* is linked to unhelpful temporal ideas of universal objectivity and progress, when the book is taken up in play it demonstrates a more accurate temporal framework, a framework which moreover has useful potentialities for climate action.

As such, this chapter begins with a phenomenological account of the picturebook format. It then turns to *TVHC*, this time following Grosz and Bergson, using the text to outline a realistic framework of how time passes in lived experience. Finally, it considers how *TVHC* displays elements of Darwin's criteria of becoming and "the new." Taken altogether, this analysis will show that when *TVHC* is examined as an extension of the lived duration of the reader, the book can provide a realistic depiction of time's flow, and moreover suggest the sort of processes this temporal framework invites for environmental intervention.

Picturebook Phenomenology

To consider *TVHC* fully requires taking the book as a material object in which readers enact, and experience, the passage of time. The narrative of *TVHC* unfolds through the turning of

pages, through which the time of the reader (the minutes in which the book is held and read) intersects in complex ways with the narrative time (several weeks) experienced by the caterpillar. Through its presentation of lengthening days in discrete slices, layout of left and right panels, punctured holes, repeated forms, etc., *TVHC* is offering its reader a specific temporal experience to be interacted with in real time with real hands.

A phenomenological account of picturebook reading must therefore attend to the ways in which interaction with a book is embodied. Eyes, fingers, and (when read aloud) mouths and ears, are all at work in the reading process. Indeed, reading any material book involves an embodied sensory encounter. We are all aware of the added information we receive about the narrative progression of a novel as the stack of pages on the left side grows thicker, and the stack on the right diminishes. Material preferences also play a role in the reading experience: a book's weight and paper texture; the distraction of small fonts or a crowded layout; the stubbornness of a spine that won't lay flat. The position of the rest of the body at desk, chair, or bed, is also a factor, as readers shift, stretch, pass the book from hand to hand, angle the pages for better light, etc. The physical process of reading, while often immersive, is bound up in all sorts of bodily habits and interruptions that affect one's experience of any material book. Such embodied interactions are especially notable when considering books with novelty features such as flaps, textures, peek-throughs, scents, etc. (Mangen and Schilhab). While there is an increasing amount of research on how bodies engage with interactive digital texts (e.g., MacKey; Kokkola; Furenes et al.; Munzer et al.; Christ et al.), when it comes to interactive material books this remains an often-neglected area of study.

Through engaging with a book's material structure, readers are invited to "animate" the text (Higonnet). This animation is especially true of books designed for babies and toddlers. Perry Nodelman stresses the uniqueness of books in an infant's world: "This particular object,

unlike all the others that adults willingly place in babies' hands, is not a toy and not food" (*Words* 22). Moreover, books have a specific angle, an up and a down, a direction, and a progression, all of which must be learned (Nodelman, *Words* 22). Unlike most adult books, baby books are constructed of hard cardboard to make the pages sturdy and turnable, and of course to withstand at least a little bit of chewing; like the caterpillar's foods, for its youngest audiences the book itself may be taken as a thing to be consumed. All of these material conditions mediate an encounter with *TVHC*.

Turning pages is the most obvious act through which readers animate a material text. Unlike in novels where the text is usually meant to flow uninterrupted from page to page, in picturebooks page breaks are very carefully placed; Lawrence R. Sipe writes: "there is not only a pause as we turn the page; there is likely to be a gap or indeterminacy in the narrative" ("The Art of the Picturebook" 243). These indeterminacies are invitations to fill the meaning and guess the next narrative step. The deliberate pause in the narrative when turning pages gives a distinct rhythm to the picturebook medium. The pause of turning pages is further extended as the reader's eyes move from text to illustration. Nodelman argues that in picturebooks the illustrations act as a sort of punctuation—the text moves us forward, but the illustrations hold us back (*Words* 261). What we are left with, then, is a series of stops and starts. Our eyes move from left to right across the text, then from text to image. Our hand moves to the right-hand edge, turns the page, and the process begins again.

Along with the process of moving eyes and turning pages, readers also animate picturebooks through acts of imagination implicit in the very nature of illustration. Nodelman explains: "Since pictures are unlike life in that they stop time, we can relate them back to life by guessing about what must come before and after what we actually see. . . [I]n imagining the inevitable follow-through of what we actually see, we ourselves create the motion" (*Words* 112).

Taken altogether this layout of still images, unfolding through page turns, and set into motion in imagination while prompted by the running text, makes up the basic phenomenon of picturebook reading. Attending carefully to the phenomenology of reading an interactive text like *TVHC* can therefore reveal the way that it is carrying its readers through time, and suggest what the environmental implications of such a temporality may be.

The Spatialization of Time in *The Very Hungry Caterpillar*

Time Reduced to Space

One challenge of accurately understanding the flow of time, is that our usual conceptualizations reduce time to the logic of space. Systems of time measurement showcase this trouble—clocks, calendars, timelines, etc.—mapping out temporal flow in circles, lines, and grids. But these spatialized depictions are simply a representation, and according to Bergson a misleading one. Todd May explains:

We are familiar with the standard view of time. It is a line, infinitely divisible and infinitely extended. Time is divisible into epochs, years, months, days, hours, and seconds. Those seconds are divisible, and what those seconds are divisible into are themselves divisible. The division can proceed without end, instants within instants (*Gilles* 41).

This spatialized conception thinks of distinct points of time, as on a timeline, never overlapping. One “now” is replaced by the next, like the ticking of a clock. This usual conception moreover views time, like space, as a container: “Things happen *in* time. Time is exterior to those things that happen; it marks them, each with its own moment, but is not absorbed by them” (May, *Gilles* 42). In such a view, time is frozen. It can be sliced into specific moments, each containing various things, but while a spatialized depiction of time can represent a series or sequence of

separate happenings, it cannot properly encapsulate the *movement* of one moment to the next. A movement, moreover, which (unlike in Newtonian mathematics) is irreversible in direction—something far removed from the logic of one’s movement through space (Guerlac, *Thinking in Time* 78-79).

Already, then, Bergson’s account of time presents a challenge for the picturebook. As a spatial medium, the picturebook freezes and slices narratives into key segments. While the reading process might maintain the flow of words, the images always highlight a pause, an action stopped mid-motion (Nodelman, *Words* 159). This pause is further augmented by the page-turns, which are deliberately spaced to stop the reader, and conceal the future until the present text is finished and a moment complete, so the reader can then turn to the next frozen moment. In this, the picturebook functions less like a novel than a comic book; as comic theorist Scott McCloud explains, “In learning to read comics we all learned to perceive time spatially, for in the world of comics, time and space are one and the same” (100). A comic panel may display a split second or a span of hours—indeed the shape, size, and structure of the panel can be used to suggest how much time the panel is meant to encompass—but even if objects are represented in motion, or action lines are added, the medium can only give a series of frozen slices of time (McCloud 101, 112; Nodelman, *Words* 159). If all picturebook illustrations slice time into frozen moments, how much more so a book which does so in the explicit process of time measurement? Monday is an apple, all at once. Temporality has been spatialized.

For Bergson, then, the first problem of the conventional understanding of time is more basic than whether time is considered a line or a circle: it’s that time is being spatialized at all (Guerlac, *Thinking in Time* 1-2). Indeed, spatial representations remove from time the very quality that makes temporality temporal: that it *cannot* be frozen, that it is always in flow. In real time, moments are not separated and infinitely divisible, but fused together, the past melting into the

present (“Bergson and Time”). Bergson argues that this very quality of flow that makes time *time* is mischaracterized by our usual time measurements and representations, as a simple consequence of their spatiality. As spatial objects, picturebooks are always therefore at a disadvantage in representing time not as a series of frozen moments, but in actual flow.

Quantity and Quality

A key reason that we tend to represent time spatially is in order to make it *calculable*. Like the series of weekdays in *TVHC*, normal modes of timekeeping seek to lay out subsequent units of time side-by-side in order to represent and quantify their relations to one another. Grosz explains:

It is nonetheless very rare in the history of Western philosophy that time, duration, is conceived outside the constraints of a mathematization of space. Indeed, since Einstein, time is conceived as *the* mode for the mathematization of space (Grosz, “Thinking the New” 47).

In terms of everyday understanding, while Einstein showed that time is relative (and in that sense subjective), his theories foundationally treated time as calculable (and in that sense objective).

The pace of time may alter based on speed and gravity, but time can be formulated and quantified; indeed, it *must* be when decoding the laws of physics. But in Bergson’s view, all such calculation presupposes time is something *quantifiable*, like interchangeable units laid out in space. What if this very presupposition is not the case? Suzanne Guerlac explains: “counting requires juxtaposition, juxtaposition implies simultaneity, and simultaneity presupposes space” (*Thinking in Time* 61-62). Bergson’s argument is that whenever time is calculated, compared, divided—whenever it is *quantified*—it is being misunderstood as a series of interchangeable units, which is a quite different thing from how time actually operates, in irreversible flow. After

all, Grosz reminds us, “[Time] is the only resource we cannot protract, save up, share, or divide” (*Time Travels* 3-4). What would it mean to think of time by a different logic, as something which cannot be quantified into numerical units at all?

In order to think of time differently than space, Bergson highlights a distinction between quantitative and qualitative differences. He argues that while we may use the same words to describe repeated happenings at different moments, “in actuality, nothing ever occurs in exactly the same way twice” (Guerlac, *Thinking in Time* 2). No day, no act, is identical to that which came before, able to be quantified and interchangeably calculated. Even repeated acts are never identical, simply by virtue of being repeated. What we are used to thinking of as a difference in *quantity*—three sips from the same coffee—are actually differences in *quality*—a third sip is different from a first if for no other reason that it is no longer new, and has therefore changed in feeling, giving a different quality of experience. Such qualities moreover blend and flow, grow and decrease in varieties of sensations, not as frozen slices, but melting together indivisibly (Guerlac, *Thinking in Time* 49). Bergson argues that this change in quality is a feature of temporality that cannot be collapsed into a mere difference of quantity. Time is therefore not a numerical sequence, moment one followed by moment two, but a world of changes in quality, unstoppable and unfolding.

Therefore, what we experience in time is *change*. Not sequence, a calculable series of equivalent happenings, but the movement between differences in quality, never identically repeated. This movement of change cannot be counted without freezing it, treating unique and flowing variations of quality as equivalent units to abstractly quantify (Deleuze, *Bergsonisms* 41). When units of time are quantified in this way, whatever is being counted is no longer truly functioning as time.

What of *TVHC*? While the text of the centerfold indicates quantity—a series of days with increasing individual fruits all mapped repetitively through time (indeed, as advertised, “great for teaching counting” (Indigo))—there are nevertheless complications. Most obviously, the days are not interchangeable units: the pages grow. Monday’s page is 1/5 the size of Friday’s. Various in size, a true attempt to quantify the weekdays would therefore require a more complex mathematics than simply counting one through five. Might this indicate that for the caterpillar the week is not progressing as a uniform series of units, but each day holds a different and unique quality than the one before? While subtle, this complication to the uniform sequencing of units of time begins to gesture toward a lived experience of duration.

Time as Duration

In order for a text like *TVHC* to accurately represent the real movement of time, it will have to immerse its otherwise frozen moments into continual flow. For Bergson time is not a series of discrete units—dots on a timeline—but requires what he calls “duration.” Duration is the flow of one moment into the next: the movement *between* moments, which necessarily differ in quality and cannot be neatly separated from one another. Philosopher Emily Thomas explains:

Any present moment we experience is not some instantaneous fraction of a second, it’s a moment that actually has duration. And that’s how for example when we see a traffic light change from red to green, that’s how we see the change. Because any one moment of our perception takes a little bit of time (“Bergson and Time”).

Through duration, Bergson seeks to describe the real flow of time, the “happening of what happens,” a movement “in terms of qualitative change, not as change that we measure after the fact and map onto space” (Guerlac, *Thinking in Time* 1).

It is therefore a mistake to think of the present as a fraction of an instant, measurable by the tick of a clock or a dot on a timeline. Such a present would be frozen and empty. Rather, the present must be understood in terms of duration, protraction, and the past melting into the present with movement and flow (Connolly, *Pluralism* 100). While retrospectively one might seek to divide and innumerate such moments to plot them on a calendar or grid, such an exercise is always a later abstraction. In the moment, as it is lived, the past is carrying into the present, situating all of us in flow.

While a picturebook such as *TVHC* is at a disadvantage in indicating real duration, as its material format is necessarily spatial, it nevertheless invites an idea of duration in its layout. There is a penetrable hole connecting each day to the next, which suggests the possibility of duration: the past emerging into the present. It is through these holes readers are to imagine the caterpillar proceeding from one day to the next. These puncture marks introduce an idea of flow to what are otherwise discrete slices of sequential presents. Readers don't simply turn a page and see the caterpillar in a new temporal moment, already present. Rather, the book shows the caterpillar mid-motion, emerging not just from an item of food but from a physical hole linking him to the page before. In this way, the book is indicating duration, the active flow of the past into the present. Here, we can also begin to see how *TVHC* problematizes neat spatialized notions of time through inviting a certain sort of reader interaction.

The Enactment of Time in *The Very Hungry Caterpillar*

To repurpose a quote from David Deamer (discussing film), a picturebook contains multiple durations: “It somehow captures up the time in which it was made, the time or times it describes, the time in which it is [read and reread], and the times in which it appears in thought” (*Deleuze's Cinema Books* 12). *TVHC* somehow captures the durations of Eric Carle in his studio,

of the caterpillar's ravenous week, of the parent reading and rereading, and of the toddler recollecting. Such durations come into alignment and misalignment: a narrative instant frozen throughout minutes of reading; a narrative week contracted into a few seconds of page turns. It is my argument that the interactive features of *TVHC* allow for a Bergsonian conceptualization of duration by correlating the real duration of the reader to the narrative experience of the caterpillar. Specifically, readers are invited to join the caterpillar in sensory-motor reactions, delay, and a perseverance of the past analogous to "the virtual," all of which are central to Bergson's understanding of lived duration. Attending to these characteristics of how time moves will allow for a more realistic temporal conceptualization than when the text is only considered at the level of linear narrative.

Motor Memory vs. Recollection

Time shows up in the body. The past endures psychologically in memory, but it affects bodies more immediately by conditioning sensory motor memory. Through habitual and automatic reactions, the past has direct bearing on the present. It is the past which teaches hands to swat away flies, eyes to blink in the wind, and feet to brace on the ice. Past experience separates the body that could have been from the body that is. Sensory motor memory is therefore a causal chain, where specific past experiences are carried forward and re-enacted in the present and into the future.

When reading *TVHC*, sensory motor memory is in play for the reader and the caterpillar both. Most obviously, the sequentially eating caterpillar and the habitually turned pages mirror each other as motor memory activities. Just as the caterpillar has learned to nibble identical holes day by day, the reader is turning the book's pages automatically, a learned activity of past experience habitually repeated into the present. The book highlights the way that these activities

represent an enduring mark erupting from the past; the holes of yesterday's meals layer beneath one another, as page by page the reader's motions stack. The repetitive nature of the act therefore remains constantly visible, as each day's punctures open onto those of the day before, creating a single, tunnelling form reaching back to its first iteration.

Moreover, readers literally see a past caterpillar endure through subsequent days. The centerfold presents not one caterpillar, but two: a left-hand being who "started to look for some food," and a tiny creature emerging from one fruit after another, both of which are visible simultaneously across the pages.



Fig. 3.

It takes the passage of three types of fruit before that first caterpillar is no longer present on the left-hand page; five fruits and an entry into the overindulgence of Saturday before his initial frame of reference—newly awakened and ravenous—is covered completely. As such, the hungry self in search of food remains in the reader's periphery for days until the caterpillar's appetite is finally quenched. Here one can easily imagine Bergson's "self which endures" lying within that self which perceives (Conolly, *Pluralism* 101). The motor memory of puncturing one fruit after

another is emanating automatically from a previous state of hunger which remains in some way present, even while within the narrative timeline that former-caterpillar-self recedes into the past.

Delay

Along with joining the caterpillar in sensory motor acts—past experiences lingering to inform the habitual movement of bodies in the present—readers also join the caterpillar in the interruption of such automatic processes: the experience of delay. For Bergson, delay is the human intervention in the continuous flow of duration. Delay is where consciousness interrupts and leaves a mark on time's flow. In Grosz's words, the brain "inserts a gap" between "stimulus and response;" "between perception and action" (*Time Travels* 99). It is this delay and interruption to the causal flow that makes possible "a genuine freedom from predictability," and opens a future of interminable possibilities (Grosz, *Time Travels* 99).

Picturebooks, including *TVHC*, work masterfully to highlight the importance of delay. Here one might be reminded of Barbara Bader's description of "the drama of the turning page" (1). Unlike in novels, where within a chapter the pages flow seamlessly one into the next with page breaks occurring randomly within paragraphs, sentences, or even mid-word, in picturebooks every page turn is carefully considered. Although authors and illustrators are highly conscious of the importance of page breaks in picturebooks, their addition to a book's narrative can be too easily ignored in literary review (Sipe and Brightman 74). This is a mistake, as page-turns do not simply cause a temporal pause in the reading process, but are often designed to provide a gap of indeterminacy in the narrative itself (Iser; Sipe 243).

The picturebook rhythm of forward then stop, forward then stop (Nodelman, *Words* 261), functions to pause the automatic flow of determinism with the possibility of genuine surprise. As much as page-turns can be automatic, when paired with illustrations they also serve as an

invitation to pause. At the conclusion of each page, as hands and caterpillars alike begin to reach for a new leaf, both can feel a subtle interruption to flow. The pictures call readers to stop and observe. Social contact may erupt between readers (the parent asking the child “what do you think happens next?”). In novelty books such as *TVHC*, the page-turn delay is further augmented by interactive elements, interrupting the straightforward march of narrative. There is a gap of indeterminacy, where hands could instead point to different edges, and a caterpillar could seek out ice-cream in the place of fruit. For Bergson, freewill and consciousness erupt in this delay between perception and reaction, and in *TVHC*, like all picturebooks, the indeterminable surprise of narrative delay is evident in the pause to turn each page.

That is to say: the forward-stop progression of the picturebook rhythm could be viewed less as an unnatural aberration to the smooth flow of time, and could rather highlight an aspect of lived temporal experience that’s less apparent in other narrative mediums (such as novels or film). Delay is an integral aspect of conscious temporal experience. We transition in and out of flow. Merleau-Ponty, summarizing Bergson, explains it by saying: “to be a mind is to stand above time’s flow, [and] to have a body is to have a present” (qtd. in Grosz, *Time Travels* 123). Delay catches the mind out of the motor reactions of the body. While the future can be guessed at during such a pause (strawberries and oranges peeking through from beyond), delay offers the potential of conscious deviation and genuine surprise. Such delay is what gives the turning page its drama, and what opens the future to true possibility.

Qualitative Difference

Another element central to Bergson’s conception of duration is the distinction between quality and quantity, which configures time as ongoing rather than a series of discrete moments. As noted above, for Bergson time cannot be reduced to quantifiable units interchangeable across

space. Instead, he argues that duration is experienced as the flow between intensities of *quality*, rather than a quantifiable series of separate moments. Counting days or moments seeks to divide and quantify them as equivalent units, but phenomenologically any such effort to split and compare temporal experiences will always be a misleading abstraction. Every experience is singular, attached to the unique moment in which it occurs (Gurlac, *Thinking in Time* 90). Even repeated acts are never true repetitions, as the very fact that they have been felt before changes the subsequent experience. As Gurlac puts it: “One never experiences the same sensation twice. All sensations are modified through repetition for the very fact of recurrence alters the nature of the sensation” (*Thinking in Time* 73). To most effectively engage in the flow of time, then, each moment should be approached as singular and shifting, rather than part of an interchangeable sequence of repetitions. Repeated acts are never identical since they occur at different times.

Here, too, *TVHC* offers food for thought. On Thursday the caterpillar may eat four strawberries, but they are not the same strawberry. There is no digital duplication of the caterpillar’s experience; each individual fruit is distinct in its stem, leaves, angle, placement of seeds, and inflections of color. While the text quantifies the fruits (“On Tuesday he ate through two pears”), the artwork shows that for the caterpillar no moment is completely identical to the previous one. The caterpillar is moving through shifts in quality. For all the uniformity and sequentiality of his hungry week, each fruit is distinct, an item all its own.

Altogether, then, it is no wonder that spatial representations of time distort the lived experience of temporal existence. A spatial timeline fails to signify sensory motor flow or interruptions of delay, and cannot indicate shifts of qualitative difference. Spatial timelines are moreover retrospective. In reality, time does not follow a single course, but splits and divides itself through processes of decision and unfolding. To reduce time to a single line of progression therefore cannot represent the flow of time as we experience it passing, but only symbolize time

that has already passed (Guerlac, *Thinking in Time* 85). Guerlac writes: “After the fact, we can reconstruct an event as if it involved a fork in the road; while the event is happening, there is no road and no fork” (*Thinking in Time* 85).

While *TVHC* is a spatial object, through an interactive reading process it nevertheless problematizes a simplistic, linear representation of temporality. The routine similarity of punctured bites and turned pages immerse readers in sensory motor flow. The pause of the page-turn and the pull of colorful imagery and interactive features moreover introduce a process of delay which is characteristic of the experience of consciousness in duration. Furthermore, distinctions between otherwise quantifiable units remind that temporal experience is one of qualitative shifts. By immersing readers into these elements of temporal flow, the material book is complicating the story’s otherwise linear, simplistic narrative. To join the caterpillar’s journey through a week, readers are invited into elements of lived duration.

The Virtual

There is one last key component of Bergson’s intervention to temporal phenomenology: “the virtual.” Here, Bergson takes up the challenging question: what is the past? How should readers think of those pages, already turned, that precondition the present spread of a picturebook narrative? For Bergson, “the virtual” describes those temporalities that are not currently present. Bergson’s argument is that the past has not simply ceased to be; moreover, it is not enough to say that the past only exists in memory. Rather, Bergson argues that the past is *real* inasmuch as it perseveres in the material conditions of possibility for the present. The past determines not just psychological recollections, but the makeup of the physical universe. It is the reality of the past that limits and provokes the unfolding of the present toward the future.

Grosz explains that the split of time is therefore not a threefold division of past, present, and future, but instead two trajectories: what is happening and what has happened. She writes:

To stretch itself so that it can be conceived in terms of a continuity between past, present, and future, time is not divisible into three orders, but only into two. Time splits into two trajectories, one virtual, the other actual, one which makes the present pass, and the other which preserves it as past. One forms perception, the other memory; one opens onto anticipation and the unknowable future, the other onto reminiscence and the past (Grosz, *Time Travels* 3).

We have trouble conceptualizing the past because we tend to think of it as simply gone. By contrast, “the virtual” allows us to describe that different state into which the present flows as it becomes past. Hence Grosz’s claim that “the virtual” and “the actual” are the two main modes in which we should think about time. “The actual” is now, while “the virtual” is comprised of all those temporal moments which we are not presently experiencing. This conceptualization allows us to continue to speak of the past, the virtual, as *real*, even though it is not currently present. In Deleuze’s words, “we believe that the past is no longer, that it has ceased to be. We have thus confused Being with being-present” (*Bergsonisms* 55). This is a misconception. The past has ceased to *be active*, but it has not ceased to *be*. Its influence continues to exert itself in the manners listed above. This influence is altogether real, and ongoing.

If the past did not exist there could be no duration or flow to time. May writes, “the virtual past is there; it is not nothing. It is not the past of the linear conception of time. It is not an instant, or a thing. But it is there, in a different way from the way the present is there” (May, *Gilles* 47-48). A linear conception of time wrongly sees the past as something that once existed, but exists no longer, except perhaps as memory; “For the linear conception, there is only Now” (May 45-47). Bergson’s intervention is to argue that if the present passes, “there must *be* a past

for the present to pass into” (May 45-47). If the past does not exist, then the present could not flow; there could be no duration, no lived experience of the passage of time. Therefore, the past must exist, albeit in a different way from the way in which the present exists.

It is this very real state of being which Bergson calls “the virtual.” It is not the actual—that element of time which is actively unfolding—but it is also not nonexistent. Rather, the virtual can be conceived as a sort of reservoir: “the virtual acts as ‘a reservoir of potential’ for the creation of change” (Jaarsma 22). Just like the items in the next room remain real while I am not spatially present to perceive them, the happenings of the past remain real while I am not temporally present to perceive them. The reality of the past moreover remains accessible to me through memory, either through conscious recollection, or through the sensory motor habits discussed above. In these ways, the virtual past continues its influence upon the present world.

While memories can access the past, they are not the past, as the past is more than just a psychological artifact. Time is not spatial, and the past is not located inside of brains (Guerlac, *Thinking in Time* 148). Rather, just like our bodies can perceive the present by turning our senses toward our surroundings, our memories can perceive the past by turning our mind toward the virtual. Grosz writes: “Perception takes us outside ourselves, to where objects are (in space); memory takes us to where the past is (in duration)” (*Time Travels* 103). Certainly, memory is prone to misperception (as are all the senses). But memory is not mere imagination, as it is directed toward something altogether real, although no longer present. We are not simply turning inward during recollection, but turning toward a very real, if virtual, past, which exists independent of any single individual’s recollection.

Bergson’s analysis means we don’t have to reduce the past to a thing in our present minds. The past *exists*, albeit virtually, and erupts into the present. Such a fully real and existing past will be fuller than the no-longer-existent, psychologically contained past usually associated

with the linear conception of time. Timelines, of course, limit ideas of the past to those causal chains of events which actually happened (became present). A virtual past carries no such limitations. The virtual refers to the true fullness of the past, with all its unactualized potentialities.

This shift in understanding the past is more drastic than reducing the virtual to “the possible.” Grosz warns that to think in such a way is too easily retrospective, beginning with the present moment and tracing backward to account for the conditions which led to it. Grosz writes:

It is not a question of dumping the word “possible” and replacing it with “virtual,” but of understanding the concept in an entirely different way, understanding the processes of production and creation in terms of an openness to the new instead of a preformism of the expected (“Thinking the New” 53).

To speak of the virtual is therefore not to retrospectively consider alternative preconditions of the present state (Mader 22). To do so takes things entirely out of order: it considers the present first and then reads backward into the past to account for it. Instead of linear possibilities, Bergson is asking us to consider the virtual as excessive, referring to the entire reservoir of the past which exists regardless of the present state (Jaarsma 21). In this way, Bergson allows us to think of not just the future as open-ended and excessive, but the past, too, as containing the stuff of manifold unactualized potentialities. This vast past which we turn toward in recollection, which prompts us in sensory motor acts, and which provides the raw material conditions of the present, is an over-abundant reality already bursting with potentialities yet to be imagined.

Returning to the picturebook, then, Bergson’s temporality refuses any myth that the past ceases to have bearing once the page has been turned. While a page may no longer be open before us, it is still very real, tucked away beneath those left-hand leaves, laying the foundation for the page before us now. Even without paging backward to uncover it, readers can turn their

memory toward it: recollect the conditions it offered, and trace how they led to the present moment, where they may have led instead, and how they continue to precondition what might happen next.

TVHC drives this point home as past pages are not wholly invisible once they are turned. Through the holes, the past continues to open onto the present. As in Bergson and Deleuze, the past is enduring, existing, and affecting the present; it is not a psychological artifact, it *is*. The caterpillar's punctures offer a glimpse of those former moments. Where I see the smiling caterpillar emerge from strawberry, pear, or plum, his tail is hidden down a tunnel of former fruits, the edges of what I know to be former pages. While those past pages are no longer fully present, readers are nevertheless unable to ignore that they exist and are real. The caterpillar's past is not safely tucked away, but is penetrating into the present moment, and he emerges in his present act of eating only out of the reservoir of potentialities, memories, and motor habits which came before.

This dynamic of the past asserting itself into the present is most vivid when the puncture holes are taken up in play. Margaret Higonnet writes: "When the child puts a little finger through the hole, we 'see' the caterpillar coming through the fruit. . . . With hole and finger, the listening child duplicates the story as it is told, translating from words to pantomime" (48). Through real-time interaction with the material book, the reader is invited to mirror the character's experience. As fingers and caterpillars push through one day into the next, the past is not laid aside in a neat sequence of slices lived in turn; rather, the past interrupts the present moment, materializing right through its centre. Moreover, such an act can only occur when a page is mid-turn, held perpendicular to the others. That is to say, it occurs in the moment of flow. In such a moment, as the present passes, the past is invited to erupt and come to bear on the flow of time.

All of the ways in which duration is experienced through picturebook reading—sensory motor memory, delay and conscious intervention, qualitative shifts, and memory turned toward the past through recollection—emerge out of such engagements with the virtual. May writes:

It is in this engagement that the actualization of the virtual occurs. A person, through action or memory or perception, brings the past to bear upon the present moment. An action may bring previous learning to bear in the discovery of a solution to a puzzle; a memory may recall, within the present context, a past moment that one is reminded of; a perception sees what is in front of one within the horizon of the past that one has lived through and the legacy of one's history. In all these cases, the past and present are mingled: the past unfolding, the present creating and inventing (May, *Gilles* 52).

For Bergson and Grosz, there can be no present that does not actualize the past in this way. For Carle's readers, embodying the caterpillar's progression through fruits and days is a vivid enactment of the material habits and conditions of the past opening into now.

While "now" can perhaps be illustrated as a frozen instant, the *passage* of time requires engagement, a phenomenological interaction which sets oneself into flow. The interactive features of *TVHC* invite just such engagement. Aspects of the lived duration of the reader come to bear on the story as in various ways the reader's experience comes into sync with the journey of the caterpillar. Of course, in a sense all books do this. Reading takes time, and so a reader's progression through any narrative will in some manner correlate with the temporal experience of characters, settings, or the flow of language therein. Still, *TVHC*'s unique interactive features, especially in a story about timekeeping, offer something special. Reader interaction allows the story to transcend its objective linear narrative and frozen illustrations. As readers bring their "now" to the narrative of the caterpillar, they set a static, frozen time into flow. While the reader's movement through pages remains more rapid than the caterpillar's movement through

days, both reader and character are invited to experience specific elements of duration that transcend a simple linear progression, and highlight the complex, lived experience of the passage of time.

Far from imagining time in terms of linear progress or stable cycles, then, this phenomenological reading of *TVHC* offers a more realistic depiction of the passage of time. Hopes for environmental action will need to fit these temporal realities. The flow of time cannot be stopped or reversed; a realistic ecological engagement will necessarily have to interact with time as it is already in flow. It will have to accept that timing—the moment in which an action occurs—is not interchangeable; just as no two fruits are alike, the continual movement of time means there is no such thing as true repetition. A realistic environmental engagement should moreover account for the existence of the past as it comes to bear on the present. This includes attending to the realities of motor memory—those page turns and tunnels which persevere into the future—and watching for the moments of delay in the flow of cause and effect which make intervention possible. Moreover, such an environmentalism might include looking to the past, not by reading backward from our present timeline, but by working to consider the fuller reservoir of potentialities which history has left entirely unrealized. With these temporal realities forming the preconditions of human intervention, the final section of this chapter will consider the environmental processes by which true change might come into being.

Darwin and Becoming

Bergson's explanations of duration and the virtual can help reconceptualize how the present and the past are being enacted in a reading of *TVHC*, but what of the future? How can one best conceptualize those right-hand-pages yet to be uncovered? While Grosz uses Bergson to ground her phenomenology of the past and present, when it comes to the future, she suggests

supplementing Bergson with a reading of Darwin—a fitting theoretical source in a story of caterpillar mutation and transformation. Moreover, like Bergson’s “virtual,” what Darwin offers is a futurity of excess.

Unstable Futures

Among the many problems of spatial timelines is that they are necessarily retrospective. After the fact timelines can chart a causal chain of historic events, but there is no way to reduce the branching possibilities of the future into a single course. Evolution, when plotted on a timeline, is no exception. Deleuze writes, “The mistake of evolutionism is, thus, to conceive of vital variations as so many actual determinations that should then combine on a single line” (Deleuze, *Bergsonisms* 99). Looking backward, we can trace a lineage from homo sapiens back to common ancestors of apes, primates, and four-legged mammals. Such a process might tempt toward determinism: it could seem that, given time, the primate was *destined* to become what we now are. But this sort of logic is just a trick, an impulse from our habituation in causal, mechanistic thinking. Given the complexity of conditions of the past there are a manifold number of courses biological history may have taken, just as the evolutionary future of our species remains fully open to chance and change. The evolutionary processes of variation and chance guarantee a massive diversity of lines of causality, all of which can only be charted after the fact.

This undeterminable future stands in stark contrast to the Newtonian, mechanistic view of the universe discussed in my introduction. Newtonian physics treated the cosmos as a closed system governed by universal laws. Such a system was regular and predictable. Its laws were such that hypothetically, a superhuman intelligence able to account for the precise material makeup of the cosmos could anticipate what would happen next (Deleuze, *Bergsonism* 104-105).

In contrast, Darwin introduced an open-ended worldview, “with no real direction, no promise of any particular result, no guarantee of progress or improvement, but with every indication of inherent proliferation and transformation” (Grosz, *Time Travels* 26). Far from any God’s-eye-view timeline of history, the future remains fully open, and impossible to predict.

Evolutionary processes are things of manifold possibilities; nevertheless, these possibilities are not infinite. They are limited by the material conditions of the past and present. History is not a single clear course, but neither is it unmoored from temporal realities. The principles of hereditary lineages, the workings of genes, and the conditions necessary for survival and reproduction, carrel future possibilities. Through chance and variation past conditions unfold in entirely unpredictable ways, but these future unfoldings are still causally grounded in the reservoir of potentialities enclosed in the very real past and present. It is this middle ground between causal realities and undeterminable possibilities that Grosz finds so valuable in evolutionary theory. She writes:

[Darwin] has provided and will continue to provide something of a bridge between the emphasis on determinism that is so powerful in classical science and the place of indetermination that has been so central to the contemporary, postmodern, forms of the humanities. Evolution is neither free and unconstrained, nor determined and predictable in advance. It is neither commensurate with the temporality of physics and the mathematical sciences, nor is it unlimited in potential and completely free to develop in any direction (Grosz, *Time Travels* 32).

What Darwin offers, then, is a future which blends causality and unpredictability; a future—like the past—which is virtual and brimming with excessive (but not unconstrained) possibilities. This depiction of the future is not only more accurate than goal-oriented dreams of progress, or hopes of cyclical stability. It also—like Little Bear advocates—places emphasis on *process*

rather than destination. What Darwin offers, then, is a temporal framework which grounds processes of genuine change.

Processes of Divergence

For Darwin, the virtual future is actualized through processes of divergence and limitation. Of the many virtual and latent possibilities of the past, the present actualizes only some (Grosz, *Time Travels* 29-30). Time therefore functions not as a linear progression but a process of *limitation*, “the culling of other possibilities” (Grosz, *Time Travels* 107). Bergson writes: “[T]ime is what hinders everything from being given at once. It retards, or rather it is retardation” (qtd. in Grosz, *Time Travels* 110). Building upon the past, the movement of time restricts the reservoir of possible futures into what is actualized in the present.

This limitation is achieved through a process of divergence. Duration is a movement of differentiation, through which what is alters into what will be (Grosz, *Time Travels* 11). Grosz writes, “Duration proceeds not by continuous growth, smooth unfolding or accretion, but through division, bifurcation, dissociation—by difference—through sudden and unexpected change or eruption” (“Thinking the New” 53). Events form ruptures and interruptions to the smooth flow of causality. As in moments of delay between stimulus and reaction, virtual possibilities are culled, certain paths actualized and others remaining latent. A page turns. One may proceed to a Saturday feast, a fresh green leaf, or a hundred things besides. Time unfolds; some possibilities close, others remain open but unrealized. This process of divergence is the invitation of becoming.

Darwin gives criteria by which such futures are realized. Evolution functions through individual variation, heritable characteristics, and natural selection. Grosz writes that through these processes, “Darwin offers an account of the genesis of the new from the play of repetition

and difference within the old” (*Time Travels* 19). The future does not merely replicate the same; nor does it veer disconnected from the past channels that provide its material conditions. “The present and future diverge from the past: the past is not the causal element of which the present and future are given effects but an index of the resources that the future has to develop itself differently” (Grosz, *Time Travels* 38). Whatever future actualizes from the reservoir of the past cannot be predicted, but what *can* be guaranteed is change. There is no pure platonic essence that remains stable over time. Through divergence, life transforms.

Darwin therefore offers what chapter one required: a nonlinear picture of temporality that is fundamentally opposed to stability. Time does not proceed according to a predestined linear chain, nor are its processes mere repetitions of the same. Rather, the future opens through “bifurcation of the latencies of the present,” introducing unpredictable (but not infinite) possibilities into the course of existence (Grosz, *Time Travels* 30). Far from the balanced and stable natural world of modernity, through evolutionary differentiation newness is continually being introduced. Grosz goes so far as to say that “Biological evolution is the generation of an immensely productive machinery for the creation of *maximal* difference” (*Time Travels* 48; emphasis added). The processes by which the future is realized are not only laden with virtual potentialities, but are realizing such unexpected transformations continually. A caterpillar enters a cocoon, and erupts, unpredictably transformed.

Life

In contrast to the restrictions of Newtonian physics, then, Darwin outlines a temporality of life. Life is a materially grounded instrument of division and transformation. Its processes are not mechanistic, teleological, nor determined (Guerlac, *Thinking in Time* 7). Grosz writes:

In Darwin's writings, life becomes definitively linked to the movement of time and the force of the unpredictable, even random, future. . . . Life is now construed, perhaps for the first time, as fundamental becoming, becoming without the definitive features of (Aristotelian) being, without a given (Platonic) form, without human direction or divine purpose" (*Time Travels* 36-37).

Grosz argues that time cannot be conceptualized outside of the processes through which life proliferates. Stable essences and spatial timelines will never explain the flows and processes of our lived conditions. Only by accounting for the actual processes of vitality in our temporal philosophy can we begin to find paths forward to meet our climate crisis.

After all, Grosz reminds us, we've become accustomed to thinking of nature as a stable material reality upon which culture elaborates and plays. But, given the elaborate processes of transformation and becoming which nature is always already engaged in, Grosz suggests we reverse these roles in our understanding. Instead of viewing the natural world as a passive material limitation to human activity, we need to understand it in its capacity for variation, proliferation, and becoming. In contrast, it is culture that's subtractive: a force which "diminishes, selects, [and] reduces nature;" which "impoverishes nature's capacity for self-variation and becoming, by tying the natural to what culture can render controllable and what it sees as desirable" (Grosz, *Time Travels* 48). Nature will continue to transform, with or without humans. We can neither stall nor proliferate its temporal becoming. If the human temporal skillset is less a matter of creation than of selection and subtraction, our hopes of mitigating climate change must temper themselves accordingly.

It is worth considering, then, that the caterpillar's punctures tunnel not only backward but forward. Ahead, readers can see the path into unturned pages, a hidden future of virtual possibilities. All one can know of such pages is that the past and its impulses carry on. The same

force driving a creature to nibble through apples and pears leads him toward the future, and indeed prompts him to eat his path forward (“he nibbled a hole in the cocoon”). It’s notable that for butterflies this continuation of motor responses is scientific. Experiments on real larvae demonstrate that those conditioned to expect an electric shock in the presence of certain scents continued to avoid such scents even after their transformation into butterflies (McKenna). There is therefore nothing fictional about motor memories guiding a path toward the future. In the book, as in life, the past endures.

But the hungry caterpillar also transforms into something unrecognizable, a change altogether bigger than the sum of its parts. A “big, fat caterpillar” on the left-hand page replicates into a big, fat cocoon on the right. Carle does not make readers privy to this final process of transformation; what we know from science is that within the chrysalis the caterpillar’s tissues dissolve, digesting itself into an oozing goo as cells divide and reorganize into the form of wings, antennae, legs and eyes (Jabr). Division, limitation, and above all mutation push toward of a future of profound variation. And, when the page turns, readers behold a being utterly transformed. Now big enough to stretch across two pages, the butterfly is new, “beautiful,” and (for younger readers) a wholly unpredictable surprise. The experience of duration, for caterpillar and reader both, has led toward the transformed and unexpected. It is at this point that Carle ends his story—not with the cyclical closure of death or a new egg—but with a fully alive caterpillar ready to fly (and eat) into the future.

A phenomenological reading of *TVHC* attends to how the text embeds readers in lived duration. In the book, as in life, the past endures, preconditioning the future, and situating readers in flow. Through interacting with the text, readers are invited to take part in a not-entirely-straightforward process of cause and effect, where the past emerges materially but not uniformly, and in which similarity and divergence both erupt in sometimes unpredictable ways. All of these

temporal lessons can be of use when accounting for realistic processes of human intervention in the natural world.

Conclusion

Obviously, this sort of phenomenological reading of a simple text is an exaggeration; no parent is using *The Very Hungry Caterpillar* to squeeze in a discourse on qualitative difference or Darwinian becoming before naptime. Still, something *is* happening when we read stories to children. The rhythms and expectations of narratives, material forms, and movements of hands and of characters is saying *something* about the passage of time. This “something” deserves to be considered. As time socialization stories, picturebooks are offering an *experience* of how time moves, and suggesting notions of what time is, and what time is for. They are indicating the linkage between past and present, the potentialities of unrealized futures, and are embedding readers in the temporal processes through which such futures might come to be. Certainly, if we believe any texts are worthy of phenomenological disambiguation, we ought to include the stories we read to our children.

And indeed, for Eric Carle the child is key. The temporal message of *TVHC* comes alive *because* this is a toddler book, a material object which must be taken up as a task and interacted with beyond the ordinary linguistic and visual habits of reading. It is embodied interaction which allows readers to bring their own duration into sync with the duration of the caterpillar in multifarious ways. And interestingly, the key gaps through which to do so are restricted to the child. My fingers no longer fit through the punctured fruits. My two-year-old took to them intuitively, non-linearly, enthusiastically. The child is the one invited into flow. As the next chapter will make clear, when it comes to the future, it is all too often the child who’s asked to carry the greatest weight of possibility.

Chapter 3

Promising the Future

Introduction

In this chapter, I will take the temporal frameworks considered so far and apply them to three overtly environmental picturebooks. *Look After Us* (2021), by prolific board-book author Rod Campbell, uses the novelty lift-the-flap medium to introduce animal extinction to very young audiences. *The Mess That We Made* (2020), written by Michelle Lord and illustrated by Julia Blattman, is emblematic of the environmental picturebook genre, taking up the topic of the Great Pacific Garbage Patch to encourage environmental action. Finally, Dr. Seuss's *The Lorax* (1971), which remains among the bestselling environmental picturebooks of all time, addresses themes of deforestation and runaway industrial growth. Taking these books as case studies, this chapter will analyse the sorts of timekeeping and temporal phenomenologies they engage in to consider the climate futures they offer. I will argue that in all three books, the child—as character and as reader—is used as a stand-in for the future, and given the arduous responsibility of ushering in a better world.

It is common for environmental literature to place extraordinary weight on children to fix the planet. As a symbol of (reproductive) futurity, the child “has come to embody for us the telos of the social order and come to be seen as the one for whom that order is held in perpetual trust” (Edelman 11). Standing in for the future, children are expected to be world changers and difference makers—ostensibly a hopeful and empowering message. As one Random House executive wrote regarding the 50th Anniversary of *The Lorax*: “Part of the book’s enduring quality is that, at the end, the Lorax says ‘It’s up to you,’ which puts the child reader into the role of making a difference—it’s empowering” (Makhijani). However, this emphasis on the child as a stand-in for futurity has been widely critiqued. Clementine Beauvais for example writes that far

from being hopeful, such messaging is in fact “too empowering,” setting up expectations “on the child’s part which are impossible to follow” (176). Temporally, these fix-the-planet environmental messages put children in an intense state of wait, the adult waiting for the child to save the day, and the child themselves waiting to become a saviour (Beauvais 171).

Augmenting this existing research, I would like to suggest that one trouble of environmental messaging in children’s literature is that it applies the logic of linear progressive growth to the hope of cyclical renewal. As in the below examples, it is common for environmental picturebooks to envision a future that is in fact a return to a nostalgic past, where nature is balanced and self-sustaining. Rather than acknowledging that such a future can only be sustained via cyclical temporal principles and engagement, however—the sorts of continual renewal envisioned by Leroy Little Bear in the face of natural cosmic flux—the stories then pretend that such a past could somehow be the future of our current timeline, accomplished via the principles of modern linear progress. Such books are moreover not characterised by the processes of divergence and becoming envisioned by Elizabeth Grosz, as they seek to replicate the old rather than making way for the new. As such, the narratives and material phenomenologies of environmental picturebooks can imply that a steady, technological march forward might somehow return us all to the state of the past. Such books suggest that the linear principles of cause-and-effect which conditioned our present environmental crisis might be ignored, unwound, or reset, returning the world to a mythic, stable state which existed before humans showed up to interfere. In doing so, the child becomes a magical figure, an innocent symbol of a simpler time whose potentialities are nevertheless lodged in an uncertain future, whom, via environmental storytelling, adults must prepare to lead the planet backward toward salvation.

Look After Us: Frozen Futures

Rod Campbell's *Look After Us* is marketed for children aged 0-2. While the title indicates the narration will come from the animals' point of view (the cover also depicting an orangutan holding a "Help us!" sign), the actual text of the book proceeds in the first person from an unknown human speaker. This speaker is eager to engage readers with a series of rhetorical questions which guide the rhythm of the book. "I love wild animals," they begin, "don't you?" The first spread shows labeled cartoon portraits of six animals: a lion; whale; orangutan; camel; tiger; and elephant. "They are very special," the text explains, "so we must look after them and keep them safe! I went to see the animals I love. . ." Having introduced the imperative of looking after the animals, the speaker begins a journey to search for them.

The next spread introduces the format which will comprise the rest of the book. The left page reads: "I went to where the lions live. But there weren't many left. That's because we need to look after them better." On the righthand page is a flap, on which the savannah is pictured, with trees, rocks, hills, and yellow grasses. The page reads "I love lions! I would look after them. Wouldn't you?" Lift the flap, and beneath is a similar image of grasslands, this time with a family of lions resting happily in the foreground (see fig. 4). The subsequent pages repeat this pattern, showing elephants, orangutans, tigers, and camels, respectively.



Fig. 4.

Finally, the speaker announces “I went to the sea where the whales live. And there were lots and lots!” This final panel of the book is not a flap to lift; rather, the entire right-hand page—already depicting two smiling whales—opens outward to reveal a pod of a dozen individuals (fig. 5). “They played and squirted water and were happy!” declares the speaker. “That’s because kind people are looking after them really well. They love them like we do! All wild animals must be looked after and kept safe too. They are all very special.”

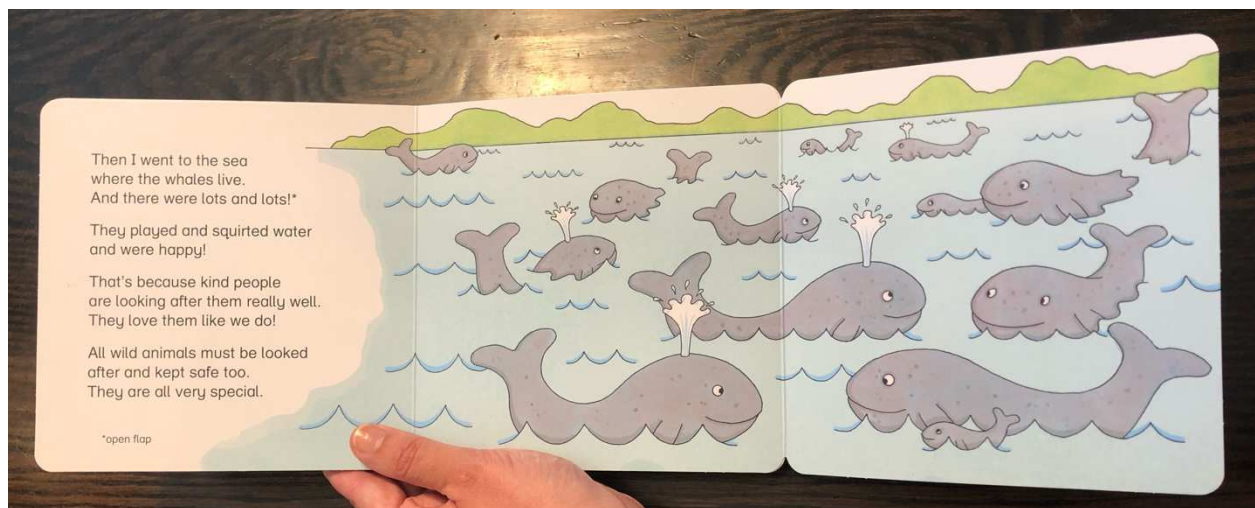


Fig. 5.

The most obvious critique of *Look After Us* is its distortion of facts. The World Wildlife Fund indeed ranks orangutans, tigers, and various species of elephants as “endangered” or “critically endangered.” Multiple species of whales, however, also rank as “endangered,” at greater risk than the lions in the book’s first spread, which are instead categorized as “vulnerable” (World Wildlife Fund). It is true that beluga whales, which could perhaps be the species depicted in the final illustration, are not currently a species of concern, but in extending the message to “whales” generally, the impression the book gives is misleading at best. In looking for a happy ending or example of positive intervention, the book gives readers the false impression that whales, as a whole, have already been saved.

Also of note is the stereotypical focus on large and appealing species of creatures. Focusing on attractive animals is typical not just of children's literature, but of environmental messaging generally. Such animals are known as "charismatic megafauna," the poster-creatures of the conservation movement (Williams and Dublin). While *Look After Us* argues that wild animals are "all very special," the focus remains on a select few mammals, each high on their relative food chains, chosen mostly for their ability to appeal to readers. Indeed, one can imagine an entry of "I love moss spiders, I would protect them, wouldn't you?" would lose much of its rhetorical sway.

In simplifying the topic for a child audience, Campbell opts to leave the causes of animal endangerment unclear. The present state of affairs is simply given, though held in comparison to former times: "there weren't many left." The cause of this endangerment is never specified, but seems to originate in a lack of affection for the species at risk. The speaker contrasts themselves to implied villains through their perhaps accusatory questions; "I love wild animals, don't you?" It is as though love in itself will provoke the needed response, never mind that so far, given the state of the habitats the book presents, the speaker's enthusiastic love has apparently come up short in producing change.

In fact, other than traveling to six separate habitats (and presumably expending considerable aircraft emissions in the process), it is not clear the speaker has done anything of substance in protecting these various species. Their voice is merely hypothetical ("I *would* look after them"), then immediately offloads the responsibility onto readers ("wouldn't you?"). Even in the supposed success story of a thriving whale population, the speaker does not indicate their own participation among the "kind people [looking] after them really well." While the speaker suggests loving the animals as a key ingredient in ensuring their welfare, then, even within the simple confines of the given narrative, the efficacy of such a strategy comes up short.

Beyond simply loving them, the animals' populations are made to grow as a consequence of human intervention, through kind people "looking after them." Again, given the simple format of a baby book, how one might go about such a task is left unsaid. It is notable, however, that the focus is on positive intervention, rather than ending harmful activities (habitat destruction; hunting; etc.). Readers are not told to stop hurting the creatures, but to actively care for them. Taken in isolation, one might get the impression that, like a neglected house pet, wild animals require human intervention to survive.

While *Look After Us* is vague about the causes of animal endangerment and what exactly we should do to respond, then, the book still relies on a firm dualism between humans and animals. Whether humans are the villains of the tale is left unsaid, but it is clear that humans are meant to be the saviours. Moreover, it is not just any human that is being called on to intervene, but the child. Rather than nature having agency in itself, Greta Gaard describes such books as rendering nature "a damsel in distress," and "an object to be saved by the heroic child actor" (18). The presumably adult speaker is not looking after the animals themselves; they are asking their young audience to intervene. Rebekah Sheldon notes that this "shift in focus from the child in need of salvation to the child who saves coincides historically with the first articulation of the concept of the Anthropocene" (Sheldon 6-7).

Moreover, the child is asked to intervene despite the speaker themselves apparently *failing* at the task. The speaker's repeated refrain "I would look after them" somehow ignores the obvious rebuttal: *well then why didn't you?* What is the child addressee meant to offer which the narrator could not? Surely the consistent "there were not many left" displayed in habitat after habitat, despite the speaker's professions of adoration, is an indication that loving the animals and wanting them to thrive is, in itself, not enough. Nevertheless, the call to "look after them" simply presupposes that the child—despite or perhaps because of their youth—is somehow

capable of this daunting task. The responsibility to care for the creatures is thereby thrust into the future, concealed beneath a simple flap, as page by page the speaker invites the implied child reader to take up the call.

Uncovered Futures

The future orientation of conservation in *Look After Us* is made even more explicit when the temporal process of moving through the material book object is taken into account.

Interactive board books are designed to be read as a shared task between parent and child. The literate adult reads the text aloud, while the preliterate child participates through lifting flaps and perhaps turning pages. As such, *Look After Us* presents a specific rhythm and allocation of roles.

The first-person narrator speaks in the literate adult's voice. "I would look after them," reads parent to child. Unlike in other lift-the-flap books where the flap conceals a surprise—including the guess-which-animal format of Campbell's own bestseller *Dear Zoo*—in *Look After Us* the text contains spoilers. It is announced at the very top of the page which creature children should expect to see beneath the flap ("I went to where the lions live," ". . . where the elephants live," etc.). Instead, the only surprise is simply that the wild creatures have apparently returned. The flap therefore offers a transition from present to future. "I would look after them," reads the parent. The toddler opens the flap. Ta-da! The smiling future emerges. Everyone feels good.

Through this lift-the-flap format, endangered animals appear *ex nihilo*, a simple consequence of human good intentions. By skipping the difficult topic of *how* to go about animal conservation, Campbell is able to present it as a process of instant gratification. Animal endangerment is translated into a peek-a-boo game of object permanence. There is no real duration indicated in this process of uncovering, no protraction of the present as it flows toward the future. It is of note however that the temporal immediacy of the lift-the-flap interaction

stands in contrast to the content of the illustrations. The settings depicted on and beneath each flap are not identical; trees, hills, and water sources change location, some appearing or disappearing entirely. There has therefore been a clear movement in either time or space separating the location without animals, and the location with them. The scale of this movement is nevertheless obscured by the simple layering of the lift-the-flap format. Indeed, the layering suggests the happy future is already there, embedded within each unique habitat, simply waiting to be uncovered by the well-meaning child.

There is moreover a contrast between the hidden futures waiting to be uncovered by the child, and the left-to-right unfolding of the already-safe whales on the final page. This page—and only this page—features stage directions for the literate reader. After “there were lots and lots” is an asterix, telling readers when to unfold the flap. Here in the already-accomplished present, it is the literate reader instructed to reveal the state of animal affairs. This present unfolds left-to-right, a linear continuation of the book’s journey around the world. The lack of similar written instructions on previous pages implies that the preliterate child was the one invited to uncover the future. In contrast, the adult reader can triumphantly present the successful conservation work that has already been done.

All of this is to assume that the flaps are revealing an idealized future state. In fact, the text gives no clear indication as to when the pictured animals are located. It is possible that the child is instead uncovering a window to the past: the before-times indicated by the phrase “there weren’t many left.” Indeed, the fact that it isn’t clear whether the flaps are revealing the past or future says a great deal about the sort of temporal stability they imply.

In every scene, the illustrations depict a frozen moment—an “empty” landscape—giving way to another equally stable temporal state. The animals are not in motion but at rest, most sitting or lying down. In each scene they face this-way or that, offering no indication of

movement or progression. The one exception to this is the elephants, who all face leftward, but appear to be lumbering quite leisurely, looking at one another rather than toward any set destination. The happy whales are playfully spouting, but they too face every-which-way, bobbing at the surface with tails up rather than in transit. These are not dramatic action shots—migration, hunting, progression, or change—this is a stable world at rest. Moreover, each set of animals appears to be an isolated family, parent and children together, a symbol of reproductive, self-sustaining cycles.

Through lifting the flaps, then, the child reader responds to the call for conservation by uncovering a stable, frozen moment, where animals thrive in their own leisurely generational cycles. The empty landscape folds down and out of sight, covering, too, the rhetorical question “I would look after them. Wouldn’t you?” This call to action, now accomplished, disappears. Having considered one habitat, readers turn the page to the next without any narrative connection. While the rhythmic text repeats, there are no evident links between one environment and the next, between species, or between human conservation efforts; the successful salvation of the lions has not, evidently, been of any benefit to the elephants. Each situation is taken in isolation. Similarly, there is no temporal process of becoming which distinguishes the landscape before the animals return from the one after; each habitat is alike in colour and in plant life. The idealized future itself does not show direction nor change outside of its comforting reproductive cycles. These are frozen, stable, disconnected snapshots—idyllic future states—embedded within our planet, waiting to (instantly) appear. All that’s missing is the child, invited to uncover them, in an act of love.

Marketed for babies and toddlers, *Look After Us* is not trying to show environmental solutions or even a realistic account of animal endangerment. Its purpose is simply to instill love for wild animals. In doing so, however, it is already feeding into environmental temporal

assumptions. The human is separate from, and the saviour of, the animal world. The appeals to help the animals, as well as the rhythm of the story—problem, call to action, uncovered solution—are moreover directed toward the interventions of the *child*. What the child uniquely brings to human conservation efforts is love, and access to futurity. Through placing environmental responsibility in the child’s hands, the book and the parent can preserve the child’s innocence—the animals are still there to uncover!—while both gratifying and offloading their own environmental consciousness. The socially conscious parent is teaching their child to love wild animals; the disempowered parent is placing responsibility in the child’s innocent hands. “*I would look after them. Wouldn’t you?*” Through this transference of agency, the book preserves hope, for parent, for child, and for planet. “Hope is central to adult narratives about childhood,” writes Bridget Stirling, “something that can be given to children by the (adult) world, and vice versa, often without explanation or justification” (38). Surely the innocent child, brought up in this way to love and care for the earth, will one day accomplish the tasks we could not.

The Mess That We Made: Backward Futures

Unlike *Look After Us*, Lord and Blattman’s *The Mess That We Made* offers practical solutions for taking environmental action. Aimed for readers aged 4-8 (Flashlight Press), the book discusses ocean garbage patches, focussing on the interconnections of human waste and natural ocean cycles before transitioning to a call to action. The story is a cumulative tale, modelled after the nursery rhyme “The House that Jack Built” (“This is the house that Jack built. / This is the malt that lay in the house that Jack built. / This is the rat that ate the malt that lay in the house that Jack built.” etc. (Halliwell)). Supplemented by beautiful illustrations of swirling

ocean life and human trash, the book compellingly illustrates the profound interrelationship between human and other-than-human forces.

From the very start, *The Mess That We Made* embeds the disaster of ocean waste in the natural food cycles it disrupts. Colourful trash swirls amidst colourful wildlife, in some places indistinguishably. A boat of four young children carries through each illustration, surveying the mess. The text toggles back and forth between human and natural elements. Page one introduces “the mess that we made,” page two, a fish which eats a bottlecap. Across the gutter, readers then meet “the seal that eats the fish that swim in the mess that we made” (fig. 6). The following pages introduce the net that catches the seal, and the boat that dumps the net. Then comes the current, which carries boat, trash, and wildlife all. Plastic traps the turtle, the landfill spills the plastic, and “we,” “the people at work and play,” are the ones who “stuff” that landfill daily. Responsibility, then, is ultimately channeled backward to its human source.



Fig. 6. (Amazon).

The “we” of the “people at work and play” applies to everyone. While the illustration shows cargo ships and perhaps factories in the distance, it is the beachgoers and commuters—

those who *use* the plastic—which are brought to the foreground. The book is therefore highlighting consumption, rather than production, as the problem; to direct responsibility toward industry and regulatory bodies would render it, after all, no longer a mess which *we* made. The universal distribution of responsibility is highlighted when readers turn the page to the little boat of children, bobbing in a dark sea of garbage, captioned as part of its source: “Look at the mess that we made.” This solemn pause marks the turning-point of the book.

On the next page, the narrative shifts. “BUT. . .” announces the text, “we are the ones who can save the day.” To do so, we must first “reduce our waste at work and at play,” and “recycle the plastic thrown away.” While the rhythm remains through the final pages, it is of note that the suggested environmental actions are not cumulative so much as a list, moving backward through the already layered cycles the book previously introduced. Along with reducing and recycling, the text calls readers to rescue the turtle, remove the garbage, protest the fishing boat, collect the nets, and free the seals that eat the fish “that swim in the ocean that WE save!” The final illustration parallels the solemn previous instruction to “look at the mess that we made,” this time showing the ocean bright blue and filled with dynamic marine life. There is no longer any trash, nor cargo ships; the only man-made objects in the sea—apart from the four children in their row-boat—are colourful sailboats. Our mess has indeed been remedied.

Like in *Look After Us*, then, children remain part of the environmental solution, though in this text they are sometimes joined by adult actors. The advertised “Beach Clean Up Day” shows multiple demographics working together to tidy the beach. Two pages later, while the four child protagonists scoop litter and release turtles, adult scuba divers retrieve garbage nearby. It is only the children, however, who “protest the boat of welded steel,” holding signs reading “No Ghost Nets!” and “Save Our Seas” from the isolation of their little boat.

The children help save the ocean, then, but they are also represented as complicit in creating the problem. To make the solutions available to individual kids, the book has seemingly located the problem in those same individuals. It would have been possible—indeed, on first read I hoped for—a story which simply ended at “look at the mess that we made,” leaving the “we” ambiguous and properly grounded in systemic, adult mistakes. Instead, the child characters (and presumed readers) seem as caught up in the “we” of making the mess as they are in the “we” of cleaning it. The illustrations appear to justify this complicity. Along with countless familiar plastic items—bottles, bags, and milk jugs—are child-specific sorts of trash. A toy pail; a rubber duck; a frisbee. All of it floats together as if to say, “look at your waste, child; look at your toys and jello wrappers.” On the central, solemn page, the quintessential red-and-yellow ride-on car used at daycares everywhere bobs sadly in the water (How dare you outgrow it!) (fig. 7). The message appears to be that, already born into sin, the children had best get on with their redemption.



Fig. 7. (Ferguson Fuller).

Why does the book treat children as complicit in the mess “we” made when garbage disposal is almost universally not a child’s responsibility? Children neither manufactured, purchased, nor irresponsibly littered any of these items. Children merely *used* them. Indeed, some of these waste-items were manufactured and purchased specifically for the benefit of the child. On this basis alone, the child is being asked to share in the responsibility of cleaning up. There are hints here, I think, of a tension at the heart of many kid’s books about climate: the fact that overpopulation—the very existence of the children being read to—is utterly wrapped up in our current predicament. Limiting one’s reproduction, and the hefty environmental footprint introduced by each additional human who joins the planet, is touted as the single most effective measure any individual can take to combat climate change (Carrington). Perhaps it is partially this parental guilt which is being soothed by the hope of child saviours.

Rewound Futures

While the problem in *The Mess That We Made* is depicted through intertwined cycles of human and other-than-human forces (perhaps including the cycles of human reproduction itself), the solutions the book offers are much less cyclical in nature. In contrast to the current that swirls through the bay entwining trash and wildlife both, the beaches and landfills are cleaned in relative isolation. One could perhaps imagine a more systemic narrative approach to ocean cleanup (this is the rally that tipped the vote, that elected the mayor, that signed the bill, that taxed the factory, etc.), but the book chooses to focus on the same forces and animals identified in the opening half. In doing so, it opts toward an ideal of linear progress rather than the interrelated networks of cause-and-effect which the first portion of the book emphasised so well.

These detached solutions to ocean pollution indeed have detached results. The backmatter indicates three parks established through community landfill cleanup. These localized success stories do very little, however, so offset the intake of eight million metric tons of discarded plastic entering the ocean each year (Lord). What is actually happening to the plastic waste the child protagonists are dutifully removing from the beach and sea? China, previously flooded with up to half of the world's recyclable waste, banned import of foreign recycling materials in 2018 (Redling and Toto). With no other country yet capable of processing recyclables at a similar scale, an increasing amount of recyclable materials are ending up in landfills and incinerators, regardless of whether beachgoers sort them into the appropriate bin. Indeed, some such plastics are finding their way right back into the sea (Lord). Even if everyone (the implicated "we") dutifully implemented the 3 Rs, our best efforts would therefore be thwarted unless these longer-scale cycles of production, consumption, and disposal, were transformed into sustainable practices. The success of the book's prescribed activities, then, relies in part on a series of technological and organizational developments that have not yet been realized.

Nevertheless, "we" are instructed to take up such activities with all the temporal enthusiasm of modern immediacy. "Shrink the landfill without delay," the book instructs. In the flip of one page the illustrations move from "Beach Clean Up Day," to spotless sand and happily playing families. Indeed, the ocean is cleaned in fewer page-turns than those spent explaining the problem—never-mind that the mess itself pre-existed the book's opening page. The urgency of the crisis is somehow matched through the immediacy of the solution. While readers are given a short to-do list of solutions, then, the temporal framework they imply ultimately feels as magical as the lift-the-flap futures of *Look After Us*. Despite combatting decades of exponential waste, which has mixed and cross-contaminated via a multitude of intersecting cycles, movements,

food-chains, disintegrations, and multi-generational transmissions, “we” are expected to save the ocean through the isolated, hard-working, fast-paced optimism of linear progress.

Where exactly are these environmental solutions meant to lead us? The ocean in the final page—miraculously clean—shows no trace of the human disruptions it has experienced (the protested boats have not been repurposed as coral reefs, for example). Nor does the book show any of the required technological fixes which might accomplish such a monumental cleanup. What is shown is the ocean that came before. We made a mess, we cleaned it up, and everything went back to how it once was. Indeed, the very movement of the poem, from fish to seal to net to boat to bay to turtle to landfill to people, then backward from people to landfill to turtle to bay to boat to nets to seal to fish, represents this temporal undoing. The stacking cumulated effects are simply unstacked in reverse order. However, the interrelated cycles which compounded so exponentially in their movement forward in time do not un-compound so easily. There is a stark contrast in pairing the “current which swirls through the bay,” powerfully sweeping together trash and wildlife both, against the feeble human attempt to “haul the garbage from the bay,” seemingly piece by piece. Temporally, the story is treating the contaminated ocean with all the optimism of a Newtonian worldview, where collections of interchangeable parts have merely arranged themselves poorly, and through reversing the process humans can rearrange them back to their former state. Such a strategy ignores the fact that the whole purpose and problem of plastic is that it *doesn't* un-compose. Instead, that current swirling through the bay has broken down the plastic into smaller and smaller pieces, leaving behind a million square kilometers of cloudy, microplastic sludge (Lord). Yet by assuming this waste accumulated through the straightforward processes of linear time, the children are hoping to simply unwind the chain of cause-and-effect backward, ignoring that the forward motion of time is not, in fact, reversible.

The Mess That We Made thereby offers an example of Maria Nikolajeva's "there-and-back-again" temporal structure. The book is invoking all the linear implications of destination, but that destination is a stable, cyclical past. Rather than envisioning a new future, in which different sustainable processes might inaugurate new, healthier cycles of becoming, the book is seeking to travel backward, erasing humanity's former missteps one by one. Here, we have Stirling's "nostalgic futurity that connects childhood with a hoped-for future that returns to a more innocent time" (38). The children are not carrying humanity into the future. They are sitting on a boat, life-vests and all, that returns them to the past. Indeed, the children don't even age. We haven't been ushered into a new world. Nothing of substance has changed. Through a bit of hard work, the mess has simply been undone.

Taken altogether, *The Mess That We Made* does not offer readers processes of becoming or cycles of renewal. While the layered, temporal cycles which led to the ocean's ecological mess are vividly displayed through the initial cumulative structure, the hope of redemption, largely taken up by the complicit child, is magically offered through a few impossible tricks. These tricks are presented according to the typical fast-paced, hard-working logic of linear progress. Implementing them moreover does not carry readers into the future, but rather to a magical replica of the past, all before the kids are even grown. As such, *The Mess That We Made* offers a characteristic example of environmental picture books that "are not disempowering for the child: they are *too empowering*" (Beauvais 176). In trying to offer children a future, they have been presented with an impossibility. Indeed, there is something depressingly fitting about the cover image of four baby-faced children, unsupervised, bobbing in a pile of trash with their little butterfly net (fig. 8). This is the sort of temporal agency we're expecting, these days; this is what we can manage for empowerment. Hurry up, kids! No more waiting to be grown. It's time to start scooping.



Fig 8. (Amazon).

The Lorax: Reset Futures

The final text I consider in this project is perhaps the world's most famous environmental picturebook, and for good reason. Dr. Seuss's *The Lorax* anchors environmental destruction not in consumers, but corporate greed and unsustainable practices of overextraction. It moreover does so using a layered temporal structure, with multiple figures—the Lorax, the Once-ler, and the child—all offering their own temporal relation to the environmental issues at play. While brilliantly depicting the exponential forces of environmental destruction, this book also displaces

hope for the future into the hands of a waiting child, who is asked to pattern his future according to the principles of a past world.

Liam Heneghan writes that “the depiction of the disassembly of the Truffula ecosystem under the Once-ler’s witless management is without parallel in children’s literature” (273). A “glorious” interconnected ecosystem of trees, their fruits, and the animals they sustain on land, water, and air, are introduced in glowing language by the Once-ler. This paradise is illustrated in stark contrast to the current state of affairs: a desolate Grickle-grass wasteland of sour wind and old crows, where the Once-ler now lurks alone in his Lerkim, waiting to pass on his tale of environmental devastation (fig. 9).

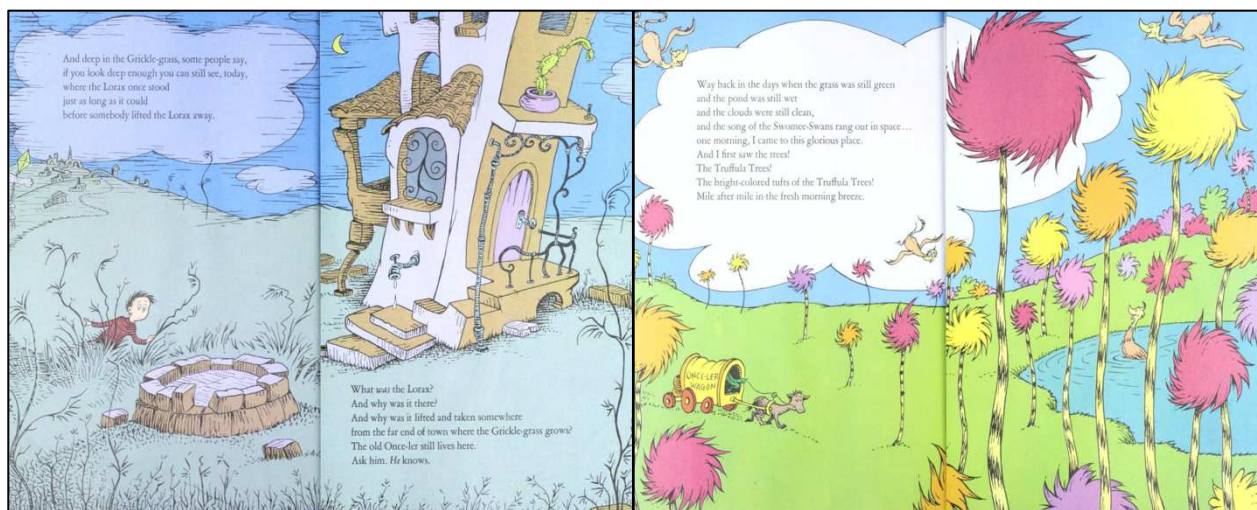


Fig. 9. (“Lorax”).

One August midnight, a young boy visits the Once-ler to hear the story of how the Lorax was lifted away. For the price of “fifteen cents / and a nail / and the shell of a great-great-great-grandfather snail,” the Once-ler (face always hidden from view) narrates the remainder of the text. He explains that “way back in the days when the grass was still green,” he came to the Truffula forest, and chopped a tree to knit a Thneed (a multi-use shirt/sock/glove/hat/carpet/pillow/sheet/curtain/bicycle-seat-cover which “All-People-Need”). As he did so, the Lorax popped out of the Truffula stump, “oldish,” “brownish,” and “bossy,” to

“speak for the trees,” and chide the Once-ler “at the top of [his] lungs.” The conflict between the Lorax’s environmental activism, and the Once-ler’s business aspirations, form the central tension of the story.

Refusing to heed the Lorax, the Once-ler expands his operation, employing his family, building factories, and eventually inventing a “Super-Axe-Hacker” (designed to “whack off four Truffula Trees at one smacker”). The Lorax returns repeatedly to warn that the Bar-ba-loots, Swanee-Swans, and Humming-Fish, are each being forced away in turn due to the increasing contamination of the landscape. The Once-ler remains indignant, citing his “rights,” and his intentions to keep “Biggering and BIGGERING and BIGGERING,” since “business is business! / And business must grow.” In this, Seuss draws a clear connection between environmental destruction and industrial growth, which the Once-ler takes as a business imperative.

Finally, seemingly all at once, the very last Truffula Tree is chopped. At this point the Lorax falls silent. The Once-ler explains that the Lorax “lifted himself by the seat of his pants,” and “heisted himself and took leave of this place, through a hole in the smog,” leaving behind only a pile of rocks with one word, “UNLESS.” The Once-ler explains that all of this happened “long, long ago. / But each day since that day / I’ve sat here and worried / and worried away,” trying to decipher the meaning of the Lorax’s final cryptic message. Now, however, at the appearance of the child, “the word of the Lorax seems perfectly clear.” The Once-ler, still hidden in his Lerkim, speaks the oft-quoted moral of the story down to the waiting child: “UNLESS someone like you / cares a whole awful lot, / nothing is going to get better. / It’s not.” According to the Once-ler, it is the child who offers the hope of environmental redemption.

On the final page, then, the Once-ler yells out “Catch!” and let’s fall the very last Truffula Seed of all (fig. 10). He gives the child charge of it, telling him to plant a new Truffula Tree, giving it clean water and fresh air. “Grow a forest,” the Once-ler instructs, “Protect it from

axes that hack. / Then the Lorax / and all of his friends / may come back.” In this final illustration, the child’s hands—like the Once-ler’s—are cropped from his body, while the Once-ler rather spectacularly passes the buck to the next generation.



Fig. 10. Final illustration (“Lorax”).

Unsustainable Futures

Unlike the previous two picturebooks, *The Lorax* locates the cause of environmental devastation entirely in corporate greed and accelerated, unsustainable extraction. The child is not made complicit in the devastation of the Truffula ecosystem. The disaster took place before his time, and the child himself does not wear a Thneed. Indeed, a Thneed’s consumer is only pictured once, a single suited man with face hidden from view by the product. It is the Once-ler,

his family, and their machines, who appear on page after page. Moreover, it is this briefly-glimpsed consumer who's given the typical business suit sometimes identified with Monopoly-man style corporate greed. By contrast, the Once-ler is depicted as truly monstrous—yellow eyes and disembodied grinch-arms peeking out from factories and machines, facelessly pulling the strings of production. Unlike in *The Mess That We Made*, then, the source of the environmental damage is located in the systems and methods of unsustainable industry, rather than in complicit consumers.

Temporally, *The Lorax* draws a sharp contrast between the accelerated industrial timeline of Truffula destruction, and the long wait which follows. Speed is central to the Once-ler's business model, and from the moment he encounters the Truffula forest it characterises everything he does. He knits his first Thneed with "great speedy speed," then immediately summons his family: "I rushed 'cross the room, and in no time at all, built a radio-phone. I put in a quick call . . . 'Get over here fast!" As the Once-ler continues "working full tilt," the Lorax critiques his operation for its speed: "you seem to be chopping as fast as you please." Unlike the frozen, restful past depicted in *Look After Us*, in illustration after illustration Seuss shows the Once-ler's machines and sneakily protruding arms in constant motion (fig. 11). The Once-ler's activity presupposes he and the Truffula ecosystem share a single universal "now," ignoring that the frantic pace of industrial progress is deeply out of sync with the pace of the ecological processes on which the Truffula ecosystem depends. The pace of his industry feels out of sync, too, with the slow approach of the waiting child, visiting the Once-ler under cover of darkness to stand and listen to his tale.



Fig. 11. From pages 16, 18, 45, and 51 (“Lorax”).

Along with its speed, the Once-ler’s enterprise is characterised by exponential growth. He is intent on “biggering” his business. When “chopping one tree / at a time / was too slow,” he “quickly” invented the Super-Axe-Hacker, which allowed him to “[make] Thneeds / four times as fast as before!” This growth extends to every part of the Once-ler’s operation. He explains:

I had to grow bigger. So bigger I got.

I biggered my factory. I biggered my roads.

I biggered my wagons. I biggered the loads

of the Thneeds I shipped out. I was shipping them forth

to the South! To the East! To the West! To the North!

I went right on biggering . . . selling more Thneeds.

And I biggered my money, which everyone needs.

Following the typical logic of industrial time, this exponential biggering is presented as a necessary consequence of business. Confronted with the starvation of the Brown Bar-ba-loots, the Once-ler feels sad, but explains: “business is business! / And business must grow / regardless of crummies in tummies, you know.”

As such, the Once-ler is buying into the presupposition of modernity which Grosz wishes to complicate: that nature is stable, and human culture is what progresses toward the future. The Once-ler has treated the interwoven Truffula ecosystem as a stable resource, upon which he can

enact the irreversible arrow of capitalization and progress (Latour, *We Have Never*). As page-by-page the Truffula forest is reduced to stumps, nothing about the machinery of production remains stable. The factory is continually expanded, emitting more smoke and Gluppity-Glupp in the process. In a truly prophetic contrast, what began as a quaint, hand-knit family business complete with beast drawn-wagons, evolves over four pages into the Seussian equivalent of an Amazon distribution warehouse (fig. 12). With the means of production now hidden within the factory walls, the only visible non-mechanized labour are the delivery drivers. In contrast to the exponential expansion of industrial growth, however, the Truffula “resources” are not unlimited. When the final tree falls, the Once-ler’s family departs with the same speedy immediacy that characterized the rest of the Thneed operation, leaving the Once-ler in his biggered factory all alone.

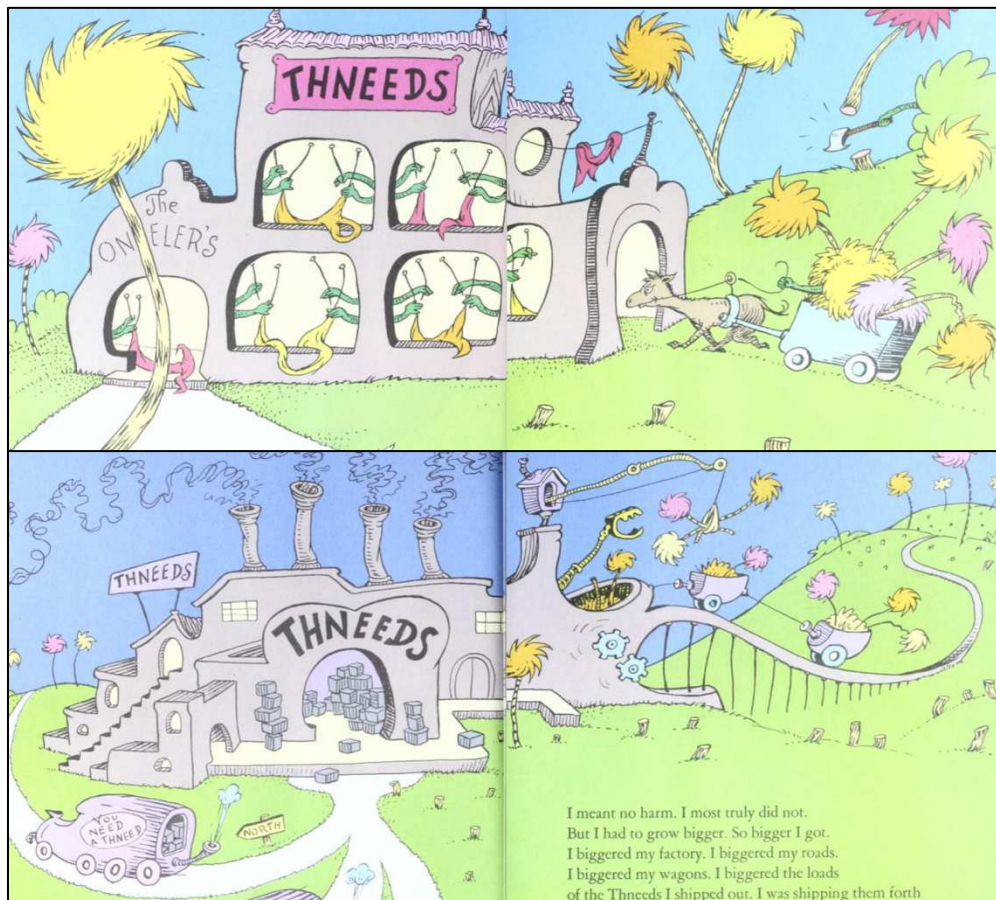


Fig. 12. (“Lorax”).

Does the Lorax’s climate activism truly draw a contrast to the Once-ler’s temporal impatience? It is no secret that the Lorax’s activism ultimately fails, but Heneghan argues that the book in fact serves as a warning about how *not* to go about environmental advocacy. Indeed, told through the Once-ler’s (perhaps unreliable) narration, the story is able to focus not on the Lorax’s intentions, but how his messaging was received. Heneghan writes:

If Dr. Seuss had intended the eponymous hero of *The Lorax* (1971) to epitomize the figure of the self-righteous, blustering, and ultimately failed environmentalist, then he succeeded impressively. The strategy that the Lorax deploys to arrest the destruction of the Truffula ecosystem—namely, hectoring, stigmatizing, and shaming the Onceler, the patriarch of a onetime successful family business—fails dramatically (Heneghan 272).

The Lorax appears the “instant” the first tree falls, and is described by the Once-ler as “sharpish and bossy,” immediately puffing and shouting at the top of his lungs. The Lorax moreover begins not by defending the worth of the Truffula Tree, but insulting the Once-ler’s product (“*what’s that THING you’ve made;*” “There is no one on earth who would buy that fool Thneed!”). As such, the Once-ler never heeds the “old-nuisance” Lorax’s “gripes,” rebutting: “All you do is yap-yap and say, ‘Bad! Bad! Bad! Bad!’”

In fact, Heneghan points out that it is the Once-ler, not the Lorax, who waxes poetical about the Truffula ecosystem, a “glorious place” he’d been searching for “all [his] life,” with trees “much softer than silk,” which “had the sweet smell / of fresh butterfly milk.” As such, Heneghan argues that “the Once-ler was always a potential conservation ally” (275). Nevertheless, instead of working together to develop a more sustainable Thneed operation, the Lorax only succeeds in insulting and ostracising the Once-ler. Uninterested in a new,

collaborative future which might introduce difference to the current ecological state, the Lorax protests the use of even a single tuft through his own claims to manage the Truffula ecosystem.

Indeed, the Once-ler is not the only one who takes ownership of the Truffulas. The Lorax doesn't just "speak for the trees," he consistently refers to them, and the animals who live amongst them, using possessive pronouns ("my Truffula tuft;" "my poor Bar-ba-loots;" "my poor Swomee-Swans"). He also dictates when each animal must leave the ecosystem in search of greener pastures ("I'm also in charge of the Brown Bar-ba-loots;" "I can't let them stay;" "I'm sending them off;" "Good luck, boys," he cried. And he sent them away;" etc.). The dualistic attitude toward nature and culture by which human(like) actors consider themselves separate from the rest of the ecosystem is therefore taken up by the Once-ler and the Lorax both.

Indeed, the Lorax does not seem very far removed from the smug human speaker of *Look After Us*, claiming he would love and care for the creatures until he eventually departs in defeat. The Lorax's disappearance—initially presented as the main mystery of narrative ("why was it lifted and taken somewhere?")—is surprisingly revealed to have happened by his own hand. Having failed to protect even a single tree, the Lorax "lifted himself by the seat of his pants," and heisted himself up and away through a hole in the smog. Heneghan writes:

Surrounded by the evidence of his own comprehensive failure, the Lorax . . . is [arguably] propelled skyward by his own indignant self-righteousness. Perhaps the Lorax was always full of hot air. Why, exactly, did he fail so epically? Let me count the ways (Heneghan 274).

The only trace the Lorax leaves behind is the "UNLESS" pile of stones, a monument to his own fruitless advocacy.

Reset Futures

The Lorax's failed advocacy is contrasted by the Once-ler's own storytelling. Indeed, the child would have no reason to take up Truffula forestry without the Once-ler's glowing report of the world which once was. Unlike the Lorax's chiding, the Once-ler presents his narrative with all the persuasion of an expert salesman, describing a brightly-colored paradise of fresh, soft, sweet-smelling comforts. His tale is a journey backward in time—nostalgic and perhaps unreliable—but backward all the same. Indeed, *The Lorax* is the only book of this project where paging forward at one point carries readers into the past. Through storytelling, the Once-ler's memory grants the child access to the virtual past, with all of its unrealized potentialities.

A capitalist to his core, access to the past has itself become a paid commodity. "He'll tell you, perhaps . . . if you're willing to pay." Just learning of the Once-ler's own greedy destruction carries the cost of "fifteen cents / and a nail / and the shell of a great-great-great-grandfather snail." (Where one might find a grandfather snail-shell in the Grickle-grass wasteland—the literal housing of a creature from the multi-generational past—is left unsaid.) The Once-ler moreover tries to render his tale a limited resource, warning "the secrets I tell are for your ears alone." One can only marvel at the gall of a resource-extraction CEO pivoting to the entertainment business, then charging to relay the story of his own past atrocities. Nevertheless, the bucket of cash and childish treasures goes up, and the seed of future responsibility falls down. While the seed (and hope for the future) is free, the story (knowledge of what came before) is treated as valuable intellectual property.

Like in *The Mess That We Made* and *Look After Us*, the Once-ler presents the environmental past as a happy, beautiful time. This is in line with C. C. Jenks claims that "in late modernity, adult hopes for children's futures are caught up in nostalgia as well as futurity" (Stirling 38). One would expect such nostalgia from a creature known as "The Once-ler." It is

only via this nostalgia-soaked memory that the child has access to the very real virtuality of his own land's history. Through the tale, the child learns how the Once-ler's actions functioned as a limitation to the bountiful unfoldings of the living landscape, the "culling of other possibilities" (Grosz, *Time Travels* 107), which eventually reduced this reservoir to the causal chain of his present day. While access to the past allows the child to ask what former possibilities might have gone unrealized, however, the Once-ler remains intent on rebuilding the nostalgic world he once knew. Through passing forward the final Truffula seed, he attempts to redeem the same linear chain of cause-and-effect he was once enmeshed in, hoping that the future might reinstate the same possibilities as his past.

Why would the Once-ler simply sit on the seed for all this time? Why wouldn't he plant it himself? Had the Lorax so eroded the Once-ler's eco-confidence that he no longer trusted himself to the task? Or is it instead the speed of the seed, its slow promise of incremental growth, that will not translate into the Once-ler's usual habits of immediacy? So far-removed from usefulness as a natural resource, the Once-ler does not even treat the seed as an item of economic value. The Lorax also abandoned the Truffula clear-cut, despite the apparent existence of at least one seed, and the possibility of eventual regrowth. Neither character saw planting it as a task worth their time. Instead, the Once-ler stayed in his Lerkim day after day, waiting for "someone like you" to make things better. He waited for the child.

What can a child offer the trees that the Once-ler could not? The Once-ler claims the child's contribution is his ability to care: "UNLESS someone like you / cares a whole awful lot. . ." But did the Lorax not care? Or the Once-ler himself? Indeed, both of them—the Lorax through his activism, and the Once-ler through his glowing narration—show far more love for the Truffula ecosystem than the silent child. While the child's investment of shell and coins indicates at least a passing interest in local history, this is a far cry from the "whole awful lot" readers are

told the current predicament requires. If good intentions were not enough for either of these previous players, why should the child fare any differently?

Or perhaps the child appeals to the Once-ler due to his silence. In this, the child is an utter contrast to the yappy Lorax; he does not once open his mouth. (Nor, it's worth mentioning, do the four children in *The Mess That We Made*.) Having no voice in the matter, the child is perhaps just the sort of environmental hero that the Once-ler will bother to engage with. If the tone of the Once-ler's storytelling was meant to contrast the failed bossy advocacy of the Lorax, the child's total silence is one step better. Indeed, a voiceless resident with little social credit who will obediently plant trees for free does seem exactly the sort of "environmentalist" whom a former logging boss might commend.

Or is the child instead—as in so many environmental morals—being singled out for his youth? The future is the domain of the child, after all. Stirling writes that "Relationships with children become relationships with the imagined future person, with children becoming temporal objects rather than subjects" (39). Such a description would perfectly describe the Once-ler's relationship to this child, who remains a total stranger, yet who's very presence seems taken as a symbol of hope. In the Once-ler's linear view, the child is still near the start of his timeline, temporally capable of seeing a Truffula plant to maturation and reproduction. The growth of the child, parallel to the growth of the seed, is therefore meant to journey with the seed in a line of succession. As Sheldon writes, "Genealogical succession, the so on of reproduction, derives its meaning-making force from conceiving of time as unfolding in a straight line running out to meet the horizon" (67). The Once-ler is apparently hoping the child can bigger a functioning Truffula ecosystem right back from extinction. Through handing off the seed to the boy, *The Lorax* therefore ends by reinaugurating the same straight, singular path toward a pre-set destination which so epitomized the linear temporalities of Once-ler and Lorax both.

Trapped in this linear framework, the Once-ler has been suspended in a continual state of waiting—a state into which he now invites the child. Beauvais writes:

What such books allow us to see is an extreme form of the existential pain of the adult. Such books are characterised by a disempowered adult authority, faced with a paralysing vision both of what they have contributed to create and of the action that would be required to address it. Both adult authority and implied child reader, in such books, are put into an intense state of wait – the adult waiting for the child to rectify the situation, and the child even more absurdly being led to wait for *itself* to turn into a messianic figure (Beauvais 171).

For linear time to march onward yet somehow return to the ecological past, the child may find himself waiting for a very long time indeed.

To ask the child to return the land to its past Truffula bliss, with hopes that the Bar-baloots, Swomee-Swans, and Humming-fish might all return, is to give the child a set *destination*, a set future to intentionally progress toward using all the logic of linear time. In this case, it is also to give the child an impossibility, as it pretends the straight line of time could somehow loop backward into the past. The Once-ler is moreover suggesting that once the child succeeds in this impossible backward journey—provided he continues the work of protecting the new-old forest from “axes that hack”—the dream of a balanced, stable, self-sustaining ecosystem will be realized. The Once-ler is therefore planting the myth of stable cyclical time into the past of his own linear timeline, then expecting a boy, through virtue of his child-ness, to advance himself toward it.

The Once-ler is oblivious to the temporal realities Bergson argued: that time can neither freeze nor repeat. The Truffula ecosystem was never a closed, frozen system, as the Once-ler’s own interference proved. Outside influences, and internal processes of variation, cannot be

avoided. Moreover, repeated acts are never true repetitions, due to the very fact that they have happened before. Time does not run backward. If the child succeeds in rebuilding a Truffula forest, it will not be identical to the ecosystem that was lost. One Truffula seed cannot replicate the Humming-Fish, forced as they were to walk on their fins in a weary search for fresh water. In his guilt and denial, the Once-ler is trying to sell the child a fantasy. The Brown Bar-ba-loots are not coming back.

Moreover, by prescribing a set destination, the Once-ler is holding the child to a linear temporal course. To do so is to deny the child's other potentialities, even as the Once-ler once chopped away the manifold possibilities of the Truffula eco-system. The same logic of human culling and limitation which epitomizes linear time is therefore being re-enacted through the Once-ler's call to action. In this way, the possibilities of becoming which make childhood such a promising symbol of futurity are themselves being squeezed away.

Indeed, the Once-ler would benefit from Little Bear and Grosz's calls to focus on *process* instead of destination. "Axes that hack" were not the only threat to the Truffula ecosystem. The ownership, smug pontificating, and single-minded trajectories, exhibited by Once-ler and Lorax both, all contributed to the Truffula's demise. All three of these attitudes are still at play in the Once-ler's tasking of the child. The Once-ler is obscuring these attitudes, however, by suggesting the solution is just an abundance of care, and an abundance of trees. In doing so, he is simply self-prescribing a new single-minded trajectory, passing it to a new owner, and hoping for the best.

If the Once-ler had learned to focus on process rather than goal—if the Lorax had taught him sustainable practices beyond simplistic tirades of "don't cut trees!"—the Once-ler might have different lessons to pass on to this child. He might have learned to consider the roles of variation, proliferation, and becoming in the forward movement of time. He might moreover

have unlearned his assumption that only human(like) actors have agency, while nature is static and inert. Indeed, empowered by sustainable processes, the Once-ler might dare to hope for a real, unknowable future, instead of pining to reinaugurate a lost past.

Instead, these realities appear to have been lost on the Once-ler. His half-formed ecological wistfulness doesn't teach the boy to consider the Grickle-grass, nor the old crows. Surely these beings offer their own potentials for growth and becoming. There is likewise no interest in the success of the potted cactus by the Once-ler's window, nor the source of the (wastefully) dripping tap extruding from his Lerkim. What futures might they suggest? If the Once-ler had learned to commit himself to sustaining the present realities of an ecosystem, he and the boy might manage to renew their current Grickle-grass world toward thriving—with or without the Truffula. Such an open-ended future could prove promising, or at the very least actually *possible*. But, fixated on destination rather than process, the Once-ler instead ends his story committed to a temporal impossibility.

Conclusion

These three stories demonstrate the role of the child in offering hope for the future. They moreover suggest how easily that hope becomes a displacement of adult responsibility. The child, full of innocence and potential, fulfills the parent's fantasy of a productive future, but also of progression backward to a nostalgic past. In *Look After Us*, the idyllic past simply reappears via the child's loving intervention. In *The Mess That We Made*, the causal chain of time is magically wound backward to replicate a previous temporal state. In *The Lorax*, the child is charged with regrowing the utopic past from scratch. In all three cases, in order to promise the future, the child is tasked with returning instead to a world which came before.

In search of ecological stability, these environmental picturebooks introduce a harmonious “before” which might then become the child’s “after.” In doing so, children’s literature becomes a genre of Once-ling, where author and parent both wax poetical about the ecological cycles and creatures of their own environmental pasts. Too often, it therefore also becomes a genre of the faceless arm, simply passing the buck. Through such stories, adults hope to make children “care a whole awful lot,” and “love [animals] like we do,” so as to plant adult nostalgia as the linear destination of an impossible backward journey. How many Grickle-grasses and old crows are children’s stories failing to propagate by following these former strategies of linear progress, in a misplaced hope that they’ll magically lead children to a Truffula-before?

Rather than offering utopic direction, a more honest environmental picturebook would take up Little Bear and Grosz’s calls to instigate strategies of renewal and becoming right here and now. Such a genre would set aside the dreams of the past. It would instead seek out new rhythms, and reckon more soberly with the irreversibilities of cause and effect. It would invest in sustainable processes that acknowledge the ongoing realities of flux. It would moreover acknowledge the human propensity toward division and bifurcation which limits our contributions to a world of natural proliferation. That is to say: a temporally grounded environmental picturebook would admit that promising a given future is impossible. Rather, it would prepare readers for unknown futures, teaching them instead to thrive in a world of change.

Conclusion

As a genre marketed to parents and read to children, environmental picturebooks seek to produce eco-conscious humans without prematurely disturbing the innocence of youth. To satisfy these conflicting demands, books like *Look After Us*, *The Mess That We Made*, and *The Lorax* are prone to pretending the arrow of time might somehow bend backward. They suggest that the linear principles of cause-and-effect which conditioned our present environmental crisis might be ignored, unwound, or reset, returning the world to a mythic, stable state which supposedly existed before humans showed up to interfere. In hopes of a future that might revive the nostalgia of the past, such books wind up merely replicating the same failed strategies of the present. “Look After Them.” “Clean the Ocean.” “Care a whole awful lot.” But time does not repeat, nor stand still. By trying to both warn and to comfort (to be both the metaphoric fire alarm and patted back), such books are therefore caught up advocating temporal impossibilities.

In order to offer a truly possible future, environmental picturebooks must consider temporal frameworks that account for how time actually works. Rather than a straight arrow, or a frozen moment, temporality is better represented when shown in dynamic flow. In this regard, the picturebook medium may be especially fruitful when it encourages reader interaction. As this project has shown, reader interactions—materially limited by the virtualities of existing pages, but open-ended to multiplicities of speed, pace, and delay—are able to emphasize temporal processes rather than advocating for pre-set goals. It is through such interactions that picturebooks can transcend the spatial limitations of the medium, and attend not to where time is leading, but to how time actually moves.

As such, rather than educating readers about a stable past, or directing them toward a utopic future, the greatest environmental strength of picturebooks may be in inviting readers to interact with sustainable present processes that embody the real flow of time. After all, it is the

reader who brings stability to the dynamic cycle of *Tap the Magic Tree*. It is likewise the reader who brings lived duration and becoming to *TVHC*. Perhaps, by attending to interactive modalities which emphasize the actual passage of time, the environmental picturebook genre can generate offerings that are truly new, open-ended, and above all *realistic* in their invitations to futurity.

Works Cited

- “About Eric Carle.” *The Eric Carle Museum of Picture Book Art*, 2021,
www.carlemuseum.org/about/about-eric-carle.
- Adam, Barbara. *Timescapes of Modernity*. Routledge, 1998.
- Amazon. 2023, www.amazon.ca/Mess-That-We-Made/dp/1947277146. Accessed 28 June 2023.
- Ashby, Neil. “Relativity and the Global Positioning System.” *Physics Today*, May 2002, pp. 41-47. doi.org/10.1063/1.1485583.
- Bader, Barbara. *American Picturebooks: from Noah’s Ark to the Beast Within*. MacMillan, 1976.
- Barr, Catherine et al. *The Story of Climate Change: A First Book About How We Can Help Save Our Planet*. Frances Lincoln Children’s Books, 2021.
- Bastian, Michelle. “Fatally Confused: Telling the Time in the Midst of Ecological Crises.” *Environmental Philosophy*, vol. 9, no. 1, 2012, pp. 23-48.
- Beauvais, C. L. *The Mighty Child*. John Benjamins Publishing Co., 2015.
- “Bergson and Time.” *In Our Time* from BBC, 9 May 2019,
www.bbc.co.uk/programmes/m0004s9w.
- Brock, Jim P., and Kenn Kaufman. *Field Guide to Butterflies of North America*. Houghton Mifflin Harcourt, 2003.
- Buis, Alan. “Milankovitch (Orbital) Cycles and Their Role in Earth’s Climate.” *NASA*, 27 Feb. 2020, climate.nasa.gov/news/2948/milankovitch-orbital-cycles-and-their-role-in-earths-climate/.
- Campbell, Rod. *Dear Zoo*. MacMillan, 1982.
- Campbell, Rod. *Look After Us*. MacMillan, 2021.
- Carle, Eric. *The Very Hungry Caterpillar*. Philomel Books, 1982.

- Carrington, Damian. "Want to Fight Climate Change? Have Fewer Children." *The Guardian*, 12 Jul. 2017, www.theguardian.com/environment/2017/jul/12/want-to-fight-climate-change-have-fewer-children.
- "Children's Picture Books." *Publishers Weekly*, 2023, www.publishersweekly.com/pw/nielsen/kidspicture.html.
- Christ, Tanya, et al. "Kindergartener's Meaning Making with Multimodal App Books: The Relations Amongst Reader Characteristics, App Book Characteristics, and Comprehension Outcomes." *Early Childhood Research Quarterly*, vol. 47, no. 2, 2019, pp. 357-372.
- Connolly, William E. *Pluralism*. Duke UP, 2005.
- Curry, Alice. *Environmental Crisis in Young Adult Fiction*. Palgrave MacMillan, 2013.
- Deamer, David. *Deleuze's Cinema Books*. Edinburgh UP, 2016.
- Deleuze, Gilles. *Bergsonisms*. Zone Books, 1988.
- Dimick, Sarah. "Disordered Environmental Time: Phenology, Climate Change, and Seasonal Form in the Work of Henry David Thoreau and Aldo Leopold." *ISLE*, vol. 25, no. 4, 2018, pp. 700-721.
- Dreyfus, Hubert. "The Ordinary Conception of Time." *Phil* 189, Spring 2008, UC Berkeley, archive.org/details/ucberkeley_webcast_itunesu_461120614.
- Edelman, Lee. *No Future*. Duke UP, 2004.
- Ehlert, Lois. *Waiting for Wings*. Harcourt, 2001.
- Ferguson Fuller, Sandy. "Book Review: The Mess That We Made." *YOGA + life*, Summer 2020, <https://yogalifelive.com/book-review-the-mess-that-we-made-by-sandy-ferguson-fuller/>.
- Flashlight Press*. 2023, flashlightpress.com/the-mess-that-we-made/.

- Furenes, May Irene, et al. "A Comparison of Children's Reading on Paper Versus Screen: A Meta-Analysis." *Review of Educational Research*, vol. 91, no. 4, 2021, pp. 483-517.
- Gaard, Greta. "Toward an Ecopedagogy of Children's Environmental Literature." *Green Theory & Praxis: The Journal of Ecopedagogy*, vol. 4, no. 2, 2008, pp. 11-24.
- Green, Dennis H. *Language and History in the Early Germanic World*. Cambridge UP, 1998.
- Grosz, Elizabeth. "All Too Human: A Conversation with Elizabeth Grosz." *Qui Parle: Critical Humanities and Social Sciences*, vol. 25, no. 1-2, 2016, pp. 17-33.
- . "Thinking the New: Of Futures Yet Unthought." *Symplokē*, vol. 6, no. 1/2, 1998, pp. 38-55.
www.jstor.org/stable/40550421.
- . *Time Travels*. Duke UP, 2005.
- Guerlac, Suzanne. *Thinking in Time: An Introduction to Henri Bergson*. Cornell UP, 2006.
- Halliwell, James Orchard. *The Nursery Rhymes of England: Collected Chiefly from Oral Tradition*. 4th ed., John Russell Smith, 1846, pp. 175-78.
- Haraway, Donna J. *Staying with the Trouble: Making Kin in the Chthulucene*. Duke UP, 2016.
- Heneghan, Liam. *Beasts at Bedtime*. Chicago UP, 2018.
- Higonnet, Margaret R. "The Playground of the Peritext." *Children's Literature Association Quarterly*, vol. 15, no. 2, 1990, pp. 47-49. doi.org/10.1353/chq.0.0831.
- Huebener, Paul. *Nature's Broken Clocks*. Regina UP, 2020.
- . "Timely Ecocriticism: Reading Time Critically in the Environmental Humanities." *ISLE*, vol. 25, no. 2, 2018, pp. 327-344. doi.org/10.1093/isle/isy037.
- . *Timing Canada*. McGill-Queen's, 2015.
- Indigo. 2023, www.chapters.indigo.ca/en-ca/books/the-very-hungry-caterpillar/9780399226908-item.html?ikwid=the+very+hungry+caterpillar&ikwsec=Books&ikwidx=0#algoliaQueryId=d6361c6f7b29eb9b02514dfae2ef0428. Accessed 28 June 2023.

Iser, Wolfgang. *The Act of Reading: A Theory of Aesthetic Response*. Johns Hopkins UP, 1978.

Jaarsma, Ada. "Critical Disability Studies and the Problem of Method." *Transdisciplinary Feminist Research*, edited by Carol A. Taylor, Christina Hughes, and Jasmine B. Ulmer, Routledge, 2020, pp. 16-28.

Jabr, Ferris. "How Does a Caterpillar Turn into a Butterfly?" *Scientific American*, 10 Aug. 2012, www.scientificamerican.com/article/caterpillar-butterfly-metamorphosis-explainer/.

Joyce, Melanie. *Little Acorn*. Scholastic, 2019.

Kokkola, Lydia. "Hands on Reading: The Body, the Brain, and the Book." *The Embodied Child*, edited by Roxanne Harde and Lydia Kokkola, Taylor and Francis, 2017, pp. 191-205.

Kolbert, Elizabeth. "Greenland is Melting." *The New Yorker*, 17 Oct. 2016, www.newyorker.com/magazine/2016/10/24/greenland-is-melting.

Kricher, John C. *The Balance of Nature: Ecology's Enduring Myth*. Princeton UP, 2009.

Latour, Bruno. *Facing Gaia: Eight Lectures on the New Climatic Regime*. 2015. Translated by Catherine Porter, Polity Press, 2017.

---. *We Have Never Been Modern*. 1991. Translated by Catherine Porter, Harvard UP, 1993.

Lennon, Julian, and Bart Davis. *Heal the Earth*. Illustrated by Smiljana Coh, Sky Pony Press, 2018.

Little Bear, Leroy. "356,000 Ways 'To Go'!: Native American and Western Science: the Possibilities for a Powerful Collaboration." *Fifth Annual Nortel Canadian Studies Address*, 2004.

---. "Aboriginal Rights and the Canadian 'Grundnorm'." *Arduous Journey: Canadian Indians and Decolonization*, edited by J. Rick Ponting, McClelland and Stewart, 1986, pp. 243-259.

- . "Aboriginal Self-Government and Treaties: A Discussion." *Federalism and the New World Order*, edited by Stephen Randall and Roger Gibbins, Calgary UP, 1994, pp. 183-195.
- . "Jagged Worldviews Colliding." *Reclaiming Indigenous Voice and Vision*, edited by M. Battiste, University of British Columbia Press, 2000, pp. 77-85.
- . "Land: The Blackfoot Source of Identity." Beyond Race and Citizenship: Indigeneity in the 21st Century Conference, 28-30 Oct. 2004, University of California, Berkeley.
- . Preface. *On Creativity*, by David Bohm, Routledge, 2005, pp. viii-xiv.
- Little Bookworm. 2023, www.littlebookworm.com.my/the-very-hungry-caterpillar. Accessed June 2023.
- "Lorax." *Archive.org*, 1 Nov. 2013, archive.org/details/theloraxbydrseus00/.
- Lord, Michelle. *The Mess That We Made*. Illustrated by Julia Blattman, Flashlight Press, 2020.
- MacKay, Elly. *If You Hold a Seed*. Running Press, 2013.
- MacKey, Margaret. *Literacies Across Media: Playing the Text*. Routledge, 2003.
- Mader, Mary Beth. *Sleights of Reason: Norm, Bisexuality, Development*. State University of New York Press, 2012.
- Makhijani, Pooja. "Speaking for the Trees: 'The Lorax' Celebrates 50 Years." *Publishers Weekly*, 5 Feb. 2021, www.publishersweekly.com/pw/by-topic/childrens/childrens-book-news/article/85510-speaking-for-the-trees-the-lorax-celebrates-50-years.html.
- Mangen, Anne and Theresa S. S. Schilhab. "An Embodied View of Reading." *Skriver! Les!*, edited by Synnøve Matre and Atle Skaftun, Akademika, 2012, pp. 285-300.
- Matheson, Christie. *Tap the Magic Tree*. HarperCollins, 2013.
- . *Touch the Brightest Star*. HarperCollins, 2017.
- May, Todd. *Gilles Deleuze: An Introduction*. Cambridge UP, 2005.
- McAnulty, Stacy. *Our Planet! There's No Place Like Earth*. Henry Holt and Co., 2022.

- McCloud, Scott. *Understanding Comics*. William Morrow Paperbacks, 1994.
- McKenna, Phil. "Butterflies Remember Caterpillar Experiences." *NewScientist*, 5 Mar. 2008, www.newscientist.com/article/dn13412-butterflies-remember-caterpillar-experiences/.
- Munzer, Tiffany G., et al. "Differences in Parent-Toddler Interactions with Electronic Versus Print Books." *Pediatrics*, vol. 143, no. 4, 2019.
- Nikolajeva, Maria. *From Mythic to Linear: Time in Children's Literature*. Children's Literature Association, 2000.
- Nixon, Rob. *Slow Violence and the Environmentalism of the Poor*. Harvard UP, 2011.
- Nodelman, Perry. *The Hidden Adult: Defining Children's Literature*. Johns Hopkins UP, 2008.
- . *Words About Pictures: The Narrative Art of Children's Picture Books*. Georgia UP, 1988.
- Redling, Adam and Deanne Toto. "China Announces Import Ban on an Additional 32 Scrap Materials." *Recycling Today*, 19 April 2018, www.recyclingtoday.com/news/china-bans-solid-waste-imports/.
- Rifkin, Mark. *Beyond Settler Time: Temporal Sovereignty and Indigenous Self-Determination*. Duke UP, 2017.
- Rose, Deborah Bird. "Multispecies Knots in Ethical Time." *Environmental Philosophy*, vol. 9, no. 1, 2012, pp. 127-140.
- Seuss, [Theodor Geisel]. *The Lorax*. Random House, 1971.
- Seymour, Nicole. *Strange Natures*. Illinois UP, 2011.
- Sheldon, Rebekah. *The Child to Come: Life After the Human Catastrophe*. Minnesota UP, 2016.
- Sipe, Lawrence R. "The Art of the Picturebook." *Handbook of Research on Children's and Young Adult Literature*, edited by Shelby Wolf, Karen Coats, Patricia A. Enciso, and Christine Jenkins, Routledge, 2011, pp. 238-251.

Sipe, Lawrence R., and Anne E. Brightman. "Young Children's Interpretations of Page Breaks in Contemporary Picture Storybooks." *Journal of Literacy Research*, vol. 41, no. 2, 2009.

doi.org/10.1080/10862960802695214.

Stahl, Bethany. *Save the Ocean*. Bethany Stahl, 2019.

Stirling, Bridget. "Childhood, Futurity, and Settler Time." *Journal of Childhood Studies*, vol. 47, no. 3, Jan 2022. doi.org/10.18357/jcs202219927.

"Teacher's Top 100 Books for Children." *National Education Association*, 3 Mar 2018,

web.archive.org/web/20130730194044/http://www.nea.org/grants/teachers-top-100-books-for-children.html. Accessed 28 June 2023.

Team Eric Carle. "Many of You Ask." *The Official Eric Carle Website*, 22 Aug. 2019,

<https://eric-carle.com/faq-items/>.

Teer, Kaitlyn. "Watching the Clock: On Parenting in the Climate Crisis." *Catapult*. 19 Sept.

2022, catapult.co/stories/kaitlyn-teer-mother-of-all-messes-deep-time-parenting-climate-crisis.

"Top 100 Picture Books Poll Results." *School Library Journal*, 6 July 2012,

afuse8production.slj.com/2012/07/06/top-100-picture-books-poll-results/. Accessed 28 June 2023.

Wallace-Wells, David. *The Uninhabitable Earth: Life After Warming*. Tim Duggan Books, 2019.

Williams, N. and H. T. Dublin. "Charismatic Megafauna as 'Flagship Species'." *Priorities for the Conservation of Mammalian Diversity: Has the Panda Had its Day?*, edited by A.

Entwistle and N. Dunstone, Cambridge UP, 2000, pp. 53-81.

World Wildlife Fund. "Species Directory." 2023, www.worldwildlife.org/species/directory.

Yunkaporta, Tyson. *Sand Talk: How Indigenous Thinking Can Save the World*. HarperOne, 2020.