

Imagining a Greenhouse Future: Scientific and Literary Depictions of Climate Change in 1980s Australia

Ruth A. Morgan

IN 1987, AMERICAN GEOSCIENTIST WALLACE BROECKER WARNED READERS OF THE journal *Nature* that 'We play Russian roulette with climate, hoping that the future will hold no unpleasant surprises. No one knows what lies in the active chamber of the gun, but I am less optimistic about its contents than many' (123). Writing on the eve of the hot northern summer of 1988, Broecker's warning highlighted the significant degree of scientific uncertainty about the scale and timing of the impacts of the phenomenon of the enhanced greenhouse effect (anthropogenic climate change) in the late 1980s, and the implications of this uncertainty for policymaking and planning for the future.

Scientists in Australia were also grappling with the uncertainty of what the future held under greenhouse conditions: they could only estimate the rate and magnitude of climate change, and their ability to predict regional impacts was limited. In the proceedings of the 1987 CSIRO conference, *Greenhouse: Planning for Climate Change*, climate scientists and resource managers could postulate the potential impacts of a warmer world, but like Broecker, could only caution policymakers and the public about the costs of inaction (Pearman). For Miles Franklin-award winning author, George Turner, the scientific uncertainty of future climate conditions posed no such limits to his imagining of Australia in his dystopian 1987 novel, *The Sea and Summer*. Turner's vision of a greenhouse future was a cautionary tale of complacency, a literary echo of the warnings

issued by the likes of Broecker and the scientists of the CSIRO. His message was clear: action was needed to avoid catastrophe.

The comparison of CSIRO and Turner's novel situates these imaginings of the future, one scientific, the other literary, in terms of the rise of anthropogenic climate change in the late 1980s as an issue of Western political concern. The purpose of the comparison is not to undermine the credibility of climate science by suggesting it is a form of speculative literature or science fiction. Rather, pairing these texts allows for the examination of two representations of the enhanced greenhouse effect in terms of the emerging fears and anxieties about an uncertain future in the late 1980s. Both the historical context of these scenarios and their nature and substance demand an examination that considers their relation to the notion of the 'risk society', which was emerging in Germany at this time, and the development of a popular 'climate as catastrophe' discourse in Australia and elsewhere in the 1980s (Beck, 'Anthropological Shock'; Beck, *Risk Society*; Hulme, 'Conquering of Climate'; Dörries). The comparison of these imaginings of Australia's greenhouse future offers important insights into the ways in which possible futures are constructed and depicted, and their implications for political action. This article considers these implications from the perspective of environmental history and argues for the role of the creative arts and humanities in helping restore people to mainstream narratives of anthropogenic climate change.

Histories of the past, the present and the future

Although environmental historians draw on literary works in their research, the genre of science fiction is unfamiliar terrain. Aside from Helen Rozwadowski's fascinating work on the contribution of Arthur C. Clarke's science fiction to changing understandings of oceans in the 1950s and 1960s (Rozwadowski), works of speculative or imaginary literature remain to be explored by environmental historians for insights into the historical context of their production. Rozwadowski's research suggests a rich field for examining how and why people in the past imagined unfamiliar worlds (such as the ocean, the atmosphere, or outer space) as well as alternative realities and futures, and the kinds of literature that shaped their expectations of these realms (582-83). That these texts are products of the imagination should not mean they are disregarded in our attempts to make sense of the relationships between people and place in the past. Rather, as Conevery Bolton Valenčius argues, 'We need to understand spaces and places as the creation of our fears, hopes, and dreams' because how these places 'are imagined does foretell apocalyptic futures, and that's important for how we understand the past' (258).

This embrace of the imaginary reflects growing efforts to understand the cultural dimensions of anthropogenic climate change. The humanities, social sciences and creative arts have an important role in returning people to public debate and policy discussions about the future (Rigby; Trexler and Johns-Putra; Yusoff and Gabrys; Morgan, 'Histories' 358). Despite the role of humans in creating and experiencing climate change, people are being written out by what geographer Mike Hulme describes as a new form of climate determinism, what he calls 'climate reductionism'. Hulme locates such reductionism in the claims of scientists, analysts and commentators who, in their predictions of the future, have elevated and isolated climate as the primary determinant of the past, present and future. In these narratives of a 'climate-shaped destiny' that derive from the hegemony of the natural sciences, he argues, the complexities of human and non-human interactions are lost, contingency overlooked, and human agency ignored (Hulme, 'Reducing the Future'; Carey). But neither the past nor the future have been historically determined, and imaginative endeavours can offer helpful antidotes to the 'fatalism and resignation' that appears to have descended on the issue of anthropogenic climate change (Limerick 11; Morgan, 'Histories' 358).

The imagination is also a vital resource to help humans come to terms with life in the age of the Anthropocene, the product of the enormous expansion in the use of fossil fuels since the late eighteenth century. In this new geological epoch, the planet's biophysical systems are no longer independent of humans, who have collectively become a geophysical force causing planetary change (Crutzen and Stoermer). As historian of science Libby Robin argues, the planetary scale of the Anthropocene requires imaginative thinking to conceptualise humans in terms of a species acting as a global geophysical force (336). Just as Benedict Anderson theorised the nation as an 'imagined community', we have a moral imperative to understand ourselves, our times and the global scale of our environmental crisis in terms of the 'Anthropocene Imaginary' (Robin 336-37).

The very concept of the Anthropocene has significant implications for the historian's craft, not least understandings of humans and human agency. Historian Dipesh Chakrabarty encourages consideration of the human in terms of different registers or scales, from studies of societies, freedom and equity, to a universalising history of the species that reaches into deep time. Owing to their time-scales, humans are endowed with ontological agency in the former, while there is no ontological dimension for the latter (Chakrabarty, 'Postcolonial Studies'). The role of the environmental historian is to find the connection between them. As Tom Griffiths argues,

Environmental history frequently makes more sense on a regional or global scale than it does on a national one. It uniquely bridges planetary and deeply

local perspectives, staking a claim for histories that are bound intimately to place and also embrace the natural world, histories that are deeply attentive to human biological parochialism. (377-8)

Writing histories across these scales might therefore help to illuminate the conundrum of our environmental crisis: although we are collectively the cause of anthropogenic climate change, we experience climate change unevenly and our political agency complicates collective action (Chakrabarty, 'Climate of History').

As Chakrabarty observes, imagining human agency on a geological scale is no easy task. Historians face the challenge of somehow appealing to human experience in order to write histories that connect their readers with this vast, seemingly incomprehensible scale (Chakrabarty, 'Postcolonial Studies'). The field of environmental history is especially attuned to these challenges of scale and agency. This is in part a result of having developed both in the context of changes in earth system science and growing scientific concern about anthropogenic climate change (McNeill, 'Observations'). Since the 1990s environmental historians have charted the ever-shifting relationships between human and nonhuman elements that complicate the notion of a human 'agent' that is somehow divorced from the more than human world (Nash, 'The Agency of Nature' 67-69). Acknowledging such interdependence is not to advocate environmental determinism. Rather, these relationships form the tangled histories of what environmental historian Richard White calls 'hybrid landscapes', which emphasise connections, conflicts and complexities, instead of the Enlightenment binary of nature and culture (White 557-74). These are the places, White argues, 'where we spend our lives' (564). Consequently, histories of such hybrid landscapes might present more familiar and recognisable narratives beyond tales of progress or decline (Morgan, 'Histories' 357). Attending to the shared affective possibilities of historical narratives and science fiction, and to the imaginary as both a means to understand ourselves as a geological force, and to bridge the past, present and an uncertain future, offers important insights into the ways people have understood the planetary crisis and approached the Anthropocene (Robin 335).

Imagining Australia's Greenhouse Future in the Late 1980s

By the end of the 1980s, the increasing scientific and political concern about anthropogenic climate change and its likely impacts had begun to seriously challenge conventional approaches to environmental management. Although scientists had made significant advances in their understandings of the greenhouse effect in the 1970s and early 1980s, the potentially harmful effects of increasing atmospheric carbon dioxide levels were yet to stimulate political action. But a small group of environmentally concerned scientists endeavoured

to inform Western nations about the growing scientific knowledge of the enhanced greenhouse effect (Bodansky 27). The well-publicised Villach meetings of the mid-1980s proved to be especially influential for the ways in which scientists and policymakers imagined and planned for a greenhouse future.

In 1985, the Austrian town of Villach hosted a joint meeting of the United Nations Environment Program, World Meteorological Organization (WMO), and International Council of Scientific Unions. There, participating scientists agreed that increasing concentrations of greenhouse gases would lead to an unprecedented rise in global mean temperature in the first half of the twenty-first century (WMO). In the preface to the conference proceedings, the editors presented what is referred to as the 'Villach Statement'. It read:

Many important economic and social decisions are being made today on long-term projects ... all based on the assumption that past climatic data, without modification, are a reliable guide to the future. This is no longer a good assumption since the increasing concentrations of greenhouse gases are expected to cause a significant warming of the global climate in the next century. (WMO)

Climate data from the past could no longer provide a reliable guide to future conditions—the future was uncertain (Morgan, 'Dry Horizons' 162).

This developing climate change agenda prompted Australia's chief scientific body, CSIRO, and the federal Labor government to convene the Greenhouse87 conference at Monash University in late 1987 (Morgan, 'Diagnosing the Dry' 99). Greenhouse87 was the first national meeting of scientists and resource managers to discuss the potential socioeconomic and environmental effects of anthropogenic climate change for Australia. The basis of these discussions was a CSIRO climate scenario for the year 2030 which predicted that the concentration of carbon dioxide in the atmosphere would have doubled. The resulting changes in the atmospheric circulations would include, according to the model, temperature increases of up to 4 degrees Celsius in the southern portions of the continent; increases in the intensity and frequency of tropical cyclones; rising sea levels; and changing rainfall patterns (Pearman).

The Greenhouse87 scenario had been largely devised by Australian climate scientist Barrie Pittock of CSIRO's Division of Atmospheric Research. The Division of Atmospheric Research had gained increasing influence in the 1980s through its contributions to international research on the phenomenon of nuclear winter, particularly in the southern hemisphere. In the event of nuclear war, scientists predicted that the spread of smoke across the northern hemisphere would cause temperatures to drop and produce global cooling

effects to which Australia would not be immune (Badash 209). Based on the Division's research, the Department of Foreign Affairs warned that, 'Even if the war was confined to the northern hemisphere, even if Australia was not hit by a single nuclear weapon, we would still suffer a nuclear winter effect in the southern hemisphere' (qtd in Badash 262). In Pittock's case, such scientific and political interest in the climate impacts of a nuclear winter converged with a broader personal and professional concern about anthropogenic climate change and variability in Australia, which he had studied since the mid-1960s (Morgan, 'Diagnosing the Dry' 100). For him, nuclear winter and the greenhouse effect were 'climatic catastrophes of human origin' (Pittock 621). And significantly, only the former could be averted.

In the months prior to the Greenhouse87 conference, the media reportage of the greenhouse effect in Australia shifted from the largely flippant and irreverent, to accounts of growing concern about the potential impacts on the nation. With its headline of 'The Sky is Falling' in November 1986, the *Sydney Morning Herald* alluded to the children's story of Chicken Little in its tongue-in-cheek reporting of a discussion of the hole in the ozone layer in Federal parliament (Frail). As the Greenhouse87 conference approached, however, reports focused particularly on the prospect of rising sea levels and the repercussions for coastal and riverside properties. Readers of the *Sydney Morning Herald* were warned about the impending 'deluge' due to rising sea levels, which would cause 'receding coastlines, flooding, intense erosion and damage to coastal structures' (Beale, 'Before the Deluge'). The following month, the newspaper warned that 'the greenhouse effect is not just another disaster story'; just 'a one-metre rise in sea level would put the main street of Cairns under water and result in the disappearance of large areas of beaches around the coast' ('Launch of Greenhouse Effect Plan').

As in Germany, where in 1986 newspapers had coined the term *Klimatkatastrophe* with an image of the Cologne Cathedral under water, the press' preoccupation with flooding echoed Biblical tropes of divine punishment (Boia 159; Dörries). The cause of this punishment was clear: paraphrasing an Australian Academy of Science spokesperson in early 1988, the *Sydney Morning Herald* reported,

Mankind is fast running out of time to understand the global consequences of its unbridled pollution of the environment. ... Acid rain, the depletion of the ozone layer, the greenhouse effect, and the recent Chernobyl and Rhine accidents were all signs of the times, which needed to be faced. (Beale, 'Little Time Left')

The media's coupling of the greenhouse effect with other ecological problems of global scale, such as the hole in the ozone layer, served to amplify the alarming tone of their reports, and to foster what geographer Mike Hulme describes as a 'contemporary discourse of "climate as catastrophe"', that is, a 'climate of fear about our future climate' ('Conquering of Climate' 5). Hulme traced the emergence of this discourse in the West to the mid-to-late 1980s when anthropogenic climate change emerged as a global public policy issue, which he argues 'induced a heightening of anxiety' about the 'unknown future' ('Conquering of Climate' 11). As Australian physicist Jim Falk observed in his 1989 book *The Greenhouse Challenge*, co-authored with Andrew Brownlow, 'The biosphere and the atmosphere breathe together in intimate embrace; we, as one part of the massive system, now await the effects of our interference with it' (Falk and Brownlow 24).

Hulme's timeline aligns closely with the German publication of sociologist Ulrich Beck's *Risikogesellschaft* in 1986, which was written mostly prior to the Chernobyl disaster and translated into English in 1992 (Beck, *Risk Society*). According to Beck, the new risks that emerged in the post-World War II world are global, complex, unpredictable, undetectable by human senses, and the product of human decisions (Beck, *Risk Society*; Ungar). These conditions were producing a 'risk society' anxiously focused on debating, preventing and managing the side effects or risks of industrialisation (Beck, 'Living'). Although this framework was popularised in the 1990s, elements of Beck's 'risk society' inform the 1987 imaginings of CSIRO and Turner. In the two years prior, scientists had discovered the hole in the ozone layer, the Chernobyl disaster had occurred, and the Sandox chemical spill had leaked toxic chemicals into the Rhine River (Ungar 273). Closer to home, the decade had been marked by the El Niño drought of 1982-3, dust storms and the Ash Wednesday bushfires of 1983, and Australia's accession to the Vienna Convention for the Protection of the Ozone Layer. On the eve of the Greenhouse87 meeting in December 1987, these events were combining to foster the makings of a risk society in Australia concerned with such issues as the greenhouse effect.

This risk society discourse found creative expression in George Turner's 1987 science fiction novel, *The Sea and Summer*. Over a decade after his novel *The Cupboard Under the Stairs* won the Miles Franklin Award in 1963, Turner had turned to writing science fiction (Milner, 'The Sea' 112). *The Sea and Summer*, published as *Drowning Towers* (1988) in the United States, had earlier appeared as a short story, 'The Fittest' (1985), and reflected the growing popular awareness of the potential impacts of anthropogenic climate change in Australia. Turner envisioned a Melbourne drowned as a result of rising sea levels in the middle of the twenty-first century, its population cleaved into haves and have-nots, the Sweet and the Swill. This Melbourne, the reader learns, is the product of

the ‘Greenhouse Culture’—where the forces of population growth, industrialisation and capitalism have gone unchecked. Its watery fate is human-caused, anthropogenic, and, the characters suggest, avoidable. As Turner warns in the postscript to his novel, ‘None of these things need happen’ (364).

The affective contrast between the abstract nature of the CSIRO scenario and Turner’s tangible future is palpable. After all, as environmental historian Tom Dunlap has observed, ‘counting and measuring and systems analysis offer little easy emotional identification’ (Dunlap 42). Where CSIRO had been tentative and offered an uncertain vision of the future, *The Sea and Summer* was definite and clear: dramatic economic, political and cultural changes would be necessary to avert Turner’s dystopia. Where CSIRO’s future was unpeopled and anonymous, the Melbourne of *The Sea and Summer* was a populated future with characters to whom readers could relate. For one reviewer, Turner’s ‘capacity to give us believable characters ... help[s] to lift this novel way above the average run of futuristic fantasies’ (‘Melbourne is Drowning’ 1988). Different characters narrate each of the chapters, some of whom belong to an average Australian family struggling to survive. Where the CSIRO’s scenario seemed remote, *The Sea and Summer* was set in place. Australian readers at least would be familiar with Melbourne and its suburbs, the Yarra, and the Dandenongs. This is a portrait of the future to which readers can ask themselves, how would *their* lives change? How would *they* survive? How would their *children* survive? At the end of his novel, Turner steps out from behind the curtain, and returns his reader to the present. Far from a relief that his dystopia is a work of fiction, the litany of environmental challenges Turner presents in his postscript is sobering. But it also suggests that Turner’s vision is not inevitable—that this future is avoidable.

That the Melbourne of *The Sea and Summer* is both familiar and foreign is key to Turner’s attempt to render a realistic future in his reader’s imagination. For instance, the character Alison Conway recalls the Melbourne bayside suburb of Elwood of her childhood: ‘there was a beach here once. I used to paddle here. Then the water came up and there were the storm years and the pollution, and the water became too filthy’ (26). Such a representation of the future climate invites the reader to undertake an imaginative act about a tangible place that is not ‘out there’ or distant. Turner himself argued in 1990 that ‘Science fiction could be a useful tool for serious consideration on the level of the non-specialist-reader, of a future rushing on us at unstoppable speed’ (qtd in Milner, *Locating Science Fiction* 180). Fostering this kind of ‘Anthropocene Imaginary’ goes some way to returning humans to mainstream narratives of climate change, and in doing so offers the possibility for local agency and political action (Yusuff and Gabrys). After all, as the editors of *The Future of Nature* note, ‘Most people live “somewhere”, no one lives “everywhere”’ (Robin, Soerlin and Warde 523).

Turner's emphasis on place in *The Sea and Summer* contrasts starkly with the detached CSIRO imagining of the future. As environmental historian William Cronon notes, 'it is hard to think of an environmental phenomenon less directly observable, more remote from day-to-day experience, more dependent on science for its supposed facticity, than the so-called greenhouse effect' ('Cutting Loose' 41). That the phenomenon was being understood as a problem of the 'global climate' was very much a product of the incipient movement of globalisation in the late 1980s and early 1990s (Ross 1991, 25; Hulme, 'Conquering of Climate' 13). Climate scientist Barrie Pittock echoed this global approach in his own plea for action, 'Can we evolve a planetary way of life which is compatible with the survival of spaceship Earth, or shall we bring our voyage to a disastrous ending?' (632). Although thinking at the global scale might promote an awareness of the connections and relationships, sociologist Andrew Ross feared it was already representing 'global warming as a distant, almost inevitable, causal explanation for a range of environmental problems and issues with a much more local provenance ... and open to change by local action' (25-26).

By grounding *The Sea and Summer* in such recognisable places as Elwood, however, Turner attempted to localise a global issue and make anthropogenic climate change 'mentally manageable' (L. Buell, *The Future of Environmental Criticism* 68). Yet literary scholar Ursula Heise wonders whether Turner himself doubted the effectiveness of novels such as his to 'bridge ... the gap between stories of individuals and accounts of global transformations' (Heise 208). In the ending to *The Sea and Summer*, for example, the character of the historian reflects on her account of the Greenhouse Culture: 'I should have seen from the beginning that these people struggled in the nets of local culture and their own personalities; they did not represent the collapsing world. It might be impossible, I feel, to create a group that *could* represent it' (361). But if this is Turner's expression of self-doubt, then he soon recovers, for his historian has the final word: 'The little human glimpses *do* help, if only in confirming our confidence in steadfast courage' (362).

This persistence of humankind in the future of *The Sea and Summer*, in spite of significant climatic changes, reflects a broader trend in depictions of environmental crisis. Literary scholar Frederick Buell argues that by the 1990s, environmental issues were no longer represented as apocalyptic, a 'terrible and conclusive moment ahead', but instead, as 'a slow crisis already in process'—a 'way of life' (*From Apocalypse* 95, 173). The reflections of one of Turner's characters resonate with this assessment of a postmodern 'domestication of environmental crisis' or 'dwelling in crisis' (F. Buell, *From Apocalypse* 274; Heise 144): 'A whining voice at the back of my mind insisted that while the greedy ocean rose, year by year, the real catastrophe was yet to come. Behind that again

was the cowardly whisper of humanity in all ages: “Please, not in my time” (Turner, *The Sea and Summer* 180). In Turner’s future, an apocalyptic event still haunts the horizon, despite the omnipresence—the ‘slow crisis’—of a changing climate. If *The Sea and Summer* is a morality tale ‘about the possible cost of complacency’, as Turner warns (364), it is a warning to readers to avoid becoming too accommodated, too comfortable, in an age of environmental crisis (F. Buell, *From Apocalypse* 190).

Possible Futures, Uncertain Futures

In the postscript to *The Sea and Summer*, Turner reminds his reader that his vision of mid-twenty-first century Melbourne is not a prophecy, it is merely a possibility—‘Nobody can foretell the future’ (363). Turner’s dystopian imagining of the years and decades ahead attempts to show readers where the prevailing mindset, the ‘Greenhouse Culture’, may lead them. This suggestion of a plurality of possible futures is a condition of the ‘risk society’ where ‘the future becomes ever more absorbing, but at the same time opaque’ (Giddens and Pierson 211). Indeed, we may read *The Sea and Summer* as a reflection of the kinds of anxieties prevalent in the risk society of the late 1980s and early 1990s—a society increasingly concerned that its commitment to industrial development was fostering the conditions for its own downfall. The corollary of progress was that the world was being rendered vulnerable to natural hazards and environmental problems that threatened to undermine the human race. These are what theorist Anthony Giddens terms ‘manufactured risks’—risks produced by human progress, particularly science and technology (Giddens and Pierson 210). The scale and complexity of such environmental problems, Giddens has argued, fed a growing disenchantment with modernisation, which posed unprecedented challenges to traditional technocratic decision-making institutions. Such critique, argued sociologists like Ulrich Beck and Giddens in the late 1980s and 1990s, was characteristic of a transition from an industrial society to the local and global ‘risk society’, whereby the global ecological crisis was perceived as ‘a profound institutional crisis of industrial society itself’ (Beck, ‘Preface’ 8).

As the CSIRO scenario suggests, uncertainty about the future also extended to scientific imaginings of the consequences of anthropogenic climate change. At the Greenhouse87 Conference, for instance, the convenor, Graeme Pearman was reluctant for resource managers to base their planning decisions on the very tentative CSIRO scenario (x). Under such conditions of uncertainty, Barrie Pittock advised, ‘We must try to anticipate the unexpected, and to use analogies and make connections which we would not otherwise make’ (Pittock 630). The difficulties that anthropogenic climate change posed reflected the characteristics of ‘post-normal’ science. In contrast to other strains of scientific inquiry such as applied or pure research, post-normal science ‘encompasses the management of

irreducible uncertainties in knowledge and its ethics, and the recognition of different legitimate perspectives and ways of knowing' (Funtowicz and Ravetz 754). Scientific inquiry in such disciplines required constant manoeuvring to adapt to changing circumstances. As Pittock wondered, 'What else may be around the corner?' (631)

Despite this lack of certainty from the Australian scientific community, there were growing calls from scientists for policymakers to take action to mitigate the greenhouse effect and implement measures to adapt to its impacts. For example, high profile American climatologist Stephen Schneider, who launched the Australian Greenhouse⁸⁸ conference in 1988, argued 'enough is known already to go beyond research and begin to implement policies to enhance adaptation to slow down the rapid build-up of greenhouse gases' (Schneider 779). The leading figures of the 1987 CSIRO conference, Barrie Pittock and Graeme Pearman, echoed this call for action, adding that researchers required greater Commonwealth funding to improve the certainty of their predictions (Pittock and Pearman 50-51). Australian scientist Ann Henderson-Sellers put it most clearly when she wondered, 'do most people understand that by the time we, the scientists, are all absolutely certain it will be much too late to avert most of the changes that mankind (sic) is currently effecting?' (Henderson-Sellers, 'Greenhouse Guessing' 8).

Meanwhile, public support for taking action was increasing among lay Australians. A 1988 *Sydney Morning Herald* poll found that three-quarters of Australians were 'troubled by the environment threatening greenhouse effect and believe[d] something must be done to halt it' (Henderson-Sellers, 'Australian Public Perception' 74). Many Australians not only sought action but wanted strategies of abatement to commence promptly, even if scientists were unsure about the full range of impacts of the greenhouse effect. Another survey, also undertaken in 1988, showed respondents required only a relatively low level of confidence about the greenhouse issue before action should be taken (Henderson-Sellers, 'Australian Public Perception' 68). The close association (in the public eye) of the greenhouse effect with the problem of ozone depletion might have also accounted for widespread public support for addressing anthropogenic climate change (Henderson-Sellers, 'Australian Public Perception' 78, 91).

In their scientific and literary imaginings of the future, both Pittock and Turner rejected any 'accommodation' of environmental crisis and advocated immediate action. For Pittock, 'Today our choice is whether to continue down the same path towards an ever more extreme climatic change, or whether to pull back, try to minimize the climatic effects, and to plan as best we may to cope with what cannot be stopped' (632). Meanwhile, Turner observed, 'We *talk* of leaving a

better world to our children but in fact do little more than rub along with day-to-day problems and hope that the longer-range catastrophes will never happen' (364). Their scientific and lay support for policies to help avert further climate change reflected the rise of a precautionary discourse in the 1980s and echoed the emphasis of intergenerational justice that was so central to the 1987 Brundtland Report's proposal of 'sustainable development' (Cameron 267).

As 1988 wore on, environmental and political conditions favoured change. Alarming testimonies of climate experts such as NASA's Jim Hansen before U.S. congressional committees resonated with the public's concern for other ecological issues (Henderson-Sellers, 'Australian Public Perception'). Earlier that year, the Canadian government had hosted a conference on 'The Changing Atmosphere' in Toronto (Bulkeley 37). Although there had been no official government representation, the conference delegates had declared a 'Call to Action' for developed countries to reduce their emissions of carbon dioxide to 1988 levels by the year 2000 (Bulkeley 37). Participants agreed that, 'Humanity is conducting an unintended, uncontrolled, globally pervasive experiment, whose ultimate consequences could be second only to global nuclear war' (qtd in Fleming 238). This conference, as well as the discovery of the stratospheric 'ozone hole' and the publication of the Brundtland Report, stirred public concern for the global environment (Bodansky 23). Soon afterwards, the WMO and the United Nations Environment Program joined forces to establish the Intergovernmental Panel on Climatic Change.

In Australia, local and national conservation groups seized the opportunity to call on state and federal governments to reduce fossil fuels and improve energy efficiency to limit climate change. The New South Wales, Victorian and Western Australian governments publicly adopted the Toronto target of reducing carbon emissions to 80 per cent of 1988 levels by 2005 (Hamilton 31-32). The Commonwealth government followed soon afterwards and established a national climate change program to coordinate Australian research efforts. In December 1992, Australia was the eighth nation to ratify the United Nations Framework Convention on Climate Change. But this enthusiasm did not last. Throughout the 1990s, Labor and Coalition governments were reluctant to accept legally binding targets and instead advocated the merits of a 'differentiated' approach in the pursuit of greenhouse gas emission reduction goals (Bulkeley 33, 39). Despite growing scientific concerns about the implications of anthropogenic climate change for Australia, policymakers allowed the nation to accommodate environmental crisis and for what Turner described as the 'Greenhouse Culture' to prevail.

Turner had expected such inertia. In his postscript to *The Sea and Summer*, he wrote, 'All governments busy themselves with preserving and continuing their

own power. They do little else. There are no votes in projects twenty years in the future let alone a hundred' (364). This political short-sightedness and complacency, Turner believed, would be humanity's undoing:

'Not in our time.' That was Teddy, sure as ever.

That phrase haunts all our lives. It has been the cry of the people and of their politicians as well as of scientists who calculated the imminence of disaster and then sought reasons why it should not happen just yet. Refusal to believe is our surety that disaster cannot happen—at any rate, not today. And, every time, it does. (26-27)

For Turner, inaction is not only the fault of government and political systems, but everyone's. By imagining a greenhouse future that is clearly a product of, and response to real issues located in real places, Turner seeks to awaken his readers and spur them to take action (Weaver 80).

Conclusion

As I write, Melbourne's *Sunday Age* reports on the final draft of the latest report of the Intergovernmental Panel on Climate Change, which predicts more extreme weather for Australia in the future. The newspaper's editorial warns, 'These scenarios may seem to appear on the horizon. But, as clichéd as it may sound, each day is a door to the future. Surely, our political leaders should realise this and stop shutting it in the face of future generations. The time for action is upon us' (Sulicich). The language, the tone, and the urgency of this warning echo the expressions of 'climate as catastrophe' of the likes of Pittock and Turner some twenty-five years ago when anthropogenic climate change, or the greenhouse effect as it was known then, made the headlines.

Exploring scientific and literary imaginings of a greenhouse future in Australia in the late 1980s reveals valuable insights into the ways that the 'climate as catastrophe' discourse was communicated in the context of other pressing global environmental concerns, particularly nuclear war and the hole in the ozone layer. That the concerns voiced in the *Sunday Age* editorial, and in the scientific and literary imaginings of CSIRO and Turner, remain largely unheeded reflects what literary scholar Rob Nixon describes as the 'acute challenges' of maintaining a media focus on the 'slow violence' of anthropogenic climate change (Nixon 47). As the twenty-first century news cycle favours drama and catastrophe over issues that 'threaten in slow motion', there is little opportunity to sustain concern about the unfolding disaster narrative of climate change (Nixon 211; Christensen, Moellers and Robin).

Contrasting the affective qualities of CSIRO and Turner's imaginings also highlights the importance of creative treatments of our environmental crisis that resonate with us on a personal level and point to the futility of the new climate reductionism. The imaginary may well offer an antidote to the sedentary pattern of 'dwelling in crisis' and 'slow violence' that prevails in the twenty-first century. Literary critic Kate Rigby suggests a form of 'utopian imagination' that serves as a 'path to an unforeseeable future', 'a compass rather than ... a destination', which help us learn to live with higher degrees of unpredictability and variability; to live more frugally; and to live more cooperatively with the more than human world (72-73). Environmental historian John R. McNeill argues that 'a better idea of our past, more complete, more compelling, more comprehensive' will give us a 'better idea of our possible futures ... [and] we will be better placed to debate and choose among them' (McNeill, *Something New* 362). Whether scientific, literary, or historical, we need storytellers and their stories to articulate this path, and to offer tangible connections to distant places and complex planetary processes.

RUTH A. MORGAN is a Lecturer in Australian History at Monash University where she teaches and researches Australian and imperial environmental history. Her first book *Running Out? Water in Western Australia* will be published by UWA Publishing in early 2015.

Works cited

- Badash, Lawrence. *A Nuclear Winter's Tale: Science and Politics in the 1980s*. Cambridge, MA: MIT Press, 2009.
- Beale, Bob. 'Before the Deluge, a Warning.' *Sydney Morning Herald*, 27 August 1987.
- . 'Little Time Left, Warns Scientist.' *Sydney Morning Herald*, 24 February 1988.
- Beck, Ulrich. 'The Anthropological Shock: Chernobyl and the Contours of the Risk Society.' *Berkeley Journal of Sociology* 32 (1987): 153-65.
- . 'Living in the World Risk Society.' *Economy and Society* 35 (2006): 329-45.
- . 'Preface' and 'The Reinvention of Politics: Towards a Theory of Reflexive Modernization'. *Reflexive Modernization: Politics, Tradition and Aesthetics in the Modern Social Order*. Ed. Ulrich Beck, Anthony Giddens and Scott Lash. Palo Alto: Stanford UP, 1994. vi-viii, 1-55.
- . *Risk Society: Towards a New Modernity*. London: Sage, 1992.
- Bodansky, Daniel. 'The History of the Global Climate Change Regime.' *International Relations and Global Climate Change*. Ed. Urs Luterbacher and Detlef F. Sprinz. Cambridge, Mass.: MIT, 2001. 23-40.

- Boia, Lucian. *The Weather in the Imagination*. Trans. Roger Leverdier. London: Reaktion Books, 2005.
- Broecker, Wallace S. 'Unpleasant Surprises in the Greenhouse?' *Nature* 328.6126 (1987): 123.
- Buell, Frederick. 'A Short History of Environmental Apocalypse.' *Future Ethics: Climate Change and Apocalyptic Imagination*. Ed. Stefan Skrimshire. London: Continuum, 2010. 13-36.
- . *From Apocalypse to Way of Life: Environmental Crisis in the American Century*. New York: Routledge, 2003.
- Buell, Lawrence. *The Environmental Imagination: Thoreau, Nature Writing, and the Formation of American Culture*. Cambridge, Mass.: Harvard UP, 1995.
- . *The Future of Environmental Criticism: Environmental Crisis and Literary Imagination*. Oxford: Blackwell, 2005.
- . *Writing for an Endangered World: Literature, Culture, and Environment in the US and Beyond*. Cambridge, Mass.: Harvard UP, 2001.
- Bulkeley, Harriet. 'The formation of Australian climate change policy: 1985-1995.' In *Climate Change in the South Pacific: Impacts and Responses in Australia, New Zealand and Small Island States*. Ed. Alexander Gillespie and William C. G. Burns. Boston: Kluwer, 2000. 33-50.
- Cameron, James. 'The Status of the Precautionary Principle in International Law.' *Interpreting the Precautionary Principle*. Ed. Timothy O'Riordan and James Cameron. London: Earthscan, 1994. 262-91.
- Carey, Mark. 'Climate and History: a Critical Review of Historical Climatology and Climate Change Historiography.' *WIREs Climate Change* 3 (2012): 233-49.
- Chakrabarty, Dipesh. 'The Climate of History: Four Theses.' *Critical Inquiry* 35 (2009): 197-222.
- . 'Postcolonial Studies and the Challenge of Climate Change.' *New Literary History* 43.1 (2012): 1-18.
- Christensen, Miyase, Nina Moellers and Libby Robin. 'Climate Change Show and Tell.' *Le Monde Diplomatique* (English), 18 November 2014. <<http://mondediplo.com/2014/11/18climate#nb2>>.
- Collis, Brad. *Fields of Discovery: Australia's CSIRO*. Crows Nest: Allen and Unwin, 2002.
- Cronon, William. 'Cutting Loose or Running Aground?' *Journal of Historical Geography* 20.1 (1994): 38-43.
- . 'A Place for Stories: Nature, History and Narrative.' *Journal of American History* 78.4 (1992): 1347-76.
- Crutzen, Paul and Eugene Stoermer. 'The Anthropocene.' *Global Change Newsletter* 41 (2000): 14-17.
- Dörries, Matthias. 'Climate Catastrophes and Fear.' *WIREs Climate Change* 1 (2010): 885-90.
- Dunlap, Thomas R. 'Nature Literature and Modern Science.' *Environmental History Review* 14.1 (1990): 33-44.

- Falk, Jim and Andrew Brownlow. *The Greenhouse Challenge: What's to be Done?* Ringwood, Vic: Penguin, 1989.
- Fleming, James R. 'Global Climate Change and Human Agency: Inadvertent Influence and "Archimedean" Interventions.' *Intimate Universality: Local and Global Themes in the History of Weather and Climate*. Ed. James R. Fleming, Vladimir Jankovic and Deborah R. Coen. Sagamore Beach: Science History Publications, 2005. 223-48.
- Frail, Rod. 'The Sky is Falling, but is it Time to Leave the Beach?' *Sydney Morning Herald*, 12 November 1986.
- Funtowicz, Silvo and Jerome Ravetz. 'Science for the Post-Normal Age.' *Futures* 25.7 (1993): 739-55.
- Giddens, Anthony and Christopher Pierson. *Conversations with Anthony Giddens: Making Sense of Modernity*. Palo Alto: Stanford UP, 1998.
- Gillespie, Bruce. 'The Four Careers of George Turner.' *Chained to the Alien: the Best of Australian Science Fiction Review*. Ed. Damien Broderick. Rockville, MD: Borgo Press. 40-42.
- Griffiths, Tom. 'How Many Trees Make a Forest? Cultural Debates about Vegetation Change in Australia.' *Australian Journal of Botany* 50 (2002): 375-89.
- Hamilton, Clive. *Running From the Storm: the Development of Climate Change Policy in Australia*. Sydney: UNSW Press, 2001.
- Heise, Ursula. *Sense of Place and Sense of Planet: the Environmental Imagination of the Global*. Melbourne: OUP, 2008.
- Henderson-Sellers, Ann. 'Australian Public Perception of the Greenhouse Issue.' *Climatic Change* 17 (1990): 69-96.
- . 'Greenhouse Guessing: When Should Scientists Speak Out?' *Climatic Change* 16 (1990): 5-8.
- Hulme, Mike. 'The Conquering of Climate: Discourses of Fear and their Dissolution.' *Geographical Journal* 174.1 (2008): 5-16.
- . 'Four Meanings of Climate Change.' *Future Ethics: Climate Change and Apocalyptic Imagination*. Ed. Stefan Skrimshire. London: Continuum, 2010. 37-58.
- . 'Reducing the Future to Climate: a Story of Climate Determinism and Reductionism.' *Osiris* 26 (2011): 245-66.
- 'Launch of Greenhouse Effect Plan.' *Sydney Morning Herald*, 17 September 1987.
- Limerick, Patricia. 'The Repair of the Earth and the Redemption of the Historical Profession.' *The Future of Environmental History: Needs and Opportunities*. Ed. Kimberly Coulter and Christof Mauch. Munich: Rachel Carson Centre for Environment and Society, 2011.
- McNeill, John R. 'Observations on the Nature and Culture of Environmental History.' *History and Theory* 42 (2003): 5-43.
- . *Something New Under the Sun: an Environmental History of the Twentieth-Century World*. New York: W.W. Norton, 2000.

- 'Melbourne is Drowning...' *Sun Herald*, 3 January 1988.
- Milner, Andrew. *Locating Science Fiction*. Liverpool: Liverpool UP, 2012.
- . 'The Sea and the Eternal Summer: Science Fiction, Futurology and Climate Change.' *Australasian Journal of Ecocriticism and Cultural Ecology* 3 (2013-14): 111-17.
- Morgan, Ruth A. 'Diagnosing the Dry: Historical Case Notes from Southwest Western Australia, 1945-2007.' *Osiris* 26.1 (2011): 89-108.
- . 'Dry Horizons: the Responses of Western Australian Water Managers to the Enhanced Greenhouse Effect in the Late 1980s.' *History Australia* 8.3 (2011): 158-76.
- . 'Histories for an Uncertain Future: Environmental History and Climate Change.' *Australian Historical Studies* 44.3 (2013): 350-60.
- Nash, Linda. 'The Agency of Nature or the Nature of Agency?' *Environmental History* 10 (2005): 67-69.
- . 'Furthering the Environmental Turn.' *Journal of American History* 100.1 (2013): 132-35.
- Nixon, Rob. *Slow Violence and the Environmentalism of the Poor*. Cambridge, MA: Harvard University Press, 2011.
- Pearman, Graeme I., ed. *Greenhouse: Planning for Climate Change*. Melbourne: CSIRO, 1988.
- Pittock, Barrie. 'Climatic Catastrophes: the Local and Global Effects of Greenhouse Gases and Nuclear Winter.' *Natural and Man-Made Hazards: Proceedings of the International Symposium held at Rimouski, Quebec, Canada, 3-9 August 1986*. Ed. M. I. El-Sabh and T. S. Murty. Boston: D. Reidel, 1988. 621-34.
- , and Graeme I. Pearman. 'Too Late for Certainty.' *Search* 20.2 (1989): 50-51.
- Rigby, Kate. 'Imagining Catastrophe: Utopia and Dystopia in a Warming World.' *Arena* 35 (2011): 57-77.
- Robin, Libby. 'Histories for Changing Times: Entering the Anthropocene?' *Australian Historical Studies* 44.3 (2013): 329-40.
- , Sverker Soerlin and Paul Warde. 'Commentary.' *The Future of Nature: Documents of Global Change*. Ed. L. Robin, S. Soerlin and P. Warde. Yale UP, 2013. 520-25.
- Ross, Andrew. 'Is Global Culture Warming Up?' *Social Text* 28 (1991): 3-30.
- Rozwadowski, Helen M. 'Arthur C. Clarke and the Limitations of the Ocean as a Frontier.' *Environmental History* 17 (2012): 578-602.
- Schneider, Stephen. 'The Greenhouse Effect: Science and Policy.' *Science* 243 (1989): 779.
- Shute, Nevil. *On the Beach*. Melbourne: Heinemann, 1957.
- Sulicich, Duska. 'In This Climate, Can Anything Be Done?' *Sunday Age*, 23 March 2014. <<http://www.theage.com.au/comment/the-age-editorial/in-this-climate-can-anything-be-done-20140322-35a84.html>>.

- Trexler, Adam and Johns-Putra, Adeline. 'Climate Change in Literature and Literary Criticism.' *WIREs Climate Change* 2 (2011): 185-200.
- Turner, George. 'The Fittest.' *Urban Fantasies*. Ed. Russell Blackford and David King. Melbourne: Ebony Books, 1985. 105-31.
- . *The Sea and Summer*. (1987) London: Orion Publishing Group, 2013.
- Ungar, Sheldon. 'Moral Panic Versus the Risk Society: the Implications of the Changing Sites of Social Anxiety.' *British Journal of Sociology* 52 (2001): 271-91.
- Valenčius, Conevery Bolton. 'Mudslides Make Good History.' *Journal of the Early Republic* 24.2 (2004): 252-59.
- Weaver, Roslyn. *Apocalypse in Australian Fiction and Film: a Critical Study*. Jefferson, NC: McFarland & Co., 2011.
- White, Richard. 'From Wilderness to Hybrid Landscapes: the Cultural Turn in Environmental History.' *Historian* 66.3 (2004): 557-64.
- World Meteorological Organization (WMO). *Report of the International Conference on the Assessment of the Role of Carbon Dioxide and Other Greenhouse Gases in Climate Variations and Associated Impacts*. Geneva: WMO, 1986.
- Yusoff, Kathryn and Gabrys, Jennifer. 'Climate Change and the Imagination.' *WIREs Climate Change* 2 (2011): 516-34.