



CONTEMPORARY FICTION VS. THE CHALLENGE OF IMAGINING THE TIMESCALE OF CLIMATE CHANGE

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Humanity's impact on the planet has become so profound that our presence will be discernible as a separate stratigraphic layer, therefore we are—for now still unofficially—living in a new geological epoch, the Anthropocene.¹ Despite the growing scientific knowledge about the anthropogenic causes and the consequences of climate change—the most salient manifestation of the Anthropocene—little effective action is taken, either by governments or individuals.² Cultural responses to the problem might help make people care about and relate to it. Writing about climate change and the Anthropocene, however, confronts writers with formal challenges. In this essay we will discuss three novels that seek to capture the temporal dimensions of climate change and the Anthropocene more generally.³

In the Anthropocene humankind “rivals some of the great forces of Nature” and “has become a global geological force in its own right” (Steffen et al. 843). As a consequence there will be a time in the future, after the extinction of humankind, when “the planet will bear the scars of a species having created such impact on the planet that their existence will be discernible as a distinct geological strata [*sic*]” (Colebrook, “TAA”). Although the Anthropocene's status as a geological unit has yet to be formally recognized, the term is already widely used in scientific discourse as well as in the humanities and social sciences, and has even started to make its way into popular discourse (Steffen et al. 843). The name emphasizes “the central role of mankind in geology and ecology” and the impact of human activities on the planet (Crutzen and Stoermer 17). Paradoxically this epoch denotes a time in which we are becoming increasingly aware that we are just one of many species that might go extinct, and that there will be a time after us, thus complicating the anthropocentrism that has characterized our culture for centuries.

The strange thing about the Anthropocene is that it is a kind of “prospective archaeology”: it will only be detectable as a geological stratum after humans have ceased to exist (or, at least, after the modern, industrial way of living has ended). To think about such a possibility, Richard Klein points out, we need to imagine a future in which our future has already become the past; “we need the future perfect tense” (83). There will be no archaeologists or geologists with instruments to excavate our artifacts or to investigate the stratigraphic signals we will have left because it will be after the total destruction of the archive (83). Klein refers to Jacques Derrida’s idea of the archive as not just the material sources but also “all the systems of cataloguing and retrieval that make access to it possible, not to mention the infrastructure and markets that sustain it” (83). Even if there are survivors, civilization will have been terminated, Klein explains, “not because material fragments won’t remain, but because its organizing systems will have been lost” (83). Imagining the Anthropocene means imagining “the end of social memory, hence the loss of social mourning. There will be no one left to record the absence of the historian, no archive left that might permit the act of recovery” (83).

The idea of the Anthropocene thus opens up the possibility to extend the time of the novel to inhuman temporalities, but at the same time it confronts writers with formal literary problems (Colebrook, “TAA”). If we imagine a time after human extinction, we have to imagine a future from which organized social memory will have disappeared (Klein 83). We can think of a time when we no longer exist, but “[h]ow would we imagine ourselves as if viewed from a position beyond the humanly inscribed archive?” (Colebrook, “TAA”). In this context Klein speaks about the “pragmatic problem of enunciation”: if the destruction is total, “there will have been no future in our future,” no one to tell our story retrospectively (84). Colebrook believes imagining the Anthropocene requires a mode of “impersonal imaging” (“Introduction” 27): one imagines a reading in the absence of readers using “images in the present that extinguish the dominance of the present” (“Introduction” 28). She ponders upon what this implies:

What happens if one thinks of the vision of no one, of the human world without humans that is still there to be seen? What remains might still take the form of “a” vision or referring eye—the scene of a human world as if viewed without any body....The Anthropocene thought experiment also alters the modality of geological reading, not just to refer to the past as it is for us, but also to our present as it will be without us. (“Introduction” 27)

Who or what will narrate the history of our existence? How will our geological stratum be read or interpreted? Klein maintains that, despite the impossibility of a human eye looking back upon the Anthropocene, “we still need to imagine such a future historian in order to speak in the present about a catastrophic destruction of organized life about which it will not have been possible to

speak historically” (84). Representing the end is necessarily fictional, because representation always postdates what it describes, he explains, referring to Derrida’s idea of the destruction of the archive as a fable. The end is “an event that cannot in principle be reliably described” because “if it arrived it could not be represented, socially remembered or mourned” (84). Paradoxically, we have to “abstract [the Anthropocene] from the human eye and its reading of the inhuman past, to imagine what would be readable, after humans, in a mode analogous to the human eye” (Colebrook, “Introduction” 24).

On top of the challenges of imagining the Anthropocene comes the challenge of representing climate change, one of its defining symptoms. It is very difficult, if not impossible, to get a grip on global warming, since it is what Timothy Morton calls a hyperobject: something that is “massively distributed in time and space relative to humans” (1). As a consequence, we can only see pieces of climate change at any one moment; we can never see it completely (4). In fact, we cannot even see or experience global warming directly, but only the local and temporal manifestations of this vast entity: a hot summer or long periods of rain are not the hyperobject global warming itself. The scales are so gigantic that even the digital devices we use to measure them have trouble modeling them in a realistic way (Morton 47-48), which is why Rob Nixon calls climate change a form of “slow violence” (2). Normally violence is conceived as something that is “immediate in time, explosive and spectacular in space,” but slow violence occurs gradually and out of sight and is attritional (2). It is “a delayed destruction that is dispersed across time and space”: although the effects are disastrous, they are played out across a range of temporal and spatial scales that mostly exceed the human scale (2). Moreover, slow violence disasters are “anonymous” and “star nobody” (2). Clear villains and a direct cause and effect are standard ingredients for a satisfying narrative, but this is exactly what is missing when one deals with climate change (Trexler 205). Writers of climate fiction are faced with the problem that climate change is not, in the traditional sense, dramatic, or, as Timothy Clark describes it, with “the tragedy that climate change is not ‘interesting’” (*Ecocriticism* 175). It exceeds human perception and can only be understood as a complex, multi-layered network of relations stretched out both in time and in space. To understand climate change one needs to go beyond normal human experience.

Thinking and, by extension, writing about the Anthropocene in general or climate change in particular thus requires a zooming out: these phenomena disrupt the scale at which we typically think (Clark, “Derangements” 153). Timothy Clark therefore proposes the idea of a “hypothetical scale” on top of the personal and socio-historical scales that literary critics typically use. This third scale adopts a much larger perspective both temporally and spatially, for example half a millennium and the whole earth. Although Clark is concerned with ways of reading, the hypothetical scale is also very useful for writers who

take on climate change. On this third scale a character becomes a physical entity, representing “not the personality, but the ‘footprint’” (Clark, “Derangements” 161). A scaled reading, or writing that takes these three scales into account, reveals a paradox of climate change: on the hypothetical scale humanity has become a geological force, but simultaneously this scale makes the individual person all but insignificant (161).

Because of its immense spatial and temporal scales, climate change challenges authors to innovate in order to adequately represent it in a way that appeals to readers. Clark wonders whether that is even possible: “are the limits of imaginative engagement emerging [in art] merely the limits of now anachronistic cultural conventions...[o]r more profoundly, does the Anthropocene form a threshold at which art and literature touch limits to the human psyche and imagination themselves?” (*Ecocriticism* 175-76). His question remains unresolved. What is clear is that writers who attempt to convert the slow violence of climate change into compelling narratives and/or images are faced with narrative and representational challenges:

To confront slow violence requires, then, that we plot and give figurative shape to formless threats whose fatal repercussions are dispersed across space and time. The representational challenges are acute, requiring creative ways of drawing public attention to catastrophic acts that are low in instant spectacle but high in long-term effects. To intervene representationally entails devising iconic symbols that embody amorphous calamities as well as narrative forms that infuse those symbols with dramatic urgency. (Nixon 10)

Nixon argues that in order to engage with slow violence and bring it to life emotionally, we need to make it “apprehensible to the senses through the work of scientific and imaginative testimony” (10). In human perception sight is the dominant sense, but climate change is by definition invisible. Writers who take the temporality of climate change as the central concern of their novels therefore have to find ways to represent the “seemingly unrepresentable” (Johns-Putra 274): an invisible aspect (time) of an imperceptible phenomenon (climate change) in an unimaginably large time period (the Anthropocene).

The temporal dimension of climate change is a salient feature in the three very different novels that we will go on to analyze: Richard McGuire’s *Here* (2014), Dale Pendell’s *The Great Bay: Chronicles of the Collapse* (2010), and Jeanette Winterson’s *The Stone Gods* (2007).⁴ The graphic novel *Here* focuses on one corner of a room and what happens, happened, and will or could happen there throughout years, decades, centuries, millennia, and even outside the scope of human existence, from three billion years ago until the year 22,175 AD. *The Great Bay* narrates a fictional future history of California’s Central Valley, where a great bay forms due to rising sea levels. The novel is a collage of texts from different sources such as newspaper articles, history books, interviews, diaries, and geographical maps of this area, which are grouped

together in chronologically ordered chapters that cover a time span from 2021 AD to 16,000 AD, during which the human population decreases dramatically as a consequence of climate change and a global pandemic. In *The Stone Gods* Winterson interleaves three allegorical narratives about anthropogenic climate change: the first is set just before the extinction of the dinosaurs sixty-five million years ago, the second in the eighteenth century, and the third in our near future, later this century.

In all three of the works the narrated time far exceeds the average human life span, which seems a logical consequence of the writers' shared interest in the geological timescale. In other aspects, however, the temporal constructions of *Here*, *The Great Bay*, and *The Stone Gods* are very different. The ways in which McGuire, Pendell, and Winterson imagine geological time resonate respectively with Barbara Adam's notion of the timescape, Nixon's concept of slow violence, and Clark's destructive doubles. It is worthwhile to analyze these works side by side to see what kind of innovations dealing with the geological timescale might provoke, and to what extent these innovations are effective in envisioning the timescale of climate change in a way that engages the reader's "emotional interest" (Clark, *Ecocriticism* 181). After all, as Clark argues, artistic work about the Anthropocene "has the challenge of somehow mapping it onto those topics and psychological and cognitive structures that constitute the 'interesting'—not just for a small number of critical specialists, but for most human beings" (176).

An Artistic Translation of a Timescape

In *Timescapes of Modernity* (1998) Barbara Adam proposes the notion of timescapes to conceptualize the towering and complex temporality of environmental destruction. Analogical to a landscape that "mark[s] the spatial features of past and present activities and interactions of organisms and matter," a timescape "stresses the temporal features of living": it emphasizes the rhythmicities, timings and tempos, the changes and contingencies of these activities and interactions (10). Just like a landscape, a timescape is receptive to absences, latencies, and interdependencies. Even more than a landscape, it points our attention to what is invisible and beyond the reach of our senses (55). A timescape shifts the emphasis from space to time: it can establish connections between multiple time-lags, stresses the importance of timing, and places processes in an intergenerational time-frame of analysis. It encompasses irreversibility and indeterminacy. Because of these qualities, Adam argues, a timescape "help[s] us to move away from the futile insistence on proof and certainty for situations characterised by indeterminacy, time-lags of unspecifiable durations and open dispersal in time and space" (55). As such it can help us to conceptualize the timescale of global warming, or, as Adam puts it, help us to "grasp environmental phenomena as complex temporal, contextually specific wholes" (54-55).

In *Here* Richard McGuire uses and innovates the panel organization to capture the geological timescale, and in doing so can be seen to turn his graphic novel into a literary translation of a timescape. McGuire opts for a non-human protagonist: the location of his childhood home. The novel starts with an image of the corner of a room that is shown as a double page spread, and from the next page onward the artist begins to leap back and forth through time, while the point of view stays fixed on this corner. Instead of organizing frames into tiers, the artist superimposes panels onto one another to split time into multiple layers. Each double page spread features one colored image with a tag in the upper left corner that indicates the year, and within and over this frame other frames float. Every single one has a year tag, but the year, size, and number of those superimposed panels vary constantly. Traditionally comics show time as space across the page, through the succession of panels. McGuire's temporal structure, by contrast, seems to be through the pages, like windows opening into different times. This windows metaphor creates a paradoxical effect that is very suitable to imagine the geological timescale, since, as Lee Konstantinou points out, "McGuire's little windows pile up individually accessible, even semi-autonomous moments that in aggregate snow the reader under the hideous size of time" (13-14)

Another effect of this formal innovation is that it strongly foregrounds the interdependencies and connections between the frames (and by extension between times). The only narrative element that connects all panels in *Here* is the spatial setting, and the form of the novel constantly draws attention to the non-narrative connections between the panels, or the so-called "translinear organization" (Baetens and Frey 106). McGuire braids different, narratively unconnected moments from different years together by using non-narrative similarities. He creates connections between times using semantic, thematic, chromatic, or iconic resemblances. At other times he uses rhyme or creates the impression that people from different times interact. These braiding techniques establish numerous translinear connections between the different times and stimulate the reader to develop a plurivectoral, non-sequential reading habit. McGuire further enhances the feeling of connectedness by removing the gutter: there is literally no distance between the different times; they directly border on one another, which creates an even closer relation between them. One double page spread, for example, shows thirteen small frames that contain text balloons with name-calling together with six frames that all show glass breaking. Apart from these semantic and thematic connections, the frames are seemingly connected by an action-reaction relation: five times the breaking of glass can be directly linked to humans, and the words seem to react to this event, suggesting that a human caused the breaking. McGuire's use of the linear and rigid calendar time (the date tags) is thus complicated by the form: time, *Here* seems to suggest, is not simply linear, but multidimensional, and just like Adam's concept of the

timescape, McGuire's form helps us comprehend this temporal complexity of undetermined interdependencies.

The layered panel organization also draws the reader's attention to what remains invisible and to what is absent. If one panel partly covers another, the reader becomes aware of the fact that he or she cannot see the whole picture, an effect that becomes even stronger in combination with the fragmented and partial stories that the frames contain; you do not get the feeling that you get to know the complete stories, but rather that you temporarily phase into times of which you can only catch a few glimpses. As a reader you still look for closure and try to connect the frames, but often the absences are too big. This links to climate change, which is similarly characterized by a phasing in and out of human time and is also impossible to see as a whole (Morton 77). By jumping back and forth through millions of years, McGuire makes us aware of absences in the timescape: people, animals, or trees that were or will be present in this location, but that are not there right now. The best example of this is probably the room itself: the first seven double-page images show the corner of the room in different times and seem to suggest that this corner will be the setting, but in the eighth image we see a forest that used to be there in 1623, but is gone now. Two superimposed panels of a cat and a woman that will at some point inhabit the house remind us of the absent building. In 2111 a flood destroys the house and turns the location into a water mass or lake; in 2213, when a tour guide shows tourists around and tells them about the house that once stood there, the location seems to have become a swamp; and in 2313 people in hazard suits are measuring the radiation level. In 8000 BCE there was a lake and the location is without any signs of human presence, just like in 22,175, when an as yet non-existing animal stares at the reader. Absences are thus included and resonate throughout the work, just as a timescape includes absences. McGuire seems to argue that "[w]e may experience time as a mundane sequence of moments... but we should not forget that other times are equally real, existing *where* (if not *when*) we stand" (Konstantinou 5).

The layered structure can thus be read as a visual translation of the complex temporality of climate change, and the form highlights the characteristics of timescapes. Every panel is like a window opening into another time, and on the one hand this windows metaphor makes the invisible, incomprehensible, inhuman vastness of time accessible to the reader, but on the other the multiplication of layers stresses the complex and multidimensional nature of this timescale: time becomes multidimensional, spreading across and through the pages, forward and backward.

The form of *Here* also evokes the Anthropocene: the panel organization creates the illusion of the book as a pile of stratigraphic layers. If one reads McGuire's graphic novel as an archaeological site, the narrating instance is a kind of future stratigrapher that digs into the history of the Earth and of humanity and that exposes fragments of different times on an archaeological

site at the location of the house somewhere in the distant future. Some of the exposed layers contain traces of humans or human civilization, but McGuire also shows us a time before and after human existence. He uses Klein's idea of the future historian in combination with what Peter Brooks describes as the "anticipation of retrospection" (23). In fiction convention encourages the reader to view the past as present: the default grammatical tense of narrative is the preterite (Currie 30). However, "[i]f the past is to be read as present, it is a curious present that we know to be past in relation to a future we know to be already in place, already in wait for us to reach it," and the temporal structure of narrative is therefore characterized by an anticipation of retrospection (Brooks 23). The advantage of the comic form is that the narrator—the stratigrapher—can remain implicit and does not express him-, her-, or itself through language, but only through organization. As the perceptual source, the narrator of *Here* is thus not personalized, but has a "non-character-bound perspective," which, Kai Mikkonen notes, "is coded for transparency: while showing and framing a field of vision, it does not presuppose a human narrator or a reporter" (312). This comes close to what Colebrook calls the "mode of impersonal imaging," "the scene of a human world as if viewed without any body" ("Introduction" 27-28). McGuire deploys the medium-specific narratological characteristics of the graphic novel form to solve the problem of enunciation by combining a prospective retrospection with an impersonal imaging.

Several story fragments in *Here* support the reading of the form of the book as representing stratigraphic layers. The first is about a team of the archaeological society that takes an interest in the house in 1986 because they believe it could be an important site for the study of Native American culture. Of course, this team is looking backwards in time, but at the same time one member is wearing a T-shirt that says: "FUTURE TRANSITIONAL FOSSIL." The T-shirt's slogan thus looks forward to a time after human extinction and refers to human remains as a biostratigraphic signal of the Anthropocene. Secondly, fragments from 1204, 1609, and 1624 show that Native Americans indeed used to live here, which reinforces the suggestion that the book itself represents an archaeological site, and thirdly, there is an archaeological tour that visits the site in 2213. The guide has a hologram device, which, she explains, "through [a] reconstruction and visualization program" makes it possible to get access to the twentieth-century home. The hologram shows the house at different times with specific details that are also present at the same position in the house (and thus on the page) elsewhere in the graphic novel: the poster of a Vermeer used to hang in the house in 2015, the bird cage stood in front of the window in 1990, the painting on the left wall is from 1941, the clock on the mantelpiece from 1930. This hologram device can thus be read as a symbol for the construction of *Here* as a whole: a device used by an archaeologist that opens windows on the past.

At some points McGuire also deals with the Anthropocene thematically, by depicting scenes that refer to the markers human existence will leave in the rocks and that will define the epoch. In 2313 the site has become radioactive, and people in hazard suits are depicted while they are measuring the radiation level. The graphic novel also depicts rising sea levels, and the panel organization implies that these are anthropogenic. Take, for example, the page with the breaking glass. In five panels it can be directly linked to humans, in the sixth panel a flood breaks the window in 2111 and in isolation from the other frames, there is no hint of a human cause. However, by placing this panel on the same page as the other ones, McGuire hints at anthropogenic climate change, while at the same time refraining from establishing clear cause-and-effect chains. The translinear organization allows the reader to identify possible connections, not certain connections. This is typical of McGuire's approach: *Here* mostly evokes the Anthropocene and climate change indirectly. It is worth noting that the characters in their everyday life stories seem unaware of the third level: most of them experience no effects of climate change, and throughout the book manifestations of climate change occur only a few times. This is very similar to how most Westerners today experience—or, rather, do not experience—global warming.

A Novel at the Pace of Climate Change

Whereas McGuire's primary focus is on time itself, Pendell turns his attention specifically to the timescale of anthropogenic climate change, particularly the long-lasting effects of our current civilization on the Earth's biosphere, which explains why *The Great Bay* is future-oriented. It also accounts for the more linear and unidirectional depiction of time. The novel starts in the year 2021 and then adapts its pace to that of climate change to end sixteen thousand years later, bringing the effects that are invisible from a human timeframe to the fore. The writer chooses a chronological order, with increasing intervals between the chapters. Each chapter contains texts from another time period and starts with a section titled "Panoptic": a description by an omniscient third-person narrator of the climatic and ecological changes of the world and in particular of Central Valley in California, where a "Great Bay" forms.

Just like McGuire, Pendell opts for a location as the protagonist of his novel: instead of one human being's life history, he narrates the (future) history of this "Great Bay" and the human population living there from 2021 onward, when civilization suddenly collapses due to a pandemic. Pendell decenters the human experience and shifts the attention to the slow violence of anthropogenic climate change. He prioritizes Clark's hypothetical scale and the scale effects that come with it: as individuals the characters do not have much influence, but cumulatively humanity is very destructive, leaving an imprint on the Earth that will be discernible for millennia ("Derangements" 158). Throughout the book Pendell juxtaposes the life cycles of humans, communities, and entire societies

with the temporal undulation of global warming to stress the difference in scale, and this is particularly prominent in the diary of a monk (129-86). “The Great Trek,” as this section is called, is by far the longest excerpt in the book, but it narrates a journey of hardly more than three months. For the monk, however, the journey is long: he measures the time in days and the distance in miles, and on 12 June he has “been traveling through sagebrush for over two months” (172). This scale stands in stark contrast with that of the Earth, which “had entered a Pliocene climate in half a millennium,” as the narrator tells us right after the journal (187). For humans, this may seem forever, but this warmer period is transient, because another five hundred years later the earth starts to cool off. The word choice emphasizes the timescale of global warming: ten thousand years after the collapse what “may have been the shortest interglacial in geological history...went off like a flashbulb.” The narrator says that “[i]t was getting cold, and very quickly,” leaving it up to the reader to imagine how fast “very quickly” is on a geological timescale (267).

Who (or what) this narrator is never becomes clear: the narrator does not provide any information about him-, her-, or itself, whether biographical or emotional, but just like McGuire, Pendell makes use of the anticipation of retrospection to create the feeling that this narrator (and by extension the reader) is looking back on our time. The novel can be read as a sort of future history of the Great Bay area and is told retrospectively: the narrator uses the past tense and has an overview over the entire time period covered. This suggests that this entity lives more than sixteen thousand years from now. It is possible that the narrator of *The Great Bay* is not even supposed to be human, but rather some intelligent entity that will have come into existence at some time in the distant future, and in that case Pendell’s depiction of the narrator can be read as an attempt to arrive at the “impersonal imaging” that Colebrook sees as a requirement for imagining the Anthropocene (“Introduction” 27). The language that the narrator uses, however, is that of a contemporary climate scientist and, in addition to that, the way the narrator looks at the world and the extent to which he, she, or it can make sense of it suggest a familiarity with our contemporary world and scientific knowledge. A telling example in this context is that the narrator describes the human population in the period 2521–3020 by referring to our distant past, as “resembl[ing] the Bronze Age” (215). He, she, or it also has access to our predictions about climate change: “None of the climate models for global warming had accurately predicted what occurred, but all of them were partially correct,” the narrator tells us (123). It is highly unlikely that the knowledge of and about these climate models would have survived the Collapse. As a consequence the narrator seems more like a detached contemporary human scientist projected thousands of years into the future than like a future non-human entity. The impersonal tone of the narrator thus does not lead to an impersonal imaging because the way he or she understands and describes the different time periods strongly suggests

that he or she is human, and thus his or her viewpoint does not “extinguish the dominance of the present” (Colebrook, “Introduction” 28).

This contradictory position of looking back from the future from a contemporary point of view is also visible in the formal organization of the collage texts. Just like McGuire, Pendell uses the form of his novel to invoke the Anthropocene, but whereas McGuire structures his book as an archaeological site, Pendell’s is built up as a collage of texts collected and introduced by a future scientist, and this form stands for an archive of texts that survived the Collapse. After the Anthropocene, there will be “no archive left that might permit the act of recovery,” except for the stratigraphic signals that the human species will leave (Klein 83). With regard to the archive, Richard Klein therefore raises the question: “if after climate catastrophe organized society were somehow able, after many years, to reconstitute itself in another ecology, what will have been lost?” (85). Or, more precisely, what will have been left? Pendell tries to imagine such a future and attempts to solve this problem of enunciation by opting for a future historian narrator, whose proficiency and knowledge suggest that eventually another, highly-developed society will come into being, in which this narrator has composed a book containing fragments of texts that somehow survived. These texts do not have much in common, except that they are all related to the geographical area of the Great Bay, which suggests that the collection in the book is a presentation of fragments that will have been retrieved from that particular area. The original context and organization is lost, and they have been chronologically catalogued into a new archive. Alongside texts that were meant to be preserved (interviews, stories, and histories of communities), there are also a lot of texts that we would not normally consider important enough to conserve for future generations, like a report about a chess championship, a news article about a club that placed a new waterwheel, and a long fragment from a travel journal (121, 90, 129). The fragments mostly do not invite the reader to connect with the individuals: from a literary and emotional viewpoint these texts are often quite uninteresting, although they could be of great importance for a future scientist who wants to gain knowledge about human life at different times in the past. The headings above the found texts indicate the source and the place where the texts are conserved and thus support the idea that the book is a collection of old texts kept for study. The journal, for example, has the caption “Journal of Solomon the Monk, Library of Green Rock Temple, Clear Lake,” and the very last text, from the far future, is a myth called “The Caribou Hunters” from the “Archives of the Colleagues of Thermocene Studies” (129, 269).

Reading *The Great Bay* as a collection of texts retrieved in a distant future, however, only goes so far. Similar to the narrator that eventually seems to talk from a contemporary perspective, the selection and organization of the texts also suggest a looking forward rather than a looking backward. The texts become sparser the further we go into the future. This seems logical

from a contemporary point of view, since the future becomes more and more unimaginable, but viewed from a time beyond the eighteenth millennium this is rather strange: one would expect that a text from recent history is more likely to survive than one from fourteen millennia ago. This discrepancy can be partly explained by Pendell's view of the future. Civilizations collapse, and there is a sort of movement that mirrors our past development all the way back to the Bronze Age: literacy decreases, archiving institutions and systems disappear, and history writing regresses into myths and legends. In spite of that, it still seems rather implausible that the texts somehow survived these "dark ages"; furthermore, there must come a time when civilization starts to become more advanced and literate, otherwise the presence of all these archiving institutions would not be possible, and one would expect this future civilization to have a more detailed knowledge about its recent history than about its ancient history. This is not the case, however, and additionally the time periods become shorter the further they go into this future's past, which is also incongruent with a future perspective. If we look back at our history, not only do we know more about the twentieth century than about the Stone Age, but we also divide the former into smaller segments than the latter. This contradictory point of view is also reflected in some headings that precede the texts. On the one hand, texts from the period 2521–3020 are conserved by the Library of the Order of Antiquities, and those from 4021–7020 are catalogued in the Institute of Medieval History, suggesting a retrospective view, but on the other hand the indication of the years suggest a prospective view, all the way to "The Far Millennia" (223, 254, 269).

By matching the pace of his novel to the pace of global warming, Pendell brings the spatially and temporally dispersed manifestations of climate change within the reach of his novel and its reader. At the same time, the hyperobject mostly escapes the attention of the individuals that figure in the story fragments that take place on the first, personal level. *The Great Bay* can therefore be read as a literary response to Rob Nixon's question of how to make slow violence visible, while also challenging the privileging of the visible (15). Alexa Weik von Mossner argues that because Pendell replaces the "empathetic ties to individual human protagonists" with a "sense of awe and wonder in the face of the [Earth's] great transformations" (214), the novel runs the risk of losing the readers' empathic engagement (204). We believe that, due to the combination of the distanced, scientific narrator, the temporal organization, and the content of the collected texts, the novel indeed fails to engage a reader's emotional interest for the complex, high-scale, and often non-human topics that the narrator pays attention to. Although *The Great Bay* avoids the peril of "shift[ing] the fictional climate for the sake of drama" to make "climate change spectacular, dramatic, and containable in a single setting and a cast of characters" (Trexler 205-06), it is an example of another pitfall that Clark identifies: the text achieves a representationally more "accurate model of the

multiple realities of the Anthropocene,” but the novelist seems less concerned with “what gives a novel emotional force for a readership” (*Ecocriticism* 179).

A Tale of Destructive Doubles

In *The Stone Gods* Jeanette Winterson does stimulate readers to emotionally connect with the characters. While Pendell focuses on the slow violence of climate change, and while McGuire’s book explores the entire history of the Earth, Winterson’s primary focus is still the human scale, and she does not deal with the geological timescale in a formal way. Although the narrated time in *The Stone Gods* is roughly sixty-five million years, one does not get that feeling when reading the novel: in contrast with Pendell and McGuire, she does not narrate small fragments of many different times and lives, but zooms in on only three times and pairs of individuals. The first pair of protagonists lives approximately sixty-five million years ago, the second in the eighteenth century, and the last pair in the twenty-first century. Winterson’s choice of a first-person narrator for every part, respectively Billie (whom we will call Billie I from now on), Billy, and Billie (henceforth Billie II), allows the reader to identify easily with the protagonists, because he or she gets a lot of direct information about their emotions and thoughts. Moreover, by opting for first-person narratives, Winterson bypasses the problem of Colebrook’s impersonal imaging. Even when she goes to a time before human existence, some humans (or human-like beings) turn out to have caused the impact of the meteorite that led to the extinction of the dinosaurs. In a way she therefore avoids imagining the Anthropocene because she literally humanizes non-human history: instead of trying to deal with the profoundly unfamiliar non-human Mesozoic Era, she sketches a world that appears to be our near future, but is revealed to be a distant planet in a distant past. *The Stone Gods* thus does not really cover the vast geological timescale, and Adam Trexler would therefore probably see her approach as an example of what he considers “the bad and bizarre evasions and transformations of literary climate fiction” that return the attention to the internal, human soul and in doing so ultimately evade dealing with climate change matters (206).

To some extent this is definitely true, as a very important theme in *The Stone Gods* is love, but it would be wrong, we believe, to just dismiss Winterson’s approach altogether. *The Stone Gods* does not depict climate change realistically but symbolically: we all know about the long-lasting effects of our behavior on the climate, but we do not act on this knowledge, and by using an iterative tale of destruction, Winterson foregrounds and denounces this shortsighted behavior. It is in this context telling that she chooses not to attempt to depict the temporality of climate change using insights from theoretical physics, even though these are important for thinking about global warming, and even though, throughout her oeuvre, Winterson has shown an interest in deploying such insights to represent the parameters of time and space

(Morrison 104). One would thus expect Winterson to use temporal strategies inspired by theoretical physics to imagine the complex temporality of climate change in *The Stone Gods*, but surprisingly this is not the case. Winterson does again complicate the linear treatment of time, but the permeation, bending, and mirroring of times is not linked to climate change. Instead, she links the ideas to questions of love, gender, and identity, three other important themes in her oeuvre in general as well as in *The Stone Gods* in particular.

Winterson does not always use theories in a scientifically correct way, but appropriates them for the story and imaginative storytelling, as Jago Morrison notes (110). She herself says about that: “All of my books manipulate time, in an effort to free the mind from the effects of gravity. The present has a weight to it—the weight of our lives, the weight of now. By imaginatively moving sideways, I try to let in more light and air” (qtd. in Kiliç xi). This might explain why she does not extend these conceptual models to the temporality of climate change: she might not want to remove the weight of the matter of climate change. Even though these theories can capture the indeterminacy and multidimensionality of geological time, Winterson only deploys them on a personal level, the level of character. On the hypothetical scale of climate change she opts for a cyclical, repetitive time, which does not “let in air” but feels stifling and inescapable. Whereas “[e]very second the Universe divides into possibilities” (83), this indeterminacy does not hold true for the climate in *The Stone Gods* because humanity will always develop into a destructive force. Handsome, the captain of the space ship in part one, says about this:

Well, I don't know what you call it, but a planet that has collapsing ice-caps, encroaching desert, no virgin forest and no eco-species left reads like gutted to me. The place is just throwing up and, I tell you, it's not the first time. My theory is that life on Orbus began as escaping life from the white planet—and the white planet began as escaping life from...who knows where? (68)

At this point in the story, the reader still assumes Orbus is our planet Earth, but as it turns out Earth will only be another destroyed planet in Orbus's future. The succession of destroyed planets is thus used “to attack the myth of the ‘New World’ that is always on the horizon, providing an escape from ecological responsibility” (Murphy 86).

To stress this iterative tale of destruction, Winterson deliberately misleads the reader about the temporal setting of Orbus in part one. Thanks to the anticipation of retrospection, the past tense does not form a problem for the reader to experience this text as a present in our future. To create the impression that the story has a future setting, Winterson utilizes the science fiction technique of exaggerating and extrapolating current technological, scientific, and social trends. Examples include the SpeechPad that has replaced the notebook and pencil (9), genetic age-fixing as the future of plastic surgery (26), and the humanoid robot. Secondly, she includes references to our

contemporary or historical culture: Captain Handsome, for example, retrieves excerpts from the works of William Shakespeare and John Donne. When the reader finds out that this supposed future is actually a distant past, this raises the question: what if our imagined future were our past? Through this temporal confusion, Winterson in a sense places the reader in a present beyond our present to look back on our time to see what we are doing to the planet. *The Stone Gods*, in other words, seems to be a kind of parable, and for Winterson the moral prevails over scientific accuracy.

Not only the temporal construction, but also the connections between the protagonists encourage a symbolic reading. Just like McGuire, Winterson connects the different characters, but not through bloodlines or location. Instead she uses the technique of the *Doppelgänger*: the three pairs have (almost) identical names (Billie, Billie, and Billy; and Spike, Spike, and Spikkers), all are explorers, all become same-sex lovers, and all live in a place that is severely altered by anthropogenic climate change and war. One of the challenges in imagining the Anthropocene is to connect the individual reader with humanity as a species and its impact on the planet. This is problematic because, as the historian Dipesh Chakrabarty points out, although we can intellectually comprehend the idea of the human species, “one never experiences being a concept” (220). Winterson uses the protagonists as a pars pro toto for humanity rather than searching for a way to depict humanity as a whole. The doubling creates a feeling of connectedness, responsibility, and repetition: regardless of the time and place, people repeat the same mistakes and always destroy the environment. Winterson really emphasizes and foregrounds this technique, and the connected human protagonists thus come to symbolize humanity.

Winterson’s technique of the *Doppelgänger* links to Timothy Clark’s idea of the “destructive double”: embedding works of fiction within the hypothetical scale, Clark argues, “is to turn the text into a peculiar kind of gothic, a doppelganger narrative” (“Derangements” 161). A character is a responsible agent at one scale, but is doubled as a mere physical entity at another scale. While actions or characters can seem harmless or normal at the personal or socio-historical level, they may reappear as “destructive doubles of themselves on the third scale, part of a disturbing and encroaching parallel universe, whose malign reality it is becoming impossible to deny” (161). The characters in *The Stone Gods* fail to connect with their destructive double, their carbon footprint. Billie I, for example, despises the culture and morals of the society she lives in and which her boss Manfred represents; she has a nostalgia for the preindustrial landscape and lives on a farm within a biodome. Yet at the same time she also drives a car and uses a cell phone, a computer, etc., and thus the very thing Billie I criticizes on a global level is partly caused by her choices on a local level. This is very similar to the attitude many Western people adopt to climate change, and it has to do with what Clark calls the scale effects of climate change:

for any individual household, motorist, etc., a scale effect in their actions is invisible. It is not present in any phenomenon in itself...but only in the contingency of how many other such phenomena there are, have been and will be, at even vast distances in space or time. Human agency becomes, as it were, displaced from within by its own act, a kind of demonic iterability. ("Derangements" 150)

The narrators are not only oblivious of their destructive double, but also fail to see the connections with their *Doppelgängers* in other times. Billie II, for example, finds a pile of paper on the Tube, which is, as only the reader realizes, Billie I's diary. Instead of reading the whole diary and thus seeing the similarities with her own life, Billie II flicks through it and thinks: "No point in starting at the beginning—nobody ever does. Reading at random is better: maybe hit the sex scenes straight away... A love story, that's what it is—maybe about aliens. I hate science fiction" (143). She does not feel connected to her historical double; instead she categorizes the characters as alien. Moreover, she reads the diary as science fiction instead of as a historical document. This creates a discrepancy between the reader and the narrators: the former sees the higher level, the interconnectedness of the protagonists and how their actions can have an effect on the other characters in other times, whereas the latter are mostly concerned with their own life. Acknowledging this interconnectedness to other times and places is essential if one wants to understand climate change, and this dramatic irony therefore highlights our own short-sightedness, since in real life we ourselves also often forget that we are interconnected with past and future generations. Winterson thus foregrounds the "demonic iterability" not only within individual characters but also temporally by doubling her protagonists.

The danger of the entanglement of the personal and the hypothetical scale, Clark points out, is that the latter is reduced to a symbol for the former (*Eco criticism* 177). Winterson avoids this pitfall by maintaining a distance between the two scales through irony. When Billie II explains the cause of her tears, for example, she starts at the hypothetical scale, only to return to the personal via the socio-historical scale: "And my tears are for the planet, because I love it and because we're killing it, and my tears are for these wars and all this loss, and for the children who have no childhood, and for my childhood, which has somehow turned up again" (239). This juxtaposition of scales underscores how difficult it is for humans to truly think on a larger scale and simultaneously makes personal sores feel banal. The subclause "which has somehow turned up again" suggests that Billie II herself too is surprised about her fixation on the personal, but that she cannot help it.

The repetition of protagonists and history in combination with the irony gives the novel a strong moral tone, and because the reader can identify with the characters, this makes it likely that he or she will reflect on his or her own actions as well. At the same time, the doubling and the choice for first-person

narrators focus on the human scale and experience, and make it very difficult for the reader to zoom out and truly imagine the non-human timescale of climate change. However, the repetitive and cyclical form Winterson chooses for the narration of climate change makes *The Stone Gods* into a cautionary climate tale more than a literary exploration of the temporality of this hyperobject.

Beyond the Human Timescale: Exploring New Fictional Territory

Climate change is characterized by a complex temporality that the linear idea of time and the limited duration usually found in novels fail to capture. The three novels that we have analyzed attempt to go beyond these limits in order to create a temporal structure that does justice to the temporality of this hyperobject. *Here's* formal composition can be seen as a literary translation of Adam's timescape: it highlights the multidimensional and interdependent relations between times, and stresses tempos and rhythmicities. Pendell's novel is future-oriented: its chronologically ordered collection of texts starts in 2021 and highlights in a quite realistic way the long-term impact of our current civilization, the slow violence of anthropogenic climate change. Winterson's engagement with geological time is more symbolic: she opts for a cyclical, iterative structure, and narrates only three short time periods, which stress the destructive nature of humanity.

The different choices made by the writers lead to three very different narratives, all of which have their strengths and weaknesses. *Here* is about deep time, and combines the personal with the hypothetical scale, leaving out the socio-historical level. It narrates the history and future of a location through numerous fragments of individual stories that together make imaginable the overwhelming scale of geological time. Thanks to the interaction between the personal and hypothetical scales, McGuire is the most successful in reconciling an impersonal imaging with a story that helps readers emotionally connect with humankind. Furthermore, his temporal composition comes closest to the complex temporality of climate change that Adam describes. In contrast with the other two novels, however, *Here* only occasionally really deals with anthropogenic climate change, and even when it does, it mostly does so implicitly. As a consequence *Here* might not be very effective in making the risks of the Anthropocene imaginable, something that *The Great Bay* and *The Stone Gods* do explicitly.

Pendell's novel is a cautionary tale that makes the slow violence of climate change visible: using a factual, realistic style he extrapolates our current behavior and explores what effects this could have on the Earth and on us over the next sixteen millennia. The advantage of Pendell's approach over Winterson's is that it makes the reader aware of the long-term effects of our current civilization, without becoming highly moralistic: the distant reporter does not judge nor care about humanity, but simply describes the long-term effects of our way of living. The emphasis on the hypothetical scale, however,

comes at the cost of the personal scale: despite the presence of individual human stories, *The Great Bay* fails to emotionally engage the reader with the individuals living in the different times, or with humankind, because many of the fragments constitute, from a literary and emotional viewpoint, uninteresting stories. Also, Pendell does not succeed in an impersonal imaging through an anticipation of retrospection: the narrator is ultimately just a contemporary scientist projected into the future, and the temporal composition too creates the impression of looking forward into the future rather than looking back from the future.

In *The Stone Gods* Winterson symbolizes the hypothetical scale through the personal scale using the *Doppelgänger* technique, which makes it easy to emotionally connect with the story and the characters, and, to some extent, to humankind. A danger of this approach is that it creates the opposite effect; that the hypothetical scale is reduced to a symbol for the personal scale. Winterson avoids this by explicitly dealing with the double role humans have, simultaneously being an individual and a carbon footprint, and by criticizing our lack of action through irony. In addition to that she connects the two scales to themes on the socio-historical scale that are related to climate change, such as imperialism and capitalism. Nevertheless the focus on the personal, combined with the theme of love, eventually does relegate the non-human theme of climate change somewhat to the background, and the temporal composition ultimately evades dealing with the geological timescale. In the end compelling storytelling prevails over scientific accuracy in *The Stone Gods*, which is a moral tale about the iterative destruction of planets whose protagonists symbolize the destructive force that an intelligent life form, according to this novel, inevitably will turn into. Such a symbolic and moralistic rendering of climate change might eventually also fail to get people to care about climate change because readers can easily discard it as unrealistic.

Clark's question whether the Anthropocene reveals the limits of the human imagination remains unanswered for now. All three of the books in some aspect fail to deal with the geological timescale of climate change in a gripping manner: Pendell's novel is not engaging, Winterson's novel is not really about the geological timescale, and McGuire's *Here* does not primarily focus on climate change. Nevertheless some of the innovations in these works are successful, and this seems to suggest that it might actually be possible to write "the great climate change novel." Or perhaps it will not be a novel: as odd-one-out McGuire seems to have an edge thanks to the fact that he does not write a traditional text novel, other or hybrid art forms might be the way forward.

NOTES

¹The Anthropocene Working Group of the International Union of Geological Sciences announced on 29 August 2016 that it is preparing a formal proposal to designate the Anthropocene as an official unit of geological time (Carrington 2016).

²The measures proposed in the Paris Agreement to address climate change, which went into effect in 2016, are widely considered to be insufficient.

³The spatial aspect has already been discussed by, among others but most notably, Ursula Heise in *Sense of Place and Sense of Planet*.

⁴Despite the fact that the effects of global warming are most manifest in the global South, the vast majority of Anglophone climate fiction published to date that we have come across, including the three novels under discussion, is written by European or American writers and primarily concerned with the impact of climate change on Europe or the United States.

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