CHAPTER 14

The Rise of the Climate Change Novel

Axel Goodbody and Adeline Johns-Putra

One of the readiest pieces of evidence of a new climate imaginary in the Anthropocene is climate change fiction or climate fiction. In this chapter, we consider the parameters of the phenomenon, outlining its emergence and summarising the key means and modes with which fiction has so far represented climate change. While climate fiction started by approaching the issue within the framework of existing popular genres such as science fiction, the thriller, and the disaster novel, authors have broadened the range of approaches in the past ten years, blending these and other genres. We pay particular attention to the extent to which climate fiction has worked within the established conventions of literary realism.[1] In order to capture the complexity of the challenges that climate change poses to individuals and societies, climate change novels must meet the many representational challenges mounted by climate change, confronting not just the invisibility of climate as opposed to weather, but also the gulfs between the standard, quantitative discourses of climate and the imaginative language of literature, as well as between the unprecedented scale of climate change effects and the human dimensions of fiction. We therefore discuss examples of literary realism, and consider their ability to render the abstract and intangible phenomenon of climate change visible, and relate it to readers' lives. However, we argue that there is also a significant body of writing on the subject which turns to alternative forms and narrative strategies in the effort to represent climate change, and manages to overcome some of the limitations of realism. In other words, where climate fiction meets the challenges of representing climate change, it has the potential to provide a space in which to address the Anthropocene's emotional, ethical, and practical concerns.[2]

[1] For a more extensive exploration of the relationship amongst climate, time and literary realism, see Chapter 15 by Adeline Johns-Putra in this volume.

[2] For a critique of climate fiction's ability to meet the ethical demands of the Anthropocene, see Chapter 16 by Claire Colebrook in this volume.

Emergence

The emergence of climate fiction was widely reported in several newspapers in mid-2013 – probably the first time the birth of a literary genre actually made the news.[3] The story, which made considerable footfall in print and digital media, originated in a US National Public Radio broadcast,[4] as did the word that was used to describe it, 'cli-fi'.[5] Since then, the term (a neologism apparently coined by journalist Dan Bloom in 2007), along with the idea of a new literary category, has gained traction, not least because of Bloom's dedicated online campaigning on its behalf.[6] Bloom was not alone in noticing the emergence of climate change as subject matter in fiction. For example, in 2009, an interdisciplinary group of academics set out to examine and compare imaginings of climate change, including literary ones.[7] The team found that what had originally appeared as a paucity of fictive responses to climate change was a rapidly growing literary trend.[8] The precise number of works, always a moving target, was estimated at 150 (the figure that one of the project's literary researchers, Adam Trexler, would go on to use in *Anthropocene Fictions*, the first book-length study of climate fiction).[9] Literary engagements with climate change have – in the second decade of this century – become even more marked, encompassing drama and poetry as well as fiction, and, as this chapter hopes to show, emerging as an international phenomenon beyond the confines of the Anglophone world.[10]

[3] See, for example, Rodge Glass, 'Global Warming: the Rise of Cli-fi', *The Guardian* (31 May 2013).

[4] Angela Evancie, 'So Hot Right Now: Has Climate Change Created a New Literary Genre?', *NPR* (20 April 2013).

[5] Dan Bloom, 'Thanks to TeleRead and NPR, Cli-fi is now an Official Literary Term', *Tele-Read* (28 May 2013).

[6] As Bloom has stated, 'I never give up. This is my life's work now and has been since I first read that IPCC report. It's all I do, and it's all I think about . . . I see myself as a cli-fi missionary, a cheerleader for novelists and screenwriters, a PR guy with media contacts, a literary theorist, and an advisor to novelists seeking publication advice and direction', Amy Brady, 'The Man Who Coined "Cli-Fi" Has Some Reading Suggestions for You', *Chicago Review of Books* (8 February 2017).

[7] Combined Universities in Cornwall, *Review 2011*, Redruth, 2012, p. 25, available at cuc.ac.uk/assets/uploads/ar2011.pdf.

[8] Adam Trexler and Adeline Johns-Putra, 'Climate Change in Literature and Literary Criticism', *WIREs Climate Change*, 2 (2011), 185–200. The rise of climate fiction is also demonstrated by the popularity of internet blogging about it, making climate novels and films a prime focus for discussion of the social function of literature, film and popular culture.

[9] Trexler, *Anthropocene Fictions: the Novel in a Time of Climate Change* (Charlottesville: University of Virginia Press, 2015), p. 7.

[10] See Axel Goodbody, 'Telling the Story of Climate Change: the German Novel in the Anthropocene', in Caroline Schaumann and Heather I. Sullivan (eds.), *German Ecocriticism in the Anthropocene* (New York: Palgrave-Macmillan, 2017), pp. 293–314; Goodbody, 'Frame Analysis and the Literature of Climate Change', in Timo Müller and Michael Sauter (eds.), *Literature, Ecology, Ethics: Recent Trends in Ecocriticism* (Heidelberg: Universitätsverlag Winter, 2012), pp. 15–33.

Discussions of the volume and impact of climate fiction invariably raise the issue of generic boundaries and definitions. The obvious definition of climate fiction is in terms of its thematic focus. Yet this turns out not to be straightforward, because although almost all climate fiction published since the 1970s is concerned with the contemporary discursive object known as climate change, holding too fast to this definition excludes novels that do not explicitly name climate change but might be read as addressing it. Most obvious in this regard is Cormac McCarthy's *The Road*, which never refers to global warming but has been hailed by some as an expression of and for 'the globally warmed generation'.[11] But climate change has also become part of the standard repertoire of ways in which human actions have irreparably damaged the global natural environment in the future storyworlds of a range of Anglophone, French, German, Spanish, Dutch, and Icelandic novels, even though it does not always carry a thematic focus or play a significant role in the plot.[12]

Moreover, a simple thematic focus on the relatively recent environmental phenomenon of anthropogenic climate change potentially disregards novels and short stories about climatic change in general. Although it is useful to identify the advent of public concern over global warming as a turning point in environmental fiction, one should not be too quick to discount the many earlier – and, one might say, prescient – representations of disastrous human interventions into global climatic conditions. Such early examples of science fiction as Jules Verne's novel *The Purchase of the North Pole* (1889) and Alexander Döblin's sprawling *Mountains Oceans Giants* (1924) imagine botched attempts to reconfigure the global climate in a bid to free natural resources.[13] In the 1950s and 1960s, a new wave of what Jim Clarke has called 'proto-climate-change' fiction emerged; this includes not just the dystopian

[11] Cormac McCarthy, *The Road* (London: Picador, 2006).

[12] For example, Margaret Atwood, *Oryx and Crake* (London: Bloomsbury, 2003), *The Year of the Flood* (London: Bloomsbury, 2009), *Maddaddam* (London: Bloomsbury, 2013); Sarah Hall, *The Carhullan Army* (London: Faber, 2007); Michel Houellebecq, *La possibilité d'une île* (Paris: Fayard, 2005), translated as *The Possibility of an Island*, trans. Gavin Bowd (London: Weidenfeld and Nicholson, 2005); Dirk Fleck, *GO! Die Ökodiktatur* (Hamburg: Rasch und Röhring, 2004); Rosa Montero, *El peso del corazón* (Madrid: Planeta, 2015), translated as *Weight of the Heart*, trans. Lilit Žekulin Thwaites (Seattle: AmazonCrossing, 2016); Peter Verhelst, *TongKat* (Amsterdam: Prometheus, 1999), translated as *Tonguecat*, trans. Sherry Marx (New York: Farrar, Straus and Giroux, 2003); Yrsa Sigurðardóttir, *Auðnin* (Reykjavik: Verröld, 2008), translated as *The Day is Dark*, trans. Philip Roughton (London: Hodder and Stoughton, 2011).

[13] Jules Verne, *The Purchase of the North Pole* (London: Sampson Low, 1890); Alexander Döblin, *Berge Meere und Giganten* (Berlin: S. Fischer, 1924). See also Chris Godwin's translation of an excerpt, Alexander Döblin, 'Mountains Oceans Giants', trans. Chris Godwin, *The Brooklyn Rail* (December 2016), available at http://intranslation.brooklynrail.org/german/mountains-oceans-giants.

novels of J. G. Ballard, which Clarke discusses, but the first full-length Japanese science fiction novel, Kōbō Abe's *Dai-Yon Kampyōki* (or *Inter Ice Age 4*), first serialised in 1958–9 and set in a near-future Japan threatened by melting polar ice caps.[14] Many of these early depictions of climatic change portray either deliberate (if misguided) efforts to change the climate for the better, or non-anthropogenic climate deterioration, and thus constitute what Trexler calls a 'considerable archive of climate change fiction', offering models for the depiction of climatic crisis.[15]

Yet, while it is useful to acknowledge this literary prehistory, a consideration of climate fiction in terms of the phenomenon we now think of as anthropogenic climate change helpfully narrows the subject down to fictional engagement with the discursive history of this phenomenon in particular. Among the earliest novels to take cognisance of the emerging phenomenon of global warming as a result of the increase in the carbon dioxide level in the atmosphere were Ursula LeGuin's short sci-fi novel, *The Lathe of Heaven* (1971), which is set in the climate-changed world of 2002 and explores the question of our responsibility as humans to fix the damage we have done to the planet, and Arthur Herzog's thriller, *Heat* (1977), which follows a heroic group of scientists as they battle the possibility of so-called 'runaway greenhouse'.[16] It was a decade before these were followed by the next significant work of climate fiction, *The Sea and Summer* (1987), written by the Australian critic and science fiction author George Turner, which presciently detailed the effects of the greenhouse effect, polar ice-melt, and rising sea levels in a near-future Melbourne.[17] Into the 1990s, climate fiction kept pace with developments in climate change awareness, namely, the growing scientific and public recognition of the phenomenon of global warming as the effect of greenhouse gases, through to increased political – particularly international – efforts to understand and address climate change, and on to the widespread collective anxiety around humanity's impact on its environment that marks the Anthropocene.[18] In the first decade of the twenty-first century, and in conjunction with high-profile efforts such as Al Gore's presidential campaign, defeat, and subsequent climate activism, the tension between

[14] Jim Clarke, 'Reading Climate Change in J. G. Ballard', *Critical Survey*, 25 (2013), 7–21; Kōbō Abe, *Inter Ice Age 4*, trans. E. Dale Saunders (New York: Perigee Trade, 1981).
[15] Trexler, *Anthropocene Fictions*, p. 8.
[16] Ursula K. LeGuin, *The Lathe of Heaven* (New York: Scribner, 2008, originally published in *Amazing Science Fiction Stories*, 44. 6–7, 1971); Arthur Herzog, *Heat* (New York: Simon and Schuster, 1977), p. 101.
[17] George Turner, *The Sea and Summer* (London: Faber, 1987).
[18] Trexler, *Anthropocene Fictions*, p. 9.

growing awareness about climate change and seeming inaction around it, occurring at the intersection of the realms of science, politics, and public perception, further invited imaginative narrative. In the light of the University of East Anglia Climatic Research Unit email controversy (dubbed 'Climategate' by journalists who believed they were exposing global warming as a conspiracy of climate scientists) and the failed Copenhagen conference in 2009, debates about our responsibility for maintaining an environment in which future generations can flourish have been conducted in a context of latent distrust of bodies such as the IPCC, disillusionment with international negotiations, and stubborn indifference to alarmist scenarios of the future and strident calls for tight state regulation of private consumption and the economy. Recent writing has thus tended to reflect a degree of detachment from catastrophist visions of the future, and to include characters and plots expressing both scepticism about the efficacy of well-meant, but naïve, direct-action eco-activism, and distrust of the political motives of proponents of radically progressive climate policies.

Representing Climate Change

Many novels about climate change frame it as a problem to be dealt with in some way (a motivator of plot or antagonist of character) or as a condition under which plot or character take shape (that is, as part of what we think of as setting). In terms of plot or character, for example, climate change occurs as, among other things, a complex political problem demanding just as complex solutions (Kim Stanley Robinson's 'Science in the Capital' trilogy (2004, 2005, 2007) or Matthew Glass's *Ultimatum* (2009)), a possibly insuperable challenge for a humanity hard-wired to pursue individual gain at the expense of others and the environment (Ian McEwan's *Solar* (2010)), or a cultural construct to be exploited for ulterior ends (Rock Brynner's *The Doomsday Report* (1998), Norman Spinrad's *Greenhouse Summer* (1999), or even Michael Crichton's *State of Fear* (2004)).[19] With regard to setting, climate change is often encountered – as we have already indicated – as one of a panoply of dystopian effects, as, for example, in

[19] Kim Stanley Robinson, *Forty Signs of Rain* (New York: Spectra, 2004), *Fifty Degrees Below* (New York: Spectra, 2005), *Sixty Days and Counting* (New York: Spectra, 2007); Matthew Glass, *Ultimatum* (London: Atlantic, 2009); Ian McEwan, *Solar* (London: Jonathan Cape, 2010); Rock Brynner, *The Doomsday Report: a Novel* (New York: William Morrow, 1998); Norman Spinrad, *Greenhouse Summer* (New York: St Martin's Press, 1999); Michael Crichton, *State of Fear* (New York: HarperCollins, 2004).

Margaret Atwood's Maddaddam novels (2003, 2009, 2013). Very broadly speaking, one could map these strategies of plot and character, on the one hand, and setting, on the other, on to two types of climate change novels: the first type tends to be set in a recognisable, realist present (or very near future) and the second in a futuristic climate-changed world, which one could characterise as apocalyptic, post-apocalyptic, or dystopian, depending on just how much this is premised on sudden disaster, its aftermath, or a prolonged state of decline. Sylvia Mayer makes a distinction along these lines between climate change novels that are set in the present and those set in the future, describing the former as 'anticipatory' and the latter as 'catastrophic'.[20] Moreover, as both Trexler and Astrid Bracke suggest, the settings of many futuristic climate change novels draw on existing generic traditions – not just apocalyptic ones, but flood stories, polar exploration narratives, and forms of pastoral and anti-pastoral, both rural and urban.[21]

Nonetheless, it is worth recognising an overlap between the realistic and the futuristic, for as many climate change novels (such as T. C. Boyle's *A Friend of the Earth* (2000), Jeanette Winterson's *The Stone Gods* (2007), and Nathaniel Rich's *Odds against Tomorrow* (2013)) show, quite often the intellectual or existential dimensions of climate change overlap with its futural, dystopian elements.[22] That is to say, what is crucial about both future worlds marked by climate catastrophe and everyday milieus touched by climate concerns is that they provide drama, and thereby engage readers' attention in a way which non-fiction cannot replicate without recourse to elements of fictionalisation and personification. Whether climate change is identifiable as a component of setting, plot, or character, it occurs in the climate change novel as something, whether individually or collectively, that affects psychological, emotional, physical, or political experience, and relates directly to readers' lives.

In representing climate change, however, fiction must grapple with the problem of the relative unrepresentability of the phenomenon. Climate change is, for want of a better word, invisible. It is, as Sheila Jasanoff notes,

[20] Sylvia Mayer, 'Explorations of the Controversially Real: Risk, the Climate Change Novel, and the Narrative of Anticipation', in Mayer and Alexa Weik von Mossner (eds.), *The Anticipation of Catastrophe: Environmental Risk in North American Literature and Culture* (Heidelberg: Universitätsverlag Winter, 2014), pp. 21–37.

[21] Trexler, *Anthropocene Fictions*, pp. 75–118; Astrid Bracke, *Climate Crisis and the Twenty-First-Century British Novel* (London: Bloomsbury, 2017), pp. 49–77, 105–31.

[22] T. C. Boyle, *A Friend of the Earth* (New York: Penguin, 2000); Jeanette Winterson, *The Stone Gods* (London: Hamish Hamilton, 2007); Nathaniel Rich, *Odds against Tomorrow* (New York: Farrar, Straus and Giroux, 2013).

'an impersonal, but naturalized, object of concern'.[23] Indeed, invisibility is the very condition of its existence as a 'scientific phenomenon', since, like climate itself, climate change has come about via 'techniques of aggregation and deletion, calculation and comparison that exhaust the capacities of even the most meticulously recorded communal memories'.[24] That is, while scientific discourse is the source of climate change knowledge, it is also an abstract way of 'knowing' about climate, the polar opposite of the experiential and personal mode of knowing that tends to be associated with literature. As Jasanoff puts it, quoting George Eliot, 'If the novelist's mission is to celebrate the specificity of "all ordinary human life", science's mission has been to transcend it.'[25] Herein, then, lies one of the key challenges to the climate change novelist – the existence of climate change outside immediate experience and its construction by the rational discourse of science. Put another way, climate change is always already mediated. It exists as an aggregate of scientific facts, garnered through a particular convention-laden process of observation, experimentation, statistical analysis, and peer review. And the scientific discourse thus shaped, which represents climate change in much day-to-day life, is often resistant to narrative drive and imaginative appeal.

Related to such difficulties in apprehending climate change is the question of its enormous scale, both spatial and temporal. After all, science tells us that climate change is not just a global environmental phenomenon but a global ecological one; that is, it is the effect of changes in the many components of a complexly, delicately interconnected and interactive climatic system. Moreover, its effects are of a temporal order of magnitude – extending over not just centuries but millennia – that lies much beyond even supposedly wide-angle human perspectives, such as the historical epoch or *longue durée*. Much recent philosophical attention has been paid to the challenge of scale to the representation of climate change, from Timothy Morton's assignment of climate change to the category of 'hyperobjects', or 'things that are massively distributed in time and space relative to humans', to Timothy Clark's diagnosis of 'Anthropocene disorder', a result of the 'demand to think of human life at much broader scales of space and time'.[26] The critical consensus has been that the extreme scale of climate change has all too often led writers and film-makers to opt

[23] Sheila Jasanoff, 'A New Climate for Society', *Theory Culture Society*, 27 (2010), 238.
[24] Ibid., 238. [25] Ibid., 234.
[26] Timothy Morton, *Hyperobjects: Philosophy and Ecology after the End of the World* (Minneapolis: University of Minnesota Press, 2013), p. 1; Timothy Clark, *Ecocriticism on the Edge: the Anthropocene as a Threshold Concept* (London: Bloomsbury, 2015), pp. 139–55, 13.

for implausible tipping-point scenarios, engage in an almost comic telescoping of the time taken for climatic change to unfold, and construct plots in which the protagonists travel ceaselessly around the world, in an effort to relate the punctual and local experience of individuals to deep time and the global.

A third way in which climate change presents a profound challenge to the human dimensions of much art, particularly narrative art, is that it resists the sort of resolution which comes with normal plots and their expectation of closure. This brings into view a further trap into which the climate novelist can fall. The rendering of climate change as an object of experience rather than of science – that is, the transformation of the abstracted, longitudinal understanding of climate change into immediate and emotional response – might mean reinstating the anthropocentric arrogance that has caused climate crisis in the first place. This concern is at the heart of Clark's analysis. For Clark, the Anthropocene's scalar derangement means that we attempt to understand it by 'scale framing', that is, by reframing of the problem within a manageable scale.[27] Though scale framing is, to some extent, an unavoidable part of any human attempt to comprehend a complex problem, Clark argues that it leads, in the case of Anthropocene phenomena such as climate change, to a reductive perception of it as a human problem, and thereby to a recommitment to ideas of human exceptionalism. For Clark, the novel and the kind of literary criticism it invites, with their investment in human-sized and human-shaped problems, are especially prone to this: 'the newly counter-intuitive demands on representation being made by issues such as climate change mean that . . . still-dominant conventions of plotting, characterization and setting in the novel need to be openly acknowledged as pervaded by anthropocentric delusion'.[28] In other words, the unrepresentability of climate change mounts not just a challenge for fiction but a dilemma. It would then be not just a question of how to represent climate change in experiential – that is, human – terms, as Jasanoff suggests, but a question of whether it is desirable to do so at all.

Literary Realism: Problems and Potential

Our discussion of the representation of climate change in fiction so far has suggested that there is little evidence of the challenge to anthropocentrism for which Clark calls. If we return to Mayer's categories of the anticipatory

[27] Clark, *Ecocriticism on the Edge*, pp. 71–96. [28] Ibid., p. 187.

and catastrophic, we find that both depend on traditional, anthropocentric expectations. Climate fiction that invokes a recognisable present (or very near future), and explores the threat of climate change as an ethical, political, or economic dilemma for the individual, clearly depends on highly conventional and canonical novelistic techniques grounded in identification and empathy with characters. Meanwhile, futuristic settings, indebted as they are to the generic conventions of science fiction and its traditions of building alien, but nevertheless internally consistent, environments, invite readers to enter into new worlds and align themselves with the inhabitants.[29] Yet, rather than bemoaning the anthropocentricism of conventional realism, it is worth reflecting on the usefulness of such realist tendencies.

Climate thrillers, science fiction, disaster novels, crime and conspiracy novels, young adult novels of personal development, social satire, and even work in the genres of cyberpunk, horror, and fantasy, all embrace some elements of realism. But they tend to employ highly conventional literary strategies of world-building and character development, with one-dimensional characters (scientists, journalists, politicians, environmental activists), wooden dialogue, stock motifs, clichéd plotlines, and unquestioned gender stereotypes. As Trexler notes, Richard Kerridge has lamented the relative paucity of more ambitious realist writing on climate change, speculating that literary realism may be incapable of exploring the emotional complexity of our responses to the phenomenon because we are collectively avoiding its import.[30] Trexler himself has argued that realism cannot in any case imagine novel technological, organisational, and political approaches to climate change because of its commitment to the status quo.[31] Yet Trexler writes of a recent 'rise of realist fiction about the Anthropocene'.[32] He discusses three novels, by Jonathan Franzen, Barbara Kingsolver, and Robert Edric, as evidence of the emergence of a new body of realist fiction about the Anthropocene in the twenty-first century, suggesting that, in the hands of these authors at least, climate fiction can bring home to readers the reality of climate change. Relying on world-building, empathy, and identification, the climate change novel reflects a tension at the heart of the naming of the Anthropocene. After all, the great paradox of the Anthropocene is not simply that it exposes the

[29] See, for example, Darko Suvin, *Metamorphoses of Science Fiction: on the Poetics and History of a Literary Genre* (New Haven, CT: Yale University Press, 1979), p. 63; Tom Moylan, *Scraps of the Untainted Sky: Science Fiction, Utopia, Dystopia* (Boulder, CO: Westview, 2000), p. 7.

[30] Richard Kerridge, 'The Single Source', *Ecozon@*, 1 (2010), 159.

[31] Trexler, *Anthropocene Fictions*, pp. 224, 233, 236. [32] Ibid., p. 233.

myth of human exceptionalism; it forces humans to consider how to transform that myth into some kind of ethical responsibility. In Trexler's words, the novel offers 'a medium to explain, predict, implore, and lament' the political tensions, ethical conundrums, and psychological dilemmas of climate change.[33]

Realist fiction possesses an authenticity and cogency deriving, on the one hand, from vivid observational detail and, on the other, from personalisation, dramatisation, and emotional focalisation. This enables it to contribute to climate discourse by exposing readers to the experiences of others, and distributing their empathy in ways which lead them to break down existing habits of thought and identify with new perspectives. In *Freedom* (2010), Franzen gives a nuanced portrait of the plight of American liberalism in the first decade of the twenty-first century, using the figure of the well-meaning but morose Walter Berglund as a way of exposing the personal motivations and latent misanthropic tendencies lurking behind the fixation on wilderness preservation in mainstream US environmentalism.[34] Against the background of a rich, detailed account of the political, economic, and social milieus of a range of characters, Berglund's attempts to address environmental issues are simultaneously justified and pathologised. Although the reader understands his desperate attempt to save a little-known bird (the cerulean warbler) from extinction, it is presented as an act of madness, doomed to failure.

Kingsolver's *Flight Behaviour* (2012) builds an equally complex portrait of contemporary America, again combining insights into society with acute observations on how individuals' situations dictate their feelings and worldviews.[35] Realist climate fiction is a medium through which the psychological mechanisms behind climate scepticism and inertia, seemingly irrational responses to climate change, can be better understood. In her study of climate change 'denial' in a small town in Norway, the social psychologist Kari Norgaard has shown that, while she encountered practically no outright disputation of global warming as a fact and general acceptance of scientific predictions of its long-term consequences, refusal to recognise any link with the subject's personal actions and any implications for their way of life was widespread.[36] She explains this 'denial' as a means of stabilising collective and individual identities in situations where they are threatened by climate change. *Flight Behaviour* offers valuable

[33] Ibid., p. 9. [34] Jonathan Franzen, *Freedom* (New York: Farrar, Straus and Giroux, 2010).
[35] Barbara Kingsolver, *Flight Behaviour* (London: Faber, 2012).
[36] Kari Norgaard, *Living in Denial: Climate Change, Emotions, and Everyday Life* (Cambridge, MA: MIT Press, 2011).

insight into the reasons for the presence of climate scepticism in the United States, by showing how it has become part of the self-understanding and perception of many individuals in poor, marginalised rural communities in the southern states. Fiction that fosters understanding of such communities, without concealing the distortion in their perception of climate change as an obsession of the middle classes which threatens their freedom and prosperity, enables readers to see the world through the eyes of others and appreciate their situation. At the same time, it has the ability to school readers in recognition of common avoidance strategies, and model ways of dealing with them. As Trexler puts it, Kingsolver 'does the good work of literary realism, complicating the stereotypical certainty of scientists, and the ignorance of rural southerners', as well as the effectiveness of interventions by well-meaning activists. Such realism goes beyond the simple oppositional politics of earlier climate change novels, with their prophecies of doom, mediation of popular science, heroic rescue plotlines, calls for voluntarily reduced consumption, and advocacy of neoprimitivism. Trexler finishes his comments on the emergence of the realist climate novel with an account of Robert Edric's novel, *Salvage* (2010).[37] Reading this work as realist 'in its refusal of fanciful technologies or spectacular disaster', he argues that its plot successfully stages socioeconomic conflicts over climate change, showing through different characters how and why different groups interpret climate change in different ways, and thereby contributing to adaptation to it.[38]

Overall, Trexler proposes there has been a more general shift from novels portraying climate change as a final disaster which will either precipitate a collective human commitment to radical change or end in devastation, to realist writing, acknowledging that climate change has already been with us for some time, its effects are gradual and incremental, and they differ from one place to another.[39] He cites Robinson, Paolo Bacigalupi, and Saci Lloyd as further examples of authors describing a world characterised by 'new forms of political agency', in which 'insurance companies' join 'scientific organizations, government groups, international businesses, zoos, spiritual leaders, technology companies, refugees, homeless people, ... stay-at-home parents' and other social actors in realistic social panoramas.[40] Robinson, in particular, who continues to publish realist climate novels, tells the professional and personal stories of scientists and policy makers, and explores in meticulous detail the

[37] Robert Edric, *Salvage* (London: Doubleday, 2010). [38] Trexler, *Anthropocene Fictions*, p. 229.
[39] Ibid., p. 233. [40] Ibid., p. 236.

institutional and political processes that shape the pursuit of scientific knowledge.[41]

Recognising and addressing human responsibility for climate change does not automatically absolve climate change fiction from the charge of human exceptionalism, particularly if its moral and political insights, suggestions, and calls to action overestimate the reach of humans as moral agents or ignore the significance of the non-human as moral patients. As Trexler notes, while *Freedom* and *Flight Behaviour* make highly effective use of both social and psychological realism to demonstrate the many paradoxes of climate change and the complexity of the challenges it poses, they are less successful in acknowledging the agency of the non-human (and he argues that *Salvage,* with its combinations of human and non-human agency, does better in this respect).[42] We must turn to other novelists such as Winterson to find the potential realised not just to clarify human responsibility but to actively critique myths of human supremacy. *The Stone Gods* shows how human arrogance – expressed as techno-scientific overreach – has destroyed not just one but several planetary biospheres. Yet, rather than advancing a solution based on mere human agency, the novel points to the need for an awareness of the contingency of human identity and the permeability of human–non-human boundaries.[43] Here, the use of familiar techniques of world-building and empathy does not necessarily translate into an affirmation of narrowly human experience. It is possible, in other words, for anthropocentric worlds and identities to be not just depicted and deployed in fiction, but deconstructed too.

Alternatives to Literary Realism

In his comprehensive study of the environment and American literature, *The Environmental Imagination*, Lawrence Buell states that realism relativises human control over nature by directing attention to the natural

[41] Most recently, Kim Stanley Robinson, *New York 2140* (New York: Orbit, 2017).
[42] Trexler, *Anthropocene Fictions*, pp. 224–33.
[43] Winterson, *The Stone Gods*; see also Nicole M. Merola, 'Materializing a Geotraumatic and Melancholy Anthropocene: Jeanette Winterson's *The Stone Gods*', *Minnesota Review*, 83 (2014), 122–32; Adeline Johns-Putra, 'The Unsustainable Aesthetics of Sustainability: the Sense of No Ending in Jeanette Winterson's *The Stone Gods*', in Johns-Putra, John Parham, and Louise Squire (eds.), *Literature and Sustainability: Text, Concept, and Culture* (Manchester University Press, 2017), pp. 177–94.

environment.[44] 'Disciplined extrospection', he writes, is 'an affirmation of environment over self, over appropriative homocentric desire'.[45] However, he does not claim that classical realism is superior to other modes of literary and artistic representation in this respect. Noting the greater capacity of the stylised image than the photograph in bird guides 'to put the reader or viewer in touch with the environment', he cautions that verbalisations 'are not replicas but equivalents of the world of objects', and pleads rather for a 'symbiosis of object responsiveness and imaginative shaping'.[46] Environmental representation has the 'power to invent, stylize, and dislocate while at the same time pursuing a decidedly referential project'.[47] Indeed, 'rendering the object world' is 'sometimes best achieved through what would seem to be outright fiction or distortion'.[48]

One form of literary stylisation which constitutes an alternative to mimetic realism in climate fiction is allegory. In McEwan's *Solar*, for instance, the protagonist, Michael Beard, serves as a modern everyman as well as a particular type of scientist and entrepreneur, and a transparently allegorical scene set in a boot room on a trip to the Arctic demonstrates the inability of the group to support each other and organise themselves harmoniously for the common goal of contributing to public awareness of the ecological crisis.[49] Symbolism is another such literary technique. In the post-apocalyptic future storyworld of Emmi Itäranta's *Memory of Water*, water has become a precious commodity which the military control access to and use to terrorise the population.[50] A young girl's spirited resistance as guardian of a secret spring becomes a tale of speaking truth to power, and a hymn to ritual, tradition, and writing as vehicles for the expression of ethical principles. Water is associated with life, ecological connectedness, sharing with others, and the memory of a truth which the authorities seek to suppress. At the same time, it symbolises the inevitability of the passing of time, change, and death. Comfort is found in the very impossibility of containing it, and the wider inability of humans to control nature: 'There are no man-made chains which will hold the water and the sky.'[51] One of many climate change novels depicting future water shortage and water wars (see, for instance, Jean-Marc Ligny's *Aqua*^{TM}, Lloyd's

[44] Lawrence Buell, *The Environmental Imagination: Thoreau, Nature Writing, and the Formation of American Culture* (Cambridge, MA: Harvard University Press, 1996), pp. 83–114.
[45] Ibid., p. 104. [46] Ibid., pp. 97–8, 99. [47] Ibid., p. 99. [48] Ibid., p. 103.
[49] See Evi Zemanek, 'A Dirty Hero's Fight for Clean Energy: Satire, Allegory, and Risk Narrative in Ian McEwan's *Solar*', *Ecozon@*, 3 (2012), 51–60.
[50] Emmi Itäranta, *Memory of Water* (London: HarperVoyager, 2014). [51] Ibid., p. 259.

Carbon Diaries 2015, and Bacigalupi's *Water Knife*[52]), this sci-fi teen novel is distinguished, on the one hand, by its sensuous evocation of the sight, sounds, smell, and taste of water, and, on the other, by its use of the element as a multidimensional symbol, enabling the issue of climate change to be overlaid with exploration of personal development and gender issues, and beyond these with reflection on the meaning of life and the ability of art to provide a permanence which human life does not afford.

In other novels, departures from the human focalisation and linear narrative structure traditionally associated with literary realism serve to undermine Cartesian exceptionalism, to expose what Clark refers to as 'the illusions of autonomous personhood', thus revealing 'the presence or intervention of the nonhuman in the human field of perception', and 'the finitude and thingness of the human itself'.[53] Some authors go beyond the traditional focus on human development and social questions by making nature itself the narrator. In Dale Pendell's novel *The Great Bay*, part of the action is narrated by the Californian landscape, a striking formal intervention, considering the relative rarity of prosopopeia (the representation of an abstract thing, or an absent or imagined person as speaking) in prose compared with poetry.[54] However, as Clark comments elsewhere, anthropomorphism 'can be a powerful tool for questioning the complacency of dominant human self-conceptions', and 'acquire provocative value as a way of doing justice to the agency of the non-human'.[55] Going further than the agential deconstructions of a novel such as Winterson's *The Stone Gods*, Ilija Trojanow's *EisTau* (2011), translated as *The Lamentations of Zeno* in 2016, makes use of anthropomorphism while calling explicitly for displacement of the human.[56] Castigating his contemporaries and lamenting their destruction of the natural environment, in particular through anthropogenic climate change, the geologist Zeno Hintermeier calls for humanity to be removed from its pedestal, to save both the planet and the human race. At the same time, he likens icebergs in the Antarctic and a glacier in the Alps (which he has played in as a child, and whose gradual melting he has spent his adult life studying) to vast

[52] Jean-Marc Ligny, *Aqua*^{TM} (Nantes: l'Atalante, 1993); Saci Lloyd, *Carbon Diaries 2015* (London: Hodder Children's Books, 2008); Paolo Bacigalupi, *The Water Knife* (London: Orbit, 2015).

[53] Clark, *Ecocriticism on the Edge*, p. 187.

[54] Dale Pendell, *The Great Bay: Chronicles of the Collapse* (Berkeley, CA: North Atlantic Books, 2010).

[55] Clark, *The Cambridge Introduction to Literature and the Environment* (Cambridge University Press, 2011), p. 192.

[56] Ilija Trojanow, *EisTau* (Munich: Deutscher Taschenbuch, 2011); Trojanow, *The Lamentations of Zeno*, trans. Philip Boehm (London Verso, 2016).

animals, portraying himself as the latter's lover.[57] The Indigenous Australian writer Alexis Wright portrays nature as animate, structuring her novel *The Swan Book* (2013) around myth, and cloaking her political messages about climate change and the treatment of her people in legend and dream symbols.[58] The novel, indeed, could be read as an application of 'magical realism' in critique of what Australian ecocritic Val Plumwood called the 'androcentric, eurocentric, and ethnocentric, as well as anthropocentric' tendencies of dominant Western cultures.[59]

In the conclusion of her study *Sense of Place, Sense of Planet*, Ursula Heise discusses further non-realist narrative structures as ways of representing climate change.[60] Displacing the dominant apocalyptic narrative by framing or satirising it, adopting the fragmented narrative techniques of high modernist fiction, and frustrating readers' expectations of unity and coherence of plot and character can all serve as formal correlatives to the limitations of human control over the natural environment. Pendell's *The Great Bay* and David Brin's *Earth* make use of such techniques.[61] Pendell juxtaposes poetic imagery with news-reporting-style writing, interviews with survivors, and maps documenting the geographic changes. The result is an assemblage of personal narratives, scientific and sociological reports, anthropological studies, folktales, and legends.[62] In *Earth*, Brin similarly develops a panoramic vision of world society in 2038 through a narrative montage that includes a large number of characters and episodes, and insets fragments of 'authentic' discourse (quotations from news announcements, letters, legal texts, books, and online newsgroup discussions) into the fictional story. But this is only one aspect of the

[57] See Goodbody, 'Melting Ice and the Paradoxes of Zeno: Didactic Impulses and Aesthetic Distanciation in German Climate Change Fiction', *Ecozon@*, 4 (2013), 92–102.

[58] Alexis Wright, *The Swan Book* (Artarmon, NSW, Australia: Giromondo, 2013).

[59] Val Plumwood, *Environmental Culture: the Ecological Crisis of Reason* (London: Routledge, 2002), p. 101; see also Adeline Johns-Putra, 'The Rest is Silence: Postmodern and Postcolonial Possibilities in Climate Change Fiction', *Studies in the Novel*, 50 (2018), 26–42.

[60] Ursula Heise, *Sense of Place and Sense of Planet: the Environmental Imagination of the Global* (Oxford University Press, 2008), pp. 205–10.

[61] David Brin, *Earth* (London: Orbit, 1990).

[62] Alexa Weik von Mossner sees this move as only partially successful in her discussion of the novel: 'Pendell responds to [the] representational challenge by compiling a wide variety of texts that zero in on individual humans at different points in the future rather than offering a continuous story or central character. In a way, that place is taken by the geographical region that is the focus of the narrative and gives the book its title. Timothy Morton has argued that because we live in the Anthropocene we can no longer understand history as exclusively human. Pendell's "Chronicle of the Collapse" suggests that the same is true for storytelling, offering readers the story of a nonhuman protagonist that changes slowly over time. The result is a highly fragmented narrative that is interesting for what it tries to achieve but at the same time remarkably unengaging'; see Alexa Weik von Mossner, 'Science Fiction and the Risks of the Anthropocene: Anticipated Transformations in Dale Pendell's *The Great Bay*', *Environmental Humanities*, 5 (2014), 203–16.

novel. As Heise explains, it possesses an unusually sophisticated architecture, in which the planet itself becomes the main character, as an electronic Gaia of sorts, created by a fusion of Earth with the internet: 'This allegorization of the planet as an epic persona contrasts with the high modernist fragmentation of the plot to create an image of a global environment that is both one and multiple, holistic and heterogenous.'[63]

One of the most radical alternatives to conventional narrative form and traditional realism is Max Frisch's *Man in the Holocene* (1980), which has recently attracted critical attention as a work of climate fiction.[64] (The novel pre-dates popular concern with climate change, but was informed by scientific research: Frisch refers to a recent 'retreat' of glaciers in the Alps and melting of polar ice caps, and imagines New York being flooded as a result of rising sea levels.) In this story of the last days of the 74-year-old Herr Geiser, who lives alone in a farmhouse in a remote valley in the Italian Swiss Alps, incessant rain and thunderstorms have caused a landslide, cutting the village off from the outside world. Geiser suffers from dementia, and his slide into memory loss and mental incoherence progresses alongside the erosion and seeming disintegration of the external world. There is in fact a three-way parallel between individual ageing and mental and corporeal vulnerability (Geiser also suffers a stroke), the economic decline of the village, which is becoming depopulated and is dependent on subsidies (serving as a symbol for a wider decline of civilisation), and natural decomposition and instability, which is further reflected in signs of the seasons being out of sync and the spread of chestnut tree cancer. What Geiser thinks, reads, and writes is reported through internal focalised narration. The notes and cuttings from reference works, with which he plasters the walls in an attempt to organise and record knowledge, form a collage of factual information interrupting the narrative. Reflections on the position of humanity in the context of geological time underline human marginality against the horizon of the Earth's history, and the emphasis on constant change suggests humankind will one day become extinct. Geiser's increasingly disjointed consciousness is conveyed through what can be thought of as a 'poetically' structured text, circling around key topics and returning to them periodically, while his

[63] Heise, *Sense of Place and Sense of Planet*, p. 83.

[64] Max Frisch, *Der Mensch erscheint im Holozän* (Berlin: Suhrkamp, 1979), translated as *Man in the Holocene*, trans. Geoffrey Skelton (San Diego: Harcourt Brace, 1980). See Gabriele Dürbeck, 'Climate Change Fiction and Ecothrillers in Contemporary German-Speaking Literature', in Dürbeck, Urte Stobbe, Hubert Zapf, and Evi Zemanek (eds.), *Ecological Thought in German Literature and Culture* (Lanham: Lexington, 2017), pp. 331–45; Bernard Malkmus, '"Man in the Anthropocene": Max Frisch's Environmental History', *PMLA*, 132 (2017), 71–85.

bodily and mental decline and the threat of physical isolation from the rest of humanity because of the weather serve as correlatives of the fate of humanity. As Gabriele Dürbeck points out, Frisch stops short of conceiving the mutual dependency of humans and nature implied by the conception of the Anthropocene.[65] However, there is an unmistakable ironic intention behind Frisch's juxtaposition, at the central point of the text, of an enyclopaedia entry confidently asserting the special status of humans with a passage explaining how human life could not have emerged without the propagating and fertilising properties of bird excrement, and surmising that we will be outlived as a species by birds and fish.

Climate fiction has become a significant literary phenomenon, addressing profound, complex issues, in a range of realist and non-realist forms, and going far beyond the genres of popular reading with which it started. It continues to evolve, with a small number of authors (Robinson and Bacigalupi, in particular) focusing their literary production on depicting climate change, and new titles coming out every year.[66] Literature's unique ability to capture complexity enables it to play a special role in the discursive construction of knowledge of climate, and its multiple interconnections with issues of class, race, and gender. As a medium for negotiating social values and a vehicle for reflection on how we want future society to be, climate fiction complements and informs political and scientific discourses. Reflecting on humankind's place in Earth history, the dilemmas of resource consumption and future conflicts over its distribution, population growth, and our responsibility for managing the planet, it contributes to the development of a new Anthropocene subjectivity, and makes a unique contribution to the evolving climate imaginary through its vividness, immediacy, and appeal to the emotions as well as the intellect, helping us to internalise what we merely know cognitively. Literary texts transport us to other worlds, giving readers access to unfamiliar environments, and they foster understanding of different experiences and imaginations by cueing us to inhabit new vantage points. Research at the interface of narratology and neurophysiology has shown that narratives have a greater impact than non-narrative modes of communication, because the experience which is simulated in reading them is a powerful means of forming attitudes. Climate fiction helps to define our perception of climate change, while drawing out its social and political, philosophical and ethical implications.

[65] Dürbeck, 'Climate Change Fiction', p. 335.

[66] Publications in 2017 included Maja Lunde, *The History of Bees* (London: Scribner, 2017); Robinson, *New York 2140*; Ashley Shelby, *South Pole Station* (London: Picador, 2017); David Williams, *When the English Fall* (Chapel Hill, NC: Algonquin, 2017).