

Faculty of English

‘Insidious Pollen’: Literature and Industrial Toxicity, 1935-Present

Robert Newton

Emmanuel College

University of Cambridge

This thesis is submitted for the degree of Doctor of Philosophy October 2020

Abstract

This dissertation tracks the entwined cultural and environmental histories of ‘legacy contaminants – enduring poisons from the past’.¹ It focuses chiefly on literary texts about industrial toxicity written in Britain, or in response to British imperial projects, from 1935-present. Critically, it situates itself within the field of what I call ‘environmental justice scholarship’, and in Anthropocene studies. In 2011, Rob Nixon influentially coined the term ‘slow violence’ to describe ‘a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all’.² Nixon’s term has since helped to shape an interdisciplinary discourse that enquires into toxic legacies, and the political systems that regulate their distribution. Often working in the social sciences, environmental justice scholars measure toxic pollution through an array of quantitative and qualitative methods. Literature too, I argue, can operate as a sensing technology for toxicity – but while environmental justice documents tend to serve defined political aims, many of the literary texts I discuss here are less direct in their intentions. They are preoccupied with how adequately to describe unsettling sensory experiences: tactile encounters with new synthetic materials, for example, or exposure to invisible toxicants. They also respond to difficult questions of systemic complicity and frustrated agency. While some of these texts overtly call their readers to political action, others voice how toxic legacies can leave people bewildered, frightened or jaded. As toxic materials have proliferated, writers have represented new kinds of political, affective and imaginative experience.

The first half of the dissertation concerns 1930s and 1960s British literary texts about synthetic technology and its associated industrial systems. In chapters One and Two, I discuss how 1930s writers associated synthetic materials with distinctive moods, such as vertigo and paranoia. In chapters Three and Four, I trace how 1960s fears about agrichemical toxicity manifested in British science fiction and nonfiction. The second half of the dissertation turns to literature about British nuclear colonialism. Chapters Five and Six draw together hitherto-unconnected literary texts that give careful representation to the aftermaths of the United Kingdom’s nuclear weapons programme in South Australia and East Anglia, respectively. I conclude with a chapter on the legacy of Rachel Carson’s influential 1962 book *Silent Spring*, and contemporary American literary work on slow violence and cancer.

¹ Rebecca Altman, ‘Time-Bombing the Future’, *Aeon*, 2 January 2019, <[goo.gl/eY9UU5](https://go.gl/eY9UU5)>.

² Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (London: Harvard University Press, 2011), p. 2.

Acknowledgments

First, I thank my supervisor Robert Macfarlane for his guidance, generosity and friendship.

For their support and conversations along the way, I thank Kerri Arsenault, Rebecca Altman, John Fanshawe, Leo Mellor, David Trotter, Louis Klee, Imogen Cassels and Camilla Newton. I learned much from the conference *Climate Fictions / Indigenous Studies*. I am grateful to my co-convenors, especially Siddharth Soni, Ananya Mishra and Louis Klee, and I thank those who spoke at the conference, in particular Jeanine Leane, Evelyn Araluen Corr, Jonathan Dunk, Michael Griffiths, Leanne Betasamosake Simpson and Nicole Furtado.

I thank my teachers from across the years – Nicholas Roe and Pàdraig MacAoidh at the University of St Andrews, and Mina Gorji at the University of Cambridge. I especially thank Richard Tiley, who has taught me so much about writing, navigation and endurance.

I have throughout this project, as always, relied upon my friends and my family. Emma Mason, in particular, always had belief in me when I lacked it, and gave me the strength to persevere. I am deeply grateful for the love and support of my parents, Tom and Camilla Newton, of my brother Alec, and of my grandparents, Heather and Michael Sandell and Lucy Newton. I also give my heartfelt thanks to Johnnie Bicket, Daisy de Montjoye, Mike Sharp, Alfie Long, Maggie Allen, Seb Tiley, Jack Martin, Jack Raeder, Christian Cargill, Andrés Zambrano Bravo, Griffin Snyder, Jacques-Emmanuel Onanga Ibekelia, Alexander Mackay, Savannah Jones, Katherine Rappoport, Naomi Morrice, Imogen Cassels, Louis Klee, Imogen Free, Lizzie Hibbert, Max Fletcher, Sidney McKinley, Siddharth Soni, Ananya Mishra, Enya Absi, Ipek Oszoy, Matteo Lenzi, Pauline Op de Beek, Lola Gillies-Creasey, Esther Wilson, Jake Phillips Head, Katie Basey and Micheal Summers.

I could not have undertaken this project without the support of Emmanuel College. I thank the Derek Brewer Research Studentships fund, a generous college Fellow, and the Late 80s Fund for their financial assistance.

I also thank the Cambridge University Library, the English Faculty Library, the British Library, and Senate House Library.

FrankNews published an early version of Chapter One; I thank the editorial staff.

Copyright © 2020 Robert Newton.

Abbreviations and Conventions

Air: George Orwell, *Coming Up for Air* (London: Penguin, 2000; 1939)

Destruction: W.G. Sebald, *On the Natural History of Destruction*, trans. by Anthea Bell (London: Penguin, 2004; 1999)

Mill: Kerri Arsenault, *Mill Town: Reckoning with What Remains* (St. Martin's Press: New York, 2020) (Advanced Readers' Edition)

Peregrine: J.A. Baker, *The Peregrine* (London: William Collins, 2017; 1967)

Rings: Sebald, *The Rings of Saturn*, trans. by Michael Hulse (New York: New Directions Press, 1998; 1995)

Spring: Rachel Carson, *Silent Spring* (London: Penguin, 2000; 1962)

'Storm': J.G. Ballard, 'Storm-Bird, Storm-Dreamer', in Ballard, *The Complete Short Stories*, 2 vols (London: Fourth Estate, 2014)

Summer: John Hargrave, *Summer Time Ends* (London: Constable & Co, 1935)

Undying: Anne Boyer, *The Undying: A Meditation on Modern Illness* (London: Allen Lane, 2019)

~

This dissertation adheres to the conventions of the MHRA Style Guide. For the most part, I have cited adjacent references to the same publication together, in a single note. In certain cases though, in the interest of clarity, I have cited adjacent references to the same publication separately, in consecutive notes.

List of Figures

Figure 1: Interior of the 'Kinlog', illustrated by Kathleen Milnes, Museum of London Kibbo Kift Collection, 2012.2/474, © Kibbo Kift Foundation, <bit.ly/2RxVDO4> [accessed 16 September 2020].

Figure 2: Kibbo Kift Vita Sancta banner, 1921, Museum of London Kibbo Kift Collection, 2012.72/465, © Kibbo Kift Foundation, <bit.ly/32BkLK4> [accessed 16 September 2020].

Figure 3: Yhonnie Scarce, *Death Zephyr* (installation view at Art Gallery of New South Wales), hand-blown glass yams, nylon and steel armature, courtesy Yhonnie Scarce and THIS IS NO FANTASY + dianne tanzer gallery, © Yhonnie Scarce, photograph Felicity Jenkins, Art Gallery of New South Wales, <bit.ly/31aov2G> [accessed 14 September 2020].

Figure 4: Yhonnie Scarce, *Thunder Raining Poison* (National Gallery of Australia), hand-blown glass yams, metal armature, courtesy Yhonnie Scarce and THIS IS NO FANTASY + dianne tanzer gallery, © Yhonnie Scarce, photograph National Gallery of Australia, <bit.ly/33wsYhE> [accessed 14 September 2020].

Figure 5: Stained glass yams from *Thunder Raining Poison*. © 2020 This Is No Fantasy, <bit.ly/2ZEVixi> [accessed 16 September 2020].

Figure 6: An overview of Barbara Hui's *Litmap*, which charts the interlinked geographies of *The Rings of Saturn*. Barbara Hui, *Litmap*, <bit.ly/3aMM7hk> [accessed 14 September 2020].

Contents

Introduction: The Dispersed Literatures of Industrial Toxicity	1
--	---

PART ONE

Industrial Synthesis and Literature in 1930s England

1. Synthetic Vertigo: George Orwell's <i>Coming Up for Air</i>	15
2. The Synthetic Weird: John Hargrave's <i>Summer Time Ends</i>	27

PART TWO

Agrichemical Imaginaries in 1960s England

3. 'Some unseen nature': J.G. Ballard's 'Storm-Bird, Storm-Dreamer'	54
4. 'Chemical horror': J.A. Baker's <i>The Peregrine</i>	78

PART THREE

Maralinga / Orford Ness: The Dispersed Memory of British Nuclear Colonialism

5. 'listen to the people who know': Nuclear Colonial Memory in the Work of Natalie Harkin and Yhonnie Scarce	104
6. 'In another country': Nuclear Colonial Memory in W.G. Sebald's <i>The Rings of Saturn</i>	133

PART FOUR

Nonfiction and Toxicity in the USA, 1962-Present

7. Writing the Carcinogenosphere: <i>Silent Spring</i> / <i>Mill Town</i> / <i>The Undying</i>	170
Coda	201

Introduction: The Dispersed Literatures of Industrial Toxicity

Once released, toxic materials trouble borders and resist re-containment – as the Narungga poet Natalie Harkin has written, they seep ‘beyond exclusion zones’.¹ For decades, and across transnational contexts, environmental justice activists and poisoned communities have worked to trace, chart and prevent the socially uneven dispersal of toxic industrial residues. For example, in North Carolina in 1982, a predominantly Black, working-class community protested the state’s decision to dump soil laced with polychlorinated biphenyls close to their homes. Five years after this demonstration, which is sometimes identified as the birth of the environmental justice movement, the United Church of Christ published an influential report, *Toxic Wastes and Race in the United States*, which found that ‘racial and ethnic Americans are far more likely to be unknowing victims of exposure’ to ‘substances emanating from hazardous waste sites’.² Though they deploy different evidentiary techniques, the protest and the report both work to expose and oppose an ‘insidious form of racism’, inflicted through toxic infrastructures.³ Since its beginnings, then, the contemporary environmental justice movement has been concerned with the strategic representation of what Rob Nixon characterises as ‘slow violence’: that is, ‘a violence of delayed destruction [...] dispersed across time and space, an attritional violence that is typically not viewed as violence at all’.⁴

In recent decades a multidisciplinary academic discourse, which Elizabeth Hoover calls ‘environmental justice studies’, has emerged out of the environmental justice movement.⁵ The primary concerns in this field of research are with the uneven allocation of toxic harm, with the political structures that regulate this allocation, and with the agency and dignity of poisoned communities. Some environmental justice scholars, such as Max Liboiron, use citizen science approaches, working alongside communities to monitor toxicants in an effort to produce data that can be used as a ‘tool for accountability’.⁶ This work intersects with research on the

¹ Natalie Harkin, ‘Apology’, in Harkin, *Dirty Words* (Melbourne: Cordite Books, 2015), pp. 1-2 (p. 1).

² United Church of Christ Commission for Racial Justice, *Toxic Wastes and Race in the United States: A National Report on the Racial and Socio-Economic Characteristics of Communities with Hazardous Waste Sites* (New York: United Church of Christ, 1987), xi; see Jedediah Purdy, *This Land Is Our Land: The Struggle for a New Commonwealth* (Oxford: Princeton University Press, 2019), p. 80; Elizabeth Hoover, *The River Is in Us: Fighting Toxics in a Mohawk Community* (Minneapolis: University of Minnesota Press, 2017), pp. 7-8.

³ Commission for Racial Justice, *Toxic Wastes and Race*, x.

⁴ Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (London: Harvard University Press, 2011), p. 2.

⁵ Hoover, *River*, pp. 7-8.

⁶ Sarah Wylie, Nick Shapiro and Max Liboiron, ‘Making and Doing Politics Through Grassroots Scientific Research on the Energy and Petrochemical Industries’, *Engaging Science, Technology and Society*, 3 (2017), 393-425 <doi:10.17351/ests2017.134>, p. 395.

limitations of data-driven projects: environmental laws in the USA, for example, allow industries to spread numerous hazardous substances with impunity.⁷ Toxic slow violence is also ‘embedded within global and local structures of inequality’ – when siting polluting infrastructure, industries target low income and ethnic minority communities.⁸ Liboiron, Sarah Wylie and Nicholas Shapiro observe that the ‘vast machine of fossil fuel extraction’, and interlinked petrochemical networks, are ‘built to resist public accountability’ – though they also insist that these ‘enterprises can be transformed in fundamental ways’.⁹ Mapping the structures that organise the distribution of industrial toxicants is both technically demanding and fraught with unresolved questions of political efficacy. Despite – or perhaps because of – these obstacles, much environmental justice scholarship inhabits an urgent mode, emphasising strategic concerns. As Thom Davies and Alice Mah write, the idea of environmental justice is ‘both utopian and dystopian’, predicated on an ‘affirmation of an unequal present and a yearning for a better future’.¹⁰ Similarly, Liboiron writes of the ‘stakes’ of her research into marine plastic pollution: the ‘representation of a problem forecloses some forms of action while allowing others to make sense’.¹¹ Nixon has examined such issues from the perspective of literary scholarship. Highlighting the ‘political, imaginative and strategic role’ in this context of ‘environmental writer-activists’, he suggests that through particular ‘strategies of representation’ literary work might ‘turn the long emergencies of slow violence into stories dramatic enough to rouse public sentiment and warrant political intervention’.¹²

Many of the texts that I discuss in this dissertation aim to tell such transformative ‘stories’, though, as we will see, writers have also approached the problem of industrial toxicity through less urgent, more multifarious registers.¹³ As the literary critic Margaret Ronda suggests, such ‘enigmatic, refractory imaginaries’ – for example, anticipatory elegies for endangered species, or speculative fictions about characters adjusting psychically to new ecological realities – can offer

⁷ See Purdy, *Land*, pp. 29-35; Sandra Steingraber, *Living Downstream: An Ecologist's Personal Investigation of Cancer and the Environment*, 2nd edn (Cambridge, MA: Da Capo Press, 2010; 1997), pp. 101-02; Kerri Arsenault, *Mill Town: Reckoning with What Remains* (St. Martin's Press: New York, 2020) (Advanced Readers' Edition), pp. 94-97 (hereafter *Mill*).

⁸ Thom Davies and Alice Mah, ‘Introduction: Tackling environmental injustice in a post-truth age’, in *Toxic Truths: Environmental justice and citizen science in a post-truth age*, ed. by Davies and Mah (Manchester: Manchester University Press, 2020), pp. 1-26 (p. 3); see also Liboiron, Manuel Tironi and Nerea Calvillo, ‘Toxic politics: Acting in a permanently polluted world’, *Social Studies of Science*, 48.3 (2018), 331-49 <doi:10.1177/0306312718783087>, p. 332.

⁹ Wylie, Shapiro and Liboiron, ‘Grassroots’, pp. 395, 413.

¹⁰ Davies and Mah, ‘Introduction’, p. 4.

¹¹ Liboiron, ‘Redefining Pollution and Action: The Matter of Plastics’, *Journal of Material Culture*, 1.24 (2015), 87-110 <doi:10.1177/1359183515622966>, p. 88.

¹² Nixon, *Slow Violence*, pp. 14-15, 3.

¹³ Nixon, *Slow Violence*, p. 3.

‘important historiographical counterpoints to the timely interventions of mainstream environmentalist discourse’.¹⁴ Many contemporary environmental justice scholars work in the social sciences. Even as they emphasise the difficulty of overturning the unequal structures they describe, they rarely, if ever, stray beyond activist rhetorical modes: determination, mobilisation, organisation. Artists and writers can move through a broader affective range, drawing on various aesthetic traditions to represent other states of mind (and body) associated with ‘chemical regimes of living’, such as rage, bewilderment, fascination or despair.¹⁵ In his 2017 book *Forensic Architecture: Violence at the Threshold of Detectability*, Eyal Weizman considers the Ancient Greek meaning of the term ‘aesthetic’, in which ‘to sense is to be aestheticized, just as, inversely, to be unaestheticized is to make oneself numb to perception’. Aesthetics, here, concerns how people and other entities ‘function as sensors and register changes in their environment’.¹⁶ The industrial intensifications underway since the time of the Second World War – a period environmental historians call the Great Acceleration – have driven vast geochemical shifts. Throughout this time certain industries, such as the agrichemical and nuclear industries, have made millions of tonnes of toxic and persistent substances – such as organochlorine pesticides, dioxins and radionuclides – and dispersed them. These operations have left distinct signatures, across local and planetary scales, in built infrastructures, in human bodies, in riverine sediments and polar ice.

This dissertation asks how these changes have manifested in literature, tracking the entwined cultural and environmental histories of ‘legacy contaminants – enduring poisons from the past’.¹⁷ As toxic materials have proliferated, writers have worked to describe consequent ‘changes in their environment’, and they have given representation to new kinds of political, affective and imaginative experience.¹⁸ Literature, I argue in the chapters that follow, can itself be conceived of as a sensing technology or recording device for toxicity, detecting its legacies and converting them into written forms. Recently, Davies, Mah and Jedediah Purdy have argued for the recognition of a ‘long environmental justice movement’, ongoing for many decades, even centuries, and unfolding in multiple geographic contexts: ‘Just as environmental pollution can reveal its consequences slowly over time, a corollary can be found with the environmental justice

¹⁴ Margaret Ronda, *Reminders: American Poetry at Nature's End* (Stanford: Stanford University Press, 2018), p. 5.

¹⁵ Michelle Murphy, ‘Chemical Regimes of Living’, *Environmental History*, 13.4 (2008), 695-703 <www.jstor.org/stable/25473297> [accessed 14 September 2020].

¹⁶ Eyal Weizman, *Forensic Architecture: Violence at the Threshold of Detectability* (New York: Zone Books, 2017), pp. 94-95.

¹⁷ Rebecca Altman, ‘Time-Bombing the Future’, *Aeon*, 2 January 2019, <goo.gl/eY9UU5> [accessed 14 September 2020].

¹⁸ Weizman, *Forensic*, p. 94.

movement, which emerged gradually and is still unfolding today'.¹⁹ The contention of these scholars is that people have been concerned with 'the themes of fairness, inequality, and political and economic power in the human environment' since long before the 1980s.²⁰ I agree with these claims. I also suggest that throughout the Great Acceleration – in response to its chemical transformations, and in company with activist discourses – less precisely defined 'structures of feeling' also manifested in culture.²¹

In his 1977 book *Marxism and Literature*, Raymond Williams describes what he calls an 'epochal' methodology of historical analysis, in which a period is identified with 'determinate dominant features: feudal culture or bourgeois culture or a transition from one to the other'. Williams warns that the risk with using this methodology is that the 'epochal' designation might 'exert its pressure as a static type', such that history is interpreted only in relation to 'the selected and abstracted dominant system'. The idea of the Anthropocene – in which a geological concept is absorbed into critical theory, and redeployed as a term for historical analysis – may behave as such an epochal 'type'. The claim for a long environmental justice movement can also apply a certain historiographical 'pressure'. Williams argues for supplementary historical framings with a granular focus, attentive not only to a period's 'dominant features', but also to its 'residual' and 'emergent' properties. His term 'residual' conceptualises how 'the residue' of 'some previous social and cultural [...] formation' may persist through time, without being 'incorporated into the dominant culture'. By contrast, the 'emergent' describes those processes by which new practices and preoccupations, 'substantially alternative and oppositional' to the dominant culture, take shape.²² When I use these terms in this dissertation, I allude to, but do not always fully replicate, Williams' theories. In stories about the dispersal of artificial poisons with long half-lives, other meanings attach themselves to the image of a residue, or of a new entity emerging. In what follows, I put some influential theories in Anthropocene studies and environmental justice scholarship into conversation with residual and emergent texts. Such texts assert their own narratives, interpretations and injunctions, and they have the capacity to test and complicate developing critical traditions.

In 1938, Upton Sinclair wrote a review of a novel by a young English writer called E.C. Large. *Sugar in the Air* tells 'the story of a hard-working and serious-minded chemist who devotes

¹⁹ Davies and Mah, 'Introduction', p. 5.

²⁰ Purdy, *Land*, p. 124

²¹ Raymond Williams, *Marxism and Literature* (Oxford: Oxford University Press, 1977), p. 133.

²² Williams, *Marxism*, pp. 121-23.

himself to the problem of making synthetic sugar'. The chemist succeeds, and markets his product under the name 'SUNSAP', but he ultimately 'finds himself and his process tied into knots by the financiers'. The 'profits of industry', Sinclair observed, 'are conferred more and more upon absentee owners'; he welcomed this novel for how it looks 'with critical eyes upon the industrial set-up'.²³ Like several of Sinclair's own books, *Sugar in the Air* is a 'tract-novel' written to expose and denounce the organisation of interwar capitalism.²⁴ Before boardroom power-struggles ruin his enterprise, the chemist allows himself to speculate about his invention's profound implications, not only for society but also for the biosphere as a whole:

Pry talked of a world without trees. In time to come, he said, there would be no more crops, no more green leaves. All organic substances on earth save the bodies of living men would be burnt to provide Man's two primal needs: Power and Synthetic Food. The earth would revert to its appearance before Life began; every landscape a waste of barren rocks, marked only by the straight white roads and the dotting of white power stations and chemical factories, about which would cluster Man's future habitations. Slowly the synthetic food factories would withdraw all the carbon dioxide from the air [...] every plant would die, and with them every animal, every living organism, except Man and his immediate parasites and pets [...] With 'SUNSAP' there had arisen on earth the inconspicuous dawn of a new age; a new aeon of geological time. The animals and the plants, created by God for the convenience, pleasure and use of mankind, having served their purpose in the childhood of Man's invention, would pass away and Man would fulfil his destiny in an absolute mastery and exclusive ownership of the earth.

This passage aligns synthetic technology, industrial expansion and earth systems at an early historical stage. Though it describes the ecological effects of the synthetics industry, its emphasis is not on the toxicity, persistence and distribution of certain materials, but rather on imaginary atmospheric alterations catalysed by the synthesis process itself. The consequent reduction, rather than increase, in atmospheric carbon dioxide inverts the well-known phenomenon now driving rapid changes in the earth's climate. While this passage depicts the socially and ecologically transformative effects of new industrial activities, it does not do so in the service of any wider political strategy. Many later eco-apocalypse narratives – from news reports to big-

²³ Upton Sinclair, excerpt from 'Technicians Awake!', *The New English Weekly*, 15 December 1938, pp. 153-54, reprinted as an unpaginated pamphlet in E.C. Large, *Sugar in the Air* (London: Hyphen Press, 2008; 1938).

²⁴ Stuart Bailey, 'Science, Fiction', in *God's Amateur: The Writing of E.C. Large*, ed. by Bailey and Robin Kinross (London: Hyphen Press, 2008), pp. 85-96 (p. 89).

budget films – aim by representing systemic erasures of plants and animals to summon up dread. Some of these texts have a paralytic effect; others seek by confronting their audiences with evidence of environmental disaster to motivate them to take reparative action. In *Sugar in the Air* though, ecological collapse simply prompts some tonally neutral reflections about ‘Man’s’ place at the top of a species hierarchy. This speculative 1930s vision arrives into the present from the ‘inconspicuous dawn’ of the Great Acceleration.²⁵ Throughout this ongoing period, writers likewise experimented with how to configure emergent conditions, responding to specific environmental estrangements – such as the cumulative proliferation of plastics, or the introduction of synthetic pesticides to agricultural landscapes – in affectively, imaginatively and technically particular ways.

Predominantly, this dissertation concerns texts written in the United Kingdom, or in response to British imperial projects. Given the mobility and pervasiveness of persistent toxic pollution, enclosing a discussion of slow violence within a particular nation state’s twentieth and twenty-first century histories might appear to risk an inhibitive narrowness of scope. Yet nation states have long exerted a strong influence over industrial toxicity’s structures and processes: they ratify regulatory regimes for pesticide use, for instance, or they irradiate sites in colonised places by conducting nuclear tests in them – a specifically toxic form of what Harkin refers to as the ‘horror of state-orchestrated oppression’.²⁶ This dissertation charts what Davies calls the ‘spread of toxic geographies’ within a selective territorial and political range, attending in close detail to how such developments have informed literary work in these contexts.²⁷ Passing from the 1930s to the 1960s to the present day, I explore British literature about chemical technologies and poisonous legacies, and I discuss Aboriginal texts about British nuclear colonialism in South Australia. Some of the texts that I consider here, like John Hargrave’s 1935 novel *Summer Time Ends*, have received little or no scholarly attention. Other, more canonical books, such as J.A. Baker’s 1967 *The Peregrine* or W.G. Sebald’s 1995 *The Rings of Saturn*, are critically re-contextualised. I situate them within localised histories of industrial change and ecological crisis, and I also consider how they might appear anew when read through recent work in the environmental humanities – as well as how they might challenge and complicate such thought. Further texts – namely, contemporary Indigenous Australian work on nuclear colonialism, such as Harkin’s 2015 collection *Dirty Words* and Kokatha / Nukunu glass-artist Yhonnie Scarce’s

²⁵ Large, *Sugar*, pp. 343-44.

²⁶ Harkin, ‘2 | Haunting’, in ‘Haunting’, in Harkin, *Archival-Poetics* (Melbourne: Vagabond Press, 2019), p. 5.

²⁷ Davies, ‘Slow violence and toxic geographies: “Out of sight” to whom?’, *Politics and Space*, 0.0 (2019), 1-19 <doi:10.1177/2399654419841063>, p. 10.

2017 sculpture *Death Zephyr* – resist integration into western intellectual traditions. Turning toward them from the vantage point of literary studies in Britain asks particular questions of critical practice, drawing attention to empire’s intellectual, as well as social and chemical, residues. The dissertation concludes with a chapter on Rachel Carson’s profoundly influential 1962 book *Silent Spring*, and contemporary American nonfiction about toxicity. All of the texts that I discuss here are concerned with new industrial materials, the structures that organise their distribution, and how they register in culture.

Industrial Synthesis and Sacrifice Zones: A Chapter Overview

The late 1930s were a ‘critical moment in industrial history’. As financial investment escalated and technical developments accelerated, synthetic technologies were ‘pulled into the engines of war and empire’.²⁸ In ways shaped by modern systems of industrial organisation, synthetic technology has throughout its existence produced historically specific structures of feeling, which have in turn influenced particular art forms and cultural modes. In the United Kingdom during the 1930s, synthetic and semi-synthetic substances (like Perspex, ersatz food or rayon fibres) were not widely identified with ecological damage. This association would only come to dominate perceptions of the new materials much later – and as Judith Brown observes, there has been a loss, ‘in the intervening decades, [of] the ability to read the early-century semiotics of plastics’.²⁹ Early British commentaries on synthetic ‘resins’ generally concern their malleable and mimetic properties, their complex molecular compositions, and the way that these materials seemed physically to embody the gathering power of industrial chemistry.³⁰ For some politically motivated writers, new synthetic substances served as shorthand for an exploitative, dehumanising and potentially violent industrial economy.

Chapters One and Two of this dissertation explore two literary texts that register and reflect on the gradual emergence of the synthetic into everyday life in Britain during this period: George Orwell’s 1939 *Coming Up for Air*, and Hargrave’s *Summer Time Ends*. These novels are conscious of – and often disturbed by – the possible implications of synthetic technology in the socio-political context of the 1930s. At times they invite interpretation through the critical discourses

²⁸ Altman, Twitter correspondence, 14 January 2019.

²⁹ Judith Brown, ‘Cellophane Glamour’, *Modernism/modernity*, 15.4 (2008), 605-26 <doi:10.1353/mod.0.0035>, p. 606.

³⁰ See John Gloag and Grace Lovat Fraser, *Plastics and Industrial Design* (London: George Allen and Unwin, 1945), pp. 11-26.

that have developed around the concepts of the Anthropocene and environmental justice. For the most part though, their representations of industrial synthesis are animated by the distinctive anxieties of their own time. These concern the troubled distinction between the organic and the artificial; repressive forms of social organisation; and new kinds of technological warfare. In these chapters, I draw briefly upon Walter Benjamin's concept of aura, elaborated in his classic 1935 essay 'The Work of Art in the Age of Mechanical Reproduction', to describe how in these novels, synthetic substances act as vehicles for certain suspicions related to 1930s industrial economy and political culture. Famously, aura, for Benjamin, conveys the authenticity of the unique art object, which 'withers in the age of mechanical reproduction'. Orwell and Hargrave, I suggest, describe how synthetic materials modify or negate auratic experience in particular ways; and they create experimental literary forms in order to express these unnerving 'changes in the medium of contemporary perception'.³¹

During the 1960s, the public imagination of industrial synthesis in Britain shifted, entering into association with anthropogenic ecological crisis. The 1960s were a time of global agricultural intensification, sometimes called the 'Green Revolution'. In his essay 'Periodizing the 60s', Fredric Jameson suggests that this decade, 'often imagined as a period in which capital and first world power are in retreat all over the globe, can just as easily be conceptualized as a period in which capital is in full dynamic and innovative expansion, equipped with a whole armature of fresh production techniques and new "means of production"'. In agriculture, these included 'new applications of chemical procedures to fertilization', 'intensified strategies of mechanization', and the systematic use of synthetic pesticides.³² These industrial techniques, which remain in widespread use, have had profound social and ecological effects, rapidly increasing food production, annually pumping tens of millions of tonnes of fertilisers into seas, and driving major declines in insect populations.³³ Some 1960s researchers and writers, most famously Carson, observed these alterations at an early phase. Through *Silent Spring*, Carson sought to raise awareness of the dangers of agricultural poisons by harnessing prior, publicly diffuse concerns about toxicity, notably fears of radioactive fallout spread by atomic explosions. In the USA, the book was a phenomenal success. When it was published in Britain in 1963, it

³¹ Walter Benjamin, 'The Work of Art in the Age of Mechanical Reproduction', in Benjamin, *Illuminations*, ed. by Hannah Arendt, trans. by Harry Zohn (London: Mariner, 2019; 1968), pp. 166-95 (pp. 171-72).

³² Fredric Jameson, 'Periodizing the 60s', *Social Text*, 9/10 (1984), 178-209 <www.jstor.org/stable/466541> [accessed 14 September 2020], pp. 185-86.

³³ Jeremy Davies, *The Birth of the Anthropocene* (Oakland: University of California Press, 2016), pp. 34-35; Francisco Sánchez-Bayo and Kris A.G. Wyckhuys, 'Worldwide decline of the entomofauna: A review of its drivers', *Biological Conservation*, 232 (2019), 8-27 <[doi:10.1016/j.biocon.2019.01.020](https://doi.org/10.1016/j.biocon.2019.01.020)>, pp. 20-21.

found no less ‘fertile ground’ for toxic anxiety. Agricultural intensification had prompted a ‘growing post-Second World War criticism of technocracy’s negative impact on the English environment’.³⁴ Unease around the ‘changes that had taken place [in] the British landscape as a result of the move to intensification’ coincided and intermingled with widespread shock at disastrous pollution events, such as the 1967 Torrey Canyon oil spill, the terror of nuclear apocalypse, and worries about fallout.³⁵ New fears, political identities and narrative tropes coalesced. Throughout the 1960s, antitoxic exposés and environmentalist jeremiads proliferated – but not all of the toxic texts that appeared in Britain in the wake of *Silent Spring* aimed primarily to catalyse activism.

In chapters Three and Four, I explore the imaginative treatment of toxicity in 1960s British literature, focusing on Baker’s experimental nonfiction book *The Peregrine* and J.G. Ballard’s science fiction short story ‘Storm-Bird, Storm-Dreamer’ (1966). Some little-known British books from this period, such as Ruth Harrison’s 1964 *Animal Machines: The New Factory Farming Industry* and John Coleman-Cooke’s 1965 *The Harvest that Kills: An Urgent Warning about Man’s Use of Toxic Chemicals on the Land*, seek to activate concern in their readers through particular aesthetic strategies. Strongly suggesting the influence of *Silent Spring*, they are written in predominantly informative registers, but also appropriate the techniques of science fiction, depicting toxic chemicals as a devious menace. Ballard and Baker also characterise synthetic agrichemicals as uncanny presences. They do not, however, do so explicitly in order to mobilise their readers to political action. In ‘Storm-Bird, Storm-Dreamer’, the use of ‘growth promoters’ on crops triggers unforeseen ecological and social transformations.³⁶ Set in a rural East Anglian landscape, the story concerns a small cast of characters, and their divergent patterns of behaviour in an unfamiliar world dominated by giant mutant birds. Here, as elsewhere in his work, Ballard asks questions about how individuals might adapt psychically to shifting earth-systems, but he stops short of elaborating any political critique. How might we discuss this literary method in relation to contemporary discourses on the Anthropocene and environmental justice? And what does it suggest about 1960s British literary sensibilities relating to ecological catastrophe? *The Peregrine* braids many forms and genres, from field notation to science fiction, in order to represent

³⁴ J.F.M. Clark, ‘Pesticides, Pollution and the UK’s *Silent Spring*, 1963-64: Poison in the Garden of England’, *Notes and Records: The Royal Society Journal of the History of Science*, 71 (2017), 297-327 <doi:10.1098/rsnr.2016.0040>, pp. 307, 303.

³⁵ Karen Sayer, ‘*Animal Machines*: The Public Response to Intensification in Great Britain, c. 1960-1973’, *Agricultural History*, 87.4 (2013), 473-501 <doi:10.3098/ah.2013.87.4.473>, p. 474.

³⁶ J.G. Ballard, ‘Storm-Bird, Storm-Dreamer’, in Ballard, *The Complete Short Stories*, 2 vols (London: Fourth Estate, 2014), II, pp. 174-92 (p. 179).

troubling ecological alterations in 1960s Essex. Its narrator moves through the landscapes of intensive agriculture, tracking peregrine falcons. Self-disgusted and elegiac in its moods, this book explores new relationships between human and nonhuman worlds: the narrator is aware that the falcons are undergoing chronic exposure to organochlorine insecticides, and believes that this condition, which renders them infertile, will soon result in their extinction. In *The Peregrine*, Baker casts his gaze forward, anticipating the Anthropocene concept: he attends to how his society generates toxic legacies, and explores the narrative implications of a deep-time perspective. If ‘Storm-Bird, Storm-Dreamer’ is distinguished by its neutral tone, *The Peregrine* is somewhat more politicised. For the most part, the narrator responds to systemic extinctions with personal misanthropy, anxiety and grief, but he also alludes to the overarching responsibility of certain industrial regimes. Like some contemporary critical work about our ‘permanently polluted world’, these two texts ask how to adjust – psychically, culturally, socially – to the reality that some toxic changes are irreversible.³⁷ They are, however, marked by their own characteristic moods and preoccupations. These offer insights into how global industrial and geochemical shifts, as they manifested in locally specific ways in 1960s England, had particular cultural effects, not only in activist circles but also more widely. My readings of ‘Storm-Bird, Storm-Dreamer’ and *The Peregrine* construct detailed literary ‘pre-histories’ of contemporary British cultures of the Anthropocene.

The term ‘sacrifice zone’ describes an area deemed more suitable than others by certain institutions for environmentally transformative activities: the burial of hazardous wastes, the construction of megadams, the detonation of nuclear bombs.³⁸ Texts about sacrifice zones, often written by people who live in them, offer granular, site-specific insights into the power relations that govern the distribution of toxicants. They describe how the history of toxicity is not only industrial and ecological, but also expresses other political forces, such as Cold War militarism, settler-colonial capitalism and imperialism. The second half of the dissertation moves through a more expansive geographical range than the first. Chapters Five and Six draw together hitherto-unconnected literary works that give careful representation to the aftermaths of the United Kingdom’s nuclear weapons programme in South Australia and East Anglia, respectively.

³⁷ Liboiron, Tironi and Calvillo, ‘Toxic politics’, p. 332.

³⁸ See Rebecca Solnit, *Savage Dreams: A Journey into the Hidden Wars of the American West* (London: University of California Press, 2014; 1994), pp. 246-47; also Naomi Klein, *This Changes Everything* (London: Penguin, 2015), pp. 310-15; Nixon, *Slow Violence*, pp. 150-54.

In her introduction to *The Nuclear Culture Source Book* (2016) – a multidisciplinary document that sets out to chart ‘the emergence of nuclear material cultures understood both as technological infrastructures and aesthetic practices’ – Ele Carpenter diagnoses ‘serious blind spots in our “Western” understanding of the nuclear’, and invokes a need to ‘rethink the limits’ of the nuclear.³⁹ Many British nuclear texts fixate on hypothetical wars. Thus ‘one of the earliest British films to engage with the atomic bomb’, the 1950 *Seven Days to Noon*, stages a communist-orchestrated nuclear attack on London; throughout the 1950s, newspapers found that ‘one of the most effective means of conveying the scale of destruction was by superimposing circles onto maps of Britain’; 1980s literary fiction and television writers frequently enlisted British landscapes as settings for nuclear devastation.⁴⁰ Here, powerful explosions driven by nuclear fission and consequent dispersals of radioactive particles come into view through the optic of a horrifyingly possible future. Carpenter notes that in ‘the early twenty-first century, nuclear aesthetics are shifting from the distant sublime atomic spectacle to a lived experience of the uncanny nature of radiation’. Many contemporary practitioners respond to the ‘proliferation of nuclear materials across time and space, investigating nuclear sites’; and they map the ‘slow violence of radiation’, attending to its unevenly distributed effects.⁴¹ During the 1950s, the British military detonated twelve nuclear bombs on Aboriginal lands in Australia: three on the Monte Bello Islands, off the coast of Western Australia, and nine in South Australia. During the early 1960s, they also conducted hundreds of irradiating ‘minor trials’ in South Australia.⁴² In contemporary Aboriginal writing on nuclear colonialism, the ‘remnant-traces’ of these operations come into view through a long historiography of invasion, dispossession and resistance.⁴³ In Chapter Five, I contextualise recent artistic work on nuclear issues by Indigenous practitioners from South Australia, considering how this discourse has been shaped not only by living with the British Empire’s radioactive residues, but also by longstanding struggles against the uranium mining industry, and by resistance to recent attempts by state and federal governments to dig deep repositories for nuclear waste in Indigenous lands. Reading responses to these intersecting forms of nuclear colonialism by Harkin and Scarce, I ask how the British nuclear humanities, and

³⁹ Ele Carpenter, ‘Introduction’, in *The Nuclear Culture Source Book*, ed. by Carpenter (London: Black Dog Publishing, 2016), pp. 9-10 (pp. 9-10).

⁴⁰ David Seed, ‘*Seven Days to Noon*: containing the atomic threat’, *British Journal for the History of Science*, 45.4 (2012), 641-52 <doi:10.1017/S0007087412001100>, p. 641; Adrian Bingham, “‘The Monster’? The British popular press and nuclear culture, 1945-early 1960s’, *British Journal for the History of Science*, 45.4 (2012), 609-24 <doi:10.1017/S0007087412001082>, pp. 616-17; Daniel Cordle, ‘Protect/Protest: British nuclear fiction of the 1980s’, *British Journal for the History of Science*, 45.4 (2012), 653-69 <doi:10.1017/S0007087412001112>, pp. 664-67.

⁴¹ Carpenter, ‘Introduction’, p. 9.

⁴² Elizabeth Tynan, *Atomic Thunder: British Nuclear Testing in Australia* (Yorkshire: Pen and Sword, 2018), p. 29.

⁴³ Harkin, ‘Zero Tolerance’, in *Dirty Words*, pp. 40-43 (p. 41).

in particular literary studies, might turn towards Indigenous artistic, literary and critical work ‘without falling into the representative traps set by our disciplines’ collective colonial inheritance’.⁴⁴ Interpreting Aboriginal nuclear texts from within British literary studies invites a reflexive critical approach, attentive to what Indigenous scholars call ‘positionality’.⁴⁵ Harkin and Scarce have intimate knowledge of the toxic legacies left by imperial and settler-colonial projects, and they celebrate the resilience of dispossessed, poisoned communities. They emphasise interrelated forms of responsibility – to the past, to land, and to future generations. I discuss the important challenges that their art and activism present to mainstream nuclear cultures, and to the memory of empire in Britain.

In Chapter Six, I read Sebald’s account of a visit to Orford Ness in *The Rings of Saturn* in relation to British and Aboriginal nuclear discourses. Orford Ness was the site of a British weapons research laboratory between 1955 and 1971; bombs designed and tested here were detonated in South Australia. Sebald’s narrator in *The Rings of Saturn* recounts a journey on foot through Suffolk. From here, he describes links between certain places in Suffolk, and a transcontinental array of events, forces and networks. Difficult questions of historical and artistic representation surface; some of these concern whether from a position in the imperial centre, and through European cultural and literary traditions, it is possible to offer an adequate account of dispersed colonial histories. This project brings the narrator to the British Empire’s nuclear infrastructures, and their afterlives at Orford Ness. While Harkin and Scarce describe the debilitating consequences of nuclear colonialism for those who inhabit sacrifice zones, and associated anticolonial struggles, Sebald enquires into the memory of nuclear testing programmes in Europe as filtered through imperial amnesia and popular nuclear imaginaries. Describing the region of Orford Ness, the narrator fixates on nuclear apocalypse, and brings to bear a vague and uncertain understanding of the nuclear past and its legacies. Responding to Indigenous work on positionality, I argue that Sebald here suggests that an important task for western commentators, when discussing nuclear colonialism, is to trace the social and cultural forces that impair their understanding of this complex, traumatic history.

The final chapter turns to the USA, returning at first to the 1960s. Here, I give a more developed critical account of *Silent Spring* than in earlier chapters. In terms of argument, genre

⁴⁴ Davies, ‘Slow violence’, p. 14.

⁴⁵ Jodi A. Byrd, *The Transit of Empire: Indigenous Critiques of Colonialism* (Minneapolis: University of Minnesota Press, 2011), xiii; see also Linda Tuhiwai Smith, *Decolonizing Methodologies: Research and Indigenous Peoples*, 2nd edn (London: Zed books, 2012; 1999), p. 14. VLeBooks ebook.

and mood, *Silent Spring* is a foundational text in the modern literature of toxicity. It also had historic political consequences – it is frequently held up as responsible for bans on certain insecticides, and the foundation of the Environmental Protection Agency. The long-term effects of these consequences, though, are often overstated. In 1962, Carson critiqued the USA’s polluting industries and permissive regulatory structures, and issued warnings about the systemic dispersal of carcinogenic chemicals. Since then, these legal structures have remained largely intact, and the production of materials linked to cancer incidence has increased.⁴⁶ Here, I read *Silent Spring* alongside two contemporary literary texts about the relationship between toxic pollution and cancer: Kerri Arsenault’s *Mill Town: Reckoning with What Remains* (2020), and Anne Boyer’s *The Undying: A Meditation on Modern Illness* (2019). While Carson worked to mobilise the public – in ways, as I discuss in detail, marked by the histories of race and class in the post-war USA – Arsenault and Boyer are wary of making direct calls to action. Their books carefully explore the lived implications of intransigent legal structures and powerful industrial lobbies. Aesthetically, they register uncertainty and grief, as well as outrage. Like many of the texts in this dissertation, they carefully map entrenched political systems, their cumulative effects, and the everyday work of living with poisonous legacies.

⁴⁶ See Steingraber, *Downstream*, pp. 47-57.

PART ONE

Industrial Synthesis and Literature in 1930s England

1. Synthetic Vertigo

George Orwell's *Coming Up for Air*

In criticism of George Orwell's novels of the 1930s, one repeatedly encounters claims that in these books – *Burmese Days* (1934), *A Clergyman's Daughter* (1935), *Keep the Aspidochelone Flying* (1936) and *Coming Up for Air* (1939) – we find Orwell grappling with the politics of modernist literary experimentation. Orwell, Michael Levenson suggests, wrote these novels with 'an intense consciousness that he was writing after the heady days of modernism and beneath its shadow. At the same time he never allowed himself to forget the degraded social reality that surrounded his literary work [...] This double sense – literary belatedness, social emergency – pervades the novels'.¹ Keith Williams claims that the thirties novels testify to how thoroughly 'Joycean discourse had rearranged literary consciousness'; he suggests that Orwell attempted to achieve a literary technique fusing social critique with a sophisticated rendering of psychological interiority, resulting in an 'uneasy mixture of experimental and documentary forms'.² Likewise, Martha C. Carpentier proposes that Orwell was in this period 'torn between the modernist formal experiments he loved and the ethical and political commitment to social realism he felt was necessary'.³ For my purposes in this chapter, the most important aspect of this discussion is that it implies a strong distance between Orwell on the one hand, and George Bowling, the narrator of *Coming Up for Air*, on the other. Orwell described the narrator of James Joyce's *Ulysses* as an 'ordinary uncultivated man described from within by someone who can also stand outside him and see him from another angle'.⁴ The description holds for Bowling. He is to be read from across an ironic distance, alerting readers to connections between his perceptual processes, and his political, economic, and cultural milieux. As we shall see, Orwell consistently foregrounds standardised, substitute, and synthetic aspects of these milieux. The novel warrants reading, I argue in this chapter, as an investigation into the influence on individual subjectivity of the increasingly commonplace presence in 1930s England of technologies of mass production – technologies which, by the late 1930s, had developed a close affinity with synthetics.

¹ Michael Levenson, 'The fictional realist: novels of the 1930s', in *The Cambridge Companion to George Orwell*, ed. by J. Rodden (Cambridge: Cambridge University Press, 2007), pp. 59-75 (p. 59).

² Keith Williams, "'The Unpaid Agitator': Joyce's Influence on George Orwell and James Agee', *James Joyce Quarterly*, 36.4 (1999), 729-63 <www.jstor.org/stable/25474084> [accessed 14 September 2020], pp. 730, 733.

³ Martha C. Carpentier, 'Orwell's Joyce and *Coming Up for Air*', *Joyce Studies Annual*, (2012), 131-53 <muse.jhu.edu/article/516512> [accessed 31 August 2020], p. 133.

⁴ George Orwell, 'Letter 186, To Brenda Salkeld Sunday' [December 10(?) 1933], in *The Complete Works of George Orwell*, ed. by Peter Davison, 10 vols (London: Secker & Warburg, 1998), X, p. 328.

In his 1935 essay ‘The Work of Art in the Age of Mechanical Reproduction’, Benjamin suggests that the ‘manner in which human sense perception is organized, the medium in which it is accomplished, is determined not only by nature but by historical circumstances as well’. He proposes that ‘social transformations’, such as those effected by the large-scale adoption of new industrial processes, give rise to ‘changes in the medium of contemporary perception’.⁵ Bowling recounts how every day he takes the train into London from the ‘inner-outer suburbs’, looking through the window at a ‘great sea of roofs stretching on and on. Miles and miles of streets, fried-fish shops, tin chapels, picture houses, little printing-shops up back alleys, factories, blocks of flats, wheelk stalls, dairies, power stations – on and on and on’. Bowling’s thought and speech here are conditioned by his participation in an age of accelerated technical reproduction. The sentence unfolds without a verb, continuing through a force of succession that hollows each descriptor of its particularity, until all that remains is a sense of relentless extent and similitude: ‘on and on. Miles and miles [...] on and on and on’. ‘Do you know’, Bowling asks the reader, ‘the road I live on – Ellesmere Road, West Bletchley? Even if you don’t, you know fifty others exactly like it’.⁶ The world of *Coming Up for Air* is a version of the ‘new England’ that J.B. Priestley described in his 1934 *English Journey* – a standardised, motorised landscape of housing developments and industrial-commercial infrastructure.⁷ As David Trotter has observed, there ‘is not much in [Bowling’s] experience that is *not* synthetic’.⁸ Prompted by the chance apparition of a childhood memory, and funded by the profits of a bet on a race, Bowling hatches a secret plan to escape from this world and return to Lower Binfield, the village of his birth, where he intends to rekindle a sense of the pastoral England he remembers from ‘before the war’.⁹

The industrial and developmental shifts of the interwar period reconfigured living environments in England.¹⁰ In *Coming Up for Air* Orwell represents these changes, and their cultural and psychic effects. Placing Bowling in the midst of an ‘ensemble of new and old materials’, among which synthetic substances occupy a prominent position, he enacts his

⁵ Benjamin, ‘Reproduction’, p. 172.

⁶ Orwell, *Coming Up for Air* (London: Penguin, 2000; 1939), pp. 9, 21 (hereafter *Air*).

⁷ J.B. Priestley, *English Journey* (London: Heinemann, 1984; 1934), p. 301.

⁸ David Trotter, *Literature in the First Media Age: Britain Between the Wars* (Cambridge, MA: Harvard University Press, 2013), p. 113.

⁹ *Air*, p. 35.

¹⁰ See Kitty Hauser, *Shadow Sites: Photography, Archaeology and the British Landscape, 1927-1955* (Oxford: Oxford University Press, 2007), pp. 3-4.

reactions to some emergent ‘realities of modern life’.¹¹ Disavowing West Bletchley, Bowling persistently identifies himself with a self-reflexive but nonetheless committed stereotype of a pastoral England in continuity with its traditions. ‘Before the war’, he reminisces, ‘it was summer all year round. I’m quite aware that that’s a delusion. I’m merely trying to tell you how things come back to me’. ‘Before the war’ comes back to him as ‘the market-place at dinner time, with a sort of sleepy dusty hush over everything and the carrier’s horse with his nose dug well into his nose-bag’; as ‘a hot afternoon in the great green juicy meadows’; or as ‘dusk in the lane behind the allotments, and there’s a smell of pipe-tobacco and night-stocks floating through the hedge’. Orwell, at once within George Bowling and standing outside him seeing him from another angle, tacitly urges readers to consider ‘how things come back’ to the narrator.¹² In what follows I track how throughout *Coming Up for Air*, Orwell signals that Bowling’s immersion in an alienating industrial-synthetic regime intensifies, and perhaps even reconditions, his alluring memories of Lower Binfield – that, as Theodor Adorno would later write, the ‘more tightly the world is enclosed by the net of man-made things, the more stridently’ those caught in that net ‘proclaim their natural primitiveness’.¹³ As we will see, Orwell depicts how modern technological systems and industrial products influence Bowling’s perception and thought – habituating him to replicability, for example, or shocking and disorienting him. He suggests that in turn, these feelings produce powerful anxieties and desires. Bowling longs to set himself apart from ‘the modern world’, and to anchor himself in what he imagines as more authentic terrain.¹⁴ Here then, Orwell identifies synthetic substances as traces of rapid social and industrial changes, drawing them into relation with some of the cultural and political tensions of the 1930s. As a result, synthetic materials gather certain associations: displacement, uncertainty, alienation.

~

Coming Up for Air begins in Bowling’s bathroom:

I was trying to shave with a bluntish razor-blade while the water ran into the bath. My face looked back at me out of the mirror, and underneath, in a tumbler of water on the little shelf over the washbasin, the teeth that belonged in the face [...] I haven’t such a

¹¹ Benjamin Steiniger, ‘Refinery and Catalysis’, in *Textures of the Anthropocene: Grain Vapor Ray*, ed. by Katrin Klingan et al., 4 vols (London: MIT Press, 2014), III, pp. 108-18 (p. 110); *Air*, p. 132.

¹² *Air*, pp. 37-38.

¹³ Theodor Adorno, *Minima Moralia: Reflections from Damaged Life*, trans. by E.F.N. Jephcott (London: Verso, 2020; 1951), p. 165.

¹⁴ *Air*, p. 24.

bad face, really. It's one of those bricky-red faces that go with butter-coloured hair and pale blue eyes.

Bowling's imaginative patterns here attest to the powerful influence that systems of replication exert upon his society. There is a shift away from personal and possessive pronouns, towards definite and demonstrative articles: 'I [...] my face [...] the teeth [...] the face [...] those bricky-red faces'. We begin with an active, governing subject: 'I'. We then focus on the reflected facial features of that subject – intimate enough to be rendered as 'my' – and on his dentures in a glass – distant enough to be designated 'the'. Bowling's subjective distance from his dentures seems enough to dislodge his face from 'my' to 'the'. '[T]he face' is distended between body and reflection, as the text slides out of the terms of authoritative individual subjectivity, and into the sphere of abject reproducibility. Finally, we move from the face, reflected or bodily, to a subclass of 'bricky-red faces' – faces that, like mass-assembled products, 'go with' other atomised attributes. Bowling implicitly accepts an identity formed within the terms of replication: he has 'one of those' faces. Sorting his physical appearance according to type is reassuring: not 'such a bad face, really'.¹⁵ Orwell deploys the demonstrative article to similar effect throughout the novel: 'I've got those kind of pudgy arms that are freckled up to the elbow'; 'those tennis clubs in the genteel suburbs'; 'those celanese shirts'.¹⁶ Bowling refers habitually to types. 'I'm the middling type, the type that gravitates by a kind of natural law towards the five-pound-a-week level'; 'the type that'd be a sergeant major only they aren't tall enough'; 'I knew the type. Vegetarianism, simple life, poetry, Nature-worship, roll in the dew before breakfast'.¹⁷ Through repeated reference to types, and through a consistent use of the demonstrative article, Orwell builds into his narrator an impulsive classificatory sensibility, subtending and informing his way of interpreting the world. Hereby, he consistently foregrounds the extent to which replication and standardisation influence his narrator, inviting readers to look sceptically upon Bowling's claims that he is not defined by modern life, but that within him, traces of a happier time from 'before the war' linger on.¹⁸

One morning, Bowling drops his papers at the office and sets out for his dentist, located 'between a photographer and a rubber-goods wholesaler', to get a new set of false teeth fitted.

¹⁵ *Air*, p. 3.

¹⁶ *Air*, pp. 3, 136, 226.

¹⁷ *Air*, pp. 132, 14, 228.

¹⁸ *Air*, p. 35.

He is early for his appointment, so he goes into a milk bar. The place is ‘slick and shiny and streamlined’. There is ‘[n]o real food’:

Just lists of stuff with American names, sort of phantom stuff that you can’t taste and can hardly believe in the existence of. Everything comes out of a carton or a tin, or it’s hauled out of a refrigerator or squirted out of a tap or squeezed out of a tube.

He orders frankfurters. He saws at the ‘rubber skin’ with his ‘temporary teeth’ until ‘suddenly – pop! [...] horrible soft stuff was oozing all over my tongue’, tasting of fish. It is worth quoting in full from the ensuing passage:

I remembered a bit I’d read in the paper somewhere about these food-factories in Germany where everything’s made out of something else. Ersatz, they call it. I remembered reading that *they* were making sausages out of fish, and fish, no doubt, out of something different. It gave me the feeling that I’d bitten into the modern world and discovered what it was really made of. That’s the way we’re going nowadays. Everything slick and streamlined, everything made out of something else. Celluloid, rubber, chromium-steel everywhere, arc-lamps blazing all night, glass roofs over your head, radios playing all the same tune, no vegetation left, everything cemented over, mock-turtles grazing under the neutral fruit-trees. But when you come down to brass tacks and get your teeth into something solid, a sausage for instance, that’s what you get. Rotten fish in a rubber skin. Bombs of filth bursting inside your mouth.¹⁹

Benjamin suggests that the ‘presence of the original is the prerequisite to the concept of authenticity’.²⁰ Bowling can locate no original presence in the frankfurter. He finds this, no less than its taste, repulsive. Trotter suggests that as plastics were developed in the early twentieth century, new methods for classifying materials came into being – new ways of comparing and contrasting the ‘archaic’ and the ‘contemporary’, the ‘raw’ and the ‘cooked’, the original and the imitation, the organic and the synthetic. This sensibility, he suggests, operated ‘within and upon technologically mediated experience by means of a strong awareness of synthetic and semisynthetic substance’; new classes of materials prompted an altered ‘awareness of substance, and [...] of the information encoded in synthetic or semisynthetic substance’.²¹ Trotter proposes

¹⁹ *Air*, pp. 22-24.

²⁰ Benjamin, ‘Reproduction’, p. 170

²¹ Trotter, *Literature*, pp. 87, 89.

the concept of ‘techno-primitivism’ – by which he means, the intuitive sensory detection of the original, organic, raw, and archaic in, rather than outside of, products of technological modernity. Vulcanised rubber, for example, is the semi-synthetic product of industrial processes through which latex is toughened or elasticated, depending on requirement. This material can be traced to a biological origin – the raw substance worked over by the industrial process is a gum extracted from a tree. Trotter claims that in the early-twentieth century, a ‘techno-primitivist’ awareness of rubber made it available for characterisation as a material with ‘dormant energies and aptitudes’.²²

The concept of techno-primitivism provides a useful point of entry for thinking about authenticity in the age of synthetics. In ‘The Work of Art in the Age of Mechanical Reproduction’, Benjamin defines an object’s authenticity as ‘the essence of all that is transmissible from its beginning, ranging from its substantive duration to its testimony to the history which it has experienced’. If an object is duplicated by technical means, Benjamin suggests, its authenticity expresses itself as an ‘eliminated element’, as ‘that which withers in the age of mechanical reproduction’: aura.²³ We might therefore think of techno-primitivism as a way of sensing latent aura in semi-synthetic materials – of locating ‘the natural *in* the synthetic’. Semi-synthetic materials can be traced back to organic origins, harbouring a ‘residue of nature that no degree of artifice could ever wholly expunge’. Their beginnings can be identified; from these beginnings, it is possible to trace their histories, and thus to detect aura. Techno-primitivism, however, does not cover the full range of synthetic experience. In ‘wholly synthetic substance’, Trotter suggests, ‘absolute artificiality threatened to rule out altogether any appeal to the primitive’.²⁴

Benjamin proposes that the ‘technique of reproduction detaches the reproduced object from the domain of tradition’, destroying its aura. Synthesis has a different way of creating experience without aura. It does not necessarily imitate or reproduce, and it does not rely on the prior ‘presence of the original’.²⁵ For Bowling, to encounter a fully synthetic material is to encounter an endlessly receding chain of substitution, with no beginning and no original – ‘everything made out of something else’. Unable satisfactorily to trace or categorise ersatz, he experiences what might be described as synthetic vertigo: ‘sausages out of fish, and fish, no doubt, out of

²² Trotter, *Literature*, pp. 86, 94-95, 98-99.

²³ Benjamin, ‘Reproduction’, p. 171.

²⁴ Trotter, *Literature*, pp. 106, 112, 125.

²⁵ Benjamin, ‘Reproduction’, pp. 170-71.

something different'. He has no cultural resources on which to draw to contextualise this 'phantom stuff', other than 'a bit I'd read in the paper somewhere about these food-factories in Germany where everything's made out of something else'. When the frankfurter bursts 'like a rotten pear' in Bowling's mouth, discharging a 'sort of horrible soft stuff' all over his tongue, he apprehends, and is deeply unsettled by, a creeping occupation of the familiar by the synthetic.²⁶ Perhaps this is why there appears to be comparatively little literary work on synthetic materials from 1930s Britain. For the most part, 'the substance steals in, unregistered'.²⁷ Bowling only recognises a change in the conditions of ordinariness because of an unexpected encounter with 'matter out of place'.²⁸ While, through slow processes of habituation, new material arrangements go unnoticed, when the strange manifests abruptly in the familiar, a realisation effect takes place. To borrow Bowling's phrasing, sausages and synthetics do not 'go with' one another.²⁹ This disjunction allows him to recognise the quiet estrangement of the everyday by an emergent industrial-technological regime.

~

Even as Bowling reckons with the pervasive normality of the synthetic, he insists on his own independence from it. He claims that he retains traces of his identity from 'before the war' – that 'I've got something else inside me, chiefly a hangover from the past'.³⁰ He is unconscious, or in denial, of the extent to which he has been moulded by his contemporary circumstances, maintaining that he retains a latent authenticity. 'Genuineness', Esther Leslie writes in her 2005 book *Synthetic Worlds: Nature, Art and the Chemical Industry*, 'is that which cannot be reproduced. Genuineness gains in value in a world of endless reproduction and synthetics, precisely because it exists no more'.³¹ In his tirade against 'the way we're going nowadays', Bowling tacitly implies the existence of a prior, more authentic domain, in which 'something solid' did not give way to repeating synthetic substitutions. But even as Bowling claims that a residue of this organic world persists within him, and immediately after he repudiates the slick feel of ersatz matter, he allows – even invites – new industrial materials to lodge 'inside' him in another form: 'When I'd got the new teeth in I felt a lot better. They sat nice and smooth over the gums'.³²

²⁶ *Air*, pp. 22-24.

²⁷ Robert Macfarlane, email correspondence, 7 November 2018.

²⁸ Mary Douglas, *Purity and Danger: An Analysis of the Concepts of Pollution and Taboo* (New York: Routledge, 1984; 1966), p. 36.

²⁹ *Air*, p. 3.

³⁰ *Air*, pp. 35, 20.

³¹ Esther Leslie, *Synthetic Worlds: Nature, Art and the Chemical Industry* (Kings Lynn: Reaktion, 2005), p. 190.

³² *Air*, pp. 20, 24.

The 'period from 1930 to 1940 represented a period of intense experimentation both by the plastic industry and the dental profession to find a suitable material' for false teeth. Common materials included Bakelite, vinyl resins, and acrylic resins.³³ It is probable that a dental patient in 1930s Britain would have been given false teeth moulded from some form of plastic. Given the importance of synthetics in *Coming Up For Air*, the location of the dentist between a photographer (celluloid photographic film was patented in 1889) and a rubber merchant, and Orwell's maintenance in the novel of an ironical distance between readers and narrator, it is justified to speculate that Bowling's dentures are plastic.³⁴ The dentures are 'nice and smooth'. Immediately after having professed distaste for streamlined aesthetics, Bowling obviously voices his enjoyment of sleek synthetic textures. When he claims to have 'bitten into the modern world and found out what it was really made of', he implicitly asserts his apartness and exemption from that world, insisting that what Trotter calls the 'new regime of pure prosthesis' has no hold on him.³⁵ He either overlooks or elides the uncomfortable detail that he bites with 'temporary teeth' made of plastic. Indeed, Bowling carefully distances his new teeth from the substitutions he associates with modern life. He describes his dentist as 'a bit of an artist', 'like a jeweller choosing stones for a necklace'. He 'doesn't aim at making you look like a toothpaste advert'. But even as Bowling claims for his teeth the cultural prestige of an artwork, he unconsciously reinscribes himself within mass consumer culture. Orwell works the register of advertising into Bowling's narration: 'though very likely it sounds absurd to say that false teeth can make you feel younger, it's a fact that they did so'; 'Nine people out of ten would have taken my teeth for natural'. He catches a reflection of himself in a 'shop window', and tries a smile.³⁶

If in *Burmese Days*, as Levenson suggests, Orwell represents 'the daily work of Empire as a constitutive fact of British life', then in *Coming Up for Air* he investigates the daily work of modern industrial technology as a constitutive fact of British life.³⁷ Tracing a doomed attempt to escape from the spiritual life of suburban 1930s Britain, this novel depicts how, as Orwell writes in *The Road to Wigan Pier*, 'modern industrial technique [...] provides you with cheap substitutes for everything', and conducts a literary enquiry into the social, cultural, and psychological

³³ S.K. Khindria, Sanjeev Mittal and Urvashi Sukhija, 'Evolution of Denture Base Materials', *The Journal of Indian Prosthodontic Society*, 9.2 (2009), 64-69 <doi:10.4103/0972-4052.55246>, p. 67.

³⁴ Stephen Fenichell, *Plastic: The Making of a Synthetic Century* (New York: HarperCollins, 1996), p. 60.

³⁵ *Air*, p. 24; Trotter, *Literature*, p. 123.

³⁶ *Air*, pp. 23-24.

³⁷ Levenson, 'realist', p. 63.

effects.³⁸ Bowling's memory of a 'rooted organic community of pre-war England before it was devastated by capitalism' can be understood as an effect of his immersion in this industrial-synthetic milieu.³⁹ The 'lost Edwardian Eden' that Bowling remembers is defined by its anteriority.⁴⁰ He complains that the 'very idea of sitting all day under a willow tree beside a quiet pool – and being able to find a quiet pool to sit beside – belongs to the time before the war, before the radio, before aeroplanes, before Hitler [...] Now all the ponds are drained, and when the streams aren't poisoned with chemicals from factories they're full of rusty tins and motor-bike tyres'.⁴¹ Bowling cannot remember the world before the war without dwelling on its disappearance, and on the world that has replaced it. His impressions of his earlier experiences, then, react with his agonised consciousness of the disappearance of the remembered time, forming compound memories.

In an endnote to 'The Work of Art in the Age of Mechanical Reproduction', Benjamin notes that 'at the time of its origin a medieval picture of the Madonna could not yet be said to be "authentic". It became "authentic" only during the succeeding centuries and perhaps most strikingly so during the last one'.⁴² In Benjamin's formulation, 'authenticity is itself [...] a function of reproduction, not a quality of what precedes it'.⁴³ Or, as Eva Geulen puts it:

In the beginning was not the original, but rather the reproduction, which makes the concept of authenticity possible in the first place. Authenticity becomes 'authentic' only against the background of reproducibility. That means, however, that authenticity is compromised from the start, inauthentic from the start, for its origin lies not in itself, but rather in its opposite, reproduction.⁴⁴

Intrigued by Benjamin's insight, Adorno suggested in his 1945 aphorism 'Gold assay' that the 'discovery of genuineness as a last bulwark of individualistic ethics is a reflection of industrial

³⁸ Orwell, *The Road to Wigan Pier* (London: Penguin, 2001; 1936), p. 91.

³⁹ Levenson, 'realist', p. 73.

⁴⁰ Jonathan Rose, 'England his Englands', in *Companion*, ed. by Rodden, pp. 28-42 (p. 30).

⁴¹ *Air*, pp. 76-77.

⁴² Benjamin, 'Notes: The Work of Art in the Age of Mechanical Reproduction', in Benjamin, *Illuminations*, pp. 222-30 (p. 222).

⁴³ Martin Jay, 'Taking on the Stigma of Inauthenticity: Adorno's Critique of Genuineness', *New German Critique*, 97 (2006), 15-30 <www.jstor.org/stable/27669153> [accessed 31 August 2020], p. 19.

⁴⁴ Eva Geulen, 'Under Construction: Walter Benjamin's "The Work of Art in the Age of Mechanical Reproduction"', in *Benjamin's Ghosts: Interventions in Contemporary Literary and Cultural Theory*, ed. by Gerhard Richter (Stanford, CA: Stanford University Press, 2002), pp. 121-41 (p. 135).

mass-production'.⁴⁵ These claims that the idea of the genuine is conditional on the ubiquity of the synthetic provide a critical framework for thinking about what propels Bowling to return to Lower Binfield, and his disillusioning experiences once he arrives.

Of course, he cannot slough off modernity and reprise his life from 'before the war'.⁴⁶ As he drives expectantly over the brow of Chamford Hill he finds, to his devastation, that Lower Binfield has 'been swallowed' by 'a good-sized manufacturing town', a 'river of brand-new houses' watched over by 'enormous factories of glass and concrete'. Despondent, he goes to the pub, which has been refurbished 'in a kind of medieval style'. Waiting for the 'slick young waiter', he taps the panelled wall behind him: 'Yes! Thought so! Not even wood. They fake it up with some kind of composition and then paint it over'. Even the beer has a 'sulphurous taste. Chemicals'.⁴⁷ Feeling a 'tiny bit boozed', Bowling has an urge to visit his former home. It now bears a sign:

WENDY'S TEA SHOP
MORNING COFFEE
HOME MADE CAKES

Dispirited, but curious nonetheless, he goes inside. It is decorated in 'an even more antique style than the George'. He orders cake. 'Home-made cakes! You bet they were. Home-made with margarine and egg-substitute'.⁴⁸ Bowling's nostalgic desire to return to Lower Binfield can be understood as an expression of his assimilation to a regime of synthesis and substitution. In acting out that desire, he discovers the pervasive physical extent of that regime. He also encounters, though he perhaps does not register, evidence that the desire for authenticating experiences is an effect of immersion in synthetic regimes. Lower Binfield offers synthetic analogues of the authenticating phenomena he craves. The implication is that the idea of originality gains in power through widespread social exposure to synthetic experience, thus multiplying the genres of synthetic experience. A yearning for rootedness – which we might presume is not unique to Bowling, given the medieval kitsch of the pub and tea room – fuels attempts to reproduce synthetically those experiences deemed most 'original'. In his escape to

⁴⁵ Adorno, *Minima*, p. 165.

⁴⁶ *Air*, p. 35.

⁴⁷ *Air*, pp. 189, 196, 207.

⁴⁸ *Air*, pp. 197-99.

Lower Binfield, then, Bowling acts both in defiance of modern life, and as what Leslie calls ‘an instrument of the economy, one of many standardized, organized human units’.⁴⁹

The next day, on the street, he recognises his former girlfriend, Elsie. At a distance, he follows her to her shop, and decides to go inside. She does not recognise him. He says, ‘I want a pipe’ – a pipe with an ‘amber mouthpiece’.

‘I don’t know as we got any amber ones jest at present, sir. Not amber. We gossome nice vulcanite ones.’

‘I wanted an amber one,’ I said.⁵⁰

Amber, a fossil resin, forms when over indeterminate spans of time, from a year to a geological epoch, buried arboreal resins oxidise or polymerise.⁵¹ Amber may entomb and preserve the flora and fauna of past ages. This gives it metaphoric potential – as in Charles Cowden Clarke’s evocation of William Shakespeare’s characters, kept ‘for all time in the imperishable amber of his genius’.⁵² Vulcanite ‘may be regarded as the first truly semi-synthetic plastic, since it is made from a natural material, rubber, which has been chemically altered, its composition and properties being changed by the addition of sulphur under controlled conditions’.⁵³ It is ‘a substitute for or imitation of wood, stone, and metal [and amber], remarkable only in so far as it gave rise to the particular form and function imposed during the process of manufacture’.⁵⁴ Amber and vulcanite remember differently. Amber holds matter – beetles, feathers, seeds – unchanged within itself. It is an organic medium of preservation, keeping its contents from decay through the ages, and so harbouring the deep past in the present. Conversely, vulcanite necessarily attests to early-twentieth century synthetic technological regimens. Vulcanite may recall the raw rubber from which it is created. However, it is impossible to be alert to this prior, organic material form without awareness that it has since been chemically transformed into an industrial product.

⁴⁹ Leslie, *Synthetic*, p. 190.

⁵⁰ *Air*, pp. 219, 221.

⁵¹ Judith W. Frondel, ‘Amber Facts and Fancies’, *Economic Botany*, 22.4 (1968), 371-82 <www.jstor.org/stable/4252998> [accessed 31 August 2020], p. 371.

⁵² Charles Cowden Clarke, *Shakespeare-characters: chiefly those subordinate* (London: Smith, Elder, 1863), p. 314.

⁵³ Susan Mossman, ‘Perspectives on the History and Technology of Plastics’, in *Early Plastics: Perspectives, 1850–1950*, ed. by Mossman (London: Leicester University Press, 1997), pp. 15-71 (p. 27).

⁵⁴ Trotter, *Literature*, p. 95.

The associative trace of raw rubber in vulcanite is like Bowling's retroactively-constituted memory of the time 'before the war'.⁵⁵ It has not been preserved, but attests to an irreversible transformation. It refers not to origin, but to process. Amitav Ghosh has suggested that the 'shadow of language' falls over sensory experience – that an unavoidable tendency to name and classify may foreclose the possibility of direct, non-linguistic perception.⁵⁶ A similar phenomenon, which we might think of as the 'shadow of technological consciousness', seems to be at play in *Coming Up for Air*. This awareness of synthetic experience is accompanied by a strong suspicion of its inauthenticity, prompting imaginative conviction in an alternative, authentic domain, elsewhere in time or space. For Bowling, these suspicions and convictions permeate existence, to the extent that they influence what Benjamin calls 'the organization of perception'.⁵⁷ Immersion in a newly synthetic world provokes him to alter and intensify his memories. Conditioned by an insistent awareness of his contemporary situation, they express the present more than they recall the past. In *Coming Up for Air*, then, Orwell explores what we might now identify as an early psychic condition of the synthetic era – a precursor of contemporary anxieties about the new substances; their production and circulation, their persistence and toxicity. *Coming Up for Air* registers neither toxicity, nor persistence; nor does it much more than nod to the industrial systems that refine, produce and distribute synthetic materials. Synthetic substance here attests to a nauseating voiding of the familiar through substitution and replication. This provokes dizziness and a loss of orientation, and induces longing for more stable ground. In another, lesser-known English novel of the 1930s, no less ideologically-charged moods hold sway. This novel engages more directly than *Coming Up for Air* with the emergent systems of the 1930s synthetics industry, finding in them new media in which to detect vibrant energies, and an incitement to paranoid investigation.

⁵⁵ *Air*, p. 35.

⁵⁶ Amitav Ghosh, *The Great Derangement: Climate Change and the Unthinkable* (London: University of Chicago Press, 2016), p. 82.

⁵⁷ Benjamin, 'Reproduction', p. 172.

2. The Synthetic Weird

John Hargrave's *Summer Time Ends*

In 1971, John Hargrave looked back on *Summer Time Ends*, his 'gargantuan experimental novel' of 1935:

Summer Time Ends, running to 877 pages and nearly 300, 000 words, was conceived and schematized during what has been called the Great Depression of 1930 and its aftermath in Great Britain, and the rest of the industrialised world. It sprang at the outset from firsthand experience of mass-unemployment in the midlands and the industrial north of the British Isles, and of the thousands of sullen, half-starved, weary, foot-sore, and gray-faced Hunger Marchers trudging slowly through the English shires towards London, who brought home to the British people as a whole the heart-rending plight of some 3, 000, 000 workless workers, and so floodlit the tragic absurdity of poverty amidst plenty.¹

The novel is expansive in scope, marshalling a multitude of characters from across social classes, and aiming to convey the inequality and economic dysfunction of its contemporary society. Tim Armstrong has discussed how in *Summer Time Ends* Hargrave crafted a 'modernism conceived in political rather than formal terms'. As I shall discuss in detail, he wrote the novel as propaganda for a fringe political organisation called the Green Shirt Movement for Social Credit, of which he was also leader. The text was to disseminate his critique of capitalist economics, and to incite popular support for the social credit movement, which advocated for a 'National Dividend' – a precursor to universal basic income.² Reading *Summer Time Ends*, one also glimpses a broader philosophical world-view subtending its political stance: a heliocentric belief in matter's immanent vibrancy. Everything in the novel – people and trees, weather and water – is latent with the energy of the sun. Intriguingly, this informs the treatment of a fictional rayon called Soltex (rayon is a semi-synthetic cellulosic fabric), and also of a projected synthetic material of the same name. Soltex figures as a lively substance; as a product of industrial synthesis, it also draws 1930s chemical cartels, and their financial, political, and military connections, into the

¹ John Hargrave, 'Steinbeck and *Summer Time Ends*' [typescript of an article published in *Steinbeck Quarterly*, 6 (1973), 67-73], London School of Economics, Hargrave Papers, Box 40, pp. 1-16 (p. 1).

² Tim Armstrong, 'Social Credit modernism', *Critical Quarterly*, 55.2 (2013), 50-65 <doi:10.1111/cრიq.12049>, pp. 55, 51.

novel. This modifies how Soltex works as a vitalist ‘meaning-making material’.³ *Summer Time Ends* explores how synthesis establishes new continuities between matter and technology, conjuring unsettling patterns of relation between biochemistry and politics, vitality and lethality.

In this chapter, I show how Hargrave’s links to early-twentieth century Neo-Vitalist cultures and to the social credit movement inform his writing in *Summer Time Ends*. I then consider how these philosophical and political positions shape the novel’s depictions of synthetic chemistry, and of 1930s chemical cartels. As we will see, *Summer Time Ends* is unusually attentive to new synthetic technologies, to the chemical industry’s increasing power and strategic importance during the 1930s, and to the lived implications of these material and political shifts. The novel begins with an unemployed young couple, Jenny and George, ‘kissing in the bracken in the limpid amber glow of a golden afternoon’. A ‘darkling old gold dusk’, ‘diffused through a honey-set haze’, sets them aglow. Below the hill on which they lie runs the river Eft, gleaming like a ‘dim goldbeater’s-skin’. Beside the river, engulfed in a ‘smudge of clouded amber’, is a town, with its ‘factories, sheds and workshops, its three spires, its gasometers, its railway station, repair shops and sidings’. In ‘the soot and smoke of the industrialised valley’, chemical transformations are underway; ‘tall smokestacks’ stream with fumes, and machines ‘suck in cotton and eject Soltex rayon fabric’. Everything in this scene – from the two lovers, to bracken’s ‘blond frondage’, to the textiles and by-products – is immersed in, even composed of, a viscous and radiant medium. States bind: ‘clouded amber’ and ‘honey-set haze’ suspend aerial smokiness in glutinous thickness; dusk and moving water assume a golden density.⁴ Meanwhile, in the factories, another ‘monstrous, infinitely plastic entity, capable of absorbing and metabolising anything with which it comes into contact’, is at work: capital.⁵ In this passage, Hargrave sets up connections between the organic and the artificial, and establishes certain tensions between vitality and instrumentality. His depiction of the environment around this ‘dirty manufacturing centre’ does not, to paraphrase Trotter, rule out any appeal to the natural.⁶ Rather, the narrator describes what Hargrave elsewhere called ‘solar-elemental energetic substance’ with language evocative of industrial synthesis, alluding to resinous and plastic media, to smog light, and to gold, capital’s totemic element.⁷ In *Coming Up for Air*, Orwell depicts an uninformed consumer

³ Margaret Konkol, ‘Prototyping Mina Loy’s alphabet’, *Feminist Modernist Studies*, 1.3 (2018), 294-317 <doi:10.1080/24692921.2018.1505273>, p. 297.

⁴ Hargrave, *Summer Time Ends* (London: Constable & Co, 1935), pp. 11, 16-17 (hereafter *Summer*).

⁵ Mark Fisher, *Capitalist Realism: Is There No Alternative?* (Winchester: Zero Books, 2009), p. 6.

⁶ *Summer*, p. 17; see Trotter, *Literature*, p. 125.

⁷ Hargrave, ‘Solar Vision’ [Chapter 5], in Hargrave, *They Can’t Kill the Sun*, (undated typescript), Hargrave Papers, Box 62, unpaginated.

struggling to identify the origins of synthetic materials. *Summer Time Ends* brings us closer to the apparatuses and processes of industrial synthesis, describing everyday life in a place where rayon is fabricated, and filtering these descriptions through Hargrave's philosophical and political frameworks. In this novel, semi-synthetic and synthetic industrial infrastructures simultaneously seethe with vitalist energies, and encode capitalist economic agendas.

During the early decades of the twentieth century, chemical industries were using new technologies – coal hydrogenation, crude oil refinement, nitrate chemistry – to alter matter at a molecular level, rapidly transforming the environments in which people lived across local and global scales.⁸ Hargrave's descriptions of the liveliness of synthetic substances invite attention to some of the affective shifts that resulted from these changes, and to how these registered at the level of literary expression. Craig Gordon has recently suggested that 'the period encompassing roughly the final two decades of the nineteenth century and the first three decades of the twentieth century witnesses the unfolding of an alternative conception of the organic [...] less a unified position than a set of shared matters of concern that orient the interanimation of certain aspects of the period's philosophy, biological science and literary discourse'.⁹ Oliver Botar and Isabel Wünsche similarly claim that many scholars have overlooked the cultural influence of late-nineteenth and early-twentieth century 'biocentric' thought, diagnosing 'a serious lack in cultural history, which, by virtually ignoring the *fin de siècle* discourse around nature and the participation of important figures in it, has insufficiently contextualised Modernist culture'. They claim that this diffuse set of attitudes – to which they refer variously as organicism, biocentrism, or Neo-Vitalism – manifests as a meandering 'intellectual current within the culture of modernity'. 'It is widely assumed', Botar and Wünsche argue, 'that Modernist culture had little interest in or even awareness of [a] looming [ecological] crisis, or even of "nature" as such. Yet a closer examination of almost any genre of Modernist artistic and cultural production reveals an active interest in the categories of "life", the "organic", and even the destruction of the environment in modernity'. Organicism might be defined as an imaginative stance placing emphasis on 'the centrality of "nature", "life" and life processes rather than "culture"'.¹⁰ It is interested in the 'forms of assemblage that organise the relationships between inanimate matter and living creatures through which individuals are constituted', and claims to set in motion a 'profound scientific and

⁸ Steiniger, 'Refinery', pp. 108-10.

⁹ Craig Gordon, 'Organicism and the modern world: from A.N. Whitehead to Wyndham Lewis and D.H. Lawrence', in *Being Modern: The Cultural Impact of Science in the Early Twentieth Century*, ed. by Robert Bud et al. (London: UCL Press, 2018), pp. 337-56 (p. 341). UCL Discovery ebook.

¹⁰ Oliver A.I. Botar and Isabel Wünsche, 'Introduction: Biocentrism as a constituent element of Modernism', in *Biocentrism and Modernism*, ed. by Botar and Wünsche (Farnham: Ashgate, 2011), pp. 1-14 (pp. 2, 5, 1, 5).

philosophical shift – one that requires us to abandon rigid distinctions between the physical and the biological, the organic and the inorganic'.¹¹ Hargrave, as Annebella Pollen has shown, was involved with British Neo-Vitalist circles in the 1920s; *Summer Time Ends* displays attitudes attributable to organicist thought.¹² It bears reading within this historical context, as a (deeply idiosyncratic) vitalist text. For the purposes of my investigation into literary cultures of early synthetic technology in Britain, reading *Summer Time Ends* in relation to biocentric discourse will show that for some followers of Neo-Vitalist ideas, synthetic materials – synonymous, by the late-twentieth century, with 'the cheap, the shoddy, and the meretricious' – by no means foreclosed approach as 'vibrant matter'.¹³

As well as a Neo-Vitalist enquiry into synthetic materials, *Summer Time Ends* can be read as an anxious literary response to the structures and mechanisms of the 1930s chemical industry – a 'technical-scientific system' that occupies an important position in the history of the Great Acceleration.¹⁴ One of the text's interweaving narrative pathways follows the work of a chemist called Harding, who strives to create a synthetic form of cellulose. As we shall see, Harding is enthused by the emancipatory potential of synthetic technology. In ways that recall some of Hargrave's speculations in his wider writing, he envisages how synthesis might allow for the easier production and more widespread provision of basic necessities, thereby abolishing social inequality. The novel's narrator insistently queries these utopian notions. He explains to readers that under the existing political set-up, powerful industrial cartels will inevitably appropriate synthetic technology, using it to create terrifying and highly profitable new weapons, rather than to generate collective prosperity. Here, synthetic technology enters into imaginative association with the capitalist socio-economic order, as conceived by the social credit movement (which importantly, as I will discuss, participated in antisemitic discourse about global finance). From a well-defined philosophical and political position, then, *Summer Time Ends* registers and responds to certain affective pressures that manifested in 1930s England, as a result of a specific intersection of forces: synthetic chemistry, industrial cartels, militarised capitalism.

~

Before he became an experimental novelist, Hargrave was the founder of the Kindred of the

¹¹ Gordon, 'Organicism', pp. 342, 337.

¹² Annebella Pollen, "'More Modern than the Moderns': performing cultural evolution in the Kibbo Kift Kindred", in *Being Modern*, ed. by Bud et al., pp. 311-36 (pp. 317-24).

¹³ Jeffrey Meikle, *American Plastic: A Cultural History* (New Brunswick, NJ: Rutgers University Press, 1995), xiv; Jane Bennett, *Vibrant Matter: a political ecology of things* (Durham: Duke University Press, 2010).

¹⁴ Steiniger, 'Refinery', p. 110.

Kibbo Kift: a utopian woodcraft movement, conceived as a pacifist, co-educational alternative to Robert Baden-Powell's Boy Scouts. Active from 1920 to the early 1930s, the Kibbo Kift aimed at 'nothing less than world peace, to be achieved through an eclectic blend of camping, hiking and handicraft'.¹⁵ Morag Shiach has suggested that often in late modern cultures, 'anxiety about the subjective and social costs of mechanization is [...] met, and to some extent answered, by a vigorous organicism'.¹⁶ The Kibbo Kift both exemplify and modify this claim. They were opposed to competitive industrialism, disillusioned with militarism, and possessed by a problematic 'anxiety that [...] civilisation had become physically and culturally degenerate'. Thinking with a 'complex retro-futurist trajectory', the group did not oppose technology as such.¹⁷ Rather, they despaired at the psychological costs of capitalist social organisation; the 'modern urban mentality' was, Hargrave diagnosed, 'higgledy-piggledy, jerky, restless, excitable and spasmodic. All without rhythm, time, or tune'.¹⁸ In response, the Kibbo Kift formed an 'innovative – if sometimes bewildering – melange of art, science, and philosophy', drawing from an eclectic range of discourses, which included Neo-Vitalism.¹⁹

Pollen has identified a 'powerful philosophy of Neo-Vitalism [...] evident across Kibbo Kift thinking'.²⁰ Vitalism is a venerable current in western scientific and philosophical thought. In its early forms, it was broadly defined by a belief that 'living organisms possessed unique properties and that their biology could not be reduced to the laws of physics and chemistry'; that life was derived from vital, often somewhat numinous, 'principles'.²¹ Interest in vitalism acquired a particular character and intensity in the late-nineteenth and early-twentieth centuries, when a 'new, more sophisticated kind of Vitalism developed [...] termed "Neo-Vitalism"'.²² This new vitalism related to a 'nineteenth-century transition from matter-based physics to an energy-based physics'. This set in motion a shift in vitalist discourse, away from longstanding proposals that an undetected substance animated matter, and towards a focus on 'process and dynamic impulse in

¹⁵ Pollen, 'evolution', p. 312.

¹⁶ Morag Shiach, *Modernism, Labour and Selfhood in British Literature and Culture, 1890–1930* (Cambridge: Cambridge University Press, 2004), p. 16.

¹⁷ Pollen, 'evolution', pp. 313, 327.

¹⁸ Pollen, *The Kindred of the Kibbo Kift: Intellectual Barbarians* (London: Donlon Books, 2015), p. 154; Hargrave, *The Great War Brings It Home: The Natural Reconstruction of an Unnatural Existence* (London: Constable & Co, 1919), pp. 338–39.

¹⁹ Pollen, 'evolution', p. 329.

²⁰ Pollen, 'evolution', p. 318.

²¹ Robert A. Lofthouse, *Vitalism in Modern Art, C. 1900–1950: Otto Dix, Stanley Spencer, Max Beckmann, and Jacob Epstein* (Lampeter: Edwin Mellen Press, 2005), p. 15; E. Benton, 'Vitalism in Nineteenth-Century Scientific Thought: A Typology and Reassessment', *Studies in the Philosophy and History of Science*, 5.1 (1974), 17–48 <doi:0.1016/0039-3681(74)90017-X>, p. 18.

²² Botar, 'Defining Biocentrism', in *Biocentrism*, ed. by Botar and Wünsche, pp. 15–46 (p. 17).

the context of an ontology of energy'.²³ Botar stresses that there 'was no coherent Neo-Vitalist ontology or epistemology, and there is little agreement about the varieties of Neo-Vitalism or the distinctions between Neo-Vitalism, Organicism, Holism, mysticism, and even mechanism. There was certainly no self-aware "Neo-Vitalist" group'.²⁴ Recently, vitalism has resurfaced in various theories within the 'nonhuman turn' in philosophy.²⁵ As the 'vital materialist' scholar Jane Bennett has observed, these discourses 'draw sustenance from a longer tradition of philosophical materialism in the West, where fleshy, vegetal, mineral materials are encountered not as passive stuff awaiting animation by human or divine power, but as lively forces at work around and within us'.²⁶

The Kibbo Kift recommended that its members read Neo-Vitalist thinkers, such as Henri Bergson; the holistic scientists Patrick Geddes and Elisée Reclus 'lectured at Kibbo Kift meetings and led tours of prehistoric sites'; even Kibbo Kift banner slogans ('All Life is Life there is no Life but Life') and campfire songs ('Energy, Energy, Ceaseless Energy') indicate Neo-Vitalist influence (see Figure 2).²⁷ In his 1925 article 'A Short Exposition on the Philosophic Basis of the Kibbo Kift', Hargrave quoted from the biologist John Arthur Thomson's popular 1921 book *The Outline of Science*: 'new revelations of the constitution of matter [...] have shown the very dust to have a complexity and an activity heretofore unimagined. Such phrases as "dead" matter and "inert" matter have gone by the board'.²⁸ Connecting biocentric discourse with atomic theory, Hargrave argued that collective immanent vibrancy implied a collapse of traditional scientific distinctions between animal, mineral, and vegetable 'kingdoms', and between matter and energy: 'We now know that the three kingdoms are not three, but one; that Man takes his proper place in the evolutionary process, acknowledging blood-relationship and atomic-kinship with Birds, Beasts, Rocks, Stars and the Energy of All of the Suns'. He continues, 'it is certain that an atom of matter = "positive-negative" electricity. And what is "electricity"? We shall be on safe ground if we call it "Energy"'.²⁹ For Hargrave, a Neo-Vitalist world-view

²³ Frederick Burwick and Paul Douglass, *The crisis in modernism: Bergson and the vitalist controversy* (Cambridge: Cambridge University Press, 1992), p. 1.

²⁴ Botar, 'Defining', p. 18.

²⁵ See Richard Grusin, 'Introduction', in *The Nonhuman Turn*, ed. by Grusin (Minnesota: University of Minnesota Press, 2015), vii-xxix (vii-ix).

²⁶ Bennett, 'Systems and Things: On Vital Materialism and Object-Oriented Philosophy', in *Nonhuman*, ed. by Grusin, pp. 223-39 (p. 223).

²⁷ Pollen, 'evolution', pp. 318, 321, 324.

²⁸ John Arthur Thomson, *The Outline of Science: A Plain Story Simply Told*, 4 vols (New York: G.P. Putnam's Sons, 1922; 1921), I, p. 4, quoted in Hargrave, 'A Short Exposition on the Philosophic Basis of the Kibbo Kift', *The Nomad*, 12.2 (1925), 281-84 (p. 281).

²⁹ Hargrave, 'Exposition', pp. 281-82.

means that teapots, chairs, mud, electric light bulbs, fingernails, hammers, steam engines, mountains, hats, shoes, needles, tram tickets, lilies, telephones, tents, dynamos, walking sticks, cow dung, churches, iron foundries, neckties, cats, human beings, steel plates, bricks and mortar, glass, sealing-wax, trees, thoughts, tables, music, flowers and flower-pots, clouds, gutter-gratings, books, food, buttons, machine guns, beads, rain, clocks, boots, ferro-concrete, eggs, sunlight, coal, stars, solar systems, slugs, pictures, maggots, wheel bolts, smells, darkness and light, collar-studs, speech, seeds, birds, bootlaces, insects, skeletons, pepper-corns, babies, Space, Time, Matter, all religions, all Spirits, all Matter(s) [...] all, all, are actually the ONE GREAT POWER.³⁰

The list recalls Bennett's perception, in her influential 2010 book *Vibrant Matter*, of a 'thing-power' in excess of human apprehension emanating from an assembly of dead and discarded items.³¹ It might even be construed as an early example of the 'Latour Litanies' that accumulate in the contemporary scholarship of the nonhuman turn.³² While this particular 'litany' does not explicitly name synthetic materials, it is striking for how it imagines modern mass-produced things not as 'passive objects', but as what Bennett calls 'lively and essentially interactive materials'.³³ Hargrave does not here 'pit the organic against the mechanical', but rather identifies both as latent with life, such that 'well-worn tensions between human and machine, animate and inanimate, or biological and physical no longer retain their familiar shape and function'.³⁴ I shall later discuss how in *Summer Time Ends*, Hargrave expounds a Neo-Vitalist view of synthesis – the narrator suggests that through synthetic chemistry, it is possible to identify biochemical links between human and nonhuman beings. As we will see, Hargrave establishes tensions between this utopian attitude, and emergent anxieties about the potential military applications of new chemical research.

³⁰ Hargrave, 'The Lodge of Instruction', Script III, Rune III, Museum of London Kibbo Kift Collection, L72/H.9.

³¹ Bennett, *Vibrant Matter*, pp. 2-4.

³² Ian Bogost, 'Latour Litanizer: Generate your own Latour Litanies', *Ian Bogost*, 16 December 2009, <bit.ly/33wBBch> [accessed 31 August 2020].

³³ Bennett, 'Systems', p. 224.

³⁴ Gordon, 'Organicism', pp. 341, 349.



Figure 1: Interior of the 'Kinlog', illustrated by Kathleen Milnes, Museum of London Kibbo Kift Collection, 2012.2/474, © Kibbo Kift Foundation, <bit.ly/2RxVDO4> [accessed 16 September 2020].

Bergson is in the top-right medallion. Note the gas mask-clad scientist.



Figure 2: Kibbo Kift Vita Sancta banner, 1921, Museum of London Kibbo Kift Collection, 2012.72/465, © Kibbo Kift Foundation, <bit.ly/32BkLK4> [accessed 16 September 2020].

Hargrave extended his Neo-Vitalist attitudes into politics. In his 'Exposition', he explained that the Kibbo Kift aimed at global unity 'not because of any "brotherhood of man" slogan, but because all energy, organic and inorganic, is interlocked'.³⁵ There are continuities between Hargrave's 1920s political application of Neo-Vitalism, and the philosophy underpinning his later commitment to social credit. Pollen suggests that by the 1930s, vitalist theories were losing their legitimacy: 'beliefs in invisible forces and life's fundamental mystery struggled to maintain validity in science in the light of the discoveries made by Mendel. Neo-Vitalism had already begun to shift sideways into mystical philosophical circles by the 1920s'.³⁶ She seems here to overlook vitalism's breadth and multiformity in early-twentieth century Britain – it infused both spiritualist and secular cultures. For example, throughout the early decades of the twentieth century, the scientists D'Arcy Wentworth Thompson and John Desmond Bernal were carrying out pioneering research in morphology and biomolecular crystallography, respectively. Their findings, which revealed hitherto-unseen natural processes, were not inconsistent with Neo-Vitalist notions of matter's inherent activity. In Britain, scientifically-informed artistic communities displayed vitalist inclinations long into (and indeed after) the 1930s.³⁷ Even so, vitalism and spiritualism certainly were not incompatible, and Hargrave undeniably moved with an occult drift. Around the time he wrote *Summer Time Ends*, he developed a heliocentric variant of vitalism, which he used as a philosophical basis for his appeals for economic reform along the lines of social credit.

The social credit movement had been active since C.H. Douglas outlined its main tenets in his 1920 *Economic Democracy*. As Armstrong explains, it aimed to 'place purchasing power in the hands of workers' through the introduction of a 'National Dividend'. Its supporters believed that such measures would overcome the main obstacle to collective socio-economic wellbeing: a lack of general purchasing power due to the concentration of capital in the hands of financial organisations. The primary objective of social credit, then, was to 'increase economic turnover and wrest the control of credit from the banks' by implementing interventionist economic policies.³⁸ Social credit was, in its animosity towards financiers, influenced by the powerful antisemitic cultural currents of early-twentieth century Europe. Colin Holmes has described how

³⁵ Hargrave, 'Exposition', p. 283.

³⁶ Pollen, 'evolution', p. 331.

³⁷ See, for example, Barbara Hepworth, 'Sculpture', in *Circle: International Survey of Constructive Art*, ed. by J.L. Martin, Ben Nicholson and N. Gabo (London: Faber and Faber, 1937), pp. 113-17; Gabo, 'Art and Science', in *The New Landscape in Art and Science*, ed. by György Kepes (Chicago: Paul Theobald, 1956), pp. 60-63; Martin Hammer and Christina Lodder, *Constructing Modernity: The Art and Career of Naum Gabo* (London: Yale University Press, 2000), p. 385.

³⁸ Armstrong, 'modernism', p. 51.

Douglas ‘saw capitalism as a very deeply laid and well considered plot of enslaving the industrial world to German-American-Jewish financiers’. The ‘social credit movement and [its primary magazine] the *New Age* presented well-worn stereotypes of Jews in the world of finance’, making it ‘difficult for Jews who believed in the New Economics [social credit] to grant the movement unqualified support’.³⁹ Armstrong and J.T. Finlay have distanced Hargrave and the Green Shirts from antisemitism within the social credit movement, emphasising an outspoken opposition to fascism.⁴⁰ However, they do not take account of antisemitic tropes either in the Green Shirt newspaper *Attack!*, or in *Summer Time Ends* (which Ezra Pound, whose enthusiasm for social credit is difficult to separate from his antisemitism, considered to be ‘an absolute record of the state of English mind in our time’).⁴¹ I will shortly interpret these tropes in more detail, reading the novel’s depiction of cartelised industrial and financial power-structures in relation to its antisemitism.

Hargrave encountered social credit in 1923, when he found his articles published alongside Douglas’ in the rural revivalist (and, later, Nazi fellow-traveller) Rolf Gardiner’s magazine *Youth*.⁴² Hitherto, according to Pollen, the Kibbo Kift had ‘largely aimed at cultural reform through outdoor living and handicraft production’.⁴³ Douglas’ arguments stirred an epiphany in Hargrave: ‘half our problem is psychological and the other half is economic. The psychological complex of industrial mankind can only be released by solving the economic impasse’.⁴⁴ He resolved to append a new support for social credit to existing Kibbo Kift precepts. By 1926, the Kibbo Kift newspaper *The Broadsheet* had announced, ‘We believe in Social Credit, the Just Price and the release of the individual from the position of machine minder’.⁴⁵ In 1933, the Kibbo Kift were reborn as the Green Shirts: a uniformed campaign group for social credit.⁴⁶

In his undated tract *They Can’t Kill the Sun*, Hargrave links the ideas of social credit with his heliocentric philosophy, rejecting ‘financial abstractionism’ and embracing ‘the free energy of the

³⁹ Colin Holmes, *Anti-Semitism in British Society, 1876-1939* (London: Edward Arnold, 1979), pp. 209-10, 215.

⁴⁰ Armstrong, ‘modernism’, p. 54; J.T. Finlay, ‘John Hargrave, The Green Shirts, and Social Credit’, *Journal of Contemporary History*, 5.1 (1970), 53-71 <www.jstor.org/stable/259980> [accessed 14 September 2020], p. 69.

⁴¹ Ezra Pound, quoted in Hargrave, ‘Steinbeck’, p. 8.

⁴² Finlay, ‘Hargrave’, p. 59; see Dan Stone, ‘Rolf Gardiner: An Honorary Nazi?’, in Stone, *The Holocaust, Fascism and Memory: Essays in the History of Ideas* (Basingstoke: Palgrave Macmillan, 2013), pp. 96-109 (pp. 102-03).

⁴³ Pollen, ‘evolution’, p. 315.

⁴⁴ Hargrave, *The Confession of the Kibbo Kift: A Declaration and General Exposition of the Work of the Kindred* (London: Duckworth, 1927), p. 49.

⁴⁵ *The Broadsheet*, 2.13 (1926), London School of Economics, Youth Movement Archives / Kibbo Kift, 168 (a), quoted in Finlay, ‘Hargrave’, p. 59.

⁴⁶ Finlay, ‘Hargrave’, p. 64.

sun as offering a plenitude which overcomes all restricted economies'.⁴⁷ 'All material, whatsoever, used by man in fashioning things – from a child's rattle to a bombing plane – is a solar-gift', he declares, adding that when 'we use solar-energy, we use something that costs nothing, and for which no-one can make out any logical, sane, reasonable, nor even legal claim to money-payment'. Echoing his 1920s Neo-Vitalism, Hargrave observes: 'We live upon a lump of sun-material. Our earth is a sun-earth built of sun-elements: a solar-planet moving within a solar-system. There is nothing in nor upon the earth, whether organic or inorganic, that is not solar-elemental energetic substance'. Thus, he argues, a 'true social-economic theory [...] must spring from astrophysics – "the music of the spheres", as understood by the scientific mind [...] because the earth itself and everything upon it is an integral part of that cosmic interplay of electrodynamic energy'. He emphasises that one 'can only "pay" for solar-energy by playing a financial game of let's-pretend; a game that leads inevitably to the game of beggar-my-neighbour'.⁴⁸ In the social credit movement's proposal for a national dividend, Hargrave saw an economic system consistent with his heliocentric philosophy. This combination of Neo-Vitalism and economic theory strongly informs *Summer Time Ends*, particularly the episodes concerning Harding's experiments in chemical synthesis. Harding claims to have 'superseded every manufacturing process known to mankind': 'we've unlocked the secret of energy – we take sunlight and make it into cellulose direct'.⁴⁹ Through Harding, Hargrave offers his readers a glimpse of what a social credit state might achieve with synthetic technology. An important narrative strand of *Summer Time Ends* concerns Sir John Jordans' Soltex combine – a rayon-manufacturing industrial enterprise. The novel characterises Soltex as an organic substance altered by modern industrial processes: 'liquid cotton plantations forced through metal jets'. Harding dreams of undoing the Jordans monopoly by synthesising what he calls 'real soltex': 'rayon made from the rays of the sun', 'rayon filaments without using woodpulp or cotton'.⁵⁰ Readers are invited to consider the socially transformative potential of this new industrial technique. Harding predicts that his work will inaugurate a golden 'Age of Solar Power', rendering present industrial systems obsolete: 'if we can get cellulose direct from light – from daylight – how long will it be before we can get anything – everything?'⁵¹ As I shall later discuss in more detail, the narrator observes that under the socio-economic order of 1930s Britain, solar synthesis is more likely to empower existing hegemonies than to undermine them. He anticipates

⁴⁷ Hargrave, 'Solar Vision', unpaginated; Armstrong, 'modernism', p. 53.

⁴⁸ Hargrave, 'Solar Vision', unpaginated.

⁴⁹ *Summer*, p. 781.

⁵⁰ *Summer*, pp. 145, 174, 614.

⁵¹ *Summer*, p. 781.

that in the near future, synthetic technology will be implemented for warlike purposes, resulting in new forms of anxious, phobic response to sunlight. Here, the novel turns away from Harding's utopian projections to delineate and critique capitalist modes of organisation. Focusing on the large-scale operations of chemical and other cartels, Hargrave works to represent how these interlocking infrastructures and technologies introduce new dangers and terrors into collective experience.

~

In *Summer Time Ends*, Hargrave undertakes a speculative approach to synthetic technology, with a keen interest in its social and imaginative implications, embedded in his understanding of the political and economic systems of the 1930s. In its representations of an insidious and unaccountable military-industrial complex, the novel persistently reproduces antisemitic tropes, echoing the antisemitism of the wider social credit movement. Finlay notes that the Green Shirts maintained a certain independence from the 'established Social Credit membership', and that Green Shirt publications directed 'vigorous attacks [...] against anti-semitism and racial theories'.⁵² Armstrong likewise writes that while 'the style of the Green Shirts is sometimes described as fascist, Hargrave was firm in his opposition to anti-Semitism'.⁵³ The front page of a 1933 edition of *Attack!* – the official organ of the Green Shirts, which Hargrave edited – carries the headline 'Hitler's Jew-Hate! The Nazis' Scapegoat', and two straplines: 'Social Credit: The Only Solution to "The Jewish Problem"', and 'Britain Against Finance-Fascism!'. The article argues that 'Hitlerism found in Jew-hatred the driving force required to smother the fact that the Nazi social-economic programme was a bundle of nonsense'. It continues, 'There are many Jews in Banking and Finance, but that is not what is wrong with the Financial System. The present Money System imposed upon us by the Bankers' Combine would work just as wrongly if it were manned by Hitler's Nazis'. The article concludes by thundering:

NO RACIAL HYSTERIA!
NO "NORDIC" NONSENSE!
DOWN WITH THE BANKERS' COMBINE!⁵⁴

⁵² Finlay, 'Hargrave', pp. 66, 69.

⁵³ Armstrong, 'modernism', p. 54.

⁵⁴ 'Hitler's Jew-Hate! The Nazis' Scapegoat', *Attack!*, 9 December 1933, p. 1.

Hargrave opposed racial ideologies in his wider publications; the narrator of *Summer Time Ends* likewise expresses aversion to ‘race-cults’ and ‘Hitlerisms’.⁵⁵ Even so, *Summer Time Ends* contains numerous antisemitic motifs, not least in its allusions to sinister and predatory financial organisations. This would appear to be consistent with Aaron Goldman’s suggestion that while ‘vehement antisemitism’ was ‘widely condemned and resented’, ‘Anti-Jewish biases [...] were widely accepted in Britain during the 1930s’. Goldman identifies ‘an unfounded and widespread belief that Jews had undue influence in [...] the world of finance [...] Disagreeable literary stereotypes, middle class professional antipathy and continued social discrimination against Jews were all clearly present in Britain during the 1930s’.⁵⁶ The *Attack!* article purports to oppose antisemitism, but connects Jewish financiers to economic iniquity: ‘If there is a “Jewish Problem” it is, in reality, not racial – but springs out of the Money Problem’.⁵⁷ In an episode about withheld strike pay, *Summer Time Ends* imagines a ‘well-to-do Hebrew’ pulling the strings of finance, and engages in a grotesque parody of a perceived Jewish accent.⁵⁸ Even as he aimed to counter, or distance himself from, explicitly antisemitic ideologies, Hargrave amplified anti-Jewish prejudices in 1930s British society. *Summer Time Ends* enquires into organic and authentic experience. Given the prominence of such themes in fascist imaginaries, it is important to consider the novel’s vitalism in relation to its antisemitism.

Leslie writes of how in Nazi ideology, Jews ‘came to represent all that was negatively disposed, inauthentic, dissimulating, and suspect’, as opposed to a German ‘*Volk*’ understood to embody ‘all that was authentic’.⁵⁹ Might a comparable set of attitudes subtend and inform the vitalism of *Summer Time Ends*? Through a politicised vitalism, Hargrave proposed that society should be reorganised to harmonise with his understanding of modern scientific research. This drastic action was conceived as a remedy to the ills of a society dominated by ‘financial abstractionism’ associated with antisemitic stereotypes.⁶⁰ I agree with Anne Harrington that ‘it is important that we resist [...] imagining that all holistic, vitalistic, or teleological views of nature are part of a larger “destruction of reason” that can be tracked in some straight, degenerating line from the romantics to Hegel to Nietzsche to Hitler’; and also with Gordon, that ‘the widespread suspicion – scientific, political and aesthetic – of late-modern organicism depends in no small part on the

⁵⁵ *Summer*, p. 492.

⁵⁶ Aaron Goldman, ‘The Resurgence of Antisemitism in Britain during World War II’, *Jewish Social Studies*, 46.1 (1984), 37-50 <www.jstor.org/stable/4467242> [accessed 31 August 2020], p. 38.

⁵⁷ ‘Scapegoat’, p. 1.

⁵⁸ *Summer*, p. 618.

⁵⁹ Leslie, *Synthetic*, p. 188.

⁶⁰ Hargrave, ‘Solar Vision’, unpaginated.

reduction of organicist thought to one of its variants'.⁶¹ Hargrave's economic critique is riddled with antisemitic attitudes. Does antisemitism also permeate his organicist thought? Conclusively to establish whether there are strong continuities between the vitalist imagination and the antisemitism of *Summer Time Ends* would entail further research into possible links between the politicised Neo-Vitalism of the Kibbo Kift and the Green Shirts, and antisemitism in 1920s and 1930s Britain. This is beyond the scope of this study. Nonetheless, in discussing Hargrave's vitalist engagement with synthesis, through which he envisaged an industrial-financial instrumentalisation of vibrant matter, we should be vigilant as to how such questions may have resonated with reactionary movements in 1930s Europe.

~

Armstrong numbers *Summer Time Ends* among a cluster of novels that exemplify what he calls 'Social Credit modernism'. These novels, he argues, all share a 'Social Credit style', characterised by 'a modernist inheritance that is experimental but non-formalist in basis, preoccupied with communication rather than the word as such'. Works of social credit modernism 'investigate distributed points of view, with a range of experience and communication across classes which is [...] unusual in 1930s literature'; and they share 'a fascination with ideas of solar productivity and natural increase'.⁶² *Summer Time Ends* has an experimental form, best considered as a tactic adopted in pursuit of Hargrave's political objectives for social credit. In the extensive draft promotional material for the novel, Hargrave insists:

I am not a novelist.

I am using the novel as one of several weapons that may be employed (i) to do away with the present Bedlam social-economic system, and (ii) to establish a Sane Economic System in its place.⁶³

Summer Time Ends is a 'vertical section through the social-economic pyramid of England [...] viewed over a period of one year', in which 'Events happening in different parts of the same English industrial village are presented together in time'.⁶⁴ Hargrave uses a 'Symphonic

⁶¹ Anne Harrington, *Reenchanting Science: Holism in German Culture from Wilhelm II to Hitler* (Princeton, NJ: Princeton University Press, 1996), xxi; Gordon, 'Organicism', p. 341.

⁶² Armstrong, 'modernism', pp. 50, 54-55.

⁶³ Hargrave, 'SUMMER TIME ENDS: Not a Novelist', Hargrave Papers, Box 46, File 5, unpaginated.

⁶⁴ Hargrave, 'Special Notes (A): "SUMMER TIME ENDS"', Hargrave Papers, Box 46, File 5, pp. 1-6 (p. 2); Hargrave, 'MODERN LITERATURE COMES OF AGE', Hargrave Papers, Box 46, File 5, pp. 1-2 (p. 1).

Technique’ to weave between alternating threads of narrative, creating ‘an impression of spatially separated events happening together at one and the same time’.⁶⁵ To the same purpose, *Summer Time Ends* elides many capital letters and full stops. Hargrave maintained that full stops and capital letters effect a ‘continual “hold-up” of the reader’s eye’; writing *Summer Time Ends*, he found that ‘full stops at the end of paragraphs were too much of a stop – too emphatic’, and that likewise, ‘large initial letters had the effect of breaking the flow’. He accordingly conceived of a ‘typographical convention’ that aimed to allow ‘the interlacing of phrase-patterns in such a way as to give an impression’ of simultaneous action.⁶⁶ The contrapuntal literary form of *Summer Time Ends* might then be read as an effort to show a ‘distributed collectivity’ of characters from various social classes, acting together in time.⁶⁷ In an early plan for the novel, Hargrave projected that this panoply of voices and sequences should be braced by four key refrains:

- (a) Radio dance band
- (b) Refrain of the Machines
- (c) Chorus of Unemployed
- (d) Antiphon of War Dead⁶⁸

In its final form, *Summer Time Ends* resonates with many more choruses. Hargrave perceived a drawback in linear narrative from the point of view of the social credit propagandist – a limitation of attention to serial events relating to a narrow group of characters, foreclosing representation of ‘the flow of [...] varied life’, and the socio-economic structures directing that flow.⁶⁹ By grappling with this ‘time problem’ in *Summer Time Ends*, Hargrave aimed to overcome a formal obstacle to his ‘desire to encompass an economic reality’ in literature.⁷⁰ In its multiple viewpoints, attention to collectives, and invocation of nonhuman entities – such as haunted field-telephones (‘we’re here’), radios (‘*pip, pip, pip*’), cars (‘by-pass – tarring – 45 30’), factory machines (‘sol, tex-tex’), and river-gods (‘plunge in and become flood’) – *Summer Time Ends* also invites approach as a literary expression of Hargrave’s Neo-Vitalism, which was, as I have demonstrated, an important influence for his politics.⁷¹ Here, words spoken by human characters are situated amidst an array of nonhuman voices. In *Summer Time Ends*, then, Hargrave

⁶⁵ Hargrave, ‘Special Notes (A)’, p. 5; Hargrave, ‘Notes on The Typographical Set-Out of “SUMMER TIME ENDS”’, Hargrave Papers, Box 46, File 5, pp. 1-3 (p. 3).

⁶⁶ Hargrave, ‘Typographical’, pp. 1-3.

⁶⁷ Armstrong, ‘modernism’, p. 56.

⁶⁸ Hargrave, ‘Special Notes (A)’, p. 2.

⁶⁹ Hargrave, ‘MODERN LITERATURE’, p. 1.

⁷⁰ *Summer*, p. 126; Armstrong, ‘modernism’, pp. 55-56.

⁷¹ *Summer*, pp. 26, 194, 658, 43, 799.

gives literary form to his proposals that all matter – living and non-living, organic and inorganic, natural and industrial – is animate. Nowhere is this vitalist modernism more apparent than in the novel's approach to synthetic and semi-synthetic materials.

Summer Time Ends is sensitive to affinities between substances – or what Vanessa Agard-Jones calls ‘chemical kinship’.⁷² It enquires into how matter may be scanned as a network of chemical arrangements. Synthetic materials are in one sense a result of this affective stance. Evan Hepler-Smith has described how early in the twentieth century, chemists created reference works in which chemicals were listed ‘on a substance-by-substance basis’, and represented ‘in terms of molecular identity: a specific set of atoms linked by a specific network of bonds’. Such texts, he continues, were designed ‘to support the growth of the synthetic chemicals industry’. They promoted ‘the development of new chemical products’ by allowing scientists ‘to search for promising chemicals in the library as well as the laboratory’. A ‘proliferation of new chemical substances’ ensued.⁷³ *Summer Time Ends* confers a distinctive sense that during the 1930s industrial synthesis was triggering ‘a dissolving from the bonds of known nature’, with significant affective consequences, with certain philosophical implications, and with both utopian and dystopian practical possibilities.⁷⁴ The narrator invites readers to heed chemical affinities between humans, plants and artificial substances:

what do you think George was? just One Big Lump of Animal Impulse? no subtle nuances?

what do you think a tree is? just a tree? no delicate soltex chemistry?

George too simple to be interesting?

no intricate mental alchemy?⁷⁵

The narrator draws attention to biochemical structures and energies at work across all organisms and, through this awareness, elaborates an ‘anti-anthropocentric worldview’.⁷⁶ Here, synthetic classificatory regimes do not imply the industrial domination of nature. Rather, the narrator uses ‘soltex chemistry’ as a figure for ‘subtle’ chemical kinships between diverse life-forms and

⁷² Vanessa Agard-Jones, in ‘Ep. #35 – Vanessa Agard-Jones’, (podcast), *Cultures of Energy: The Energy Humanities Podcast*, Center for Energy and Environmental Research in the Human Sciences, 29 September 2016, <goo.gl/zgc19z> [accessed 14 September 2020].

⁷³ Evan Hepler-Smith, ‘Molecular Bureaucracy: Toxicological Information and Environmental Protection’, *Environmental History*, 24.3 (2019), 534-60 <doi:10.1093/envhis/emy134>, pp. 538-39.

⁷⁴ Leslie, *Synthetic*, p. 180.

⁷⁵ *Summer*, p. 598.

⁷⁶ Botar and Wünsche, ‘Introduction’, p. 2.

substances.⁷⁷ In *rayon*, technology is embedded in plant life, just as the biological, instrumentalised, accedes to the technological. This is a synthesis not only of matter, but also of categories of thought. George too is a

delicate biometallurgic structure
he is a living lump of Soltex

Hargrave does not specify exactly which elements of George's biochemistry mark him out as 'living [...] Soltex'.⁷⁸ Nonetheless, in this passage, an awareness of the chemical make-up of an artificial substance informs a biocentric orientation towards the world, attentive to chemical kinships between taxa, and between organic and synthetic matter. Indeed, knowledge of synthetic chemistry arguably forms the very basis of this biocentrism. Here, it is possible to detect synthetic technology effecting 'changes in the medium of contemporary perception' in 1930s England.⁷⁹

Hargrave was also alert to the potential military applications of industrial chemistry. Powerful chemical cartels shaped the geopolitical tensions of the 1930s. Organisations such as IG Farben and Imperial Chemical Industries built a 'system of increasingly state-integrated, rationalized, and internationalized capitalism', reaching a 'climactic stage' during the Second World War, when these industries incorporated inextricably with the 'war-making machineries, collectivities and powers of the modern state'.⁸⁰ Hargrave writes uneasily of an 'interminable tangle of industrial-financial interlocking agreements':

merging, extending, combining – combining, extending, merging...
and then doubt-spasm (anxiety?) – what was really happening? [...] combining,
extending, merging⁸¹

Summer Time Ends is also anxious about the 'New Chemical Warfare' – that the 'Next War will be an Air War waged with gas and other chemical means of destruction'.⁸² It responds to how under

⁷⁷ *Summer*, p. 598.

⁷⁸ *Summer*, p. 734.

⁷⁹ Benjamin, 'Reproduction', p. 172.

⁸⁰ Steven Weisenburger, *A Gravity's Rainbow Companion: Sources and Contexts for Pynchon's Novel* (Athens: University of Georgia Press, 2006), pp. 58-59.

⁸¹ *Summer*, p. 338.

⁸² *Summer*, pp. 492, 498.

these industrial, technological and political conditions, an awareness of synthetic chemistry and its wide-ranging applications might provoke terror. Leslie describes how in the First World War, ‘the very air had become a resource for explosives, as nitrogen was snatched from the atmosphere and processed’. 1930s advances in synthetic technology extended the domain from which chemicals might be ‘snatched’, refined, and put to lethal use – making synthetic rubber, synthetic gunpowder, or nerve gases.⁸³ The systematic militarisation of modern chemistry effected a horrifying inversion of Hargrave’s vitalist enthusiasm for biochemical homologies. Here, synthetic technology is of interest not because it suggests ‘blood-relationship and atomic-kinship’ between humans and nonhumans, but rather because it promises new opportunities for profit and political domination.⁸⁴ With knowledge – however vague – of how chemistry interacted with modern power structures, it became possible to trace, or to suspect, new and threatening associations between everyday things and the instruments of war.

Michelle Murphy has recently observed that we are ‘living in a historic moment when life on earth unevenly shares [a] condition of already having been altered by human-made chemicals [...] a historically new form of life that is altered by the chemical violence of capitalism and colonialism’.⁸⁵ *Summer Time Ends* is not about toxic slow violence, but it is keenly aware of the chemical industry as a set of infrastructures, and of what Leslie has called ‘[c]hemistry enmeshed in the fatal logic of war and competition’.⁸⁶ Discussing this deadly integration, the narrator of Thomas Pynchon’s *Gravity’s Rainbow* identifies ‘Plasticity’s central canon’: chemists ‘were no longer to be at the mercy of Nature. They could decide now what properties they wanted a molecule to have, and then go ahead and build it’. Indeed, Pynchon’s meditation on affect and paranoia in *Gravity’s Rainbow* suggests a stance from which to read *Summer Time Ends* – a novel which likewise, though less reflexively, stages leaps of the mind from ‘the different Technologies’ through to the arcane ‘interlocks’ of a ‘ruling elite’.⁸⁷ Both books explore the cultural effects of the cartelisation of political, industrial and military power. In *Summer Time Ends*, synthetic materials register as traces of these power structures, and they often introduce an anxious mood into the text. Here, modern chemistry’s transformative powers alter not only the physical environment, but also cognitive relations with it, activating awareness of how materials encode multiform potentials in their molecules. Harding can read these codes, and with his fluency in

⁸³ Leslie, *Synthetic*, p. 169.

⁸⁴ Hargrave, ‘Exposition’, p. 281.

⁸⁵ Murphy, ‘Alterlife in the Ongoing Afterlives of Chemical Exposure’, *Michelle Murphy*, <bit.ly/2CaltDC> [accessed 20 September 2020].

⁸⁶ Leslie, *Synthetic*, p. 16.

⁸⁷ Thomas Pynchon, *Gravity’s Rainbow* (London: Vintage, 2013; 1973), pp. 296-297, 617.

the ‘language of chemicals’ dreams a new alchemy – to borrow a phrase from a commentary on synthesis from the 1930s USA, he shifts ‘the atoms in their lattices [...] [creating] stuffs that nature herself forgot to make’.⁸⁸ This is not just the ‘material itself [...] speaking and revealing’.⁸⁹ Other voices are at work. Not content with learning the language of chemistry, the synthesist invents new grammars and vocabularies. When this knowledge is put to the service of industrial capitalism, molecules are inscribed with, and inscribe, dominant forms of social organisation.

Hargrave found that cellulose was an apt medium through which to articulate a modern vision of vitalism. He also imagined how chemical cartels might harness its destructive potential:

cotton is a compound of carbon, hydrogen, and oxygen, called cellulose. The explosive forming the basis of smokeless powder used in guns of all calibres is made by the action of nitric acid on cotton. This action converts cellulose into a compound called nitrocellulose⁹⁰

The novel registers the chemical proximity of organic cellulose, Soltex, and nitrocellulose, also known as smokeless gunpowder or guncotton. A partially-redacted passage in a working manuscript of *Summer Time Ends* reads:

which hand will you have – left or right?
~~right? pair of soltex stockings for Jenny~~
~~left? war material~~⁹¹

Which reads, in the final version:

which hand will you have – left or right?
 Right? Superfine Ladies Hose (sun beige) for Jenny
 Left? Death in the Dug Out

⁸⁸ Leslie, *Synthetic*, p. 58; G. Edward Pendray, *The Book of Record of the Time Capsule of Cupaloy* (East Pittsburgh, PA: Westinghouse Electric and Manufacturing Company, 1939), quoted in Altman, ‘Time-Bombing’.

⁸⁹ Leslie, *Synthetic*, p. 67

⁹⁰ *Summer*, p. 313.

⁹¹ Hargrave, “SUMMER TIME ENDS”, (manuscript), Hargrave Papers, HARGRAVE 1/1-7, unpaginated.

Here, commercial and political motives determine the uses to which synthetic technologies are put. This brings organic life, textiles, and lethal weapons into new imaginative proximity; it becomes possible for the narrator to associate cotton plants and rayon stockings with smokeless gunpowder, and thereby with the fissile political atmosphere of 1930s Europe. His anxiety feeds on the potential uses of industrial synthesis:

finely knitted on 300-needle machines, court sole and Cuban heel: all the above can be supplied in kangaroo, gunmetal, tropique and sirocco or the dyes converted into – Death ⁹²

Meanwhile, Harding dreams of synthetic rayon:

suppose I showed the Soltex people how to produce rayon without any of their viscose acetate processes [...] that, as a matter of fact, it is possible to produce rayon filaments without using woodpulp or cotton?

[...]

they'll go on making rayon from woodpulp or cotton or the stalks of weeds, but it never seems to occur to them that there's no need to employ the process of vegetational photosynthesis to build up sunlight into the required substance ⁹³

He envisions 'cellulose direct from solar-energy' – 'real soltex', 'straight from the sun'. As I have discussed, for Harding true synthesis represents not only a technical feat, but also the possibility of wholesale social reform. He never manages to 'extract cellulose out of sunbeams' – waylaid by a lack of funding, and suffering from mental illness, he commits suicide.⁹⁴ But as he chases his grail, he regales his lab assistant with fantasies of the coming synthetic utopia:

we've done them in! raw materials – sunlight – the spectrum! do you know what we've done? we've revolutionised the whole world – we've changed the life of mankind! we've ushered in the Age of Solar Power!

[...]

⁹² *Summer*, p. 313.

⁹³ *Summer*, pp. 174-78.

⁹⁴ *Summer*, pp. 178-79.

if we can get cellulose direct from light – from daylight – how long will it be before we can get anything – everything? We’re dangerous to them, Watkins – damn dangerous! their hole-and-corner world of combines and financial jiggery-pokery is done for – swept away – we’ve flooded it with light – sunlight!⁹⁵

In *They Can’t Kill the Sun*, Hargrave predicts a ‘New Man – the Solar man – soon to become a reality here on this earth, here in Britain’.⁹⁶ In *Summer Time Ends*, however, solar synthesis does not catalyse alternative forms of social organisation. Rather than presenting readers with a utopia enabled by futuristic technology, Hargrave places just such a technology in the context of 1930s Britain, as imagined through the ideology of the social credit movement. This allows him to show capitalist economic organisation inhibiting the emancipatory potential of synthetic technology – that, as Harding puts it, ‘they’re afraid... all they want are tinkering little improvements – gadgets. They hate the big thing – the idea that would change the face of the earth: that would scrap all their machines, all their processes’. Dismayed by failure and taking refuge in grievance, Harding accuses prominent capitalists of starving his research of funds, in order to preserve themselves from its potential consequences.⁹⁷ Unlike Harding, the narrator perceives that relations between capitalism and transformative technologies may be structured less by opposition, than by assimilation.

The society of *Summer Time Ends* is determined by an economic system organised around cycles of conflict, so that any newly-developed technology will be militarised. The narrator imagines how those who play the ‘financial game’ might respond to Harding’s projected technology:

soltex direct from the sun
 no pulp forests, no pulp cotton plantations
 rayon made from the rays of the sun
 if Harding can do that – have you thought what it means?
 more and cheaper stockings for Jenny – Irene, Etty, Lily?
 it means the Solar War!
 it means that men will hurl chunks of chemically reconstructed sunlight at each other
 it means that essential war supplies cannot be held up
 the sun shineth on the righteous and the unrighteous

⁹⁵ *Summer*, pp. 780-81.

⁹⁶ Hargrave, ‘Solar Vision’, unpaginated.

⁹⁷ *Summer*, p. 174, 782.

Harding hated war... and because he hated it, he put it out of his mind and went on
with his work
and his work was war-work: the use of sun-energy
real Soltex⁹⁸

The narrator imagines the assimilation of solar-synthetic technology into the 1930s military-industrial complex. Harnessing ‘sun-energy’ will not catalyse social reform, but rather instigate a new form of ‘war-work’. The imbrication of solar-synthetic technology with military-industrial capitalism forges new associations between sunlight and deadly weapons:

and when we consider the gigantic complex of the Jordans Combine, its linkages with
the I. G. Farbenindustrie, with the Cohn-Funck Mitteleuropa Stahlwerke: the Goliath
Steel Corporation (U. S. A.), the Ioto textile group, the Elihu-Speidlehus-Funck
international finance organisation, the Ropp-Krantz (chemical) interests, the
peardrop smell and the drowsy (ave one, Jenny?)
when we see the sun with healing in his wings
with tearing gutripping death in his glance
little moving pools of sunflicker in Waistcoat Wood
upspiriting in blazing javelin-splendour behind the chemical works
anxiety... anxiety?
[...]
sing, dynamo, hum: S-O-L
T-E-X spells – Death!⁹⁹

The phrase ‘the peardrop smell and the drowsy hum’ recurs throughout *Summer Time Ends* as a refrain, imbuing the text with the olfactory and aural atmosphere of the Soltex mills.¹⁰⁰ In the excerpt above, this refrain is spliced with a fragmentary quotation from an earlier episode – Jenny’s mother bringing her peardrops. Here, odour tells of a chemical’s distribution across domestic and industrial environments, eliciting unsettling associations between these spheres. To register such connections, and to respond with unease, is to experience what we might call a ‘synthetic *unheimlich*’; or, after Mark Fisher, a ‘synthetic weird’. By noticing chemical affinity where one expects categorical difference, one becomes aware of the long reach of the synthetics

⁹⁸ Hargrave, ‘Solar Vision’, unpaginated; *Summer*, pp. 614-15.

⁹⁹ *Summer*, pp. 615-16.

¹⁰⁰ See *Summer*, pp. 169, 482, 517.

industry; its scope to reorganise matter. By ascribing affinity to sweets, rayon textiles, and a prospective military technology, the narrator imagines industrial chemistry's powers to 'determine the properties of molecules', and the multiple purposes to which synthesis may be put – from confectionary to explosives.¹⁰¹ One is reminded that things may be read according to their chemical properties, as well as their habitual uses; and one is alerted to the extent to which a capitalist instrumentalisation of chemical taxonomy re-conditions experience in the dawning age of industrial synthesis. This pattern of compositional binding finds its way into Hargrave's language: 'gutripping', 'upspiriting', 'sunflicker' and 'javelin-splendour' might be approached as synthetic kennings.¹⁰² Recalling the retro-futurism of the Kibbo Kift, Hargrave here glances to Old English verse forms, reaching for archaic patterns in language to craft a form adequate to express emerging regimes of industrial production and material formation. The names of the cartels are likewise compounded – yoked together, as though with molecular bonds, by hyphens and brackets.

In Fisher's sense, the weird is 'that *which does not belong*. The weird brings to the familiar something which ordinarily lies beyond it'; it is 'a signal that the concepts and frameworks which we have previously employed are now obsolete'.¹⁰³ To sense synthetic affinities is to encounter, but not necessarily to understand, continuities between familiar domains and withdrawn power structures. *Summer Time Ends* detects chemical kinships between domestic and deadly phenomena, making partially visible their incorporation into the cartelised machinery of military-industrial capitalism, and prompting paranoid, anxious responses. Like *Coming Up for Air*, *Summer Time Ends* registers a pivotal moment in industrial history, and senses a creeping occupation of the familiar by the synthetic. It also marks how the industrial implementation of synthetic technology implies new proximities between disparate spheres, such as textiles and explosives, or home and the battlefield. Through 'soltex direct from the sun', the synthetic weird expands its range, infiltrating not only trace chemicals, but also sunlight.¹⁰⁴

When the narrator envisages the militarisation of solar-synthetic technology, 'little moving pools of sunflicker in Waistcoat Wood' acquire new malevolence.¹⁰⁵ In his 1990 book *The End of Nature: Humanity, Climate Change and the Natural World*, Bill McKibben observes that smog 'breeds

¹⁰¹ Leslie, *Synthetic*, p. 17.

¹⁰² *Summer*, pp. 615-16.

¹⁰³ Fisher, *The Weird and the Eerie* (London: Repeater, 2016), pp. 10, 13.

¹⁰⁴ *Summer*, p. 614.

¹⁰⁵ *Summer*, p. 616.

spectacular sunsets', remarking that an awareness of the composition of this residual glow changes 'the meaning that beauty carries'. A sunset, once evocative of celestial cycles independent of human activity, smoulders through an industrial atmosphere, so that 'we see, or think we see, many things beyond a particular arrangement of orange and purple and rose'.¹⁰⁶ In *Summer Time Ends*, technological awareness likewise reconditions perception of natural phenomena. The narrator can no longer perceive sunlight simply as sunlight. The prospect of 'real Soltex' triggers an involuntary sense of light's new status as a raw material for lethal technology. This creates new sources for, and forms of, anxiety; a phobic awareness, particular to dawning experiences of a world rendered unfamiliar by modern industrial chemistry. The correspondence in the above passage between sunlight, 'chemical works', and 'gutripping death' would be inconceivable without Hargrave's imagined advances in synthesis.¹⁰⁷

This technological anxiety is also a vehicle for the novel's social credit politics, and so for its antisemitism. Here, synthetic technology is assimilated into a 'gigantic complex' of unscrupulous financial and industrial concerns.¹⁰⁸ The representation of this complex, in turn, replicates antisemitic stereotypes concerning Jewish influence in finance. Hargrave deploys an imagined form of chemical phobia as an incitement to the politics of social credit. Because this politics is encoded with prejudice, the novel's phobic and paranoid response to synthetic technology can be read as latent with wider reactionary discourses in 1930s Britain. *Summer Time Ends*, like *Coming Up for Air*, shows how the particular forms of synthetic consciousness that developed in 1930s Britain locked into wider sets of cultural anxieties, which both informed and were informed by unstable notions of the 'organic' and the 'artificial', utopias and dystopias.

¹⁰⁶ Bill McKibben, *The End of Nature: Humanity, Climate Change and the Natural World* (London: Bloomsbury, 2003; 1990), pp. 65-66.

¹⁰⁷ *Summer*, pp. 615-16.

¹⁰⁸ *Summer*, p. 615.

PART TWO

Agrichemical Imaginaries in 1960s England

3. 'Some unseen nature'

J.G. Ballard's 'Storm-Bird, Storm-Dreamer'

J.G. Ballard's 1966 short story 'Storm-Bird, Storm-Dreamer' unfolds in the aftermath of a 'biological accident'. Set in a Norfolk backwater, it concerns the local effects of a global avian mutation event triggered by the use of synthetic 'growth promoters' on crops. In the affectless and impersonal tone that is characteristic of Ballard's writing, the narrator conveys the recollections of an East Anglian farm labourer called Crispin, describing 'the extraordinary and unforeseen effects on the bird life', which play out over a period of several years. Crispin remembers how after farmers first applied the chemicals, fields were 'covered with the dead bodies of gulls and magpies'. Three years later, 'cormorants and black-headed gulls had wing spans of ten or twelve feet, strong bodies and beaks that could slash a dog apart'. Gliding 'low over the fields as Crispin drove his tractor under the empty skies, they seemed to be waiting for something'. The next year, 'a second generation of even larger birds appeared':

sparrows as fierce as eagles, gannets and gulls with the wing spans of condors. These immense creatures, with bodies as broad and powerful as a man's, flew out of the storms along the coast, killing the cattle in the fields and attacking the farmers and their families. Returning for some reason to the infected crops that had given them this wild spur to growth, they were the advance guard of an aerial armada of millions of birds that filled the skies over the country. Driven by hunger, they began to attack the human beings who were their only source of food.

A 'battle against the birds all over the world' ensues, the outcome of which remains uncertain to readers.¹ The story is restricted in scope, tarrying in the intertidal marshlands where Crispin has taken refuge, and following his psychic responses to his altered circumstances. In Ballard's alarming vision, agrichemicals trigger profound ecological transformations, which in turn exert unnerving pressures upon the human mind.

In this chapter, I situate 'Storm-Bird, Storm-Dreamer' in the historical context of 1960s Britain. During this decade, a distinctive nonfiction discourse about agrichemical toxicity, with

¹ Ballard, 'Storm-Bird, Storm-Dreamer', in Ballard, *Short Stories*, II, p. 179 (hereafter 'Storm').

an explicitly activist focus, emerged in Britain, responding both to local concerns and to Carson's widely influential book *Silent Spring*. Like these nonfiction texts, 'Storm-Bird, Storm-Dreamer' attunes its readers to 'unforeseen effects' that can result from the dispersal of synthetic toxicants – but unlike these books, it does not argue overtly against the use of such chemicals.² During the early 1960s, Ballard worked for the journal *Chemistry & Industry: The Journal of the Society of Chemical Industry*. As we shall see, Ballard's writing in 'Storm-Bird, Storm-Dreamer' owes more to technical articles about pesticides published in this magazine than to environmentalist writing about toxicity. In 'Storm-Bird, Storm-Dreamer', I suggest, Ballard is not concerned with how toxicity gives rise to new political urgencies, but is rather interested in how to represent the erosion of human agency, whether individual or collective, by emergent ecological forces. Throughout his body of work, Ballard repurposes the neutral tones of 'invisible literature' – a term he coined to describe texts such as 'market research reports, pharmaceutical company house magazines [...] [and] US government reports'.³ In what follows I discuss how in 'Storm-Bird, Storm-Dreamer', he uses this artistic technique to create a literary form that registers some of the defining moods of late capitalist ecological experience: passivity, helplessness, unease. I then consider this literary method in relation to some recent critical conversations about the challenges that the destabilised worlds of the Anthropocene pose to fictionalised representation. I shall also argue, drawing on a recent article by Nixon, that 'Storm-Bird, Storm-Dreamer' troubles 'the distinction between speculative nonfiction and speculative fiction', combining fantastical subject matter with the distinctive premonitory moods that characterised British writing about agrichemical toxicity in the 1960s.⁴

~

In his 1980 monograph on peregrine falcons, *The Peregrine Falcon*, the ornithologist Derek Ratcliffe describes a macabre situation in rural Britain during the late 1950s and early 1960s. Conservation agencies received 'numerous reports from various arable districts [...] throughout the country, of large numbers of wild birds found dead'.⁵ Looking back on these disturbing mortalities in 1965, the journalist John Coleman-Cooke recalled how 'long letters from land-owners, bird-watchers or members of the general public, who had seen carcasses around the

² 'Storm', p. 179.

³ Ballard, 'Quotes', in *Re/Search: J.G. Ballard*, ed. by V. Vale and Andrea Juno (San Francisco: V/Search, 1984), pp. 154-64 (p. 156).

⁴ Nixon, 'All Tomorrow's Warnings', *Public Books*, 13 August 2020, <bit.ly/31ficwz> [accessed 14 September 2020].

⁵ Derek Ratcliffe, *The Peregrine Falcon* (London: T & AD Poyser, 2000; 1980), p. 324.

countryside', had 'poured into the bird societies'.⁶ The Royal Society for the Protection of Birds (RSPB) and the British Trust for Ornithology (BTO) responded by publishing four investigative reports, between 1961 and 1964. They concluded that the cause of the mysterious deaths was 'freshly sown seed', treated with organochlorine insecticides, 'left scattered on the soil surface', where foraging birds ate it.⁷ Researchers developed a new terminology for the unprecedented ecological phenomena related to the increasingly widespread use of organochlorines (particularly dieldrin), and the deleterious effects on wildlife (particularly birds). A 'kill' described a lethal poisoning, mass or singular, as event and as aftermath.⁸ The first RSPB/BTO report, from 1961, records fifty-nine kills in twenty-two counties; the second, from 1962, three hundred and twenty-four in forty-four.⁹

Though prompted by public concerns, the RSPB/BTO reports were technical documents intended for circulation within conservation organisations and government departments, and so were 'soundproofed' from a broad public audience.¹⁰ I shall discuss Ballard's creative engagement with similarly insular texts later in the chapter. First, I will describe how an alternative 'toxic discourse', aiming to address and to give voice to wider constituencies, began to take shape in Britain in the early 1960s.¹¹ Such texts offer insights into shifts in the public perception of agrichemical toxicity at this time, allowing for a granular location of 'Storm-Bird, Storm-Dreamer' within specific historical, cultural and literary contexts. In 1963, *Silent Spring* was published in Britain. 'Never before or since', as Ralph Lutts summarises, 'has a book been so successful in alerting the public to a major environmental pollutant, rooting the alert in a deeply ecological perception of the issues, and promoting major public, private, and governmental initiatives to correct the problem'.¹² Carson showed her readers a 'never-ending stream of chemicals of which pesticides are a part':

⁶ John Coleman-Cooke, *The Harvest that Kills: An Urgent Warning about Man's Use of Toxic Chemicals on the Land* (London: Odhams Books Ltd., 1965), pp. 70, 72.

⁷ Ratcliffe, *Peregrine*, p. 324.

⁸ See Coleman-Cooke, *Harvest*, p. 70; also Ratcliffe, 'The Status of the Peregrine in Great Britain', *Bird Study*, 10.2 (1963), 56-90 <doi:10.1080/00063656309476042>, p. 73.

⁹ S. Cramp and P.J. Conder, *The deaths of birds and mammals connected with toxic chemicals in the first half of 1960: Report No. 1* (London: RSPB/BTO, 1961), quoted in Coleman-Cooke, *Harvest*, p. 74; Cramp, Conder and J.S. Ash, *Deaths of birds and mammals from toxic chemicals: Report No. 2* (London: RSPB/BTO in collaboration with the Game Research Association, 1962), quoted in Coleman-Cooke, *Harvest*, p. 74.

¹⁰ Steingraber, *Downstream*, p. 18.

¹¹ Lawrence Buell, 'Toxic Discourse', *Critical Inquiry*, 4.3 (1998), 639-65 <doi:10.1086/448889>.

¹² Ralph H. Lutts, 'Chemical Fallout: *Silent Spring*, Radioactive Fallout and the Environmental Movement', in *And No Birds Sing: Rhetorical Analyses of Silent Spring*, ed. by Craig Waddell (Carbondale and Edwardsville: Southern Illinois University Press, 2000), pp. 17-41 (p. 17).

chemicals now pervading the world in which we live, acting upon us directly and indirectly, separately and collectively. Their presence casts a shadow that is no less ominous because it is formless and obscure, no less frightening because it is simply impossible to predict the effects of lifetime exposure to chemical and physical agents that are not part of the biological experience of man.¹³

The historian J.F.M. Clark has uncovered how *Silent Spring* arrived into a 'British context of [...] pre-existent fears for pesticides and other toxic chemicals'. As well as the dieldrin crisis, the early 1960s witnessed two toxic events related to fluoroacetamide, a poison developed in the Second World War as a chemical weapon, and subsequently used as a pesticide for insects and rodents. In the Welsh town of Merthyr Tydfil, one pony and between seventy-five and one hundred cats and dogs were 'accidentally poisoned'. In the Kentish village of Smarden, a toxic spill killed pets, working dogs, livestock and wildlife. Unfolding alongside the organochlorine controversy and coinciding with the publication of *Silent Spring*, the fluoroacetamide episodes, in particular the Smarden affair, drew widespread media attention. Clark argues that they 'provided a forum for the expression of growing anxieties' about agricultural chemicals, fuelling a 'nationally significant indictment of pesticides in the English landscape'. The organochlorine poisonings, the fluoroacetamide episodes, and the publication of *Silent Spring* 'combined to "galvanise" nascent toxic and environmental consciousness' in British cultures of place.¹⁴

During this period, a range of British constituencies, including scholars, writers and activists, began to apprehend and articulate what appeared to be a 'new age of toxicity', sensing a 'deep alteration' brought about by the lethality and 'extreme latency' of chemicals routinely released into their surroundings.¹⁵ As Carson put it, organisms were now 'required somehow to adapt' to 'chemicals totally outside the limits of biologic experience'.¹⁶ In *Slow Violence and the Environmentalism of the Poor*, Nixon observes that activist-writers engaging with industrial toxicity must 'plot and give figurative shape to formless threats whose fatal repercussions are dispersed across space and time':

¹³ Rachel Carson, *Silent Spring* (London: Penguin, 2000; 1962), p. 168 (hereafter *Spring*).

¹⁴ Clark, 'Pesticides', pp. 301, 304-05, 301, 297.

¹⁵ Brett L. Walker, *Toxic Archipelago: A History of Industrial Disease in Japan* (London: University of Washington Press, 2010), xi; Liboiron, Tironi and Calvillo, 'Toxic politics', p. 332.

¹⁶ *Spring*, p. 24.

The representational challenges are acute, requiring creative ways of drawing public attention to catastrophic acts that are low in instant spectacle but high in long-term effects. To intervene representationally entails devising iconic symbols that embody amorphous calamities as well as narrative forms that infuse those symbols with dramatic urgency.¹⁷

Ronda has written of how Carson, reckoning with these challenges, depicts 1960s America as a gothic landscape where ghastly toxic entities stalk unsuspecting citizens.¹⁸ I shall discuss Carson's representative techniques in detail in Chapter Seven. Here, I mention them only because a cluster of British nonfiction writers drew upon *Silent Spring's* contaminated atmospheres, similarly characterising toxic chemicals as lurking antagonists. Ruth Harrison's influential 1964 book *Animal Machines*, for which Carson wrote a foreword, projects a toxified vision of immunised insects, defenceless crops and poisoned people. In his 1965 polemic *The Harvest that Kills*, Coleman-Cooke suggests that pesticides possess an 'eerie anti-life quality' that might be 'dredged from the extra-planetary unconscious of H.P. Lovecraft'. A 'creeping death' spreads across the Earth; the 'time may not be very far distant', he writes, when 'our whole planet is besmeared with a film of chemical residue'.¹⁹ Imaginatively extending and intensifying ongoing toxic effects into the near future, these writers aimed to activate concern in their readers, and thereby to spur them to take political action. The texts also emphasise that toxicity sows more obscure futures, persistently suggesting that many of its long-term eventualities remain to be seen. Such potential changes are only partially sensible; divined in slow-moving biochemical processes, still in their early stages, their outcomes imperceptible but latent in time. Carson had written that it is 'impossible to predict the effects of lifetime exposure to chemical and physical agents that are not part of the biological experience of man'.²⁰ Coleman-Cooke likewise warns that toxicity introduces 'new and disturbing factors into the human situation, the consequences of which cannot at this stage be foreseen'; Harrison observes that it 'is going to take many generations even to begin to form a picture of what tolerance is permissible in man before noticeable breakdowns occur'.²¹ Taken together, the texts convey a sense that in the early 1960s, in Britain and in the USA, toxicity foreboded impending but unforeseeable 'effects', 'factors' and

¹⁷ Nixon, *Slow Violence*, p. 10.

¹⁸ See Ronda, *Reminders*, p. 47.

¹⁹ Coleman-Cooke, *Harvest*, pp. 120, 125, 173.

²⁰ *Spring*, p. 168.

²¹ Coleman-Cooke, *Harvest*, p. 23; Ruth Harrison, *Animal Machines: The New Factory Farming Industry* (London: Vincent Stuart, 1964), p. 132.

‘breakdowns’; it had the potential to revolutionise ‘biological experience’.²² Reading them today, in the midst of ongoing and accelerating ecocide and climate crisis, it is difficult not to feel some affinities with this imaginative position – to identify it as an early iteration of the dread that grips contemporary experience of what has since been named the Anthropocene. While Carson, Coleman-Cooke and Harrison warned their readers about the probable future effects of certain toxic materials, at times combining ‘vivid futuristic writing with credible projections constrained by science’, they did not enter imaginatively into worlds beyond the scope of reasonable prognostication.²³ In ‘Storm-Bird, Storm-Dreamer, however, Ballard embraced the uncertainty of emergent toxicity as a creative opportunity.

~

In her recent article “‘Resurrected from its Own Sewers’: Waste, Landscape, and the Environment in J.G. Ballard’s 1960s Climate Fiction’, Rachele Dini explores how in his ‘climate trilogy’ – *The Drowned World* (1962), *The Drought* (1965) and *The Crystal World* (1966) – Ballard ‘approaches ecological catastrophe as a narrative problem, exploring physical and psychological transformations generated by anthropogenic and natural disasters’. In these novels, radical environmental changes – a warming climate and rising seas; the encasement of the sea in a synthetic membrane; a plague of rapidly duplicating crystals – create conditions in which technological and natural phenomena intermingle and ‘breed new hybrid forms’.²⁴ Placing characters in the midst of mutating landscapes, Ballard explores how the inhabitants of late-stage capitalism might respond psychologically to such changes. Brian Baker observes that in many disaster narratives, ‘a group of men and women survive in an apocalyptic scenario and comfortingly (even heroically) retain a grasp on conventional social and cultural values’; writing in 1973, Brian Aldiss famously called this trope the ‘cosy catastrophe’.²⁵ Ballard shuns this convention. Rejecting the label ‘disaster stories’, he preferred to think of his narratives as

²² *Spring*, p. 168; Coleman-Cooke, *Harvest*, p. 23; Harrison, *Machines*, p. 132.

²³ Nixon, ‘Warnings’.

²⁴ Rachele Dini, “‘Resurrected from its Own Sewers’: Waste, Landscape, and the Environment in J.G. Ballard’s 1960s Climate Fiction’, *ISLE: Interdisciplinary Studies in Literature and Environment*, 0.0 (2019), 1-22 <doi:10.1093/isle/isz003>, p. 19.

²⁵ Brian Baker, ‘The Geometry of the Space Age: J.G. Ballard’s Short Fiction and Science Fiction of the 1960s’, in *J.G. Ballard: Contemporary Critical Perspectives*, ed. by Jeannette Baxter (London: Continuum, 2008), pp. 11-22 (p. 15); Brian Aldiss, *Billion Year Spree: The History of Science Fiction* (London: Weidenfeld and Nicholson, 1973), p. 293.

‘transformation stories’.²⁶ Here, characters psychically adapt, voluntarily or involuntarily, to emergent realities, which unfold despite efforts at mitigation. In Ballard’s transformation stories the future does not, as Donna Haraway puts it, ‘remain at stake’.²⁷ There is no scope for averting planetary changes through collective political action; nor are readers shown preferable futures composed from the ruins of capitalism. Earth systems and matter forms simply shift. These shifts may have anthropogenic causes, but ultimately elude control. In such conditions, Ballard implies, there is no choice but to shed prior forms of identity and categories of thought, and engage with the ‘imaginative possibilities represented by the disaster’.²⁸ Unlike *Silent Spring*, *Animal Machines* and *The Harvest that Kills*, the climate trilogy are not works of ‘what Joyce called “kinetic art”, produced in particular political and cultural circumstances with a particular aim, to sway an audience into action’.²⁹ Rather, as Dini writes, they envision catastrophe after the fact, imagining a ‘radical shift: even if humankind survives, it will have been fundamentally altered [...] by its new relationship to the material world’. Ballard’s ecological consciousness is then ‘less interested in rehabilitating the devastated environment than in meeting it on its own terms, and exploring the stories generated therein’, asking ‘what new ways of being might emerge from the destruction of reality as we know it’.³⁰

Ballard’s science fiction is often described as more concerned with what he called ‘inner space’ than with outer space.³¹ As Andrzej Gasiorek suggests, he approached sf as ‘a way of exploring and perhaps coming to terms with the unprecedented scale of twentieth-century social and technological change’.³² His works, Dini writes, rehearse the ‘convergence of material landscape and dream, physical world and psyche’, often emphasising the oneiric impressions of new technological phenomena. The ‘central conflict in *The Drowned World*’, she observes, ‘revolves around competing visions of how to occupy [its] new context’.³³ Similarly, in ‘Storm-Bird, Storm-Dreamer’, characters undergo unsynchronised and divergent mental responses to the birds –

²⁶ Ballard, in ‘1975: James Goddard and David Pringle, An Interview with J.G. Ballard’, in *Extreme Metaphors: Selected Interviews with J.G. Ballard, 1967-2008*, ed. by Simon Sellars and Dan O’Hara (London: Fourth Estate/HarperCollins, 2012), pp. 81-98 (p. 90).

²⁷ Donna J. Haraway, *Staying with the Trouble: Making Kin in the Chthulucene* (London: Duke University Press, 2016), p. 55.

²⁸ Ballard, in ‘1984: Peter Rønnov-Jensen. Against Entropy’, in *Extreme Metaphors*, ed. by Sellars and O’Hara, pp. 199-210 (p. 202).

²⁹ Fisher, ‘why I want to fuck ronald reagan’, in Fisher, *K-Punk: The Collected and Unpublished Writings of Mark Fisher (2004-2016)*, ed. by Darren Ambrose (London: Repeater, 2018), pp. 47-51 (p. 50).

³⁰ Dini, ‘Resurrected’, pp. 14, 4-5.

³¹ Ballard, ‘Time, Memory and Inner Space’, in Ballard, *A User’s Guide to the Millennium: Essays and Reviews* (New York: Picador, 1997), pp. 199-201 (p. 200).

³² Andrzej Gasiorek, *J.G. Ballard* (Manchester: Manchester University Press, 2005), p. 9.

³³ Dini, ‘Resurrected’, pp. 4, 7.

hybrid beings, created through the intersection of evolutionary biology and industrial chemistry. The story begins offshore, in the creeks and inlets of an East Anglian saltmarsh. Crispin lingers in a decaying 'picket ship', 'one of the hundreds of old coastal freighters hastily converted to duty when the first flocks of giant birds appeared two years earlier'. He has fought off a 'white armada' of birds; their bodies drape the marshes like a 'wet quilt'. From this position, he spies on Catherine York, a 'white-haired woman' who lives in a house at the edge of the marsh, as she gathers feathers from the corpses. Initially, Crispin clings to martial structures of thought, even sending a message about his battle with the birds to 'the district officer at the station twenty miles away' in the hope he 'might receive a medal or some sort of commendation'.³⁴ If Crispin is, at least at first, 'temporally displaced and redundant', his militarism burdening him with a 'conception of time that is no longer valid', Catherine rapidly develops an imaginative system for her new reality.³⁵ Throughout the story, to Crispin's bemusement, and for reasons withheld from readers until the ending, she builds a structure of mysterious purpose – variously described as a 'pyre' or a 'nest' – out of white feathers.³⁶

In Ballard's stories, characters are powerless to prevent their mental transformations. As David Punter remarks, the 'long tradition of unitary subjectivity comes to mean less and less to him as he explores the ways in which person [sic] is increasingly controlled by landscape'.³⁷ A fugue state may take root, Ballard writes elsewhere, 'like a lingering disease in the interstices of its victim's lives, in the slightest changes of habit and behaviour'.³⁸ Crispin undergoes this kind of realignment, haunted, despite a conviction in his 'authority over the birds', by a subconscious obsession with the new avian paradigm, which brings about his dissolution as a socialised subject. He first feels a 'sense of identity' with birds when, peering at submerged corpses, he finds that 'their washed faces in the water looked [...] like those of drowned dolphins, almost manlike in their composed and individual expressions'. This sense of affinity with nonhuman beings sets in motion an involuntary internal transformation: 'dreams of the giant birds [...] filled the moonlit skies of his sleep'. One night, merging with Crispin's reflection in 'darkened glass', a 'huge white face, beaked like his own, swam into his image. As he stared at this apparition, a pair of immense white wings seemed to unfurl themselves from his shoulders'. Crispin comes face to face with a dove outside his window. Dutifully, he kills it, but an 'obsession with the dead bird'

³⁴ 'Storm', pp. 177, 175, 174, 177.

³⁵ Jim Clarke, 'Reading Climate Change in J.G. Ballard', *Critical Survey*, 25.2 (2013), 7-21 <doi:10.3167/cs.2013.250202>, p. 11.

³⁶ 'Storm', p. 186, 191.

³⁷ David Punter, *The Hidden Script: Writing and the Unconscious* (London: Routledge, 1985), p. 9.

³⁸ Ballard, 'Myths of the Near Future', in Ballard, *Short Stories*, II, pp. 602-34 (pp. 606-07).

sets in; he eviscerates the body, and wears its ‘hollow carcass [...] over his head and shoulders’.³⁹ Here, as Jim Clarke suggests of the climate trilogy, ‘civilisation recedes to the status of a memory, and existence comes to be dominated and defined by the environment and its monothematic transformation’.⁴⁰

Dini concludes her article by declaring that Ballard ‘renders ecological catastrophe nightmarishly, beautifully, and electrifyingly palpable’.⁴¹ This phrase recalls Nixon’s enquiries into ‘the quandary of how to give sensory definition to the unimaginable’.⁴² Similarly, Murphy has analysed the methods with which, throughout the twentieth century, ‘scientists and laypeople came to render chemical exposures measurable, quantifiable, assessable, and knowable’. The ‘ability to register chemical exposures as existent’, she observes, resulted from ‘specific historical practices and technologies’, which in turn led to the imposition of what she calls ‘regimes of perceptibility’. Nixon and Murphy assess how specific representative techniques – whether literary or scientific – make toxic materials and their effects perceptible ‘in some ways and not others’.⁴³ Both describe how these techniques can be used to conceal toxic harm, resulting in a ‘violent invisibility’; and they discuss how this invisibility can be countered.⁴⁴ We might here recall the 1960s nonfiction texts I discussed earlier, which introduce readers to toxicity as a new lived reality, expose the industrial networks that determine this reality, and urge activism in pursuit of change. By contrast, while Ballard makes a toxified world ‘palpable’, he does not do so in order to expose and critique ecologically damaging agricultural methods.⁴⁵ Rather, he feeds the theme of toxicity into his habitual narrative and imaginative machinery. Fisher neatly observes that Ballard’s oeuvre works over a ‘limited repertoire of fixations’, ‘re-permutating the same few themes’, and that a Ballardian narrative typically follows a ‘well-defined sequence, whose stages can be readily enumerated’. As disaster takes hold, characters find ‘eagerly savoured opportunities to relax civilisation’s impulse control and neutralising of affect’; they subsequently move psychologically deeper into an ‘intensive zone beyond – outside – standard perceptual thresholds’. ‘Storm-Bird, Storm-Dreamer’ approximates this arc; while Crispin resists rather than embraces psychological change, he nonetheless ‘finds himself drawn into a *logic* he is compelled

³⁹ ‘Storm’, pp. 182, 190, 181, 187, 188, 190.

⁴⁰ Clarke, ‘Climate’, p. 7.

⁴¹ Dini, ‘Resurrected’, p. 20.

⁴² Nixon, *Slow Violence*, p. 160.

⁴³ Murphy, *Sick Building Syndrome and the Problem of Uncertainty: Environmental Politics, Technoscience, and Women Workers* (Durham, NC: Duke University Press, 2006), pp. 9-10.

⁴⁴ Nixon, *Slow Violence*, p. 160.

⁴⁵ Dini, ‘Resurrected’, p. 20.

to investigate'.⁴⁶ Ballard's narrative techniques, then, generate their own 'regimes of perceptibility'.⁴⁷ In 'Storm-Bird, Storm-Dreamer', toxicity operates as a trigger mechanism for intensive environmental and psychic transformations. This allows Ballard to activate his core themes: like the climate trilogy, 'Storm-Bird, Storm-Dreamer' demands an imaginative realignment, calling readers to consider how even 'the most comfortable, settled, and stable world [...] can be pulled apart'.⁴⁸

Adrian Tait suggests that Ballard's approach may be politically limited: 'so complete a transformation leaves no room for a detailed social or economic critique'.⁴⁹ Dini concurs that Ballard's eco-catastrophe texts 'are certainly not an environmentalist call to arms – Ballard does not appear to think that humans can learn from their mistakes'.⁵⁰ The lack of an evident 'political teleology' in Ballard's writing can be linked to his interest in the neutral formal procedures of what he called 'invisible literatures':

scientific journals, technical manuals, pharmaceutical company brochures, think-tank internal documents, PR company position papers — part of that universe of published material to which most literate people have scarcely any access but which provides the most potent compost for the imagination.⁵¹

Ballard described himself as a 'voracious reader' of such texts.⁵² His 1970 experimental novel *The Atrocity Exhibition* contains a chapter called 'Why I Want to Fuck Ronald Reagan', which, Ballard explains, presents itself as a 'psychological position paper on [Reagan's] subliminal appeal, commissioned from some maverick think-tank' (Reagan was at this time governor of California).⁵³ This document, as Fisher comments, lacks 'any clear designs on the reader', and has 'no implicit but flagged attitudes and opinions'; 'defined by its flatness', it simply plays out.⁵⁴ Like the scientific articles in which Ballard was 'immersed' during his six years working for *Chemistry*

⁴⁶ Fisher, 'space, time, light, all the essentials – reflections on j.g. ballard season (bbc four)', in Fisher, *K-Punk*, pp. 43-45 (pp. 43-44).

⁴⁷ Murphy, *Syndrome*, p. 10.

⁴⁸ Adrian Tait, 'Nature Reclaims Her Own: J.G. Ballard's *The Drowned World*', *Australian Humanities Review*, 57 (2014), 25-41 <bit.ly/2DYczqu> [accessed 14 September 2020], p. 31.

⁴⁹ Tait, 'Nature', pp. 37-38.

⁵⁰ Dini, 'Resurrected', p. 20.

⁵¹ Fisher, 'reagan', p. 50; Ballard, 'J.G. Ballard', in *The Pleasure of Reading*, ed. by Antonia Fraser (London, Bloomsbury, 1992), p. 94.

⁵² Ballard, 'Ballard', p. 94.

⁵³ Ballard, *The Atrocity Exhibition* (London: Fourth Estate, 2014; 1969), p. 170.

⁵⁴ Fisher, 'reagan', p. 50.

↳ *Industry* – of which more shortly – it proceeds in ‘language scoured of emotion’.⁵⁵ ‘Storm-Bird, Storm-Dreamer’ is written in a similarly impassive register. For example, the narrator reports that after repelling an attack, Crispin ‘moved through the shattered fields [...] filled with the stripped skeletons of cattle and pigs, finishing off the wounded birds that lay there’.⁵⁶ Here, there is no indication of a desired or expected response from readers. Nor may we sense Crispin’s feelings. It seems more helpful to interpret this excerpt by considering that which is absent from it, rather than present in it; as Fisher asks, ‘what does “Ballard” want the reader to feel [...]?’ It is unclear’.⁵⁷ Every day the tide casts a ‘fresh freight’ of dead birds onto the shore, ‘but now that they were decomposing their appearance, except at a distance, was devoid of any sentiment’.⁵⁸ Ballard uses the passive voice – characteristic of the ‘empiricist repertoire’ of scientific reports – to describe the impressions that the corpses make on Crispin.⁵⁹ By way of this technique, Crispin appears less as an emotionally active subject than as a kind of recording device for his shifting environment. While this passage concerns perceptions of a ‘wave of stranded material’, Ballard’s syntax implies the marginality of the one who senses, rather than that which is sensed.⁶⁰ Lacking power to shape his circumstances, Crispin reacts to uncanny forces set astir by the widespread distribution of new chemical agent.

In this world, agency is not a human property, but is dispersed throughout intersecting infrastructures and ecosystems. As Dini has suggested, Ballard’s seething assemblages evoke ‘what Bruno Latour terms “actants” – matter with agential potential – and what New Materialists such as Jane Bennett, Maurizia Boscagli, and Susan Morrison (among others) have termed the “vibrant” or “unruly” quality of seemingly inert things’.⁶¹ Imagining chemicals and birds imposing new behavioural limits, Ballard extends narrative influence to nonhumans. In ‘Storm-Bird, Storm-Dreamer, people do not master the landscapes they inhabit, but are shaped by them, even as they seek clumsily to control them. Ballard’s subject matter here asks particular questions of literary method. In his important 2016 book *The Great Derangement*, Amitav Ghosh argues that by deploying the ‘techniques of a modern novel’, writers inevitably construct an ‘illusion [...] that humans have freed themselves from their material circumstances’, foreclosing

⁵⁵ Ballard, quoted in Mike Bonsall, ‘J.G. Ballard’s Experiment in Chemical Living’, *Ballardian*, 1 August 2007, <bit.ly/2H9ALH4> [accessed 14 September 2020]; Nixon, *Slow Violence*, p. 169.

⁵⁶ ‘Storm’, p. 180.

⁵⁷ Fisher, ‘reagan’, p. 50.

⁵⁸ ‘Storm’, p. 177.

⁵⁹ Randy Harris, ‘Other-Words in *Silent Spring*’, in *No Birds*, ed. by Waddell, pp. 126-56 (p. 131).

⁶⁰ Þóra Pétursdóttir and Bjørnar Olsen, ‘Theory adrift: The matter of archaeological theorizing’, *Journal of Social Archaeology*, 18.1 (2018), 97-117 <doi:10.1177/1469605317737426>, p. 98.

⁶¹ Dini, ‘Resurrected’, p. 6.

literary engagement with the geophysical shifts of the twentieth and twenty-first centuries. Ghosh proposes that fiction took a ‘turn’ at ‘a certain time in the countries that were then leading the way to the “Great Acceleration” – a turn away from depictions of systems and collectives, and towards an ‘individualizing imaginary’, through which fiction became ‘radically centred on the individual psyche’.⁶² The individualizing imaginary tells stories compatible with the ambient “‘regularity of bourgeois life’”. It does not countenance such aberrant phenomena as cyclones, mutation events, or other ‘forces of unthinkable magnitude’. ‘Within the mansion of serious fiction’, Ghosh claims, ‘connections and events on this scale appear not just unlikely but also absurd’. The Anthropocene, he argues, ‘consists of phenomena that were long ago expelled from the territory of the novel’, and so it presents a ‘form of resistance, a scalar one’, to what he identifies as the dominant representative strategies of contemporary fiction.⁶³ Ghosh never satisfactorily explains why he does not admit sf into the domain of the ‘modern novel’ – let alone the ‘mansion’ of ‘serious fiction’. Leaving this aside, his analysis of what ‘the novel’ excludes offers a way of thinking about Ballard’s work. In Ballard’s sf, characters reckon with ‘insistent, inescapable continuities, animated by forces that are nothing if not inconceivably vast’ – entities that ‘communicate, with marvellous vividness, the uncanniness and improbability, the magnitude and interconnectedness of the transformations that are now underway’.⁶⁴

‘Storm-Bird, Storm-Dreamer’ has nothing of the ‘individualizing imaginary’.⁶⁵ Here, Ballard stages how an extreme earth-systemic mutation might eliminate the possibility of ‘individual moral adventure’.⁶⁶ At the end of the story Crispin, clad in the dove’s carcass, attempts to perform a ‘symbolic flight’ towards Catherine’s house, and thereby to ‘free’ not only her, ‘but himself as well, from the spell of the birds’. He manages briefly to transform himself into a ‘speeding glider’ – until Catherine shoots him.

Half an hour later, when she saw that he had died, Catherine York walked forward to the twisted carcass of the dove and began to pluck away the choicest plumes, carrying them back to the nest which she was building [...] for the great bird that would come one day and bring back her son.⁶⁷

⁶² Ghosh, *Derangement*, pp. 60, 161, 79, 135, 78.

⁶³ Ghosh, *Derangement*, pp. 58, 63, 61, 63.

⁶⁴ Ghosh, *Derangement*, pp. 60-61, 63, 62, 73.

⁶⁵ Ghosh, *Derangement*, p. 135.

⁶⁶ John Updike, ‘Satan’s Work and Silted Cisterns’, *The New Yorker*, 17 October 1988, quoted in Ghosh, *Derangement*, p. 77.

⁶⁷ ‘Storm’, pp. 191-92.

Throughout ‘Storm-Bird, Storm-Dreamer’, the narrator voices Crispin’s thoughts and experiences, filtering these through a sterile mode of expression. After Crispin’s death, the narrator registers no shock or trauma, but mechanically switches focus, beginning dispassionately to report on Catherine’s activities, and on her psychic responses to the debilitating changes in her environment. Ballard’s writing, as Fisher argues, expresses the ‘collapse of individual subjectivity and the failure of collective political action’ under the conditions of late capitalism.⁶⁸ Redeploying techniques from ‘invisible literatures’, he uses impersonal narrators and reactive characters to imply that in a world defined by increasingly powerful and uncontrollable structural forces, personal agency obsolesces, such that the individualizing imaginary becomes untenable as a narrative conceit.⁶⁹ Here, he uses these methods speculatively to explore some ‘untheorized new forces’ as they emerge during the 1960s: global agrichemical dispersal infrastructures, and their residues.⁷⁰

Like the climate trilogy, ‘Storm-Bird, Storm-Dreamer’ is characterised by its ‘desistance from critiquing industrial modernity’, operating as a ‘disinterested forensic examination[] of what may be’.⁷¹ Tait proposes that Ballard’s neutral descriptions of physical and psychic transformations prompt ‘the question of what we want “cli-fi” to mean’. Is literary engagement with anthropogenic environmental upheaval ‘by definition “overtly political”’? If so, a Ballardian eco-catastrophe text seems ‘maladapted, its message obscure, its characters often strikingly passive’.⁷² Ballard presents processes of ecological change as unstoppable, beyond the scope of reparative action. His ecological imaginary hereby comes into friction with some strands of contemporary critical discourse around the Anthropocene, which stress the importance of forming alternative narratives to industrial intensification and socioecological collapse. Haraway, for example, claims that ‘another world is not only urgently needed, it is possible, but not if we are ensorcelled in despair’: in order to establish ecologically healthy futures, it is first necessary to be convinced that they are feasible.⁷³ From Haraway’s position, Ballard’s eco-catastrophe texts read as defeatist, foreclosing the possibility of effective mitigation of ecological destruction. However, might a text

⁶⁸ Fisher, ‘reagan’, p. 49.

⁶⁹ Ballard, ‘Ballard’, p. 94.

⁷⁰ Jameson, ‘Periodizing’, p. 208.

⁷¹ Dini, ‘Resurrected’, pp. 1-2.

⁷² Tait, ‘Nature’, p. 38.

⁷³ Haraway, *Staying*, p. 51.

like ‘Storm-Bird, Storm-Dreamer’ be ‘both radical and provocative precisely because it steps outside the considerations that shape’ some contemporary cultures of the Anthropocene?⁷⁴

Ballard does not urge readers to ‘limit the destruction we call Anthropocene and protect the Holocene entanglements we need to survive’.⁷⁵ However, he does respond to the socioecological instability of the Great Acceleration by ‘inventing new practices of imagination’, enquiring into the cognitive influence of mid-twentieth century western industrial society, and imagining what psychic effects might ensue from its collapse.⁷⁶ Given that in his texts such collapses are often, as Fisher writes, ‘greeted by the characters as opportunities, chances to shuck off the dull routines and processes of sedentary society’, we might now return to the question of whether Ballard glosses over the structural issues at the heart of anthropogenic ecological disasters.⁷⁷ Does he marginalise such political concerns, instead finding in ecological catastrophe a mere prompt for characters to stir from their white bourgeois inertia, go on a ‘neuronic odyssey’, and, in some cases, discover ‘forgotten paradises’?⁷⁸ His eco-catastrophe texts refrain from explicitly critiquing destructive industrial systems, and invite readers to take vicarious pleasure in characters’ departures from behaviour consistent with, as Ballard puts it, ‘the civilized human beings we imagine ourselves to be’.⁷⁹ However, they also make other imaginative demands. They stage interactions between twentieth century technologies, systems of capital accumulation and earth systems, and tacitly induce readers to situate themselves in relation to these intersecting forces.

Jedediah Purdy has recently suggested that the ‘human species is remaking the planet as an integrated piece of global infrastructure – in its artificial carbon and nitrogen cycles, climatic patterns, energy flows, biodiversity, and skin of roads, farmland, and settlements’. This ‘planetary infrastructure’, he observes, operates under its own internal momentum; though it has been brought into being through human activity, it is ‘unremitting in its command over its inhabitants’. Purdy proposes that the primary political challenge of the twenty-first century is to construct institutions that are capable of rendering this infrastructure – which he also describes as a ‘collective technological exoskeleton’ – ‘nondestructive’. In Ballard’s scenarios, it is too late to issue such calls to action. The ‘exoskeleton’ has passed beyond human control.⁸⁰ Indeed, we

⁷⁴ Tait, ‘Nature’, p. 38.

⁷⁵ Anna Lowenhaupt Tsing et al., ‘Introduction: Haunted Landscapes of the Anthropocene’, in *Arts of Living on a Damaged Planet*, ed. by Tsing et al. (Minneapolis: University of Minnesota Press, 2017), pp. G1-G12 (p. G2).

⁷⁶ Haraway, *Staying*, p. 51.

⁷⁷ Fisher, ‘what are the politics of boredom? (ballard 2003 remix)’, in Fisher, *K-Punk*, pp. 57-61 (p. 57).

⁷⁸ Ballard, *The Drowned World* (London: Fourth Estate, 2014; 1962), pp. 174-75.

⁷⁹ Ballard, in ‘Reality is a Stage Set: Travis Elborough Talks to J.G. Ballard’, in Ballard, *Drowned*, p. 180.

⁸⁰ Purdy, *Land*, pp. 84, 86-87, 82, 87, 82.

might imagine the birds' outsize stature as a mutant response to late capitalist ideology. Here, biological sensors register demands for expansion inscribed into synthetic 'growth promoters'.⁸¹ This is, then, a tale of growth promotion gone haywire – where 'growth' may signal both a technoscientific quest for ever greater crop yields, and 'the idea of economic growth at the core of the ideologies of the socioeconomic and political systems whose competition marked the twentieth century'.⁸² As such, 'Storm-Bird, Storm-Dreamer' speaks to contemporary Anthropocene discourse as an Anthropocene text *avant la lettre*. This story does not anticipate the concerns of environmental justice scholarship; it does not enquire into toxicity as a condition of unevenly-distributed chemical exposure, and it does not call for political resistance to this condition. However, it does offer insights into a nascent awareness in 1960s Britain of links between late capitalist escalation and ecological degradation, asking readers to orient themselves imaginatively in irrevocably altered geophysical conditions – a prefiguration of the Anthropocene concept that is, perhaps despite Ballard's intentions, inherently politically pointed.

~

In 1935, Benjamin observed that 'through gas warfare the aura is abolished in a new way'.⁸³ In *Synthetic Worlds*, Leslie modifies this suggestion. She proposes by 'hazing up the battlefield', those engaging in chemical warfare do not negate aura, but rather produce 'something akin to aura, a haze [...] this is aura after aura'. This phenomenon, she continues, is not unique to the battlefield, but can also be experienced at other locations where artificial chemical miasmas trouble 'the vista of nature as a place of contemplation'.

The aura of nature does not vanish. Auratic experience remains experience of a peculiar weave of space and time, the experience of distance, and yet, undeniably, natural experience is also technological, industrialized. Aura, the air, the cool breeze on a summer's day, turns toxic, is polluted. We cannot escape it, for it surrounds us and is our world.⁸⁴

⁸¹ 'Storm', p. 179.

⁸² Matthias Schmelzer, *The Hegemony of Growth: The OECD and the Making of the Economic Growth Paradigm* (Cambridge: Cambridge University Press, 2016), p. 1.

⁸³ Benjamin, 'Reproduction', p. 195.

⁸⁴ Leslie, *Synthetic*, p. 226.

‘Storm-Bird, Storm-Dreamer’ registers something akin to this misting of the landscape, in which attention is pulled in contrary directions, whether towards ‘the aura of those mountains, of that branch’, or into awareness of the systems involved in a toxicant’s distribution.⁸⁵ Ballard draws imaginative associations between farming, and incipient geochemical changes:

[Crispin] remembered the first of the new sprays being applied to the wheat and fruit crops, and the tacky phosphorescent residue that made them glimmer in the moonlight, transforming the placid agricultural backwater into a strange landscape where the forces of some unseen nature were forever gathering themselves in readiness. The fields had been covered with the dead gulls and magpies whose mouths were clogged with this silvery gum.⁸⁶

Ballard here depicts a character looking back on ecologically transformative industrial procedures from a position in a radically new world. As I will shortly discuss in detail, this retrospective passage engages something akin to what Nixon, in a recent article about ‘speculative nonfiction, a genre that strives to document the years ahead’, calls ‘anticipatory memory’.⁸⁷ An ‘unseen nature’ lingers, yet fully to emerge, in the chemical residues, recalling Coleman-Cooke’s warnings of ‘consequences [...] which cannot at this stage be foreseen’, and Harrison’s fears of obscure future ‘breakdowns’.⁸⁸ Like the activist nonfiction with which it coincided, ‘Storm-Bird, Storm-Dreamer’ fixates on the unpredictable futures that toxicity portended during the 1960s. Ballard exploits the imaginative potential of this premonitory sensibility, envisaging experiences that ‘do not signal an ecstatic interaction with nature, but nature subjected to toxicity: material passes in and out of [...] the body’, with terrifying effects.⁸⁹

Ballard’s imaginative engagement with the ecological effects of agrichemicals is likely to have been shaped by articles printed in *Chemistry & Industry* in the wake of the publication of *Silent Spring*. He worked for *Chemistry & Industry* between 1958 and 1964. The magazine influenced him imaginatively and, I argue, stylistically:

⁸⁵ Benjamin, ‘Reproduction’, p. 173.

⁸⁶ ‘Storm’, p. 179.

⁸⁷ Nixon, ‘Warnings’.

⁸⁸ ‘Storm’, p. 179; Coleman-Cooke, *Harvest*, p. 23; Harrison, *Machines*, p. 132.

⁸⁹ Leslie, *Synthetic*, p. 229.

Chemistry & Industry [...] was a good place to work because, of course, the office of any scientific magazine is the most wonderful mail drop. It's the ultimate information crossroads. Most of it went straight into the wastepaper basket, but en route I was filtering it like some sort of sea creature sailing with its jaws open through a great sea of delicious plankton. I was filtering all this extraordinary material.⁹⁰

Silent Spring was published in the USA in September 1962. Issues of *Chemistry & Industry* around this time contain numerous references to pesticides, from technical articles about application methods, to polemical pieces defending their use. The October 6 issue contains a notice for the 'Fifth International Pesticide Congress', informing readers that the conference would discuss 'latest developments in pesticide residue analysis', taking 'current problems' into account.⁹¹ Similarly, the October 20 edition has a piece called 'FAO to Hold Conference on Pesticides', mentioning 'possible hazards which can stem from their misuse'.⁹² It seems likely that these conferences were organised as a result of the impact of Carson's work. As I shall further discuss in Chapter Seven, the chemical industry responded to *Silent Spring* with great hostility. The *Chemistry & Industry* edition of October 13 contains an article entitled 'Silence, Miss Carson', which dismisses *Silent Spring* as consisting of 'high-pitched sequences of anxieties' and concludes 'this book should be ignored'.⁹³ Evidently, anyone working for *Chemistry & Industry* in the autumn of 1962 would have been conscious of Carson's arguments in *Silent Spring*, and the chemical industry's unscrupulous attempts to discredit them. Ballard, then, would have been familiar with the 1960s pesticide context not only due to the acute public awareness of toxicity at this time, but also because of his professional life. Still more intriguingly for my purposes, certain details of an article on pesticide distribution techniques in the 10 November issue suggest that here, Ballard may have found 'delicious plankton' and 'potent compost' for 'Storm-Bird, Storm-Dreamer'.⁹⁴

The article is called 'General Requirements of Pesticide Emulsions', and it is by 'J.K. Eaton'. It reports on research into how pesticides might better fulfil 'requirements for maximum biological activity', focusing in particular on how the fluids in which they are diluted when sprayed affect

⁹⁰ Ballard, J.G. 'Ballard: Voiceover Transcription' [transcript of Ballard's commentary in *Shanghai Jim*, dir. by James Runcie (BBC Bookmark, 1991)], *Ballardian*, 27 August 2007, <bit.ly/3jRTYzr> [accessed 7 October 2020].

⁹¹ 'Fifth International Pesticide Conference', *Chemistry & Industry: Weekly Publication of the Society of Chemical Industry*, 6 October 1962, p. 1739.

⁹² 'FAO to Hold Conference on Pesticides', *Chemistry & Industry*, 20 October 1962, p. 1834.

⁹³ William J. Darby, 'Silence, Miss Carson', *Chemistry & Industry*, 13 October 1962, 1782-84 (pp. 1782-83).

⁹⁴ Ballard, 'Voiceover'; Ballard, 'Ballard', p. 94.

lethality. Eaton comments that ‘in general commercial practice today the biological effects of a formulation are perforce left to chance’. He intends to remedy this, suggesting that the ‘physical specification’ of a suspension medium should take into account:

- (1) Coverage of the target;
- (2) Retention of the spray on the target;
- (3) Physical form of the deposit;
- (4) Persistence of the deposit.

Eaton observes that in some cases ‘spray liquid is retained and this remains as a continuous film’; as ‘the spray liquid dries, constrictions occur and the deposit may be distributed in an irregular manner’. A ‘factor of considerable importance is the adherence of the toxicant particles to the sprayed surface, small crystals adhering to surfaces more strongly than large crystals’. As an aside, he notes that the ‘addition of resins [...] can enhance the toxicity of DDT residues, apparently by alterations in the crystal size and shape’.⁹⁵ This enquiry into the adhesive qualities of toxic crystals recalls the ‘tacky phosphorescent residue’ and ‘silvering gum’ that coat crops and clog beaks in ‘Storm-Bird, Storm-Dreamer’ – and it also evokes the fractal topologies of *The Crystal World*.⁹⁶ Still more suggestively, Eaton describes methods ‘for the study of the distribution of toxicants on various surfaces. These include the use of fluorescent dyes’.⁹⁷ Correlations between the phenomena described in ‘General Requirements of Pesticide Emulsions’ and the sticky, luminous toxicants in ‘Storm-Bird, Storm-Dreamer’ suggest the article’s influence on Ballard’s imaginative treatment of agricultural chemicals.

Leslie writes that phosphorescence, ‘from the Greek “I bring light”, is a faint luminosity, continuously emitted, not flashing. It is a phenomenon of transition and is at home in both the organic and inorganic world. It can be found in living and dead matter’.⁹⁸ In their phosphorescence, the chemical residues in ‘Storm-Bird, Storm-Dreamer’ might be imagined as, like the proliferating lapidary forms Ballard describes in *The Crystal World*, ‘neither animate nor inanimate [...] Neither living nor dead’.⁹⁹ Phosphorescence manifests across ‘parallel worlds’ –

⁹⁵ J.K. Eaton, ‘General Requirements of Pesticide Emulsions’, *Chemistry & Industry*, 10 November 1962, 1914-16 (pp. 1915-16).

⁹⁶ ‘Storm’, p. 179.

⁹⁷ Eaton, ‘Emulsions’, p. 1916.

⁹⁸ Leslie, *Synthetic*, p. 97.

⁹⁹ Ballard, *The Crystal World* (London: Fourth Estate, 2011; 1966), p. 89.

‘animal, vegetable, mineral, human, technological, sparking, sparkling, dead and dying’.¹⁰⁰ The chemical deposits left by the ‘new sprays’ in ‘Storm-Bird, Storm-Dreamer’ likewise trouble categorical boundaries, initiating new kinds of biological and social experience.¹⁰¹ Agard-Jones has described how through exposure to pesticides, places and bodies enter into ‘material entanglements with chemical commodity chains’, and are ‘altered by these contacts’. Here, ‘contingent forms of non-life and life are being entwined, as synthetic chemicals embed, accrete, and leave their residue in our bodies’.¹⁰² Murphy similarly observes that the widespread dispersal of synthetic granules, and their subsequent absorption by life-forms, has resulted in the creation of ‘chemically transformed beings’.¹⁰³ The birds in ‘Storm-Bird, Storm-Dreamer’ may be considered as such beings. They resist identification as discretely biological or technological entities – like the ambiguously luminescing chemicals, they inhabit a hybrid state. Directed away from slow ecosystemic metamorphoses by the sudden genomic interventions of synthetic molecules, they attest to the rapid and transformative effects of twentieth-century industrial networks on the biosphere. In the story’s early stages, while the chemicals still lie glowing on the fields, this looming condition remains ‘some unseen nature’ – doubly unseen, both in the sense that it is yet fully to exist; and in the sense that it will come into being through the invisible passage of chemicals into bodies, where they will reshape what Kathleen Jamie calls ‘the unseen landscapes within’.¹⁰⁴

‘Change a ship’s course by one degree, and in a decade, a century, a millennium, that ship will be sailing through entirely different waters. Subtle alterations barely perceptible today could mean profound changes’, writes Rebecca Altman in her landmark 2019 essay on persistent synthetic toxicants, ‘Time-Bombing the Future’. Altman describes how industrial chemicals have ‘altered the biochemical composition of the food web and the interior of the human body [...] These have been swift, sweeping changes over the course of just three or four generations, too quick for the slow-grinding machinery of human evolution to adapt’.¹⁰⁵ ‘Storm-Bird, Storm-Dreamer’ is a prescient imaginative response to the bodily modifications and abbreviated temporalities of chemically-induced mutation. The birds change over three to four years – a period that barely registers in evolutionary timescales. Haraway describes the evolutionary

¹⁰⁰ Leslie, *Synthetic*, p. 97.

¹⁰¹ ‘Storm’, p. 179.

¹⁰² Agard-Jones, ‘Spray’, *Somatosphere: Science, Medicine and Anthropology*, (2014), <bit.ly/2Wx6qIZ> [accessed 14 September 2020].

¹⁰³ Murphy, ‘Regimes’, p. 696.

¹⁰⁴ ‘Storm’, p. 179; Kathleen Jamie, ‘Pathologies’, in Jamie, *Sightlines* (London: Sort Of Books, 2012), pp. 20-41 (p. 34).

¹⁰⁵ Altman, ‘Time-Bombing’.

theorist Lynn Margulis' model of biological change as an indeterminate process unfurling through 'long-lasting intimacy' between life-forms; alterations occur through the 'fusion of genomes in symbioses, followed by natural selection', 'with a very modest role for mutation'.¹⁰⁶ Conversely, in the 'biological accident' that defines 'Storm-Bird, Storm-Dreamer', a 'wild spur to growth' manifests in a shallow temporality, and through widespread and intense mutations.¹⁰⁷ These rapid and worldwide morphological changes result from what Murphy calls a 'chemically recomposed planetary atmosphere' that gives rise to 'new forms of chemical embodiment'.¹⁰⁸

While 1960s activist nonfiction texts look to obscure futures with trepidation, they stop short of giving potential toxic effects a 'physical reality'.¹⁰⁹ In 'Storm-Bird, Storm-Dreamer', Ballard goes further, imagining what such shifts might entail, and writing from this speculative vantage point. The story quietly invites readers to step back from its chemically-altered landscapes into their own worlds, and to consider how here too, forbidding 'forces' might already be 'gathering themselves in readiness'.¹¹⁰ As such, it recalls contemporary speculative nonfiction texts that, as Nixon writes, 'encourage us to feel our way forward into the emergent worlds that our current actions are precipitating'.¹¹¹ By describing future ecological catastrophes in the past tense, as though they have already happened, such texts allude to how the planetary mechanisms drawing these realities into being remain in full operation, despite the warnings of scientists and activists. Nixon is here writing about texts concerned with the destabilisation of the climate, but his terms also apply to contemporary toxic nonfiction. In 'Time-Bombing the Future', for example, Altman's narrator describes human bodies as 'scrolls indelibly marked in fluorocarbons. Like PCBs, they have made us walking, talking time capsules of 20th-century technologies'.¹¹² She here invokes and disrupts a prominent convention in Anthropocene discourse, in which writers envisage a 'hypothetical post-human geologist' probing Earth's strata for future residues of present societies.¹¹³ Inviting her readers to perform an unsettlingly similar imaginative manoeuvre, she prompts them to consider their own bodies as archives for relic toxicants dispersed by past polluting industries. Just as Altman meddles with distinctions between the recent past, the present, and the deep future, the overriding sense in 'Storm-Bird, Storm-

¹⁰⁶ Haraway, *Staying*, p. 60.

¹⁰⁷ 'Storm', p. 179.

¹⁰⁸ Murphy, 'Regimes', p. 696.

¹⁰⁹ Nixon, 'Warnings'.

¹¹⁰ 'Storm', p. 179.

¹¹¹ Nixon, 'Warnings'.

¹¹² Altman, 'Time-Bombing'.

¹¹³ Macfarlane, *Underland: A Deep Time Journey* (London: Hamish Hamilton, 2019), p. 78; see also Nixon, 'Warnings'.

Dreamer' is of what Nixon calls 'a future drenched with the present'.¹¹⁴ While it is superficially about giant mutant birds created through the action of fictional chemicals, the story attunes its readers towards incipient ecological threats in their own world, and their limited capacity to address them. Here, the border between science fiction and speculative nonfiction is thin.

~

Ghosh argues that the branch of science fiction concerned with ecological issues is 'made up mostly of disaster stories set in the future, and that, to me, is exactly the rub. The future is but one aspect of the Anthropocene: this era also includes the recent past, and, most significantly, the present'.¹¹⁵ He quotes from an essay by Margaret Atwood, in which she comments on how science fiction and speculative fiction engage with 'imagined other worlds located somewhere apart from our everyday one: in another time, in another dimension, through a doorway into the spirit world, or on the other side of the threshold'.¹¹⁶ The Anthropocene, observes Ghosh, is not 'an imagined "other" world located apart from ours; nor is it located in another "time" or another "dimension"'. He calls for what might be imagined as climate realism – for narratives 'set in a time that is recognizable as our own', attuned to newly plausible extremes, and that register the complexity of ongoing transformations. I agree with Ghosh that there is a need for literary forms that can adequately describe contemporary political systems and geophysical realities. I also think it is worth further enquiry into how literature might represent experiences of the convoluted stratifications of 'our own' time.¹¹⁷ 'Storm-Bird, Storm-Dreamer' concerns a radical break from the evolutionary temporality that defines the entirety of what Carson calls 'biological experience'.¹¹⁸ It registers a dawning twentieth century imaginary, also present in *Silent Spring*, *The Harvest that Kills* and *Animal Machines*, in which experiences of late capitalism's ecologically disruptive effects generate new forms of temporal awareness. Attention is oriented backwards, towards deep expanses of time in which earth-systems unfolded in ways no longer possible; forwards, towards uncertain ecological and geophysical shifts; and to the present, a time of accelerating, dizzying and traumatic change.

1960s activist nonfiction writers developed 'future-oriented' aesthetic strategies to serve

¹¹⁴ Nixon, 'Warnings'.

¹¹⁵ Ghosh, *Derangement*, p. 72.

¹¹⁶ Margaret Atwood, 'Margaret Atwood: the road to Utopia', *The Guardian*, 14 October 2011, <bit.ly/2W7tvID> [accessed 14 September 2020], quoted in Ghosh, *Derangement*, p. 72.

¹¹⁷ Ghosh, *Derangement*, pp. 72-73.

¹¹⁸ *Spring*, p. 168.

specific political objectives. *Animal Machines*, for example, follows what Ronda calls the ‘temporal logic of the jeremiad’; building upon the work of *Silent Spring*, it seeks to convince readers of the potential for meaningful ecological repair through political action.¹¹⁹ Harrison aims to ‘provoke feelings of dismay, revulsion, and outrage’ throughout ‘the whole fabric of our society’ by portraying toxicants as an indiscriminate menace.¹²⁰ Meanwhile, she insists that less toxic futures are politically and ecologically feasible, balancing her discussions of toxic threats with more optimistic passages. Working to incite both fury and hope in her readers, she seeks to motivate them to protest, and thereby to increase pressure on governments to implement legislative changes. In Chapter Seven, I will discuss in detail how in *Silent Spring*, Carson likewise worked imaginatively to convince her readers that an ecologically healthy world was within political reach. ‘Storm-Bird, Storm-Dreamer’ conspicuously refuses to replicate this reformist toxic politics, and its associated literary imaginaries. Here, powerful inhuman forces, rather than political institutions, ‘mutely direct the fate of the world’.¹²¹ These divergent imaginative approaches to toxicity recall Ronda’s observation that in the early decades of the Great Acceleration, there was a ‘non-synchrony, even friction, between poetry and environmentalist discourse’ in the USA. In her 2018 book *Remainders: American Poetry at Nature’s End*, she contrasts environmentalist polemics with texts that attend to the ‘forms and figures of ecological calamity rather than to narratives of hope’. The 1960s texts that I have discussed in this chapter similarly frame their discussions of toxicity with either appeals to collective action, or evocations of unsettling disasters. Considered from a contemporary vantage point, these imaginative and political tensions allow us to perceive how over time, ‘evolving rhetorics [...] reflect on and shape collective sensibilities around ecological crisis’.¹²² As I shall discuss in detail in later chapters, more recent writing about toxicity has complicated these reformist and apocalyptic imaginaries, emphasising the mundane, lived realities of toxic harm, and the difficulty of overturning polluting systems. We might here consider Thom Davies’ interviews with inhabitants of ‘Cancer Alley’ in Louisiana; or Harkin’s work on the slow violence of nuclear colonialism; or Kerri Arsenault’s recent *Mill Town*, which I will discuss in Chapter Seven, and which describes the cumulative toxification of a working-class town in Maine over several decades.¹²³ Such texts confront readers with details drawn from ‘slow observations’ – the ongoing depletion of wild animal populations, the incremental deaths of trees, or the drawn-out

¹¹⁹ Ronda, *Remainders*, p. 92.

¹²⁰ Carson, ‘Foreword’, in Harrison, *Machines*, vii–viii (viii); Harrison, *Machines*, p. 178.

¹²¹ Purdy, *Land*, xxv.

¹²² Ronda, *Remainders*, pp. 4–5.

¹²³ See Davies, ‘Slow violence’, pp. 6–14; Harkin, ‘Zero Tolerance’, pp. 40–43; *Mill*, pp. 38–46.

effects of debilitating illnesses.¹²⁴ They situate themselves in what Liboiron, Manuel Tironi and Nerea Calvillo call a ‘permanently polluted world [...] characterized by chronic slow disasters’, in which, due to the failure or inadequacy of ‘science-based policy’, it has become necessary to ‘expand the inventory of what politics means and does in late industrialism’.¹²⁵

Unlike these texts, ‘Storm-Bird, Storm-Dreamer’ does not document existing toxic landscapes. Through it draws creatively upon the discourse of 1960s industrial chemistry, it unfolds in an otherworld. As such, it fits Ursula K. Le Guin’s definition of ‘extrapolative’ sf – in which a given science fiction writer will take ‘a trend or phenomenon of the here and now, purify it and intensify it for dramatic effect, and extend it into the future’.¹²⁶ This is, then, a science fiction text with much to tell us about the Anthropocene’s recent past, precisely because it extends its sense of its present into a speculative engagement with futures that, in the 1960s, remained hidden. ‘Storm-Bird, Storm-Dreamer’ complicates Ghosh’s doubts about whether ‘stories set in the future’ can adequately attest to the ongoing ruptures of the Anthropocene.¹²⁷ Reading *Silent Spring*, *The Harvest that Kills*, *Animal Machines* and ‘Storm-Bird, Storm-Dreamer’ today, one may experience a sense of uncanny familiarity with the worlds, both historical and speculative, that they describe. Some of those potential long-term effects that remained mysterious in the 1960s have since manifested, contributing to an intensifying biodiversity collapse. Meanwhile, a new form of toxic obscurity has emerged. As they persist and circulate in earth systems, relic toxicants (like 1940s fluorocarbons) mix with newer synthetic chemicals (like neonicotinoid pesticides), forming a miasma that might be imagined as a churning archive of developments in twentieth and twenty-first century industrial chemistry. Each chemical in this brew ‘changes the behaviors of the others’; this, alongside toxicity’s ‘extreme latency’ and ‘transgenerational effects’, makes it hard to form a clear picture of how toxicants act in ecosystems, and how they will behave in the future.¹²⁸ The current situation, then, resembles the scenarios that Carson, Harrison, Coleman-Cooke and Ballard imagined. While industrial toxicity has not led to the development of invulnerable insects or gigantic birds, it has profoundly altered earth-systems, and social relations with them. Tim Dee describes how on 26 April 1986, when he learned of the Chernobyl disaster, he found his sense of his surroundings transformed: the ‘sky was the same colour as it had been the day before but now was utterly changed’.¹²⁹ A similar sense of emergent

¹²⁴ Davies, ‘Slow violence’, pp. 11-12.

¹²⁵ Liboiron, Tironi and Calvillo, ‘Toxic politics’, pp. 340, 337, 341.

¹²⁶ Ursula K. Le Guin, ‘Introduction’, in Le Guin, *The Left Hand of Darkness* (London: Orion, 2018; 1969), xvii-xxi (xvii).

¹²⁷ Ghosh, *Derangement*, p. 72.

¹²⁸ Liboiron, ‘Redefining’, p. 98.

¹²⁹ Tim Dee, *Four Fields* (London: Vintage, 2014), p. 197.

and ambient threat pervades ‘Storm-Bird, Storm-Dreamer’. Though its events unravel in a world ‘somewhere apart from our everyday one’, this story, with its polluting systems, residual effects and biochemically altered beings, anticipates contemporary ecological conditions.¹³⁰ Indeed, the emerging lexicon of the Anthropocene is deeply preoccupied with crossings to ‘the other side of the threshold’:

Threshold: A ‘tipping point’ can be triggered if human activity pushes a natural system beyond the threshold of its stable state, causing an abrupt and possibly irreversible change in the functioning of the system.¹³¹

Many thresholds have been crossed since the 1960s. It almost seems redundant to report that current levels of atmospheric carbon dioxide are at the ‘highest level since the Pliocene era 3–5 million years ago’, or that ‘the Earth is undergoing the sixth mass extinction in its history’.¹³² In this context, there is a place for unsettling literary texts that blend documentary and fantastical registers, situated in worlds that differ radically from what ‘we think of as normal’.¹³³

¹³⁰ Atwood, ‘Ustopia’.

¹³¹ Atwood, ‘Ustopia’; Laurie Laybourn-Langton, Leslie Rankin and Darren Baxter, *This Is a Crisis: Facing Up to the Age of Environmental Breakdown* (London: Institute for Public Policy Research, 2019), p. 11.

¹³² Laybourn-Langton, Rankin and Baxter, *Crisis*, p. 12.

¹³³ Ghosh, *Derangement*, p. 73.

4. 'Chemical horror'

J.A. Baker's *The Peregrine*

In summer 1971, John Alec Baker set out, 'as he had done hundreds of times in search of peregrines, along the sea wall that stretches along the Dengie, a haunch of land that thrusts into the sea between the estuaries of the River Blackwater and the River Crouch'.¹ To the south lay Foulness island: offshore saltmarsh and scrub. As he crept under vast Essex skies, Baker looked 'towards Foulness, towards the future'. The island had recently been confirmed as the location for a third London airport – a development with ruinous implications for the region's delicate coastal ecosystems. In response, Baker wrote his most explicitly politicised work: a 1971 essay for the *RSPB Birds* magazine, entitled 'On the Essex Coast'. Its narrator, who describes himself as 'the watcher', prowls the Dengie's edge:

seven miles of sea-wall north to south, a great arc of saltings outside it, half a mile of mudflats beyond. An austere place perhaps, withdrawn, some might say desolate. But the silence compels.

The watcher listens to the silence, and hears 'something here':

something more than the thousands of birds and insects, than the millions of marine creatures. The wilderness is here. To me the wilderness is not a place. It is the indefinable essence or spirit that lives in a place, as shadowy as the archetype of a dream, but real, and recognisable. It lives where it can find refuge, fugitive, fearful as a deer. It is rare now. Man is killing the wilderness, hunting it down. On the east coast of England, this is perhaps its last home. Once gone, it will be gone forever. And of course it is doomed.²

Ronda suggests that throughout the second half of the twentieth century, literary texts increasingly enrolled an idea of nature not as an inexhaustible imaginative resource, but as 'that which is fugitive or no longer available'. Both 'On the Essex Coast' and Baker's 1967

¹ Hetty Saunders, *My House of Sky: The Life and Work of J.A. Baker* (Toller Fratrum: Little Toller Books, 2017), p. 130.

² J.A. Baker, 'On the Essex Coast', in Baker, *The Peregrine* (London: William Collins, 2017; 1967), pp. 211-216 (pp. 215, 211, 212).

masterpiece *The Peregrine* may be read as participating in an international and ‘evolving poetic inquiry [...] into the ecological limits and crisis tendencies that come to characterize the Great Acceleration’, investigating the growing ‘indistinction of the anthropogenic and the nonhuman in a globalized age’.³ The narrator of ‘On the Essex Coast’ stumbles upon an artefact – or ecofact – that marks this emergent ambiguity:

a dead, mummified object. It is a red-throated diver so matted and bound with oil as to be almost unrecognisable, the mere torso of a bird. It stinks of oil. It is an atrocity [...] a messenger from the wilderness: now here it has been returned like a crushed and mutilated fugitive thrust back across a frontier.⁴

There is a preoccupation here with thresholds crossed, and with deep and lasting alterations. Latent in the diver’s ‘almost unrecognisable’ corpse, the narrator senses an ‘indefinable essence or spirit’ of nonhuman alterity – which he perceives as a distorted message. This signal has mingled with an indelible trace of the globalised operations of oil extraction, distribution and consumption. Indeed, the sensation of wilderness is here secondary to the apprehension of a violent metamorphosis. Readers first register not a diver, but a ‘dead, mummified object’ – extinguished; remote; an entity twisted into another state. Mummification is the art of preserving a dead body by altering its physical and chemical composition, so that it may endure across wide expanses of time. By referring to mummification, Baker also alludes to afterlives. What legacies, he implicitly asks, does twentieth century industrial society bequeath? How will contemporary activities haunt the ‘vile years to come’?⁵

Baker lived through successive waves of societal, environmental and ecological change in his home region. During the Second World War, the Essex coast was militarised; the area was overflowed by Allied and Nazi warplanes; local factories were targets of bombing raids. The agricultural interior was also transformed: woods were felled and fallow fields sown in order to augment timber and food production.⁶ Post-war decades saw continuing agricultural intensification, and ‘increased development pressure from industry, housing, tourism and transport’.⁷ In ‘On the Essex Coast’ and *The Peregrine*, Baker explores how such shifts ask

³ Ronda, *Reminders*, p. 9.

⁴ Baker, ‘Essex’, pp. 214-15.

⁵ Baker, ‘Essex’, pp. 214, 212, 214, 215.

⁶ Saunders, *House*, pp. 36-41.

⁷ Sean J. Nixon, ‘Vanishing Peregrines: J.A. Baker, Environmental Crisis and Bird-Centred Cultures of Nature, 1954-73’, *Rural History*, 28.2 (2017), 205-26 <doi:10.1017/S0956793317000115>, p. 208.

particular questions of place-minded literature. The phenomenon of ‘stationary displacement’ was not specific to the twentieth century, and nor was it new to English literature.⁸ For example, in early-nineteenth century Northamptonshire, John Clare elegised ‘every bush and tree’ that was ‘levelled’ during enclosure, ruefully chronicling the spread of a ‘desert strange and chill’.⁹ Newer to experience and to literary expression were certain toxic presences in British landscapes, and their devastating ecological effects. Baker registered that these presences and their effects had profound ethical and aesthetic implications.

After finding the diver, the narrator is in shock:

I blunder on across the saltings, in too great a rage to see or hear anything clearly. After a day of peace, I have seen the ineffaceable imprint of man again, have smelt again the insufferable stench of money. A yellow wagtail flits ahead of me, a brilliant torch flaming up into the sun. That at least seems to be still clean, still untainted. Yet who can know what insidious chemical horror may be operating beneath those brilliant feathers?

The narrator cannot escape the traces of industrial systems through which humans and nonhumans are becoming ‘bound’ in new and unsettling ways. The encounter with the diver residually influences his perception of the yellow wagtail, foreclosing the possibility of an ‘untainted’ experience of nature.¹⁰ The contaminated landscapes of mid-twentieth century Britain fostered this kind of perception. Throughout the 1950s and 1960s, Baker stalked wintering peregrine falcons in coastal Essex. He devoted so much time and attention to pursuing them, in part by interpreting the remains of their prey, that he ‘learned to predict their locations’.¹¹ While Baker was tracking falcons, it was becoming possible to read wildlife corpses in another way – as signs of organochlorine poisonings. Sean J. Nixon has shown how mid-century British cultures of birdwatching responded to a ‘crisis of the countryside and coast produced by a distinctive concatenation of forces peculiar to the immediate postwar decades’. He argues that these developments undergirded a ‘sense of profound change and loss in the British countryside’, which became ‘central to the culture of birdwatching’ that was then emerging.¹² As I discussed in Chapter Three, in the wake of the organochlorine kills, the fluoroacetamide poisonings, and the

⁸ Davies, ‘Slow violence’, p. 8.

⁹ John Clare, ‘Remembrances’, in Clare, *John Clare: Poems Selected by Paul Farley*, ed. by Paul Farley (London: Faber, 2007), pp. 35-37 (p. 37).

¹⁰ Baker, ‘Essex’, pp. 214-15.

¹¹ Macfarlane, ‘Afterword’, in Baker, *Peregrine*, pp. 193-209 (p. 193).

¹² Nixon, ‘Vanishing’, p. 208.

British publication of *Silent Spring* in 1963, a ‘nationally significant’ public conversation about agrichemical toxicity took place in Britain.¹³ Meanwhile, ecologists and birdwatchers scrutinised emergent toxic effects with mounting anxiety. A heightening awareness of ecological degradation ‘meant that looking at birds as a recreational pastime was not an innocent activity or untainted simple pleasure. It was a form of observation shadowed by crisis’.¹⁴ This sense of loss was especially pronounced for those who loved peregrines. In his 1963 article ‘The Status of the Peregrine in Great Britain’, Ratcliffe established how peregrines were under threat as ‘secondary victims of agricultural toxic chemicals, through repeatedly taking prey which carried sub-lethal doses and so building up poison in the body, finally to a fatal concentration’. He also identified a correlation between organochlorine residues in eggs, and reduced hatching success.¹⁵ In 1980, Ratcliffe recalled how during the 1960s ‘the impact of the organochlorine insecticides on birds of prey’, and on peregrines in particular, became ‘a cause célèbre in nature conservation’. The ‘Peregrine itself’, he noted, ‘has come to symbolise one of the foremost trends of our time – the relentless domination by Man, the supreme competitor, of the rest of the living world’.¹⁶ To monitor peregrines during the 1960s, not only in Britain but worldwide, was to become aware of their ongoing elimination, and of the political and industrial forces driving this decline. As we shall see, like the ‘watcher’ in ‘On the Essex Coast’, the narrator of *The Peregrine* frequently perceives avian bodies as though contaminated.¹⁷ In this chapter, I consider how *The Peregrine* responds imaginatively to an industrially-induced geochemical shift. It asks how to give literary representation to the ecological effects of newly ubiquitous presences, such as agrichemicals, oil slicks and radionuclides. In doing so, it elides ‘categories for the perception of nature’ conventionally used to describe rural Britain, compounding heterogeneous forms and genres, such as field notation, science fiction and elegy, into an experimental toxic discourse.¹⁸ In what follows, I historicise *The Peregrine* in light of the politicised intersection of industrial toxicity and ecological science during the 1960s. I then consider how Baker borrows ‘regimes of perceptibility’ from science fiction and science nonfiction in order to situate the events and processes described in *The Peregrine* within deep temporal scales.¹⁹ This allows him to indicate the epochal implications of a wide dispersal of persistent synthetic toxicants. I close the chapter by

¹³ Clark, ‘Pesticides’, p. 301.

¹⁴ Nixon, ‘Vanishing’, p. 222.

¹⁵ Ratcliffe, ‘Status’, pp. 73, 76.

¹⁶ Ratcliffe, *Falcon*, p. 5; Ratcliffe’s reading of *The Peregrine* may have informed this observation.

¹⁷ Baker, ‘Essex’, p. 211.

¹⁸ Macfarlane, ‘Afterword’, p. 196.

¹⁹ Murphy, *Syndrome*, p. 10.

enquiring into *The Peregrine* as a traumatised anticipatory elegy, asking how to grieve for species and ecosystems.

~

Ratcliffe recalls how as a result of intensifying anxieties about toxicity in 1960s Britain, the scientific work of observing and recording ecological phenomena was invested with new political meaning. Following two international conferences on the ecological effects of pesticides in 1965, scientists launched coordinated campaigns calling for greater legal restrictions on organochlorines. In 1969, the British Government's Advisory Committee on Pesticides and other Toxic Chemicals reviewed the evidence presented by the campaigners, and recommended stronger restrictions. While thoroughgoing organochlorine bans were not implemented until the early 1980s, this course of action nonetheless contributed to the eventual (and ongoing) recovery of British peregrine populations.²⁰ Ratcliffe describes the years preceding the Advisory Committee's decision:

It was not an easy time. Some of us had our first experience of scientists playing politics, and we learned how vicious a vested interest under pressure can be. It was clearly in many people's interests, one way or another, to believe that the wildlife conservationists were talking nonsense, and they left no stone unturned in trying to establish this [...] Some of the toughest opposition came, not surprisingly, from the agrochemical industry's own scientists, but certain members of the Government's agricultural establishment were well to the fore.

The agri-business lobby demonstrated no 'great desire to establish the real truth of the matter': 'They were much more concerned to find evidence to support their own case, and their unhelpful attitudes, delaying tactics and covering up of unpalatable facts made it that much harder for the truth to be found'.²¹ The systematic introduction of pesticides to British landscapes had created substantial income for agrochemical industries. In 1967, annual expenditure on pesticides was estimated at fifteen million pounds, worth roughly three hundred and thirty million today.²² In this context, accurately to observe predatory birds as bodies subjected to lethal contamination by organochlorines – chemicals that Carson had recently

²⁰ Ratcliffe, *Falcon*, pp. 352-53, 334-40; Macfarlane, 'Afterword', pp. 207-09.

²¹ Ratcliffe, *Falcon*, pp. 353-54.

²² Kenneth Mellanby, *Pesticides and Pollution* (London: Collins, 1967), p. 189.

described as potential carcinogens for humans – took on great political and industrial significance.²³ Should the Advisory Committee endorse the work of Ratcliffe and his colleagues and advocate more restrictive controls on organochlorines, substantial flows of capital might be stemmed and diverted. The ‘pesticide apologists’ responded by seeking to warp and obfuscate empirical data to suit their economic purposes, adopting ‘strategies of corporate obfuscation’ that are now a familiar ‘part of the playbook for other industries sued for damages associated with their products: asbestos, oil, silica, tobacco, and most recently opioid pharmaceuticals’.²⁴ They hereby violated the scientific dictum that, as Ratcliffe put it, ‘the validity of a scientific hypothesis or argument is quite unrelated to its relevance to human affairs and value judgments’.²⁵

These words may seem somewhat dated today. As Bruno Latour has perceptively discussed, many scientists have been prompted by climate and ecological crises to ‘acknowledge that they actually do have a politics’, as their networks of instruments produce knowledge which implies the necessity of certain political actions. Ecological and climate scientists identify phenomena that ‘entail a frontal attack on the decisions of many pressure groups, and they bear upon questions of direct interest to billions of humans obliged to change their mode of life’. Latour archly observes that there is no reason for scientists ‘to keep claiming that they are not in the game, as if they were speaking from nowhere and behaving as if they didn’t belong to any earthbound population’.²⁶ As ‘scientists playing politics’, Ratcliffe and his fellow campaigners engaged in an early skirmish of what Latour calls the ‘war’: an ongoing conflict in which powerful institutions, spooked by the possible political implications of data showing that they produce harmful environmental mutations, respond with misinformation, calling upon a ‘whole panoply of communicators, paid experts, and even academics above suspicion’.²⁷ Ratcliffe was alarmed that throughout the campaign for greater legal controls on pesticides,

Tactics at times resembled those of the courtroom rather than the scientific debating chamber and ‘smear technique’ was openly used. There were tedious arguments about the nature of proof [...] attempts to deny effects of pesticides on wild raptors descended

²³ See *Spring*, pp. 198-99.

²⁴ Ratcliffe, *Falcon*, p. 354; Thomas Beller, ‘Wearing the Lead Glasses’, *Places Journal*, May 2019, <bit.ly/2S09xYE> [accessed 1 September 2020].

²⁵ Ratcliffe, *Falcon*, p. 354.

²⁶ Bruno Latour, ‘On the instability of the (notion of) nature’, in Latour, *Facing Gaia: Eight Lectures on the New Climatic Regime*, trans. by Catherine Porter (Cambridge: Polity, 2017), pp. 7-40 (pp. 31-32).

²⁷ Ratcliffe, *Falcon*, p. 353; Latour, ‘instability’, pp. 9, 27.

now and then into obscurantism [...] Some of the pesticide protagonists actually said that because it was ‘only wildlife’ set against pressing human needs, the acceptable level of proof of cause and effect had to be of an altogether higher order than in a more neutral scientific issue.²⁸

The agri-business lobby registered that in such a case, the ‘*description* of the facts is so dangerously close to the *prescription* of a policy that, to put a stop to the challenges addressed to the industrial way of life, one has to cast doubt on the facts themselves’.²⁹ This episode (which recalls similar, though more vicious, industry attacks on *Silent Spring* and *Animal Machines*) vividly illustrates the changing political philosophy of science in the initial decades of the Great Acceleration. By observing and publicly reporting the toxification of ecosystems in 1960s Britain, one engaged in a politically charged act.

Contemporary work in environmental justice scholarship offers some new ways of historicising and interpreting these events. Davies has recently elaborated on Nixon’s definition of slow violence as a ‘delayed destruction’ that is ‘typically not viewed as violence at all’.³⁰ Slow violence is also, he observes, closely linked to an ‘epistemic violence’ through which certain ‘stories about pollution [...] do not *count*’.³¹ In 1960s Britain, a sustained activist campaign based on diligent scientific research into the harmful effects of toxicants on birds of prey led eventually to bans on a particular class of chemicals. Insofar as this may be read as a representative episode in toxicity’s history, it draws attention to how, as Liboiron, Tironi and Calvillo have recently noted, ‘toxic politics allow the flourishing of some forms of life by defining toxicity through regimes of evidence’.³² In 1960s Britain, peregrines took on narrative, evidentiary and, eventually, legal significance. How ought this story to be approached in light of a pervasive ‘politics of *indifference* about the suffering of marginalized groups’ in toxicity’s broader history, which ‘helps to sustain environmental injustice, allowing local claims of toxic harm to be silenced’?³³ At the end of this chapter, and also in Chapter Seven, I will give closer attention to historiographical fixations on ‘successful’ post-1960s organochlorine restrictions in the Global North. For now, I will provide

²⁸ Ratcliffe, *Falcon*, pp. 353-54.

²⁹ Latour, ‘instability’, p. 25.

³⁰ Nixon, *Slow Violence*, p. 2.

³¹ Gayatri Chakravorty Spivak, “Can the subaltern speak?” revised edition, from the “History” chapter of *Critique of Postcolonial Reason*, in *Can the subaltern speak? Reflections on the history of an idea*, ed. by Rosalind Morris (New York: Columbia University Press, 2010; 1988), pp. 21-80 (p. 37); Davies, ‘Slow violence’, p. 3.

³² Liboiron, Tironi and Calvillo, ‘Toxic politics’, p. 339.

³³ Davies, ‘Slow violence’, p. 13.

a detailed description of the connections between cultures of toxicity in 1960s Britain, and *The Peregrine*; and I will enquire into how these informed Baker's literary experiments.

Baker wrote about industrial toxicity from a specific social and environmental vantage point. As a devotee of the peregrine living in Essex, a county 'under particular pressure from the intensification of agriculture in its rural areas and from demand for land for housing', he had first-hand experience of what Glenn Albrecht calls 'solastalgia': 'a form of psychic or existential distress caused by environmental change'.³⁴ In *The Peregrine*, the narrator recalls the 'neglected, fallen farmland of pre-war years [...] the wild hedges and the glorious wastes of flowering weeds flaming with hawks and finches'.³⁵ As early as 1946, Baker was writing to mourn the loss of this landscape, in this case to new housing developments:

Across the green fields lie long rows
Of the sharp red roofs.
They have built over my childhood dreams,
There is no way back
To the bright fields of my youth.³⁶

By the time he wrote *The Peregrine*, Baker was grappling with another manifestation of late capitalist unhomeliness: the ecological effects of what he called the 'filthy, insidious pollen of farm chemicals'.³⁷ In 'The Status of the Peregrine in Great Britain', Ratcliffe notes that by 1962, peregrines had 'practically disappeared as a nesting species in southern England', an arable area associated with an especially 'copious use of pesticides'.³⁸ John Fanshawe observes that 'when Baker was walking the Essex countryside, persistent pesticides were still paramount in the minds of the newly emerging conservation community as a threat to the birds that occupied the land and seascapes he loved'.³⁹ Baker interacted with this community. He contributed to the records of the Essex Bird Watching Society, and in 1967 wrote a paper on peregrines for the *Essex Bird Report*.⁴⁰ He was also aware of scientific and literary accounts of organochlorine pollution.

³⁴ Nixon, 'Vanishing', p. 212; Glenn Albrecht, 'Solastalgia, a New Concept in Human Health and Identity', *Philosophy Activism Nature*, 3 (2005), 41-55 (p. 43).

³⁵ Baker, *Peregrine*, p. 154 (hereafter *Peregrine*).

³⁶ Baker, 'The Lost Kingdom', in Saunders, *House*, p. 155.

³⁷ *Peregrine*, p. 32.

³⁸ Ratcliffe, 'Status', pp. 65, 74.

³⁹ John Fanshawe, 'Notes on J.A. Baker', in *Peregrine*, p. 17.

⁴⁰ Nixon, 'Vanishing', p. 212; Fanshawe, 'Notes', p. 24.

Baker's library contains Ratcliffe's 'epic monograph' *The Peregrine Falcon*, and a copy of *Peregrine Falcon Populations: Their Biology and Decline*.⁴¹ This latter work, published in 1969, synthesised research presented at the 1965 World Conference on the Peregrine Falcon – one of the important scientific gatherings that I mentioned above. Each of these texts were published years after Baker wrote *The Peregrine*. However, given the multiple references to chemically-induced death and sterility in *The Peregrine* – of which more shortly – we might infer that Baker added them to his library to enrich a prior, active awareness of organochlorine toxicology. It is worth briefly noting that Ratcliffe praised *The Peregrine* as 'remarkable work' and urged peregrine 'enthusiasts' to read it 'for its originality of approach'; Baker and Ratcliffe communicated, though it is uncertain whether their relationship preceded the publication of *The Peregrine*.⁴² Fanshawe suggests 'we can assume that JAB [Baker] must have read *Silent Spring* or been deeply conscious of its impact'; later in the chapter, I will trace affinities between characterisations of toxicants in *Silent Spring* and *The Peregrine*.⁴³ *The Peregrine*, then, may be linked to intersecting ecological, cultural and literary toxic contexts, in which the accurate documentation of toxicity became associated with dissent against 'institutional fictions' promoted by chemical and agricultural industries.⁴⁴

Baker apprehended that in this altered context, nature could no longer be approached as 'untainted' by society, and that this had political consequences for literary approaches to the nonhuman realm.⁴⁵ I do not here mean to suggest that Baker wrote *The Peregrine* primarily and explicitly as a work of protest. It is 'not "green" literature. It suggests no basis for an environmental ethics born of commonality'.⁴⁶ The narrator scans toxified twentieth-century landscapes, but he locks his focus onto old themes: the alterity of nonhuman life, and the extent to which a human may take part in the existence of a wild creature. *The Peregrine's* political energies derive from the new relevance to this ancient subject of industrial toxicity. Pesticides were so widely dispersed that it had become impossible to observe wild animals closely without detecting signs of contamination. Baker recognised this as an unprecedented socioecological mutation, approaching industrial toxicity as a new field of correspondence between humans and nonhumans that raised particular ethical and aesthetic questions. This recognition lends *The*

⁴¹ Fanshawe, 'Notes', p. 17.

⁴² Ratcliffe, *Falcon*, xx-xxi.

⁴³ Fanshawe, email correspondence, 19 June 2019.

⁴⁴ Nathalie Jas, 'The Politics of (In-)visibilisation: Organophosphate Pesticides' acute Toxicity in the 'Trente Glorieuses France', paper presented at *Chemical* workshop, Institute of Advanced Studies and the Department of Geography at UCL, 7 June 2019.

⁴⁵ Baker, 'Essex', p. 215.

⁴⁶ Macfarlane, 'Afterword', p. 196.

Peregrine a certain political urgency, rarely explicitly voiced, but nonetheless present. As Baker's biographer Hetty Saunders writes:

If those who killed hawks – deliberately or otherwise – bore a responsibility, then Baker felt it was *his* responsibility as a writer to hold them accountable [...] 'It seems to me', he wrote, 'that in view of the world's condition today, we who have creative ambitions and, perhaps, a genuine creative ability, are bound by our conscience to give all that we have to the cause of working for a better way of living'.

Baker was here writing shortly after the Second World War, with reference to its atrocities. However, by the 1960s, his

conscience had directed him to the world beyond humankind and how it, too, deserved a 'better way of living'. Now confronted with the cruel indifference of people in Britain to that most remarkable of birds, the peregrine, Baker was, as he said, bound by his conscience to give all that he had.⁴⁷

In the peregrine falcon, Baker found a 'dramatic symbol', as his lifelong partner Doreen put it, for the toxification of landscapes and the thinning of ecosystems.⁴⁸ By narrating encounters with poisoned bodies in contaminated places, he sought to articulate how this traumatising context generated unfamiliar sensations and emotions. I will stop short of claiming that *The Peregrine* is a polemic against the political structures that drive toxicity; it is not what Eve Kosofsky Sedgwick calls a 'tracing-and-exposure project'.⁴⁹ However, it does understand toxicity as a systematically imposed condition. Its aesthetics of protest is not to name and map chemical dispersal infrastructures. Rather, it is viscerally to describe what poisons do once they have entered into ecosystems: 'bright yellow foam bubbling from its throat'; 'eyes were open and living, the rest of it was dead'.⁵⁰ By demanding unrelenting imaginative attention to emergent toxic phenomena, the text implicates readers in its politicised practices of observation and inscription. To reiterate Latour's insight into the politicisation of accurate perception and documentation in the Anthropocene, here the '*description* of the facts is [...] close to the *prescription* of a policy'.⁵¹

⁴⁷ Saunders, *House*, pp. 105-06.

⁴⁸ Doreen Baker, quoted in Saunders, *House*, p. 110.

⁴⁹ Eve Kosofsky Sedgwick, *Touching feeling: affect, pedagogy, performativity* (Durham: Duke University Press, 2003), p. 124.

⁵⁰ *Peregrine*, p. 126.

⁵¹ Latour, 'instability', pp. 25.

~

The narrator of *The Peregrine* travels through the scoured landscapes of intensive agriculture, forensically describes unsettling encounters with poisoned animals, and attends closely to his emotional and imaginative responses to these incidents. The sedimentation of such episodes, and of other direct and indirect allusions to toxicity, comes to influence the text's sense of body and landscape. A peregrine can 'take up and accumulate pesticide residues' over time; *The Peregrine* is similarly invested with a sense of contamination through its narrator's slow and ongoing exposure to toxic phenomena.⁵² If, as I argued in Chapter One, Orwell aims in *Coming Up for Air* to give literary expression to how an expectation of technological reproducibility is 'manifested in the field of perception', then in *The Peregrine* Baker does the same for a certain kind of toxicity, fostering knowledge of contamination through a gradually unfurling pattern of revelation and intimidation.⁵³ *The Peregrine* hereby prompts its readers to suspect – to expect – unseen poisons in fields and birds. At times, the narrator mentions toxicants overtly ('the filthy, insidious pollen of farm chemicals'), but for the most part he indicates them obliquely, so that they haunt the text as one of several possible causes for its withered landscapes ('nothing moved in the silent valley'; 'there was a bitter silence, a slow dying').⁵⁴ Such half-allusions, which accommodate the potential activity of alternative killers, such as cold, accumulate slowly and disquietingly, rendering toxicity perceptible as always possible, but rarely certain.

Baker recognised that to describe newly entangled ecological and industrial phenomena would require a new way of writing – old conventions for describing landscape, such as the sublime or the picturesque, were inadequate. Peregrines had resided on Earth for epochs, but now, like many other beings, they faced rapid extinction. Landscapes once 'flaming with hawks and finches' were being sown with persistent, virulent synthetic substances that would eradicate ancient ecosystems, and endure as an 'ineffaceable imprint'.⁵⁵ In this context, to write about peregrines was to write about toxicity; and in order fully to describe the ecological effects of toxicants, it was necessary to think in deep temporal scales, opening 'into the future as well as the past'.⁵⁶ Once, to think with such scales would have been to feel human agency dwindle into

⁵² Ratcliffe, 'Status', p. 76.

⁵³ Benjamin, 'Reproduction', p. 173.

⁵⁴ *Peregrine*, pp. 32, 105, 137.

⁵⁵ *Peregrine*, p. 154; Baker, 'Essex', p. 215.

⁵⁶ Macfarlane, *Underland*, p. 15.

insignificance, but now various industrial activities were burning an unfamiliar bright line through planetary history – a line separating a biodiverse past from a geochemically altered, ecologically harrowed future. Established ways of thinking and writing about nature were ill-equipped to attest to emergent systems, presences and deletions. Baker’s subject matter brought *The Peregrine* close to the terrain of science nonfiction and science fiction. Baker combines tropes from these genres with techniques borrowed from an array of literary forms, such as the field note or the imagist poem, to create an experimental and generically hybrid work which perceives British rural landscapes in unfamiliar, often startling ways. British cultures of landscape have long been highly coded – from the eighteenth century cult of the picturesque, adherents of which sought to define, exhaustively, the ‘prerequisites of a truly picturesque view’, to Baker’s contemporaneous birdwatching societies, which often had rigid observational and archival conventions.⁵⁷ *The Peregrine* is itself a compulsive text, following intricate procedures and sequences (and drawing, as Nixon has traced, upon ‘the observational and recording practices of the “new ornithology”’).⁵⁸ However, the cumulative effect of this systematicity is to unsettle, rather than situate, readers in place and time; the text refuses any stable aesthetic vantage on its landscapes. Baker repeatedly establishes unusual homologies between coastal Essex and distant geographies, extending even to planets: the narrator notes that herring gulls ‘in snow were calm as camels in the desert’; he patrols a ‘dying world, like Mars, but glowing still’.⁵⁹ He also explores continuities and discontinuities between the present, and other ages and epochs, recalling how certain contemporary writers strive to ‘reimagine human and nonhuman life outside the confines of the Holocene’.⁶⁰ A ‘serrated prehistoric grin’ snarls into the twentieth century through the skull of a merganser; the narrator anticipates outliving the peregrine ‘as the gibbering ape outlived the dinosaur’.⁶¹ In a recent article, Alexis Wright describes an Anthropocene event:

another massive pyroconvection producing bushfire – a super cell thunderstorm that was perhaps similar to the cumulonimbus flammagenitus clouds associated with the 2003 Canberra bushfire [...] This is the new language of climate change.

⁵⁷ Carl Thompson, ‘The Picturesque at Home and Abroad’, *British Library*, (undated), <bit.ly/2XIeCKt> [accessed 1 September 2020]; see Helen MacDonald, “‘What makes you a scientist is the way you look at things’: ornithology and the observer 1930-1955”, *Studies in History and Philosophy of Biological and Biomedical Sciences*, 33 (2002), 53-77 <doi:10.1016/S1369-8486(01)00034-6>, pp. 60-64.

⁵⁸ Nixon, ‘Vanishing’, p. 215.

⁵⁹ *Peregrine*, pp. 134, 32.

⁶⁰ Davies, *Birth*, p. 209.

⁶¹ *Peregrine*, pp. 98, 133.

Wright observes that while ‘most of us have never heard’ these words before, ‘we are now learning to understand from experiencing the extreme weather events affecting us more frequently’. *The Peregrine* was written at an earlier stage of this grim learning curve, but like Wright, Baker apprehended the need for a ‘new language’ to describe induced geosystemic mutations and their psychic effects.⁶²

Fenland, writes the narrator, is ‘withdrawn, remote, deep sunk in silence’.⁶³ In ‘On the Essex Coast’, the narrator describes the silence of the Essex marshes as a sedimentary phenomenon, forming over deep spans of time: it ‘seems to have been sinking slowly down through the sky for numberless centuries, like the slow fall of the chalk through the clear Cretaceous sea. It has settled deep’.⁶⁴ Throughout *The Peregrine*, landscapes are similarly presented as sites of ongoing, long-term processes of erosion, decay and accumulation. Baker seeks to convey that, as Lauret Savoy puts it, what ‘one might perceive as timeless is but one frame of an endless geologic film’.⁶⁵ Even snow is ‘Neolithic, eroded by the warm south wind. Snow tumuli crumble where the great drifts rose against the sky’; hills ‘unwind their long horizons, and the land surfs up into limestone and hangs like a frozen wave of green’. Biological phenomena too afford glimpses of the deep past’s latency in the present. The narrator perceives the ‘prehistoric’ merganser as an aggregation of evolutionary metamorphoses, relations and traces. He also imagines a ‘Jurassic saurian, fetid and inert in a swamp’, lurking in fog, and compares lesser spotted woodpeckers with ‘strange primeval butterflies clinging to a huge tree fern in a steamy prehistoric jungle’; one clamps onto a willow ‘as though his large feet were disced with suckers’. At such moments, Baker is not seeking to indicate exact evolutionary links. Rather, he draws upon science nonfiction and science fiction to situate *The Peregrine* within an epochal imaginary. The text hereby exceeds what the narrator calls ‘the grey and shrunken time of towns’, adopting an expansive temporal scale through which it seeks to convey interlinked nonhuman agencies, and their intricate patterns of influence and relation.⁶⁶ Here, inhuman agents possess narrative import; past geological periods obtrude in the present. Like Ballard, Baker writes about uncanny socioecological entanglements, ‘forces of unthinkable magnitude’ and other entities that, according to Ghosh, were ‘long ago expelled from the territory of the novel’.⁶⁷ Indeed, Baker

⁶² Alexis Wright, ‘We all smell the smoke, we all feel the heat. This environmental catastrophe is global’, *The Guardian*, 17 May 2019, <bit.ly/2L2RgcA> [accessed 1 September 2020].

⁶³ *Peregrine*, p. 149.

⁶⁴ Baker, ‘Essex’, p. 212.

⁶⁵ Lauret Savoy, *Trace: Memory, History, Race, and the American Landscape* (Berkeley: Counterpoint, 2015), p. 16.

⁶⁶ *Peregrine*, pp. 146, 121, 98, 56, 184-85, 31.

⁶⁷ Ghosh, *Derangement*, p. 63.

seems to have been an avid reader of Ballard: he possessed no less than ten of Ballard's books, including *The Drowned World*, which takes place in a 'radically new environment, with its own internal landscape and logic, where old categories of thought would merely be an encumbrance'. Here, Ballard imagines London engulfed in a resurgent 'Triassic swamp, thickly populated by reptiles with 'ancient impassive faces'. Characters undergo a 'terrestrial and psychic' 'descent into deep time'.⁶⁸ Perhaps Baker drew upon Ballard's novel for the above descriptions of 'Jurassic' and 'primeval' landscapes, and in his own attempts to develop new 'categories of thought' for a 'radically new environment'.⁶⁹ Baker also owned a copy of *Empire of the Sun*, Ballard's autobiographical novel about the dawn of the nuclear age. This brings us to another striation in Baker's accretive imagination: his literary attention to the emergent geological deposits and evolutionary influences of his own kind, through which he seeks to 'extend the temporal horizons of our gaze not just retrospectively but prospectively as well'.⁷⁰

Baker wrote at a time of ambient nuclear threat; he describes intensive agricultural terrain, sown with persistent toxicants, in the grip of a bitter winter. His landscapes are stark and barren: 'A dead tree in dark fields reflected light, like an ivory bone. Bare trees stood in the earth, like the glowing veins of withered leaves'. The narrator here observes and records a frozen arable zone, but this irradiated image might also be construed as a foreboding of nuclear aftermath. Baker often uses this imagistic technique, through which descriptions of his contemporary agricultural landscapes suggest the outcome of an apocalyptic toxic event. The narrator describes 'just a curve of the earth, a rawness of winter fields. Dim, flat, desolate lands that cauterise all sorrow'; he reports that the 'sun fired the bone-white coral of the frosted hedges with a cold and sullen glow. Nothing moved in the silent valley'; there 'was a bitter silence, a slow dying. Everything sank down to the frozen edge of the grey lunar sea'.⁷¹ Such images hesitate between testimony, prophecy and metaphor, investing *The Peregrine* with a speculative register. Like Baker's invocations of deep, inhuman temporalities, they also displace the English rural landscape from its customary aesthetic categories. Hedges are coral; the sea is lunar; by compelling alternative perceptions of coded land, Baker administers a 'jolt to the imagination'.⁷² In 1964, Harrison suggested that British farming was 'still associated with mental pictures of [...] cows waiting patiently in picturesque farmyards for the milking' – a bucolic and lucrative 'association of ideas',

⁶⁸ Ballard, *Drowned*, pp. 14, 18, 74, 70.

⁶⁹ *Peregrine*, pp. 56, 185; Ballard, *Drowned*, p. 14.

⁷⁰ Nixon, *Slow Violence*, p. 62.

⁷¹ *Peregrine*, pp. 104, 28, 105, 137.

⁷² Macfarlane, 'Generation Anthropocene: How humans have altered the planet forever', *The Guardian*, 1 April 2016, <goo.gl/KxgRFz> [accessed 1 September 2020].

‘cleverly kept alive’ by the advertising industry on behalf of agri-business.⁷³ We might draw Harrison’s observation into relation with contemporary discussions of shifting baseline syndrome – a sociological and psychological condition through which ‘accepted thresholds for environmental conditions are continually [...] lowered’ as ‘members of each new generation accept the situation in which they were raised as being normal’.⁷⁴ By adopting a radically experimental landscape aesthetic, Baker refuses any such conditioned complacency, subjecting readers to an ‘optic that might allow us to see – and foresee – the lineaments of slow terror behind the façade’ of entrenched aesthetic conventions.⁷⁵ Sometimes, the narrator even seems to speak from a near future of absolute biological depletion. As though elegising a species already extinct, he writes that the ‘frail bones of generations of sparrowhawks are sifting down now into the deep humus [...] when they died they could not be replaced’.⁷⁶ Baker, then, turns his attention to some of the geological and ecological legacies conferred by twentieth century industrial society: persistent synthetic toxicants and extinction events. However, while the text is haunted by invisible toxic phenomena – inferred in the present, predicted in the future – it only rarely names toxicity. Occasionally, the narrator senses toxicants directly, as when he smells ‘damp grass, fresh soil, and farm chemicals’ (another instance of Leslie’s ‘aura after aura’, in which ‘natural experience is also technological, industrialized. Aura, the air, the cool breeze on a summer’s day, turns toxic’).⁷⁷ More often though, he only hints at their presence, as when the ‘air was heavy and sweet-smelling, borne in the wind like pollen’. There is a verbal trace here of the earlier denunciation of the ‘filthy, insidious pollen of farm chemicals’, but the reader is kept uncertain as to the precise source of the smell.⁷⁸ Toxicity is thus admitted into the text as a suspicion; as the object of a reasonable paranoia.

Lutts writes that in *Silent Spring*, Carson was

sounding an alarm about a kind of pollution that was invisible to the senses; could be transported great distances, perhaps globally; could accumulate over time in body tissues; could produce chronic, as well as acute, poisoning; and could result in cancer, birth defects, and genetic mutations that may not become evident until years or decades after

⁷³ Harrison, *Machines*, p. 2.

⁷⁴ Masashi Soga and Kevin J. Gaston, ‘Shifting baseline syndrome: causes, consequences, and implications’, *Frontiers in Ecology and Environment*, 16.4 (2018), 222-30 <doi:10.1002/fee.1794>, p. 222.

⁷⁵ Nixon, *Slow Violence*, p. 62.

⁷⁶ *Peregrine*, p. 29.

⁷⁷ *Peregrine*, p. 186; Leslie, *Synthetic*, p. 226.

⁷⁸ *Peregrine*, pp. 171, 32.

exposure [...] Chemical pesticides were not the only form of pollution fitting this description. Another form, far better known to the public at the time, was radioactive fallout.

Lutts suggests that readers of *Silent Spring* ‘throughout the world were prepared, or preeducated, to understand the basic concepts underlying’ the text by a ‘decade-long debate over radioactive fallout preceding it’.⁷⁹ Carson registered that pesticides ‘could be understood as another form of fallout’, and encouraged associations between the toxicants: she writes that ‘the parallel between chemicals and radiation is exact and inescapable’.⁸⁰ Baker, perhaps drawing on *Silent Spring*, likewise explores continuities between pesticides and nuclear fallout. In the 1960s (as today), it was reasonable to be paranoid about fallout. Regular nuclear explosions (in 1962 alone, the USA detonated ninety devices) sent radioactive debris into the upper atmosphere, where it circulated in aerial currents; fallout ‘could blow in any direction, take decades or generations to register’.⁸¹ In this way, what Carson called ‘the grey rains of fallout’ spread across the planet – though as I shall discuss later in the dissertation, deposits were (and remain) particularly concentrated in the vicinity of test sites.⁸² Just as the narrator of *The Peregrine* often suspects, but only sometimes unequivocally detects, the action of agricultural toxicants, so too does he hint at, without definitively identifying, the presence of radioactive ash. Baker hereby reflects aesthetically on how the perception of landscape may be inflected by an anxious awareness of nuclear operations. Thus light behaves in fearful ways – it may ‘flake and burn down to the west in a cold mercurial glow. There is suddenly a feeling of “too late”’; clouds are ‘bone-white in ashes of sky’.⁸³ By having his narrator allude ambiguously to radioactive residues, Baker raises the spectre of nuclear war. The narrator is not only paranoid about unseen toxic presences, but also experiences forebodings of detonation events. Some descriptions of wintry landscapes evoke this particular sense of ‘overshadowing doom’:

The sky peeled white in the north-west gale, leaving the eye no refuge from the sun’s cold glare. Distance was blown away [...] New horizons stood up bleached and stark, plucked out by the cold talons of the gale [...] ducks’ heads smouldered [...] luminous, seething [...] burning [...] hissing.⁸⁴

⁷⁹ Lutts, ‘Fallout’, pp. 19-20.

⁸⁰ Lutts, ‘Fallout’, p. 19; *Spring*, p. 185.

⁸¹ Lutts, ‘Fallout’, p. 31; Solnit, *Savage Dreams*, p. 96.

⁸² *Spring*, p. 186.

⁸³ *Peregrine*, pp. 120, 82.

⁸⁴ Lutts, ‘Fallout’, p. 33; *Peregrine*, p. 78.

Throughout the text, nuclear terror laces perception and description: snipe ‘burn slowly, flicker, then slowly fade’; ‘deep-cut silver burns’ wound ‘long moors of mud’; a ‘huge, red, hostile, floating sun [...] was a globe no longer’. In some cases, Baker evokes agricultural intensification and nuclear aftermaths simultaneously – as in the aforementioned ‘bitter silence [...] slow dying’, or in an image of Essex’s ‘flat land’ as a ‘booming void where nothing lived’.⁸⁵ In chapters Five and Six, I will consider in detail how the nuclear age gave rise to particular forms of literary imagination, exploring work by those anxious about the possibility of nuclear war in the near future, and by those who have suffered it already. Here, I mention Baker’s nuclear imagination only in connection with its bearing upon his literary treatment of pesticide toxicity. In *Silent Spring*, while aligning pesticides with fallout, Carson also developed literary techniques to allow readers to visualise how specific biocides behave inside human bodies. These too, as I will now discuss, seem to have influenced Baker’s writing.

The narrator describes a dying heron:

Its wings were stuck to the ground by frost, and the mandibles of its bill were frozen together [...] All was dead but the fear of man [...] No pain, no death, is more terrifying to a wild creature than its fear of man [...] We are the killers. We stink of death. We carry it with us. It sticks to us like frost. We cannot tear it away.

Here, frost does not simply describe ice crystals, but is drawn into association with toxicity, instilling new valences into ice. For the narrator, frost’s slow and adhesive lethality evokes a poison’s biological activity. Elsewhere too Baker deploys frost as a toxic metonym: ‘blood now courses from the hunting frost [...] frail hearts choke in the clawed frost’s bitter grip’. Frost is ‘clawed’ like a ‘hunting’ peregrine, but it also seems to infiltrate vascular systems, circulating in the bloodstream like a toxic particle. Baker also describes nontoxic processes in terms that elicit organochlorine and organophosphorus poisoning specifically. As snow falls, a ‘fungus of whiteness grows upon the eye, and spreads along the nerves like pain’.⁸⁶ As Elizabeth Lee Reynolds has noted, this invocation of nervous agitation recalls *Silent Spring*’s descriptions of how pesticides affect the nervous system.⁸⁷ Here, Carson focuses ‘first on the individual cells of the

⁸⁵ *Peregrine*, pp. 123, 81, 149, 137, 75.

⁸⁶ *Peregrine*, pp. 126, 128, 133.

⁸⁷ Elizabeth Lee Reynolds, ‘Tracing the *Silent Spring* in *The Peregrine*’, *Zoomorphic*, 18 September 2016, <bit.ly/2XtmwTy> [accessed 14 September 2020].

body, then on the minute structures within the cells, and finally on the ultimate reactions of molecules within these structures', surveying the 'serious and far-reaching effects of the haphazard introduction of foreign chemicals into our internal environment'. Just as Baker invites his readers to imagine industrial-geophysical processes that exceed immediate human perception, so too does Carson seek to equip hers with an ability to envisage microscopic events. She describes how both 'major types of insecticides, the chlorinated hydrocarbons and the organic phosphates, directly affect the nervous system, although in somewhat different ways'. Organophosphorus compounds 'strike directly at the nervous system'.⁸⁸ They destroy a 'protective enzyme' such that 'impulses continue to flash across the bridge from nerve to nerve' unchecked. Consequently, the 'movements of the whole body become uncoordinated: tremors, muscular spasms, convulsions, and death quickly result'. Organochlorines likewise 'target' the nervous system.⁸⁹ The action of dichlorodiphenyltrichloroethane (DDT), for example, is 'primarily on the central nervous system of man [...] Abnormal sensations as of prickling, burning or itching, as well as tremors or even convulsions, may follow exposure'. Carson contextualises her explanations of biochemical processes with images of 'doomed birds' locked in the 'agonized tremors that precede death'.⁹⁰ *Silent Spring* seems a likely source for Baker's descriptions of falcons dying 'on their backs, clutching insanely at the sky in their last convulsions, withered and burnt away by the filthy, insidious pollen of farm chemicals'.⁹¹

Carson's writing brings to perception, to repeat Jamie's phrase, the 'unseen landscapes within'.⁹² Perhaps the landscapes of *The Peregrine* – 'super-saturations of colour, wheeling phantasmagoria, dimensions blown out and falling away' – owe something to this kind of imaginative insight, in which an awareness of toxicity draws the mind into what Jamie calls the 'inner body, plumbing and landscapes and bacteria'.⁹³ Might Baker have repurposed *Silent Spring's* anatomical, cellular and molecular forms to perceive Essex anew? Jamie writes about peering through a microscope at an eviscerated human colon:

I was admitted to another world, where everything was pink. I was looking down from a great height upon a pink countryside, a landscape. There was an estuary, with a north bank and a south. In the estuary were wing-shaped river islands or sandbanks, as if it was

⁸⁸ *Spring*, pp. 178, 172, 177.

⁸⁹ *Spring*, p. 42.

⁹⁰ *Spring*, pp. 172, 103.

⁹¹ *Peregrine*, p. 32.

⁹² Jamie, 'Pathologies', p. 34.

⁹³ Macfarlane, 'Afterword', p. 195; Jamie, 'Pathologies', p. 37.

low tide. It was astonishing, a map of the familiar; it was our local river, as seen by a hawk.⁹⁴

In this catascopic perspective onto estuarine cellular forms, Jamie encodes an allusion to Baker, registering his curiosity about what he called ‘unregarded vision’ – whether that which (like a falcon’s sight) cannot be witnessed by a human, or that which may be seen only with the aid of prosthetic optical devices. The narrator may imagine, though he cannot attain, a peregrine’s eyesight:

Looking down, the hawk saw the big orchard beneath him shrink into dark twiggy lines and green strips; saw the dark woods closing together and reaching out across the hills; saw the green and white fields turning to brown; saw the silver line of the brook, and the coiled river slowly uncoiling; saw the whole valley flattening and widening.⁹⁵

In this speculative enquiry into a falcon’s gaze, landscape comes unstuck from established aesthetic categories. Barry Lopez wrote in the 1980s of the Arctic’s ability ‘to expose in startling ways the complacency of our thoughts about land in general’; he found the cryscape ‘baffling in its ability to transcend whatever we would make of it’.⁹⁶ A falcon’s eyesight, always outstripping human perception, plays a similar role for Baker’s narrator. The ‘anchored and earthbound’, he writes, ‘cannot envisage this freedom of the eye. The peregrine sees and remembers patterns we do not know exist [...] He may live in a world of endless pulsations, of objects forever contracting or dilating in size’. This ‘may’ – its subjunctive, speculative sense – is important; it sets the narrator’s inability to apprehend the world as a falcon into his style.⁹⁷ Had Baker written a ‘book about becoming a bird’, then perhaps the above passage would read as follows:

dark twiggy lines and green strips [...] closing together and reaching out [...] green and white [...] turning to brown [...] silver line [...] coiled [...] slowly uncoiling [...] flattening and widening.⁹⁸

⁹⁴ Jamie, ‘Pathologies’, p. 30.

⁹⁵ *Peregrine*, pp. 144, 143.

⁹⁶ Barry Lopez, *Arctic Dreams* (London: Vintage, 2014; 1986), xxviii, p. 12.

⁹⁷ *Peregrine*, p. 48.

⁹⁸ Macfarlane, ‘Introduction’, in Baker, *The Peregrine* (New York: New York Review, 2005; 1967), quoted in Macfarlane, ‘Afterword’, p. 198; *Peregrine*, p. 143.

However, Baker does not set out to cleave shapes, colours and processes wholly from their referents. They remain yoked to nouns: ‘orchard’, ‘woods’, ‘hills’, ‘fields’, ‘brook’, ‘river’ and ‘valley’.⁹⁹ Elsewhere, as Mark Cocker has observed, he works to ‘convey the otherness of wildlife through reference to objects of domestic and human function’.¹⁰⁰ A dead porpoise’s teeth look ‘like the zip-fastener of a gruesome nightdress-case’; the flensed corpse of a black-headed gull recalls a ‘mash of raw beef and pineapple’ (apparently Baker found this recipe ‘appetising’). Baker ensures that his narrator remains enmeshed not only in language, but also in his own acculturated perceptions; counterintuitively, he uses cumulative reminders of his inescapably socialised identity to instil a powerful sense of the falcon’s alterity. Though he may seek to conceal the ‘glare of the eyes, hide the white tremor of the hands, shade the stark reflecting face, assume the stillness of a tree’, the narrator can no more ‘let the human taint wash away’ than change his ‘predatory human shape’.¹⁰¹ *The Peregrine* is, then, self-consciously a book about ‘failing to become a bird’ – where to fail is to remain tainted, enforcing a reckoning with one’s culpability for the ‘insidious chemical horror [...] operating beneath’.¹⁰²

~

As I discussed in Chapter Three, *Silent Spring*, *The Harvest that Kills* and *Animal Machines* all, to a certain extent, proceed according to a ‘double rhetoric of apocalyptic warning and tactics of prevention and preservation’. Like ‘Storm-Bird, Storm-Dreamer’, *The Peregrine* largely declines this persuasive register. It does not urge readers to fight for a nontoxic, ecologically healthy future. Rather, it ‘begins with the recognition of irretrievable loss, unrecuperable absence, and [...] dwells strangely [...] in that logic of the break’. It is a meditation on the ‘psychic costs of ecological devastation’, the ‘awareness of one’s material determination as a destructive agent’ and the ‘unresolvable, melancholic grief that accompanies this realization’.¹⁰³ This does not mean that, as one commentator has suggested, Baker wallows in an ‘abandoned nihilism’.¹⁰⁴ As I have established, at the time of *The Peregrine*’s publication, to observe, record and distribute information about agrichemical toxicity was a highly politicised act. We might also read *The Peregrine* in light of the fierce political voice Baker projected in ‘On the Essex Coast’ – in which

⁹⁹ *Peregrine*, p. 143.

¹⁰⁰ Mark Cocker, ‘Introduction’, in *Peregrine*, p. 12.

¹⁰¹ *Peregrine*, pp. 173, 117, 31, 28, 51.

¹⁰² Macfarlane, ‘Afterword’, p. 199; Baker, ‘Essex’, p. 215.

¹⁰³ Ronda, *Reminders*, pp. 92, 93, 95-96.

¹⁰⁴ Richard Smyth, ‘Nature writing’s fascist roots’, *New Statesman*, 3 April 2019, <[bit.ly/2YOCqtR](https://www.newstatesman.com/2019/04/nature-writing-fascist-roots)> [accessed 1 September 2020].

the narrator commands readers not to be ‘soothed away by the lullaby language of indifferent politicians’, and defiantly predicts that birds will ‘endure the shadow of our tyranny’ to ‘fly out into the sun’.¹⁰⁵ Even so, to overemphasise *The Peregrine’s* polemical shadings may be to risk misreading its melancholic politics – or rather, its ethics of grief. Baker does not intend through the narrator of *The Peregrine* to reflect on the necessity for an organised political response to ecological devastation. Rather, he experimentally represents its traumatising psychological effects, depicting experiences of the living world overcast by unfamiliar, interspecies forms of grief and guilt. The narrator’s melancholic stance may be read as a ‘resistant and incomplete mourning’ which, by rejecting ‘cultural and psychological narratives of resolution’, ‘stands for an ethical acknowledgment of – or perhaps a ceding to – the radical alterity of the other whom one mourns’.¹⁰⁶ He struggles to learn how to grieve not only for individual peregrines, but an entire species – an ancient ecosystem; perhaps an epoch. He must also cede to the alterity of the emergent time, and in doing so experiences an agonistic sense of complicity with what Isabelle Stengers calls ‘the coming barbarism’.¹⁰⁷

Certain contemporary works of literature engage with the ‘sense of crisis’ imposed by late capitalism as an ‘abiding psychic condition’, responding to how socioecological shifts ‘demand a new poetics’.¹⁰⁸ Ronda has described how some such texts dwell melancholically on ecocide as a ‘loss that defies resolution’. Others probe the ‘inadequacies of melancholic response, articulating shared political commitments and envisioning the possibility of radical activity in response to generalized economic and ecological crisis’. This latter strain – for example, Joshua Clover and Juliana Spahr’s ‘#Misanthropocene: 24 Theses’ – tend to offer speculative ‘revolutionary images’, but without the ‘pastoral promise’ underpinning calls to action in *Silent Spring* or *Animal Machines*.¹⁰⁹ This kind of literary work acknowledges industrial chemistry’s irreversible telluric influence, and aims to develop ways of dealing imaginatively with debilitating geophysical alterations. In its refusal to uphold nature as an organising idea, and in its attention to toxic systems and aftermaths, it might be conceived of as literary ‘slow activism’, committed to finding a language for poisoned circumstances.¹¹⁰ *The Peregrine* is an early work in this evolving discourse. It tends towards elegy rather than calls for insurrection, and conducts a sustained enquiry into a

¹⁰⁵ Baker, ‘Essex’, pp. 215-16.

¹⁰⁶ Clifton Spargo, *The Ethics of Mourning: Grief and Responsibility in Elegiac Literature* (London: Johns Hopkins University Press, 2004), p. 13.

¹⁰⁷ Isabelle Stengers, *In Catastrophic Times: Resisting the Coming Barbarism*, trans. by Andrew Goffey (London: Open Humanities Press, 2015). Open Humanities Press ebook.

¹⁰⁸ Cocker, ‘Introduction’, p. 4; Ronda, *Remainders*, pp. 100, 107.

¹⁰⁹ Ronda, *Remainders*, pp. 104, 107, 111.

¹¹⁰ Liboiron, Tironi and Calvillo, ‘Toxic politics’, p. 341.

subjectivity moulded by industrial toxicity, saturated in ‘species shame’ and ‘stalked by ecosystemic memory’.¹¹¹

In *The Peregrine*, systematic extinction registers as an ongoing, inevitable, as yet unfulfilled process, for which the narrator bears partial responsibility. The narrator cannot resolve this situation, materially or psychologically. Driven by horror to abscond from his kind, he retains a vigilant awareness of the inadequacy – even mendacity – of this fugitive impulse, repeatedly emphasising his complicity in the toxification of the landscapes to which he obsessively returns. Ronda suggests that Spahr’s melancholic elegy to an ecosystem ‘Gentle Now, Don’t Add to Heartache’ explores ‘the *feeling* [...] of thinking “nothing but us”’.¹¹² We might imagine Spahr’s speaker as an inhabitant of the Eremocene – the ‘Age of Loneliness’, a ‘miserable future’ scoured of biodiverse life:

I didn’t even say goodbye elephant ear, mountain madtorn, butterfly, harelip sucker,
white catspaw, rabbitsfoot, monkeyface, speckled chub, wartyback, ebonyshell, pirate
perch, ohio pigtoe, clubshell.¹¹³

Spahr’s speaker is caught in a ceaseless cycle of deeply-felt lack and self-reproach, in which her ‘self-accusations are both entirely appropriate and never adequate’.¹¹⁴ She refuses to complete what Peter Sacks identifies as a defining feature of the elegy: a ‘substitutive turn’ – a ‘withdrawal of affection from the lost object and a subsequent reattachment of affection to some substitute for that object’.¹¹⁵ This poem both fails and refuses to ‘say goodbye’, insisting upon ‘the other’s uncancellable and unassimilable value’.¹¹⁶

In *The Peregrine*, falcons are not yet extinct but their life is ‘lonely death, and would not be renewed’. The narrator remembers watching a toxified pair of nesting peregrines:

¹¹¹ Macfarlane, ‘Afterword’, p. 195; Rory Gibb, ‘A Crushing Embrace with the Earth: Ecological Sound in 2015’, *The Quietus*, 3 December 2015, <bit.ly/2x2Dduq> [accessed 1 September 2020].

¹¹² Ronda, *Remainders*, p. 106.

¹¹³ E.O. Wilson, *The Meaning of Human Existence* (London: W.W. Norton, 2014), p. 123; Juliana Spahr, ‘Gentle Now, Don’t Add to Heartache’, in Spahr, *well then there now* (Boston: Black Sparrow, 2011), pp. 123-33 (p. 132).

¹¹⁴ Ronda, *Remainders*, p. 105.

¹¹⁵ Peter Sacks, *The English Elegy: Studies in the Genre from Spenser to Yeats* (London: Johns Hopkins University Press, 1985), pp. 5-6.

¹¹⁶ Spahr, ‘Gentle’, p. 132; Spargo, *Ethics*, p. 13.

They had a nest-scrape, but no eggs or young. They spent the day just sitting on the cliff or soaring out to sea. Their hunting was done inland, very early and late, and it did not take long. They seemed bored, sterile; they had no meaning.

‘Foul poison’ burns within them ‘like a burrowing fuse’.¹¹⁷ I have argued throughout that we should read *The Peregrine* as a testimony to a chemically altered landscape. This act of witnessing leads Baker to conduct an anticipatory elegy for an ecosystem. Like Spahr’s, this elegy is unconventional. Baker aims through it not to console, but to bequeath something of the peregrine’s alterity to those who would never encounter it directly, crafting a ‘persistent [...] dedication to the time and realm’ of a doomed being.¹¹⁸ His approach implies that a ‘substitutive turn’ constitutes a betrayal of the mourned: ‘forgetting rather than remembering, integration without closure’.¹¹⁹ It also responds to how toxicity submits grief to unusual temporal and scalar demands. If poisoned birds live a ‘lonely death’, when does one begin to grieve for them?¹²⁰ If toxicants do not harm peregrines alone, but all living systems, where does one stop grieving? Baker’s narrator does not indulgently reject a possible resolution, but is rather confronted with a situation that defies physical and psychic containment. As he describes encounters with individual birds, he is aware that toxicity affects the entire species; all birds of prey; all ecosystems in which toxicants accumulate; all ecosystems.

~

At a recent conference, Nathalie Jas suggested that a historiographical tendency in toxic discourse to focus on organochlorine bans in the Global North risks ‘contributing to the ongoing invisibilisation’ of toxicity in the Global South.¹²¹ DDT is still ‘illegally used in most of the developing countries’, often alongside other organochlorines, the acutely toxic organophosphorus compounds, and further hazardous pesticides, such as endosulphan.¹²² In India, for example, ‘practices of pesticide sale and distribution’ are ‘largely unregulated’, multinational corporations engage in ‘aggressive’ advertising campaigns, and a ‘market for “spurious” and “adulterated” pesticides has flourished’. Here, ‘pesticide ingestion is the most

¹¹⁷ *Peregrine*, p. 123.

¹¹⁸ Spargo, *Ethics*, p. 11.

¹¹⁹ Sacks, *Elegy*, p. 5; Ronda, *Remainders*, p. 104.

¹²⁰ *Peregrine*, p. 123.

¹²¹ Jas, ‘(In-)visibilisation’.

¹²² Ravindran Jayaraj, Pankajshan Megha and Puthur Sreedev, ‘Organochlorine pesticides, their toxic effects on living organisms and their fate in the environment’, *Interdisciplinary Toxicology*, 9.3-4 (2016), 90-100 <doi:10.1515/intox-2016-0012>, pp. 95-96.

popular method of suicide’, with organophosphorus compounds ‘the most common pesticide for suicide’. Angeliki Balayannis and Brian Robert Cook find it is ‘tempting to attach symbolic meaning to pesticide suicide’, though they ultimately ‘leave this question to be explored in future research’.¹²³ Between 1994 and 2015 in Colombia, ‘duster planes sprayed a concentrated formula of Monsanto’s herbicide, glyphosate, over illicit [coca] crops, and also forests, soils, pastures, livestock, watersheds, subsistence food and human bodies’.¹²⁴ Monsanto’s recent purchaser, Bayer, have been rocked by an ‘avalanche of legal cases’ over allegations that glyphosate is carcinogenic; in June 2020, Bayer agreed to an £8.8 billion settlement with over one hundred thousand US plaintiffs.¹²⁵ In Colombia, compensation claims are systematically rejected. The afflicted must seek out ‘alternative forms of justice’, outside the apparatus of the state, as they ‘attempt to transform chemically degraded ecologies’.¹²⁶ Or, as one victim of the poisonings put it, ‘My dad died of cancer as a result, and who will answer for it?’¹²⁷ The Colombian government is currently working towards lifting a 2015 ban on aerial glyphosate spraying.¹²⁸ In 1960s Britain, activists, scientists and writers sought to craft ‘arresting stories, images and symbols’ of toxicity’s harmful ecological effects in order to capture public attention, and thereby to exert pressure on the state to implement reforms.¹²⁹ In some of these stories, peregrine falcons played an important role as a ‘sentinel species’.¹³⁰ As subjects of stories told by relatively powerful groups, the birds were granted a narrative, evidentiary and, ultimately, political significance denied to the majority of today’s ‘chemically wounded’ people.¹³¹ We might here recall Davies’ discussion of how slow violence endures in part because the no less ‘arresting’ stories about toxicity told by structurally disempowered communities ‘do not count [...] rendering certain populations and landscapes vulnerable to sacrifice and being “let to die”’. He proposes that in order more

¹²³ Angeliki Balayannis and Brian Robert Cook, ‘Suicide at a distance: The paradox of knowing self-destruction’, *Progress in Human Geography*, 40.4 (2016), 530-45 <doi:10.1177/0309132515587469>, pp. 537, 531, 538, 539.

¹²⁴ Kristina Lyons, ‘Chemical warfare in Colombia, evidentiary ecologies and *senti-actuando* practices of justice’, *Social Studies of Science*, 48.3 (2018), 414-37 <doi:10.1177/0306312718765375>, p. 414.

¹²⁵ Philip Giorgiadis, ‘Bayer outlines widening lawsuits over weedkiller cancer allegations’, *Financial Times*, 25 April 2019, <on.ft.com/2xHrodF> [accessed 8 October 2020]; Joe Miller, ‘Bayer to pay up to \$10.9bn to settle US Roundup lawsuits’, *Financial Times*, 24 June 2020, <on.ft.com/2DhKkMH> [accessed 1 September 2020].

¹²⁶ Lyons, ‘Chemical warfare’, p. 414.

¹²⁷ Quoted in Mimi Yagoub, ‘US Calls to Revive Colombia Coca Fumigation Could Damage Peace Process’, *InSight Crime*, 14 June 2017, <bit.ly/2XtJSxb> [accessed 1 September 2020].

¹²⁸ Laura Alejandra Alonso and Parker Asmann, ‘Glyphosate Alone Won’t Fix Colombia’s Complex Coca Woes’, *InSight Crime*, 14 March 2019, <bit.ly/2HyCRIO> [accessed 1 September 2020]; Yagoub, ‘Coca Fumigation’; Andrés Bermúdez Liévano, ‘Colombia will spray Chinese glyphosate to control coca’, *Diálogo Chino*, 1 August 2019, <bit.ly/3gC62Dj> [accessed 1 September 2020].

¹²⁹ Nixon, *Slow Violence*, p. 3.

¹³⁰ Christelle Gramaglia, ‘Watching Pollution with Sentinel Species in Fos-sur-Mer (France): Can Participative Biomonitoring become Cosmopolitical Experiments?’, at *Chemical*, 7 June 2019.

¹³¹ Shapiro, ‘Attuning to the Chemosphere: Domestic Formaldehyde, Bodily Reasoning, and the Chemical Sublime’, *Cultural Anthropology*, 30.3 (2015), 368-93 <doi:10.14506/ca30.3.02>, p. 370.

adequately to convey the lived realities of slow violence, scholars working in the social sciences must ‘deeply engage with people who are already experiencing the drawn-out havoc of environmental pollution’, while addressing the methodological and representational complexities that such work involves. Literary scholars working on toxic texts should likewise seek to contest the ‘epistemic, structural and slow harms we are investigating’, and engage carefully with work by those most harmfully exposed to slow violence.¹³²

In the next two chapters, I consider literary texts and artworks associated with interlinked nuclear sites in South Australia, and in Britain. I close this chapter by emphasising that *The Peregrine* and other 1960s toxic texts ought to be read outside of ‘comfortable’ historiographies of organochlorine regulation. Such historiographies tend to stress the interdiction of a single type of chemical and the recovery of a certain species in selected contexts, overlooking the worldwide continuity of systematic industrial toxicity. The organochlorine crisis in 1950s and 1960s Britain should not be interpreted as a discrete historical episode, long since resolved. It should be approached as a manifestation of structural forces – political, industrial, technological and ecological – at a particular stage of intersection, and which remain in operation today. Baker, unlike his future readers, was not aware that the organochlorine crisis would be, in some cases, ‘successfully averted’.¹³³ However, like his future readers, he reckoned ethically and imaginatively with a transformative toxic regime that seemed to defy resolution.

¹³² Davies, ‘Slow violence’, pp. 13-14.

¹³³ Steingraber, *Downstream*, p. 30.

PART THREE

Maralinga / Orford Ness

The Dispersed Memory of British Nuclear Colonialism

5. 'listen to the people who know'

Nuclear Colonial Memory in the Work of Natalie Harkin and Yhonnie Scarce

our hearts grows as we mourn for our Land.
it's part of us. we love it. poisoned and all.

Ali Cobby Eckermann, 'Thunder raining poison', *Poetry*, 208.2 (2016), 150-51 <www.jstor.org/stable/44016115> [accessed 20 October 2020], p. 151.

It is hard to unlearn a language:
to unspeak the empire

Evelyn Araluen Corr, 'Learning Bundjalung on Tharawal', *Overland*, 223 (2016), <bit.ly/3aRFpHH> [accessed 14 September 2020].

Speaking in Cambridge at the recent conference *Climate Fictions / Indigenous Studies*, the Goorie poet, researcher and educator Evelyn Araluen Corr noted that she stood on ‘land which is entangled in the denial of our sovereignty’.¹ How, she asked, might she acknowledge her country, her culture, and ongoing anticolonial struggles from this place? British people seeking to understand colonial legacies, and their generally inadequate cultural memory of those legacies, might usefully consider similar questions. A great deal of contemporary writing about place in Britain sets out to soothe climate-anxious readers with a restorative dose of the picturesque. Another body of work, more historically attentive and aesthetically sophisticated, approaches British terrain as ‘constituted by uncanny forces, part-buried sufferings and contested ownerships’.² Yet even texts in this mode tend to seal up their repressed histories inside the shores of ‘these islands’. The empire maintains a ‘protracted, complex, and striated’ presence in British landscapes.³ Many writers choose to overlook it.

In the next two chapters, I bring together artistic discourses that respond to the legacies left by the British nuclear programme at Maralinga, in South Australia, and at Orford Ness, in Suffolk. As Caitlin DeSilvey has noted, Orford Ness, a former military laboratory, has for decades been an important location in British place-culture.⁴ Many artists have visited the site, and made work in response to it – yet few have engaged concertedly with ties between Orford Ness, and irradiated places in Australia, Oceania and North America. British nuclear culture, as I have mentioned, has an evasive relationship with nuclear colonialism which requires further study. In Chapter Six, I will suggest that in his account of a visit to Orford Ness in *The Rings of Saturn*, W.G. Sebald enquires aesthetically into the memory of nuclear colonialism in Europe as conditioned by popular nuclear and imperial imaginaries. First, however, I will discuss the work of the poet Natalie Harkin and the glass-artist Yhonnie Scarce. Harkin and Scarce attend closely to the ongoing, embodied implications of nuclear detonations coordinated by the British military at Maralinga, on Pitjantjatjara and Yankunytjatjara lands in South Australia, during the 1950s; and they situate the bombings in relation to Australia’s settler colonial history. Their artistic discourse gives precise definition to what much British nuclear culture ignores. It reckons with complex and persistent colonial legacies; and, through this work, with radioactive contamination as ‘not

¹ Evelyn Araluen Corr, ‘Text in the Grass: The Fallacy of Form in Indigenous Literary Studies’, paper presented at the roundtable ‘Towards a Transnational Indigenous Imaginary’, at *Climate Fictions / Indigenous Studies*, Cambridge, 24 January 2020.

² Macfarlane, ‘The eeriness of the English countryside’, *The Guardian*, 10 April 2015, <bit.ly/1XwUSmN> [accessed 14 September 2020].

³ Edward Said, *Culture and Imperialism* (London: Vintage, 1994; 1993), p. 70.

⁴ Caitlin DeSilvey, *Curated Decay: Heritage Beyond Saving* (Minneapolis: University of Minnesota Press, 2017), p. 89.

just a kind of pollution as we take it from a global perspective', but a local presence that raises the memory of invasion.⁵

~

In a recent review of Harkin's 2019 collection *Archival-Poetics*, Wiradjuri man Nathan 'Mudyi' Sentance writes:

Most people think of archives, especially big government archives, as either neutral sites of memory and history, or as mundane, boring storage facilities for administrative records, or they don't think about them at all. But the poet Dr Natalie Harkin (Narungga) knows what many First Nations people know, that official archives are a powerful colonial weapon [...] Archives are meant to hold the memory of Australia, but whose memory? The history these official archives preserve and tell is funded, collected, configured, curated, and often created by the colonial settler state. As such, they reflect the state's values and ideology. This is the power that the archives wield: they can turn ideology into history, opinion into fact.⁶

Harkin's 2014 essay 'The Poetics of (Re)Mapping Archives: Memory in the Blood' describes an intimate encounter with the colonial archive, and its power to select and delimit historical records. Harkin's grandmother was a member of the Stolen Generations: Aboriginal children forcibly separated from their families between the 1910s and the 1970s, as a result of systematic attempts by federal and state governments to eradicate Aboriginal peoples through a 'policy of assimilation'.⁷ In 2002, Harkin approached archival authorities on behalf of her grandmother, 'in search of a missing-narrative and the possibility of answers beyond what we knew':

She had important questions about her childhood and removal from her family and community; and important questions about the State-orchestrated domestic-placements and movements of her mother, the beloved spectral-matriarch of our family.⁸

⁵ Bonaventure Muzigirwa Munganga, 'Every (un)thinkable world is (un)thinkable: ecological thinking, the aesthetics and poetics of the uncanny and epistemic issues in Alexis Wright's *The Swan Book*', paper at *Climate Fictions / Indigenous Studies*, 25 January 2020.

⁶ Nathan Sentance, 'Disrupting the Colonial Archive', *Sydney Review of Books*, 18 September 2019, <bit.ly/312YN05> [accessed 14 September 2020].

⁷ 'The Stolen Generations', *Common Ground*, <bit.ly/3gk5yRX> [accessed 14 September 2020].

⁸ Harkin, 'The Poetics of (Re)Mapping Archives: Memory in the Blood', *JASAL: Journal for the Association of the Study of Australian Literature*, 14.3 (2014), 1-14 (p. 1).

Harkin was presented with ‘an almost two-inch-thick, ring-bound file; the unexpected shock-representation of Nanna’s life recorded under the Aboriginal Protection Board and the State Children’s Welfare Department, between the years 1938 to 1947’. In ‘Memory in the Blood’, she describes being ‘[s]haken by the sheer volume of material’; ‘the level of surveillance was overwhelming’. This file, she writes, ‘chronicled in part one woman’s journey under policies of protection and assimilation, but it was not the sum of my beloved Nanna... just one twisted version of her life through the brutal colonial-lens of the State’. The curated racial violence in the file left Harkin ‘aching to touch something, anything more of our recorded past to understand this journey and the particular impacts of colonialism on my family’.⁹

Through her substantial body of work on the poetics of colonial archives, Harkin seeks to ‘destabilise and subvert [...] white-supremacist “archons”’, working towards both the ‘recovery of the forgotten and the revelation of the act of forgetting’.¹⁰ Wright has identified a phenomenon of ‘avoidance’ in Australia, in which settlers ‘refuse to be implicated’ in their own violent history.¹¹ Harkin similarly theorises the ‘national forgetting’ of colonial atrocities in Australia as an ‘active form of collective memory’, tracing how programmatic historical erasures result in public ignorance about the past. She also seeks memories from ‘beyond the so-called-official record’.¹² Harkin writes of being ‘haunted by what has been excluded’ from the archive, and needing to ‘enter those hidden in-between places full of mystery, pain and possibility; to peel back layers of memory and flesh and liberate our stories and skin’. She considers

ways in which the past still haunts us and maintains its influence on the present, and particularly how the layers of meaning in events or texts, previously consigned to history’s shadows, can be exposed through creative means.¹³

Describing her work as ‘re-mapping the archives through art and poetic-prose’, Harkin argues that ‘[l]iterary practice and the arts offer a space to interrogate the racialised-archive and its role in forming national consciousness and identity’. In this space, it is possible to develop new ways critically to ‘unsettle linear modes of history-making which claim the ability to recover the past

⁹ Harkin, ‘Memory’, pp. 1, 3.

¹⁰ Harkin, ‘Memory’, pp. 3, 8.

¹¹ Wright, ‘Politics of Writing’, *Southerly*, 62.2 (2002), 10-20 (p. 18).

¹² Harkin, ‘Memory’, pp. 8, 3.

¹³ Harkin, ‘Memory’, pp. 8, 3, 5.

objectively, wholly and completely'.¹⁴ In *Forensic Architecture*, Weizman turns what he calls the 'forensic gaze' back onto 'state agencies [...] that usually monopolize it'.¹⁵ Committed to 'interrogat[ing]' colonial institutions, Harkin's work might be imagined in similar terms. However, she does not simply invert the state's surveillant gaze, appropriating and repurposing its tools. She worries it by 're-mapping' territories it claims to comprehend and control.¹⁶

Speaking at *Climate Fictions / Indigenous Studies*, the Wiradjuri writer, poet and academic Jeanine Leane described how for Aboriginal writers, there is no difference between text and country, between inscriptions on paper or inscriptions in land; to be invited into an Aboriginal text, she said, is to be invited into country.¹⁷ These are the terrains in which Harkin moves, subverting colonial cartographies, and asserting the endurance and adaptability of ancient Aboriginal knowledge systems. In her 2013 book *Mark My Words: Native Women Mapping Our Nations*, Mishuana Goeman (Tonawanda Band of Seneca) argues that 'settler colonial society is built on the violent erasures of alternative modes of mapping', and considers how Indigenous literary work can 'provide imaginative modes to unsettle settler space'.¹⁸ Warren Cariou and Isabelle St-Amand have similarly discussed colonial 'conceptions of the land as an empty space to be appropriated, commodified, and exploited'; Indigenous writers counter this imaginative scrubbing of space, working to maintain 'a storied relationship between the people and the land, fostering political and cultural resurgences in the same stride'.¹⁹ Harkin's work ought to be read in relation to these wider acts of '(re)mapping' – in which Indigenous writers 'employ traditional and new [...] stories as a means of continuation', crafting 'what Gerald Vizenor aptly calls stories of survivance'.²⁰ Her project to 'unsettle' dominant narratives might also be aligned with Eve Tuck (Unangax) and K. Wayne Yang's approach, in their influential 2012 article 'Decolonization is not a metaphor', to that which they argue is 'unsettling about decolonization'.²¹

Decolonization, they propose, 'brings about the repatriation of Indigenous land and life; it is not a metaphor for other things we want to do to improve our societies and schools'.²² Here, the

¹⁴ Harkin, 'Memory', pp. 4-5.

¹⁵ Weizman, *Forensic*, p. 9.

¹⁶ Harkin, 'Memory', pp. 4-5.

¹⁷ Jeanine Leane, paper presented at the roundtable 'Towards a Transnational Indigenous Imaginary', at *Climate Fictions / Indigenous Studies*, 25 January 2020.

¹⁸ Mishuana Goeman, *Mark My Words: Native Women Mapping Our Nations* (Minneapolis: University of Minnesota Press, 2013), p. 2.

¹⁹ Warren Cariou and Isabelle St-Amand, 'Introduction: Environmental Ethics through Changing Landscapes: Indigenous Activism and Literary Arts', *Canadian Review of Comparative Literature*, 44.1 (2017), 7-24 (p. 10).

²⁰ Harkin, 'Memory'; Goeman, *Mark*, p. 3.

²¹ Harkin, 'Memory', p. 5; Eve Tuck and K. Wayne Yang, 'Decolonization is not a metaphor', *Decolonization: Indigeneity, Education and Society*, 1.1 (2012), 1-40 (p. 1).

²² Tuck and Yang, 'Decolonization', p. 1.

word ‘unsettle’ does double work, troubling embedded discursive complacencies, and insisting that to decolonise is actively to undo settler-colonial power. Drawing on Jacques Derrida’s claim that there ‘is no political power without control of the archive’, Harkin investigates the archive’s elisions, exposing the ideological function of its assumed documentary neutrality.²³ She also directs attention to that which persists beyond the archive, and in spite of settlement: sovereign Aboriginal ways of remembering, steeped in what she calls ‘memory in the blood’.²⁴

I will shortly further consider memory in the blood, before discussing the politics of representation involved in non-Indigenous literary critical work on Indigenous texts. First, I will attend to confluences between Harkin’s work, and that of her friend, the Kokatha and Nukunu glass-artist Yhonnie Scarce. Scarce gives form to glass as a medium for ‘opening story zones into dreadful pasts and presents’.²⁵ She has described family as the ‘driving force behind my work’; her art, like Harkin’s, traces and responds to ancestral enmeshments in colonial forces.²⁶ Scarce often blows glass into the shapes of endemic Australian plant forms, such as murnong, or yam daisy, tubers. These yams were ‘crucial [...] in the economy of pre-colonial Aboriginal Australia’, but have since ‘virtually disappeared’ – a collapse attributed to the introduction by nineteenth century colonists of herds of hooved ruminants, such as sheep and cattle, to landscapes Aboriginal people cultivated.²⁷ Livestock dug up and ate yams; the ‘continuous tramping’ of their hooves hardened soils, such that murnong no longer could grow in them.²⁸ In conversation with Scarce, Teri Hoskin is ‘struck by the thought of your breath, each breath a yam’.²⁹ In response, Scarce describes blowing glass into yams as ‘an extension of self’.³⁰ Fluid glass, incandescent, swells with breath, is shaped, and cools into organic forms which, Scarce explains, refer to ‘Aboriginal culture, bodies, traditions’.³¹ Blown glass, for Scarce, has bodily intimacy, indexing a ‘considered and controlled act of breathing’ through which directed exhalations are ‘enclosed’ in glass.³² This material poetics of the breath involves the voices of ancestors – or, as Scarce puts it,

²³ Jacques Derrida, *Archive Fever: A Freudian Impression*, trans. by Eric Prenowitz (Chicago: University of Chicago Press, 1996; 1995), p. 4, quoted in Harkin, ‘Memory’, p. 9.

²⁴ Harkin, ‘Memory’, p. 6.

²⁵ Teri Hoskin, ‘Yhonnie Scarce breathing, and the sound of knuckles cracking’, *fine print*, 9 (2016), <bit.ly/315HefR> [accessed 14 September 2020].

²⁶ Ausglass, *Yhonnie Scarce, Artist Talk*, online video recording, YouTube, 10 August 2015, <bit.ly/2u3X7HB> [accessed 14 September 2020].

²⁷ Bruce Pascoe, *Dark Emu: Aboriginal Australia and the birth of agriculture* (Melbourne: Scribe, 2018), p. 26.

²⁸ Isaac Batey, quoted in D. Frankel, ‘An Account of Aboriginal Use of the Yam Daisy’, *The Artefact*, 7.1-2 (1982), 43-45 (p. 44); see Pascoe, *Emu*, p. 21.

²⁹ Hoskin, ‘breathing’.

³⁰ Scarce, in Hoskin, ‘breathing’.

³¹ Ausglass, *Yhonnie Scarce*.

³² Hoskin, ‘breathing’.

‘Nat Harkin says the old people are speaking through me. I’m giving voice to my grandparents and great grandparents – they didn’t have a voice’.³³

Scarce engages this practice to reckon with colonial histories of ‘genocide, scientific testing, eugenics’.³⁴ Vegetable shapes, she suggests, offer a ‘perfect metaphor for bodies’.³⁵ Her installations often consist of traumatised glass yams, bush bananas or bush plums, subjected to settler-colonial violence. For example, in *The Silence of Others* (2014), which attests to the history of eugenics in Australia, black glass yams are ‘pinched, twisted and manipulated, forceps still clinging on’, or else are encased in nineteenth century glass display domes.³⁶ Later, in regard to Scarce’s work on nuclear colonialism, I will return to how she physically distorts organic forms, lesioning glass yams when still warm and malleable, or torching black lustre applied to bush plums, ‘bruising’ them.³⁷ Here, I want briefly to contextualise these forthcoming discussions by considering how Scarce connects the proliferation of ‘enclosed objects’ in her work to state policies designed to keep Aboriginal people ‘away from culture’ – and to related histories of cultural resilience.³⁸ I do so in order to show that while Harkin and Scarce work in different media, their practices of inscription are intimate, concerning colonial harm, archives and Aboriginal memory work. It is through these practices that they address South Australia’s nuclear colonial legacies and infrastructures.

Scarce often uses nested structures of containment as a technique to broach ‘hidden histories and stories [...] and their resonating impact on contemporary life’. Harkin engages her 2011 artwork *Florey and Fanny* ‘to teach about State-orchestrated systems of indentured domestic labour targeting young Aboriginal girls for removal from their families’. This work comprises two linen aprons, ‘styled upon those that her Grandmother Fanny and Great-great-grandmother Florey wore when they were domestic servants in the early 1900s’. Scarce ‘hand-stitched their names into the fabric’. She also made ‘sixteen hand-blown glass bush plums’, which she placed inside the apron pockets. The glass fruits, stems protruding through ‘small hand-stitched holes’, nestle together, ‘largely hidden, but acutely present’. Harkin describes drawing upon this palpably ‘embodied work’ as a ‘way to transform out from the archive-box I found myself trapped in’:

³³ Scarce, in Hoskin, ‘breathing’.

³⁴ NGV Melbourne, *Blood on the wattle: Yhonnie Scarce*, online video recording, YouTube, 23 March 2017, <bit.ly/2RDlnUY> [accessed 14 September 2020].

³⁵ Scarce, in Hoskin, ‘breathing’.

³⁶ Toby Fehily, ‘Through a Glass Darkly’, *Broadsheet*, 16 June 2014, <bit.ly/2UdeIr0> [accessed 14 September 2020].

³⁷ Scarce, in Hoskin, ‘breathing’.

³⁸ Ausglass, *Yhonnie Scarce*.

Florey and Fanny have agency to signify something else beyond symbols of servitude and subjection. Despite the glass bush plums being placed into white linen ‘aprons of colonialism’, these fruits are clever and subversive; dignified and defiant. They are our Nannas, our Aunties, our Great-Grandmothers. They are always, and will forever be, firstly Aboriginal.³⁹

Harkin positions *Florey and Fanny* as a response to one of her own primary concerns: ‘memory in the blood’. Kiowa writer N. Scott Momaday developed the trope of ‘blood memory’ in his 1968 novel *House Made of Dawn*.⁴⁰ Harkin describes it as ‘the most recognisable trope used in American Indian literature’.⁴¹ Chadwick Allen has defined it as a ‘collapse of space-time’, in which ‘genealogical terms are rendered equivalent, and the speaker claims a viable contemporary Indigeneity by speaking with and in an ancestral tongue’. Blood memory ‘responds to the colonial imposition of the West’s alienating fiction of (absolute) individual autonomy by rendering space-time as a palimpsest’. To invoke memory in the blood is, then, to ‘place in layers, to lay one generation upon another’, enacting how ‘distinctly Indigenous modes of cultural and artistic expression persist into contemporary times’.⁴²

The glass bush plums held in the pockets of *Florey and Fanny* constitute refusals, by Scarce and by her ancestors, to ‘accept a cultural amnesia, one of irresponsibility to the past’. They embody Harkin’s insistence that ‘atrocities of colonialism must not be our [Aboriginal people’s] defining point’:

We have existential agency and we can choose to materialise beyond such embodied and genealogical pain; we can choose to live beyond the genealogical scarring inflicted by colonisation. To do so, we need to be present in sites that disrupt colonial narratives beyond the old disciplines of knowledge production.⁴³

³⁹ Harkin, ‘In her pocket she carries her heart’, *Southerly*, 18 April 2017, <bit.ly/2RMUjXJ> [accessed 22 September 2020].

⁴⁰ See N. Scott Momaday, *House Made of Dawn* (New York: Harper Perennial, 2018; 1968), p. 114.

⁴¹ Harkin, ‘Memory’, p. 6.

⁴² Chadwick Allen, *Trans-Indigenous: Methodologies for Global Native Literary Studies* (Minneapolis: University of Minnesota Press, 2012), pp. 134-36.

⁴³ Harkin, ‘Memory’, pp. 5-6.

Florey and Fanny also bear witness aesthetically to Aboriginal cultural adaptation and change in the settler-colonial context. If memory in the blood is sustained through successive layering, then the composition of the whole is subtly altered as new deposits accumulate; or, as Michael Dodson suggests, ‘Aboriginalities of today are regenerations and transformations of the spirit of the past, not literal duplications of the past; we recreate Aboriginality in the context of all our experiences, including our pre-colonial practices, our oppression, and our political struggles’.⁴⁴ In their literary and artistic work on nuclear colonialism, Harkin and Scarce respond to South Australian nuclear legacies through these cultural and aesthetic systems. They re-map nuclear exposures and traces, describing their colonial orchestration, and expressing how they inform local experiences of time and place. Harkin has described memory in the blood as ‘a relationship to [...] ancestors, written through landscape and the body’.⁴⁵ The speaker in ‘Memory Lesson 4 | Beyond Intuition’ in *Archival-Poetics* remembers by breathing:

this is the air comprised of the concentrated
elements of our ancestors’ breaths that return and repeat for us to
breathe in deep – air, carried on winds that whisper messages from
generations and a life-time-ago⁴⁶

‘Memory Lesson 4’ is an ‘embodied literary intervention’ against colonial ways of knowing, responding to how Aboriginal memory and identity endure in terrain, beyond archival control.⁴⁷ It also seems aesthetically to respond to how some ‘undercurrents’ riddling the South Australian landscape bear traces of ‘radioactive contamination leaks and spills’.⁴⁸ Returning ancestral breath is comprised of ‘concentrated / elements’, like fallout, or the refined uranium extracted from ores in Indigenous lands.⁴⁹

We might here turn to Joseph Masco’s concept of the ‘nuclear uncanny’ – a phenomenon which exists, he suggests, ‘in the material effects, psychic tension, and sensory confusion produced by nuclear weapons and radioactive materials’. The nuclear uncanny is most intense

⁴⁴ Michael Dodson, ‘The End in the Beginning: Re(de)finding Aboriginality’, in *Blacklines: Contemporary Critical Writing by Indigenous Australians*, ed. by Michelle Grossman (Melbourne: Melbourne University Press, 2003), pp. 25-42 (p. 40).

⁴⁵ Harkin, ‘Memory’, p. 6.

⁴⁶ Harkin, ‘Memory Lesson 4 | Beyond Intuition’, in ‘Haunting’, pp. 9-11 (p. 9).

⁴⁷ Harkin, ‘Memory Lesson 7 | Archival-Poetics Manifesto’, in ‘Haunting’, p. 34.

⁴⁸ Harkin, ‘Harts Mill Projections’, in ‘Haunting’, pp. 18-22 (p. 18); Harkin, ‘On coalitions for hopeful futures’, *Overland*, 224 (2016), <bit.ly/2RSM7EE> [accessed 14 September 2020].

⁴⁹ Harkin, ‘Memory Lesson 4 | Beyond Intuition’, p. 9.

for those ‘inhabiting an environmental space threatened by military-industrial radiation’, in which ‘invisible, life-threatening forces intrude upon daily life, bringing cancer, mutation, or death’.⁵⁰ Harkin encodes ‘Memory Lesson 4 | Beyond Intuition’ with a similar anxiety. However, while the nuclear uncanny as conceived from western perspectives often relates primarily to immediate threat and the human body, Harkin speaks from a mournful knowledge of Maralinga’s indelible contamination. The Yankunytjatjara / Kokatha poet Ali Cobby Eckermann has written of her irradiated country near Ooldea: ‘it’s part of us. we love it. poisoned and all’.⁵¹ Similarly, Wright has described her writing process as ‘like looking at the ancestral tracks spanning our traditional country which, if I look at the land, combines all stories, all realities from the ancient to the new, and makes it one – like all the strands in a long rope’.⁵² Some such strands, as Harkin describes, lead to nuclear histories – to toxic ‘deep colonialisms / written on the body’.⁵³ Though laced with a painful awareness of toxicity, ‘Memory Lesson 4 | Beyond Intuition’ is not ‘damage-centered’ literature, but works above all to sustain culture.⁵⁴ Similarly, Scarce’s work on Maralinga, while haunted by corrosive nuclear presences, is foremost an expression of cultural resilience. Scarce’s *Thunder Raining Poison* (2015) and *Death Zephyr* (2017) attest to Maralinga’s afterlives; they suspend glass yams in air, as fallout clouds. Harkin urges readers to visit and let the work ‘settle to rest under your skin, and never leave you’.⁵⁵

⁵⁰ Joseph Masco, *The Nuclear Borderlands: The Manhattan Project in Post-Cold War New Mexico* (Oxford: Princeton University Press, 2006), p. 28.

⁵¹ Ali Cobby Eckermann, ‘Thunder raining poison’, *Poetry*, 208.2 (2016), 150-51 <www.jstor.org/stable/44016115> [accessed 20 October 2020], p. 151.

⁵² Wright, ‘Politics’, p. 20.

⁵³ Harkin, ‘Seep/Stir/Signify’, in ‘Blood Memory’, in Harkin, *Archival-Poetics*, pp. 17-19 (p. 17).

⁵⁴ Tuck, ‘Suspending Damage: A Letter to Communities’, *Harvard Educational Review*, 79.3 (2009), 409-27 (p. 409).

⁵⁵ Harkin, ‘pocket’.



Figure 3: Yhonnie Scarce, *Death Zephyr* (installation view at Art Gallery of New South Wales), hand-blown glass yams, nylon and steel armature, courtesy Yhonnie Scarce and THIS IS NO FANTASY + dianne tanzer gallery, © Yhonnie Scarce, photograph Felicity Jenkins, Art Gallery of New South Wales, <bit.ly/31aov2G> [accessed 14 September 2020].

~

I have turned towards Aboriginal nuclear cultures from the perspective of British literary scholarship on industrial toxicity, and as part of an enquiry into the memory of nuclear colonialism in Britain. This turn risks replicating colonial discursive structures. Cariou and St-Amand write of how in Indigenous studies, ‘the politics of interpretation of literary works and the definition of scholarly criteria for evaluating critical discourses continue to be negotiated’. There is here, they observe, an ‘acute awareness of research as “a significant site of struggle between the interests and ways of knowing of the West and the interests and ways of resisting of the Other”’.⁵⁶ In his article ‘Decolonizing Comparison: Towards a Trans-Indigenous Literary Studies’, Allen urges mitigation against an ‘insidious *inclusion* [of Indigenous thought] within the dominant academy’s dominant paradigms’; he calls on scholars to oppose the assimilation of such work into a ‘universalizing, essentialist, or appropriative discourse’, and to insist upon

⁵⁶ Cariou and St-Amand, ‘Introduction’, p. 16.

‘Indigenous intellectual autonomy’. Undertaking a narrowly literary-critical approach to Indigenous Australian nuclear cultures, with their forceful and pragmatic commitments to activism and resistance, from the viewpoint of a British scholar risks such an ‘insidious inclusion’.⁵⁷ It has the potential to inaugurate another episode in what Tuck and Yang call the ‘long and bumbled history of non-Indigenous peoples making moves to alleviate the impact of colonization’.⁵⁸ How then might those working from a western vantage discuss Indigenous work on nuclear legacies ‘without falling into the representative traps set by our disciplines’ collective colonial inheritance’?⁵⁹

In her 2011 article ‘The White Man’s Burden: Patriarchal White Epistemic Violence and Aboriginal Women’s Knowledges within the Academy’, Aileen Moreton-Robinson (Goenpul) writes of a ‘significant increase’ throughout the preceding decade in ‘the number of Aboriginal women scholars’ publications informed by our respective embodied standpoints and disciplinary training’. She describes how ‘Aboriginal axiology (way of doing), ontology (way of being) and epistemology (way of writing) shape the knowledge production work that we do’. Moreton-Robinson draws attention to the distinctiveness and ‘complexity of Aboriginal subjectivity’, describing how Aboriginal discourses are ‘informed by [...] living every day as a minority on our lands’ – an experience that cannot be ‘shared by white people, but is inextricably connected to their presence’.⁶⁰ She brings into close focus how Aboriginal cultural work is constituted through specific inheritances and circumstances. Much recent Indigenous scholarship, from across transnational contexts, likewise asserts and enacts the sovereignty of Indigenous knowledge systems. In the revised 2012 edition of her influential 1999 study *Decolonizing Methodologies: Research and Indigenous Peoples*, Māori scholar Linda Tuhiwai Smith discusses a ‘burgeoning international community of indigenous scholars’, ‘grounded politically in specific indigenous contexts and histories, struggles and ideals’. For these scholars, she notes, ‘research is not an innocent or distant academic exercise but an activity that has something at stake and that occurs in a set of political and social conditions’. Smith considers ways ‘to ensure that research with

⁵⁷ Allen, ‘Decolonizing Comparison: Towards a Trans-Indigenous Literary Studies’, in *The Oxford Handbook of Indigenous American Literature*, ed. by James H. Cox and Daniel Heath Justice (Oxford: Oxford University Press, 2014), pp. 377-94 (pp. 377, 392, 377). Oxford Handbooks Online.

⁵⁸ Tuck and Yang, ‘Decolonization’, p. 3.

⁵⁹ Davies, ‘Slow violence’, p. 14.

⁶⁰ Aileen Moreton-Robinson, ‘The White Man’s Burden: Patriarchal White Epistemic Violence and Aboriginal Women’s Knowledges within the Academy’, *Australian Feminist Studies*, 26.70 (2011), 413-31 <doi:10.1080/08164649.2011.621175>, pp. 413, 420.

indigenous peoples can be more respectful, ethical, sympathetic and useful'. She describes how through feminist and other critical practices,

spaces have been opened up within the academy and within some disciplines to talk more creatively about research with particular groups and communities – women, the economically oppressed, ethnic minorities and indigenous peoples. These discussions have been informed as much by the politics of groups outside the academy as by engagement with the problems which research with real, living, breathing, thinking people actually involves.⁶¹

Smith proposes a comprehensive methodological 'blueprint' for research in Indigenous contexts, which Allen summarises as 'centering Indigenous concerns and perspectives within academic research paradigms and localizing Indigenous theories'. As a literary scholar, Allen notes that Smith's methodologies were 'developed within the context of education and other sociologically based research, typically conducted on individual human subjects and in human communities', and considers their limits and extents for 'scholars working within the text-based humanities and arts disciplines'. He observes that while interviewing authors and associated communities 'can be essential to biographical scholarship and to literary history, it is not always possible or practical, and it is not always a productive strategy for literary interpretation'. Instead, he suggests, literary critics should respond to the 'situated nature of knowledge and the active role of context in all forms of communication', through 'scholarship embracing multiple perspectives rather than a singular focus'.⁶²

Towards greater 'Indigenous intellectual production and self-representation in all areas of the academy', Allen calls for more widespread and 'rigorous study of Indigenous literatures'.⁶³ To this end, he asks how 'literary scholars who may or may not be enrolled citizens of Indigenous nations' might 'emphasize the local in the form of the tribally specific', while keeping in mind 'global contexts and approaches'.⁶⁴ For western literary scholars considering Indigenous literary and artistic work, 'rigorous study' might here be defined as enquiry into sedimented 'colonial biases', and respect for 'the local specificities, histories, and geographies that inform the concept

⁶¹ Smith, *Decolonizing*, pp. 16-17, 21.

⁶² Allen, *Trans-Indigenous*, xx-xxii.

⁶³ Allen, 'Decolonizing', p. 381.

⁶⁴ Allen, *Trans-Indigenous*, xx.

of indigeneity'.⁶⁵ British subjects (where 'subject' connotes not only a thinking being, but also an obedient servant to the monarchy) are steeped from the moment of birth in a colonial culture. Contemporary British society routinely elides the violent imperial disposessions on which it was founded, whether through outright denials of the past, a racist and fraudulent nostalgia, or subtler psychic tropes. As Michael Griffiths, an Australian settler scholar, has argued, when reading Indigenous literatures, people belonging to such a society must first step back before going forward.⁶⁶ Here, stepping back to consider the persistence of the imperial past in the present should involve reflection on scholarly research methods. Western academic research – anthropological, sociological, 'medical' – has historically, as Smith discusses, 'been a process that exploits indigenous peoples, their culture, their knowledge and their resources'. As such, research can be understood as 'a set of ideas, practices and privileges that were embedded in imperial expansionism', while becoming 'institutionalized in academic disciplines'. Many non-Indigenous scholars, Smith observes, 'resent indigenous people asking questions about their research', and refuse to acknowledge the colonial roots of institutionally dominant practices. Non-Indigenous critical readers of Indigenous texts ought to listen closely to such questions, and ask some of their (our) own. Why have western scholars historically been so determined to 'get access' to Indigenous 'forms of knowledge'?⁶⁷ How might they (we) acknowledge this violent and intrusive legacy, and what does such an acknowledgement entail for scholarly writing? (Critical theory, Sedgwick influentially suggested, is obsessed with uncovering and demystifying hidden truths.⁶⁸) Chickasaw academic Jodi A. Byrd has argued for the paramount importance of what Smith calls 'vantage point' in a 'world growing increasingly enamoured with faster, flatter, *smooth*'; 'where positionality doesn't matter so much as how [...] we travel there'.⁶⁹ In my readings of work by Harkin and Scarce, I consider 'the situated nature of knowledge and the active role of context in all forms of communication', writing reflexively from a (white, male) British vantage point, and attending to how this position conditions my understanding of Aboriginal texts.⁷⁰ I also bear in mind Harkin's intimation in 'Memory in the Blood' to 'respect the paths I need not travel'.⁷¹

Aboriginal nuclear discourse, with its precise contextual focus, punctures vague imaginaries. It testifies to a persistent, localised form of slow violence inflicted through Britain's internationally

⁶⁵ Allen, *Trans-Indigenous*, xx; Byrd, *Transit*, xxix

⁶⁶ Michael Griffiths, *The Distribution of Settlement: Appropriation and Refusal in Australian Literature and Culture* (Perth: UWA Publishing, 2018), pp. 16-19.

⁶⁷ Smith, *Decolonizing*, pp. 10, 27, 81.

⁶⁸ Sedgwick, *Touching*, pp. 138-43.

⁶⁹ Smith, *Decolonizing*, p. 14; Byrd, *Transit*, xiii.

⁷⁰ Allen, *Trans-Indigenous*, xxii.

⁷¹ Harkin, 'Memory', p. 10.

distributed nuclear colonial network. Attending to this violence, one is compelled to ‘jump[] scales from the local to the regional and to the global’.⁷² Harkin and Scarce respond aesthetically to traces – chemical, colonial, cultural – of ‘forced integration’ into transcontinental military-industrial webs.⁷³ As such, I argue, their work bears reading alongside literary and artistic responses to other points in the same infrastructure. In what follows, I interpret Harkin and Scarce’s work in light of Angela Last’s use of ‘the geophysical [...] as a tool for re-situating oneself and for reimagining global divisions’; and subsequently, in Chapter Six, I juxtapose their work with Sebald’s account of a visit to Orford Ness in *The Rings of Saturn*.⁷⁴ At Orford Ness, the Atomic Weapons Research Establishment tested components of a nuclear device called Blue Danube. They later detonated Blue Danube bombs in South Australia. The devices trialled at Orford Ness were not fitted with plutonium cores, so that there was no risk of triggering nuclear reactions; such explosions were deferred and displaced elsewhere. South Australia’s irradiated landscapes shadow Orford Ness, from which radioactive materials are conspicuously absent. Though geographically distant, the sites are drawn close through enlistment in Britain’s nuclear systems; their absences and presences archive the racialised violence of the operations they hosted. In *Anthropocene Poetics* (2019) David Farrier identifies a distinctive ‘poetics of sacrifice zones’ in contemporary British and American poetry, emerging from uneasy apprehensions of complicity in consumerist infrastructures ‘built on sacrificial places and sacrificial people’.⁷⁵ As I shall later argue in more detail, *The Rings of Saturn* may be read as a nuclear colonial instance of this poetics. Harkin and Scarce have created another kind of sacrifice zone poetics, reckoning with persistent radioactive legacies, and refusing to play the role of ‘sacrificial people’.⁷⁶ Their work offers what Tuck calls a ‘counterstory’ to ‘damage-centered narratives’ of Indigenous peoples, ‘intent on portraying our neighborhoods [...] as defeated and broken’.⁷⁷ While these bodies of work are culturally discrete, there are nonetheless continuities between them. Each express subversive memories of the same empire, and of its nuclear programme, as encountered from different subjective, historical and infrastructural positions. Read together, they attest to the dispersed nature of nuclear colonial memory, and to how imperial positionalities condition it.

⁷² Agard-Jones, ‘Bodies in the System’, *small axe*, 42 (2013), 182-92 <doi:10.1215/07990537-2378991>, p. 183.

⁷³ Michel-Rolph Trouillot, *Peasants and Capital: Dominica in the World Economy* (Baltimore: Johns Hopkins University Press, 1988), p. 181.

⁷⁴ Angela Last, ‘Fruit of the cyclone: Undoing geopolitics through geopoetics’, *Geoforum*, 64 (2015), 56-64 <doi:10.1016/j.geoforum.2015.05.019>, p. 56

⁷⁵ David Farrier, *Anthropocene Poetics: Deep Time, Sacrifice Zones, and Extinction* (Minneapolis: University of Minnesota Press, 2019), p. 51; Klein, ‘Let Them Drown: The Violence of Othering in a Warming World’, *London Review of Books*, 38.11 (2016), <bit.ly/2Pnfgap> [accessed 14 September 2020].

⁷⁶ Klein, ‘Let Them Drown’.

⁷⁷ Tuck, ‘Suspending’, pp. 415, 412.

Harkin and Scarce experience nuclear aftermath as an embodied colonial legacy. Sebald, as we shall see, reflects on the ethical implications of his narrator's explicitly imaginative relationship with the nuclear. In light of Gabrielle Hecht's claim for the necessity, when investigating nuclear cultures, of 'layering stories that are usually kept distinct', I ask – what happens when such literatures are drawn closer?⁷⁸

~

Harkin wrote her epistolary poem 'Zero Tolerance' in 2015, after the South Australian state government initiated a study into the feasibility of boring subterranean chambers into Adnyamathanha lands, in which to place the radioactive waste products of an international array of nuclear power plants. The poem, published in her 2015 book *Dirty Words*, has three epigraphs. The first quotes the Kupa Piti Kungka Tjuta, a group of South Australian Aboriginal women who led a successful anti-dumping campaign between 1998 and 2004: '*We know the country. We know the stories for the land [...] We say "No radioactive dump in our ngura in our country"*'.⁷⁹ The second records the 2013 objection of 'Jeffrey Lee, Senior Traditional Owner' to plans for a new uranium mine at Koongarra: '*Money comes and goes but the land is always here it always stays if we look after it and it will look after us*'.⁸⁰ The third quotes from a 2015 statement by 'Jay Weatherill, Premier of South Australia':

*The Royal Commission will be the first of its kind in the nation and will explore the opportunities and risks of South Australia's involvement in the mining enrichment energy and storage phases for the peaceful use of nuclear energy.*⁸¹

Harkin embeds the poem in a small but representative archive of South Australia's recent nuclear past. She invites readers to scrutinise not only the passages in this archive, but also the rifts between them. The first two quotations index Indigenous resistance to nuclear colonialism in South Australia. The third, drawn by Harkin into relation with the first two, illustrates the rhetorical elision of that resistance in state and industrial nuclear discourse. In *Archival-Poetics*, Harkin declares her intent to 'interrogate what is remembered / recover the forgotten', and

⁷⁸ Gabrielle Hecht, *Being Nuclear: Africans and the Global Uranium Trade* (London: MIT Press, 2012), p. 4.

⁷⁹ Kupa Piti Kungka Tjuta, quoted in Harkin, 'Zero Tolerance', p. 40.

⁸⁰ Jeffrey Lee, quoted in Harkin, 'Zero Tolerance', p. 40.

⁸¹ Jay Weatherill, quoted in Harkin, 'Zero Tolerance', p. 40.

‘reveal the act of forgetting’.⁸² Mobilising a poetics of citation and juxtaposition, Harkin here attunes readers to state nuclear discourse as a kind of archive; one which promotes some kinds of nuclear knowledge, while obscuring others. She also orients them to another nuclear archive: testimonies to dispossession, irradiation and protest. Like Hecht in her 2012 book *Being Nuclear*, Harkin asks readers to reflect on the ‘high stakes’ of the vetting procedures that govern knowledge production in nuclear institutions.⁸³ Disrupting the authority according to which discourse is conventionally ‘designated as “nuclear”’, she historicises official archival procedures, and directs attention to Aboriginal ‘nuclear [...] expertise’.⁸⁴

By situating Weatherill’s statement among stories it seeks to silence, Harkin ‘implants [her] own intentions in it, making it serve [her] [...] aims’. Readers do not hear Weatherill’s voice in isolation, but encounter it among records of Indigenous anti-nuclear protest. This reading context incites recognition of that which the statement seeks to conceal: its historical positionality. There is, too, another voice at work here: Harkin’s archival-poetic voice, which, having ‘lodged’ in Weatherill’s utterance, ‘clashes antagonistically’ with its host, forcing it to ‘serve directly opposite aims’.⁸⁵ Weatherill’s announcement is an example of what Ballard called ‘invisible literature’.⁸⁶ In this literary field, many genres and sub-genres proliferate, each with their distinctive purposes and conventions. In ‘Zero Tolerance’, Harkin exhibits a particular form of nuclear-industrial literature (publicity) in order to make palpable what Hecht describes as the industry’s hidden ‘work of invisibility’, which proceeds sometimes through ‘deliberate decisions, sometimes from structural suppression, sometimes from the tangle of both’.⁸⁷ Weatherill, Harkin indicates, encrypts his putatively neutral language with ‘hierarchies of visibility’, carefully regulating ‘the seen and the unseen, the tangible and the untouchable’.⁸⁸ Jim Green has noted a pervasive trope in Australian federal documents related to proposed deep geologic repositories: the marginalisation of Aboriginal concerns through ‘misrepresentation-by-omission’.⁸⁹ Weatherill similarly mobilises platitudes and jargon – ‘*the first of its kind*’; ‘*opportunities and risks*’ – to gloss over

⁸² Harkin, ‘Memory Lesson 6 | A Way of Knowing’, in ‘Haunting’, p. 31.

⁸³ Hecht, *Being Nuclear*, p. 4.

⁸⁴ Hecht, *Being Nuclear*, p. 4; N.A.J. Taylor, ‘Situated Nuclear Knowledges: an Ecology of Antipodean Nuclear Art’, *Unlikely Journal for Creative Arts*, 5 (2018), <bit.ly/2IpXy61> [accessed 12 October 2020].

⁸⁵ Mixail Baxtin, ‘Discourse Typology in Prose’, in *Readings in Russian Poetics: Formalist and Structuralist Views*, ed. by Ladislav Matejka and Krystyna Pomorska (Cambridge, MA: MIT Press, 1971), pp. 176-98 (pp. 190, 185).

⁸⁶ Ballard, ‘Quotes’, p. 156.

⁸⁷ Hecht, ‘The Work of Invisibility: Radiation Hazards and Occupational Health in South African Uranium Production’, *International Labour and Working-Class History*, 81 (2012), 94-113 <www.jstor.org/stable/23258372> [accessed 14 September 2020], p. 95.

⁸⁸ Nixon, *Slow Violence*, p. 169.

⁸⁹ Jim Green, ‘Radioactive Waste and Australia’s Aboriginal People’, *Angelaki: Journal of the Theoretical Humanities*, 22.3 (2017), 33-50 <[doi:10.1080/0969725X.2017.1387364](https://doi.org/10.1080/0969725X.2017.1387364)>, p. 36.

South Australia's complex, unresolved and traumatic nuclear past.⁹⁰ By forcibly contextualising Weatherill's bland announcement, Harkin counters what Nixon calls the 'calculated opacity' and 'the profoundly consequential tedium' of technocratic discourse – a mode which often 'camouflages violence while clearing a path for it'.⁹¹

In 1946, Orwell observed that the 'whole tendency of modern prose is away from concreteness'. Political writing in particular, he grumbled, 'consists less and less of *words* chosen for the sake of their meaning, and more and more of *phrases* tacked together like the sections of a prefabricated hen-house'. He suggested that such 'ready-made phrases' are very useful for those invested in 'the defence of the indefensible':

Things like the continuance of British rule in India, the Russian purges and deportations, the dropping of the atom bombs on Japan, can indeed be defended, but only by arguments which are too brutal for most people to face, and which do not square with the professed aims of the political parties. Thus political language has to consist largely of euphemism, question-begging and sheer cloudy vagueness [...] Millions of peasants are robbed of their farms and sent trudging along the roads with no more than they can carry: this is called *transfer of population* [...] Such phraseology is needed if one wants to name things without calling up mental pictures of them.

Weatherill scrupulously avoids 'calling up mental pictures' of tailings dams, radioactive waste or political protests.⁹² Rather than describing the physical properties of nuclear operations, he gathers nebulous terms – '*involvement*'; '*phases*'; '*peaceful use*' – and allows them to fall 'upon the facts like soft snow, blurring the outlines and covering up all the details'.⁹³ Like Orwell, Nixon has subjected the indistinct registers of 'policy speak, boardroom speak, and environmental impact speak' to literary analysis. Orwell enquires into how politicians use nonspecific stock phrases to legitimise atrocities in general; Nixon investigates the role of what he calls 'uninhabited language' in the establishment of specific geographies of slow violence, such as nuclear test sites, or the 'submergence zones' that pool behind hydroelectric megadams. He claims that in order to turn places into sacrifice zones, organisations must first displace those

⁹⁰ Weatherill, quoted in Harkin, 'Zero Tolerance', p. 40.

⁹¹ Nixon, *Slow Violence*, p. 169.

⁹² Orwell, 'Politics and the English Language', in Orwell, *Inside the Whale and other essays* (London: Penguin, 1957), pp. 143-57 (pp. 150, 145, 150, 153).

⁹³ Weatherill, quoted in Harkin, 'Zero Tolerance', p. 40; Orwell, 'Politics', pp. 153-54.

who inhabit them imaginatively, through an ‘indirect bureaucratic and media violence’.⁹⁴ Turning to ‘strategically impersonal’ language, they impose an ‘administered invisibility’: ‘almost no population [...] informal residents [...] underdeveloped’.⁹⁵ After the ‘imaginative work of expulsion’ is complete, the ‘direct violence of physical eviction’ begins. Traces of residence are then also erased from the map, absorbed into ‘an empty, isolated space, sealed against culture and memory’. Thus, Nixon argues, do many state and corporate development programmes depend upon the ‘production of ghosted communities’ – first in discourse, and subsequently in the physical world.⁹⁶ Harkin introduces ‘Zero Tolerance’ by using ‘archival-poetics’ to expose how Weatherill’s Royal Commission statement participates in such clearance procedures.⁹⁷ She also amplifies those she seeks to muffle. Prominently juxtaposing Aboriginal voices with Weatherill’s speech, she positions the refusal to acknowledge Aboriginal concerns in state nuclear discourse as an instance of longstanding and systematic settler-colonial racism – ‘new hostile-unfoldings’, as she writes in another poem in *Dirty Words*, of a persistent ‘racist ideology’, working to erase Aboriginal agency and ‘re-enforce terra nullius’.⁹⁸ Harkin, then, aligns the epigraphs of ‘Zero Tolerance’ to enquire into the active imaginative negations that inform the creation of nuclear sacrifice zones; to investigate the racism implicit in these deletions; and to remind her readers that the ‘*use of nuclear energy*’ in South Australia has been anything but ‘*peaceful*’.⁹⁹

Weatherill adopts an ‘uninhabited’, ‘disembodied’ register.¹⁰⁰ He refers to the participation of the state, as an abstract political entity, in routine ‘*phases*’ of a background industrial process. Here, the nuclear industry resembles a natural phenomenon, like gravity, already active regardless of South Australia’s passive ‘*involvement*’.¹⁰¹ Nuclear operations are dissociated from landscape – in the ‘affectless language of technospeak’, cleansed of bodies and places, it is impossible precisely to describe the specific terrains, practices and materials implicated in ‘*mining enrichment energy and storage*’.¹⁰² Throughout ‘Zero Tolerance’, Harkin counters this ‘*smooth*’ rhetoric.¹⁰³ Addressing Weatherill, she invites him physically to visit an international range of irradiated sites.

⁹⁴ Nixon, *Slow Violence*, pp. 169, 162, 151.

⁹⁵ Nixon, *Slow Violence*, pp. 169, 151, 154, 165.

⁹⁶ Nixon, *Slow Violence*, pp. 150, 151, 152-3, 151.

⁹⁷ Harkin, *Archival-Poetics*.

⁹⁸ Harkin, ‘Mythology’, in *Dirty Words*, p. 18.

⁹⁹ Weatherill, quoted in Harkin, ‘Zero Tolerance’, p. 40.

¹⁰⁰ Nixon, *Slow Violence*, p. 169; Moreton-Robinson, ‘Burden’, p. 413.

¹⁰¹ Weatherill, quoted in Harkin, ‘Zero Tolerance’, p. 40.

¹⁰² Nixon, *Slow Violence*, p. 169; Weatherill, quoted in Harkin, ‘Zero Tolerance’, p. 40.

¹⁰³ Byrd, *Transit*, xiii.

She then pictures him at these places, collecting radioactive body burdens. I write here of Harkin, and not of her poetic speaker, because just as Aboriginal literary traditions do not distinguish between the inscription of paper and the inscription of land, nor do they separate writer from text.¹⁰⁴ The idea of a gap between writer and narrator is an important critical tool in western literary contexts, but quite useless in this one. To identify a ‘speaker’ here, then, would be to project western critical expectations onto the text, overwriting Harkin’s specific literary context. Leane has described this form of epistemic violence as ‘academic entrapment’ – a particular manifestation of a wider ‘cognitive imperialism’ driving the ‘cultural transmission of settler narratives and values’.¹⁰⁵ Harkin’s, then, is an emphatically inhabited language. By enlisting Weatherill’s body as a vessel to measure toxic harm, ‘Zero Tolerance’ insists upon a corporeal approach to radioactive geographies. Harkin engages speculative radiation monitoring as a form of ‘counter-mapping’, disrupting state and industrial optics.¹⁰⁶ She also asks:

*What would it take to listen to the Traditional Owners to learn from the lessons
of the land to respect voices that refuse to be bought buried sold?*¹⁰⁷

Urging Weatherill to ‘listen to the people who know’, she undertakes a poetic enquiry into ‘refractory registers of [nuclear] environmental understanding’, layering technocratic discourse with visceral accounts of radioactive toxicity, and with Aboriginal cultures of landscape.¹⁰⁸

Harkin pictures Weatherill lounging on ‘Pacific-paradise-paradox’ archipelagos, contaminated by French and American nuclear weapons tests.¹⁰⁹ Rebecca Solnit has enquired into how nuclear bomb blasts get designated as ‘tests’. She notes that while ‘test’ evokes something ‘controlled and contained’, the thousands of bombs detonated throughout the latter half of the twentieth century in preparation for nuclear war were ‘full-scale explosions in the real world, with all the attendant effects’.¹¹⁰ Similarly, Harkin’s poetics scrutinise state control, and trouble control-state rhetoric. She is interested in literary registers, as well as physical infrastructures, as containment technologies; and she is interested in finding their limits. In ‘Zero Tolerance’, and throughout

¹⁰⁴ Leane, ‘Towards’; Corr, ‘Grass’.

¹⁰⁵ Leane, ‘Towards’; Leane, ‘Other peoples’ stories’, *Overland*, 225 (2016), <bit.ly/3aR30bP> [accessed 14 September 2020].

¹⁰⁶ Adam Loftin and Emmanuel Vaughan-Lee, ‘Counter-Mapping’, *Emergence*, 1 (2018), <bit.ly/37QQMhv> [14 September 2020].

¹⁰⁷ Harkin, ‘Zero Tolerance’, p. 43.

¹⁰⁸ Harkin, ‘Zero Tolerance’, p. 43; Ronda, *Remainders*, p. 50.

¹⁰⁹ Harkin, ‘Zero Tolerance’, p. 41.

¹¹⁰ Solnit, *Savage Dreams*, p. 5.

often ignore this kind of knowledge. Radiation may be sensed in complex ways not only by scientific instruments, but also by those who live intimately with toxic legacies. In one sense, ‘Zero Tolerance’ ends where it begins – on a former proving ground for the nuclear arsenal of a colonial power. Harkin envisages Weatherill surveying ‘leaks and spills’ at South Australian uranium mines before arriving at Maralinga. Punning sardonically, she intensifies the poem’s uncanny nuclear atmosphere, warning Weatherill that ‘it’s hot’ at the Olympic Dam mine, and reminding him to ‘drink lots of water’. Here, an ambient awareness of radioactive contamination corrodes everyday language, imbuing it with toxic fear. ‘[H]ot’ might describe radiation levels, as well as temperature; water – though ‘within the industry’s radiation-health standards’ – both hydrate and irradiate.¹¹⁶ We might here return to Harkin’s claim that ‘[l]iterary practice and the arts offer a space to interrogate the racialised-archive and its role in forming national consciousness and identity’.¹¹⁷ In ‘Zero Tolerance’, she enquires poetically into the influence of what Kathryn Yusoff calls radioactive ‘earth archives’ – no less racialised – on localised forms of consciousness in certain areas of South Australia.¹¹⁸ Emplacing Weatherill, otherwise effectively insulated by privilege from hazardous exposure, firmly within these damaged landscapes, she invites him to ‘drink-up’.¹¹⁹

~

Harkin urges Weatherill to respect Aboriginal nuclear knowledge, and to allow this knowledge to inform policy. At Maralinga, his eyes, lungs and skin will be vulnerable to persistent radioactive legacies, exposing him to imperial violence:

as the wind blows remnant plutonium-dust from old mushroom-clouds
to settle on your skin take time listen to the people who know¹²⁰

In her 2017 essay ‘In her pocket she carries her heart’, Harkin describes Scarce’s installations *Thunder Raining Poison* (2015) and *Death Zephyr* (2017). In *Thunder Raining Poison*, over two thousand glass yams, suspended on wires, assume the form of a mushroom cloud. *Death Zephyr*, similarly, consists of thousands of yams afloat as atomic vapour. This cloud is at a later stage of

¹¹⁶ Harkin, ‘Zero Tolerance’, pp. 41-42.

¹¹⁷ Harkin, ‘Memory’, p. 5.

¹¹⁸ Kathryn Yusoff, *A Billion Black Anthropocenes or None* (Minneapolis: University of Minnesota Press, 2018), p. 49.

¹¹⁹ Harkin, ‘Zero Tolerance’, p. 42.

¹²⁰ Harkin, ‘Zero Tolerance’, p. 43.

dispersal; it is not mushroom-shaped, but spreads, as though torn by aerial currents, through the exhibition space. ‘You could walk so close to *Thunder Raining Poison*’, writes Harkin, as to ‘almost reach in and catch a trace of the deceptively peaceful fallout’. *Death Zephyr*, conversely, is ‘suspended high enough to walk beneath and imagine being swept-up in its deathly toxic wind’.¹²¹ Both these works constitute an ‘embodied response’ to the ‘living memory of Maralinga’ – a memory that persists both in culture, and in physical traces ‘imprinted’ into landscapes.¹²² Memories of Maralinga, writes Harkin, are ‘deeply social and collective’, and ‘rise with tides, stir on currents, and settle with sediment. They are never still’.¹²³ Harkin here recalls Savoy’s words, in her 2015 book *Trace: Memory, History, Race, and the American Landscape*, on the layers of memory – ‘restless [...] animate [...] “scientific”’ – held in Anishinaabe land near Kitchigame, or Lake Superior, in North America. Settler geologists began to survey this region in the 1820s. Land seizure and mining soon followed. ‘Tumultuous histories, human and geological, formed this landscape in which I am implicated. And they continue’.¹²⁴ Harkin and Savoy respond to colonial memory as composed of shifting strata, in which ‘slices of settler consciousness’ come into friction with Indigenous cultures of place.¹²⁵ Land itself also archives contesting practices – from architectures of Indigenous ‘deep relationality’, to extractive settler technologies.¹²⁶ Here, memory aggregates and persists in material traces, not always subject to powers of conscious recall, sometimes resurfacing unbidden. What some know as country, and others the geosphere, archives nineteenth-century mining expeditions, in which settlers pursued minerals formed through Precambrian ‘outpourings of lava’.¹²⁷ It remembers twentieth-century fission reactions; and it holds older stories. Writing colonial legacies engrained into Indigenous land, Savoy and Harkin draw into view these refractive patterns of interpretation.

¹²¹ Harkin, ‘pocket’.

¹²² Harkin, ‘pocket’; Harkin, ‘coalitions’.

¹²³ Harkin, ‘coalitions’.

¹²⁴ Savoy, *Trace*, pp. 64-65.

¹²⁵ Leane, ‘stories’.

¹²⁶ Leanne Betasamosake Simpson, Keynote Address, at *Climate Fictions / Indigenous Studies*, 25 January 2020.

¹²⁷ Savoy, *Trace*, p. 63.

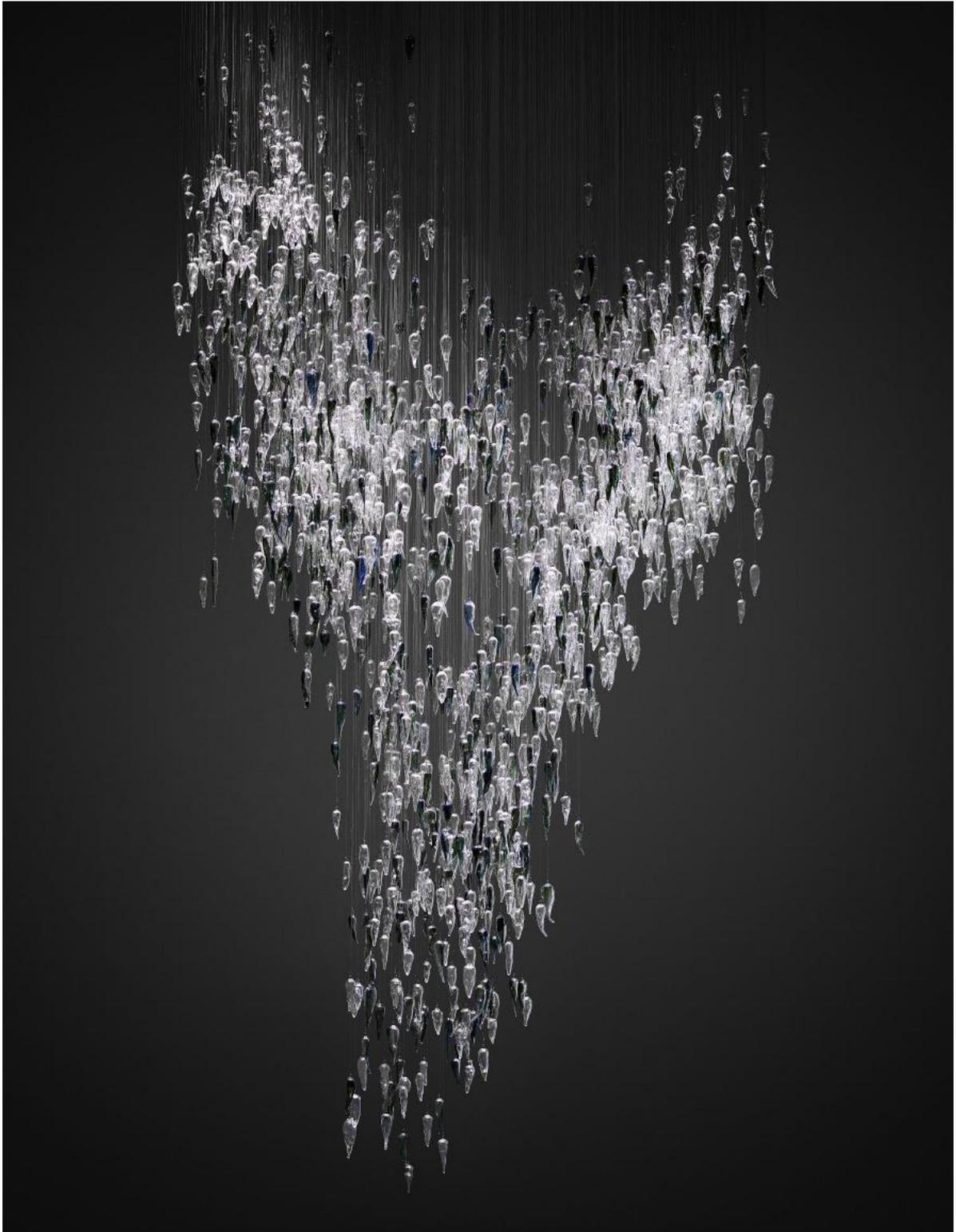


Figure 4: Yhonnie Scarce, *Thunder Raining Poison* (National Gallery of Australia), hand-blown glass yams, metal armature, courtesy Yhonnie Scarce and THIS IS NO FANTASY + dianne tanzer gallery, © Yhonnie Scarce, photograph National Gallery of Australia, <bit.ly/33wsYhE> [accessed 14 September 2020].

Considered through western geological timescales, Maralinga's red sand is a trace of the Pleistocene epoch, a time of glaciations. As temperatures cooled, water solidified into ice and atmospheric moisture decreased, so that less rain fell and communities of plants died out. 'No longer consolidated by vegetation, sediments were blown away in the cold winds [...] and settled into waves of dunes [...] The leaching of iron stained their quartz sands Martian-red'.¹²⁸ For Eckermann, Maralinga is 'traditional country':

where stories were shared under a vast sky, through dance and pantomime. Chapters of story were sung in unison, recited over and over. The song-lines of these ancient stories crisscrossed the land, uniting Aboriginal people in a varied yet shared history of place.

The dispossessions and nuclear blasts at Maralinga severed many of these lines, silencing stories. Eckermann describes walking in Maralinga's sand dune country during the 1980s:

It seemed strange that Aboriginal people were absent from this place. Evidence of existence lay scattered, flints and stone tools, carvings of birds and animals were sun-bleached on the sand, a child's boomerang distorted and alone. There was much mystery residing here. And no-one to ask.

Thunder Raining Poison, she writes, 'marked the beginning of an important and overdue dialogue with the past'.¹²⁹ The nuclear blasts liquefied the 'iron oxide-coated sediment of the Pleistocene aeolian dunes', transforming it into glass with 'a greenish tinge like a cheap wine bottle'.¹³⁰ Its clear glass yams stained with bottle-green hues, *Thunder Raining Poison* embodies the local, ongoing consequences of the atomic explosions.

¹²⁸ Alice Gorman, 'trace fossils – the silence of Ediacara, the shadow of uranium', *The Conversation*, 2 February 2017, <bit.ly/3aXjK0Q> [accessed 14 September 2020].

¹²⁹ Eckermann, 'Thunder raining poison', *Soundings: A journal of politics and culture*, 65 (2017), 136-40 (pp. 136-37).

¹³⁰ Gorman, 'trace fossils'.



Figure 5: Stained glass yams from *Thunder Raining Poison*. © 2020 This Is No Fantasy, <bit.ly/2ZEVixi> [accessed 16 September 2020].

An assumed right to land underpinned the requisitioning, bombing and contamination of Maralinga. *Thunder Raining Poison*, Eckermann suggests, identifies continuities between such presumptions, and representations of Aboriginal knowledge in settler discourse, especially in the context of art curation. In her poem ‘Thunder raining poison’, which responds to Scarce’s artwork, she writes of ‘poison trapped in glass like a coffin, like a museum’.¹³¹ Eckermann here describes how Scarce’s art captures the lethal poisoning of Maralinga, an event written out of the dominant narratives of Australian (and British) history. She also seems to allude to the work’s exhibition context in the National Gallery of Australia. Harkin has described the ‘implicit violence underpinning’ heritage industries in colonial states – many museums, she writes, are ‘haunted spaces’, sustaining the legacies of dehumanising ‘archivisation processes’ by retaining and displaying stolen ‘artefacts’.¹³² Similarly, western strategies for art interpretation can perpetuate what Leane calls ‘entrapment in someone else’s story’.¹³³ I have not flown to Australia to visit Scarce’s installation. In a sense, then, my own experience of her work reinscribes dominant British nuclear imaginaries. I perceive it from across a distance, through photographic representations or verbal descriptions. I do not understand it in its own context. I cannot, to

¹³¹ Eckermann, ‘Thunder’, *Poetry*, p. 150.

¹³² Harkin, ‘Projecting Decolonial Love’, *Southerly*, 3 May 2013, <bit.ly/3hRQYB2> [accessed 22 September 2020].

¹³³ Leane, ‘Towards’.

repeat Harkin's words, 'walk so close' as to 'almost reach in and catch a trace of the deceptively peaceful fallout'.¹³⁴ To evoke *Thunder Raining Poison*, I rely on embedded descriptions like this one from Eckermann:

If you looked closely at the installation you could see the energy of a moment halted in time. And if you listened with compassion you could hear the sorrows of our old people caught in the glass.¹³⁵

Even this limited experience of Scarce's work has power to disrupt the nuclear imaginaries ingrained into contemporary British culture. According to Masco, by the onset of the Cold War a popular '*nuclear phantasmagoria*' had come into being, characterised by 'oscillation' between perceptions of the 'nuclear arsenal as the absolute terror', and of nuclear threat as 'an utterly banal fact of life, one not worth considering'. This phantasmagoria, he argues, is palpable in public discourse about the bomb, which is 'always doubled: simultaneously terrifying and banal':

Consequently, it prevents thought through either an anaesthesia effect or overstimulation. Both of these attitudes reveal the impossibility of thinking past the remainderless event, of thinking through the nuclear apocalypse.¹³⁶

In contemporary Britain, such imaginaries work alongside active elisions and deletions of nuclear history from public discourse. As Sue Rabbitt Roff has noted, for example, the 2019 exhibition *Protect and Survive: Britain's Cold War Revealed* contained 'barely anything' about the forty-five atomic explosions triggered by the British military. She also observes that the recent withdrawal from public access, pending a 'security review', of declassified files on the nuclear tests gives the impression that 'successive governments seem to want the story of British nuclear testing to die off naturally'.¹³⁷ *Thunder Raining Poison* confronts its viewers with the persistence of the nuclear colonial past; it disturbs the imagination of nuclear detonation as a 'remainderless event', and what Masco calls the 'counterdiscursive effect' of this way of thinking.¹³⁸ The yams of which the cloud is composed bring to wider memory the 'sickness that was created through these tests'.¹³⁹

¹³⁴ Harkin, 'pocket'.

¹³⁵ Eckermann, 'Thunder', *Soundings*, p. 136.

¹³⁶ Masco, *Borderlands*, pp. 13-16.

¹³⁷ Sue Rabbitt Roff, 'Cold War exhibition tries to airbrush Britain's dark history of nuclear testing', *The Conversation*, 1 May 2019, <bit.ly/2uP99oo> [accessed 14 September 2020].

¹³⁸ Masco, *Borderlands*, pp. 14-15.

¹³⁹ Scarce in conversation with Daniel Browning, 'The human fallout from Maralinga', (radio programme), *ABC Radio Australia*, 24 September 2016, <ab.co/2S7awq9> [accessed 14 September 2020].

I have already discussed the metaphorical status of yams in Scarce's work – how they stand in for bodies, land and culture. Composed of 'two thousand or more' burnt and irradiated yams, the cloud mourns dispossession, ongoing contamination, and 'the sickness and the dying'.¹⁴⁰ The nine nuclear bombs detonated at Emu Field and Maralinga not only vitrified sand, but also released radioactive fallout into the atmosphere, where the wind caught it, and spread it far and wide. The 'minor' trials, in particular the Vixen B series, dispersed roughly twenty kilograms of plutonium-239, a radioactive isotope with a half-life of twenty-four thousand years, 'as an aerosol over plumes that reach out 150 kilometres or more'.¹⁴¹ As well as this 'fine particulate of plutonium', the trials scattered millions of small fragments of 'paraffin wax, lead, light alloys and plastic with plutonium plated on them'.¹⁴² These materials were not accounted for during British-led clean-up operations in 1967, but lay exposed until 1996, when the Australian Government's Department of Primary Industries and Energy initiated a remediation operation. Even these procedures were not executed to the proposed standard.¹⁴³

Scarce knows Maralinga's glass as burnt and poisoned country. Eckermann's poem describes

that bomb. the torture of red sand turning green
the anguish of earth turned to glass¹⁴⁴

It evinces how, as Leane has said, 'land is the first character in any [Aboriginal] story'.¹⁴⁵ In the immediate aftermath of the detonations, 'glazing covered a circular area with a radius of about 180 metres at each major [bomb] site'. This glass was 'alive with beta radiation, largely from the strontium-90 trapped in it'.¹⁴⁶ Scarce visited Maralinga as part of her research. She describes how these vast 'sheets of glass' now exist in the form of 'little shards that look like glitter'; and she remembers feeling 'uneasy'.¹⁴⁷ She has spoken of her 'strong relationship with my medium':

¹⁴⁰ Eckermann, 'Thunder', *Poetry*, p. 150.

¹⁴¹ Tynan, *Thunder*, pp. 119-20; Ian Anderson, 'Britain's dirty deeds at Maralinga', *New Scientist*, 12 June 1993, <bit.ly/2RETYqt> [accessed 14 September 2020].

¹⁴² Maralinga Rehabilitation Technical Advisory Committee, *Rehabilitation of Former Nuclear Test Sites at Emu and Maralinga (Australia) 2003* (Canberra: MARTAC, 2003), quoted in Tynan, *Thunder*, p. 281.

¹⁴³ See Alan Parkinson, 'Maralinga: The Clean-Up of a Nuclear Test Site', *Medicine and Global Survival*, 7.2 (2002), 77-81 (pp. 79-81).

¹⁴⁴ Eckermann, 'Thunder', *Poetry*, p. 150.

¹⁴⁵ Leane, 'Towards'.

¹⁴⁶ Tynan, *Thunder*, p. 234.

¹⁴⁷ Andrew Taylor, 'Tarnanthi Festival: How a bomb blast inspired glass artist Yhonnie Scarce', *Sydney Morning Herald*, 25 August 2015, <bit.ly/2U6RuTD> [accessed 14 September 2020]; Scarce, 'Artist: Yhonnie Scarce', *National Gallery of Australia*, <bit.ly/3aYSi32> [accessed 14 September 2020].

you have to get along with it, you have to have respect for it otherwise you hurt yourself or others around you. It is alive, it's moving, it comes from something very still – sand – and is made live by heat.¹⁴⁸

Earlier, I discussed how blowing glass allows Scarce to transmit the ‘stories and voices of her ancestors [...] through her breath’, telling of Aboriginal experiences of Australia’s colonial history by crafting densely allusive objects. Here, breath offers a way of giving concrete form and narrative power to a substance in a state of animate transformation. The vitrified sand at Maralinga is similarly lively matter. However, where in Scarce’s work story-bearing breath is ‘enclosed by a film of molten sand’, the Maralinga glass formed in the heat of nuclear explosions orchestrated by a colonial power.¹⁴⁹ This glass works as another reminder of the ‘powerful legacy of settler representations’ – the presumption of access to Indigenous land, and the assumed right to inhabit and manipulate it, maintained through military and other institutional enforcements. Aboriginal storytellers, and in particular the ‘relatively recent emergence of Aboriginal published writing’, disrupt this ‘unquestioned privilege’.¹⁵⁰ Through her sculptural storytelling method, Scarce participates in this kind of writing. Her installations are inseparable from her responsibility to country as a Kokatha and Nukunu woman; like Harkin’s work, they should be approached as ‘deep knowledge understood in complex relations to context’.¹⁵¹ Harkin and Scarce mourn ‘poison ways’ and intervene in the nuclear colonial archive, drawing attention to concealed histories, and their persistent presence in South Australian places and lives.¹⁵² In the next chapter, I turn towards another literary text concerned with the physical and cultural traces of nuclear colonial violence: Sebald’s *The Rings of Saturn*. Harkin and Scarce express their intimate knowledge of and strong responsibilities to their poisoned country. By contrast, Sebald enquires into how in Britain, the places blasted and irradiated in the name of national defence have a vague, occluded presence in collective memory. His narrator enters into these warped imaginative landscapes when, while walking the East Anglian coast, he crosses a tidal river and sets foot on Orford Ness.

¹⁴⁸ Scarce, in Hoskin, ‘breathing’.

¹⁴⁹ Hoskin, ‘breathing’.

¹⁵⁰ Leane, ‘stories’.

¹⁵¹ Judy Iseke-Barnes, ‘Unsettling Fictions: Disrupting Popular Discourses and Trickster Tales in Books for Children’, *Journal of the Canadian Association for Curriculum Studies*, 7.1 (2009), 24-57 (p. 50).

¹⁵² Eckermann, ‘Thunder’, *Poetry*, p. 150.

6. 'In another country'

Nuclear Colonial Memory in W.G. Sebald's *The Rings of Saturn*



Figure 6: An overview of Barbara Hui's *Litmap*, which charts the interlinked geographies of *The Rings of Saturn*.

Barbara Hui, *Litmap*, <bit.ly/3aMM7hk> [accessed 14 September 2020].

Orford Ness is a dynamic landform on England's east coast. Composed of alluvial sediment and shingle, it recedes and accumulates through patterns of erosion, drift and deposition. Its presence does not register in deep geological timescales; its growth has been comparatively rapid, so rapid as to have left a historical signature. The village of Orford was a busy port in the early medieval period, until the Ness silted it off from the open sea. The Ness still crawls south into shallow waters from its northernmost point, where it maintains a tenuous connection with the mainland. From 1955 to 1971, this flint spit was the site of a laboratory controlled by the Atomic Weapons Research Establishment (AWRE). The 'island' had already been 'intermittently occupied as a classified research and test site since the early part of the twentieth century'. The AWRE built six concrete structures, shored up with shingle, in which 'bombs (absent their fissile nuclear cores)' were tested – their aerodynamics, their firing mechanisms, their resistance to extreme temperatures and violent physical concussions. Though Orford Ness remained in the possession of the Ministry of Defence until 1993, when ownership passed to the National Trust, military personnel left the site in 1987. Throughout these successive phases of industrial withdrawal – first scientists and technicians, then other official custodians – the creatures and

plants that make up the Ness' distinctive littoral ecosystems – halotolerant lichens; sea poppies, elder and bracken; black-backed gulls – infringed into the laboratory shells. Salvage merchants trespassed, to strip corroding structures of valuable metal fittings. Now the promontory is a wildlife reserve, and specially appointed caretakers preside over its disintegrating military installations. Orford Ness has, especially since the onset of this period of controlled ruination, come to occupy an important position in British cultures of landscape. As DeSilvey notes, 'dozens of photographers, painters, performers, and filmmakers have travelled over on the passenger ferry to make work in response to the place's encrypted and enigmatic charms'.¹ She omits writers: W.G. Sebald triggered this emergent tradition of pilgrimage to the Ness.

Sebald probably visited Orford Ness in the years between its abandonment by the British military, and its acquisition by the National Trust. The site was then, as it remains, 'a watchword for feint and disguise, the true detail of its operations mired under layers of half-truths, misinformation and deception'.² Historically-minded practitioners working on the Ness must sift through Cold War disinformation, rumour, the unreliable recollections of veterans, a damaged and selective archive, and often a simple absence of information. It is, then, a place of 'historically repressed or contested documentation', sibilant with deceptions and stories that might themselves be thought of as 'transmutating traces, shifting remains'.³ Despite these encryptions, Orford Ness is unambiguously a site of displaced radioactive violence. The British military detonated nuclear devices developed at Orford Ness at locations in Australia, North America and Oceania. In what follows, I read Sebald's account of a visit to Orford Ness in his 1995 *Die Ringe des Saturn: Eine englische Wallfahrt (The Rings of Saturn)* in light of the Ness' enmeshment in empire's 'extensive infrastructural relations'.⁴ Drawing on recent critical work by Richard T. Gray and Josephine Carter, I read *The Rings of Saturn* as a representation of the effects of a longstanding and racialised 'elision of key strands in the story' of the nuclear complex in western culture.⁵ In their work on nuclear colonial slow violence in South Australia, Scarce and Harkin respond to 'forced integration' into transcontinental military-industrial networks, and craft 'what Gerald Vizenor aptly calls stories of survivance'.⁶ These stories record dispossessions,

¹ DeSilvey, *Curated*, pp. 75-76, 89.

² Judith Palmer, 'Echoes of Destruction', in *A Record of Fear*, ed. by Louise K. Wilson (Salisbury: B.A.S. Printers Ltd, 2005), pp. 97-118 (p. 97).

³ Renée Green, 'Survival: Ruminations on Archival Lacunae, 2002', in *The Archive*, ed. by Charles Merewether (London: Whitechapel Gallery, 2006), pp. 49-55 (p. 52).

⁴ Murphy, 'Alterlife and decolonial chemical relations', *Cultural Anthropology*, 32.4 (2017), 494-503 <doi:10.14506/ca32.4.02>, p. 501.

⁵ Priyamvada Gopal, *Insurgent Empire: Anticolonial Resistance and British Dissent* (London: Verso, 2019), p. 4.

⁶ Trouillot, *Peasants and Capital*, p. 181; Goeman, *Mark*, p. 3.

poisonings, and Indigenous resilience. In *The Rings of Saturn*, Sebald represents an encounter with another site in Britain's nuclear colonial infrastructure. As we shall see, his object here is not to attune readers to the toxic slow violence inflicted upon people in colonised territories; rather, it is to offer up for inspection the forces that condition his narrator's inhibited awareness of this history. *The Rings of Saturn* warrants reading as an enquiry into the quandaries of representation involved in turning from a position at an imperial centre to consider the nuclear colonial past. Here, Sebald insists that 'one cannot simply get out' of the unevenly distributed heritage – geophysical, social, cultural – of colonial power; that 'this hurtful and deadly entanglement forms part of contemporary existence'.⁷

~

Before continuing, we must consider the question of translation: Sebald wrote *The Rings of Saturn* in German. For the English version he collaborated with Michael Hulse, with whom he also worked on translations of *Die Ausgewanderten* (*The Emigrants*) and *Schwindel. Gefühle* (*Vertigo*). Hulse divulges that after he was commissioned to translate *The Emigrants*, Sebald said he would be 'willing to look at draft translation material and offer suggestions. This was something I welcomed, because his English had already struck me as rich and nuanced and because an author can take liberties a translator cannot and should not take'. Hulse makes no indication that this relationship changed for the translation of *The Rings of Saturn*, and records Sebald's contribution to the English version. For example, Sebald's reconstituted quotations posed challenges for his translator. Should he translate original sources, or Sebald's amended versions? Hulse's 'policy at such points was to restore the original', but only as 'a way of silently prompting [Sebald] to consider whether his adaptation of texts for German readers remained appropriate [...] for an anglophone readership'.⁸ Regarding translations of embedded quotations in chapter V, Sebald wrote to Hulse that he had 'changed your version, which goes back to the proper source, so that it follows my own (partially fabricated) rendering'.⁹ In general, Hulse 'probably adopted ninety per cent of [Sebald's] suggestions'.¹⁰ The translation was, then, a collaborative process in which Sebald retained strong authorial agency. Given Sebald's bilingualism, his prominent role in the

⁷ Murphy, 'Alterlife', p. 500.

⁸ Michael Hulse, 'Englishing Max', in *Saturn's Moons: W.G. Sebald – A Handbook*, ed. by Jo Catling and Richard Hibbitt (Leeds: Modern Humanities Research Association and Maney Publishing, 2011), pp. 196, 200-01.

⁹ W.G. Sebald, letter to Hulse, quoted in Hulse, 'Englishing', p. 200.

¹⁰ Hulse, 'Englishing', p. 204.

translation, and Hulse's receptivity to his input, we might justifiably read the English version of *The Rings of Saturn* as a primary text, as I do here.

The narrator of *The Rings of Saturn* alights at Orford Ness while engaged in a *Wallfahrt*, or pilgrimage, 'to walk the county of Suffolk'.¹¹ Gray has observed that this pilgrimage is 'not simply geographical in nature: it is also a *temporal* pilgrimage through the history of modern Europe and its colonial conquests from the seventeenth through to the twentieth century'.¹² As the narrator walks through Suffolk, he encounters 'traces of destruction, reaching far back into the past', and seeks to uncover their histories.¹³ In doing so, he is drawn into complex, intersecting stories – often oblique and enigmatic – unfolding across an extensive territorial range. Critics have tended to read these tales of destruction as expressing a universalising historiography of decline, understating their politically critical dimensions.¹⁴ As Carter has suggested, while many have noted 'Sebald's condemnation of colonialism, they typically proceed to undermine its specificity, viewing it as yet another example which lends support to Sebald's diagnosis of the nineteenth and twentieth centuries as characterised by a history of destruction'.¹⁵ Carter and Gray give close consideration to Sebald's 'critique of reason', and to his interest in the implementation of 'regulation and order [...] for the purposes of mastery over others'.¹⁶ This critical work allows us to see destruction in *The Rings of Saturn* as a politically orchestrated, as much as neutrally inevitable, phenomenon.

It is difficult to classify *The Rings of Saturn*. As Gray describes:

¹¹ Sebald, *The Rings of Saturn*, trans. by Hulse (New York: New Directions Press, 1998; 1995), p. 3 (hereafter *Rings*).

¹² Richard T. Gray, *Ghostwriting: W.G. Sebald's Poetics of History* (London: Bloomsbury Academic, 2017), pp. 278-79.

¹³ *Rings*, p. 3.

¹⁴ For example, J.J. Long suggests *The Rings of Saturn* is distinguished by an overriding 'historical pessimism'; Peter Morgan 'locates Sebald in a line of German "romantic nihilists"' and argues that *The Rings of Saturn* typifies his wider 'cultural pessimism in which everything is interpreted under the sign of destruction'; Maya Barzilai likewise remarks on a 'fixation on decline'. See J.J. Long, *W.G. Sebald: Image, Archive, Modernity* (New York: Columbia University Press, 2007), p. 144; Gray, *Ghostwriting*, p. 307; Peter Morgan, 'The Sign of Saturn: Melancholy, Homelessness and Apocalypse in W.G. Sebald's Prose Narratives', *German Life and Letters*, 58.1 (2005), 75-92 <doi:10.1111/j.0016-8777.2005.00305.x>, p. 86; Maya Barzilai, 'Melancholia as World History: W.G. Sebald's Rewriting of Hegel in *Die Ringe des Saturn*', in *W.G. Sebald and the Writing of History*, ed. by Anne Fuchs and Long (Würzburg: Königshausen & Neumann, 2007), pp. 73-90 (p. 89).

¹⁵ Josephine Carter, 'W.G. Sebald and the Ethics of a Guilty Conscience', *International Journal of Postcolonial Studies*, 16.5 (2013), 730-49 <doi.org/10.1080/1369801X.2013.858972>, p. 733.

¹⁶ Gray, *Ghostwriting*, pp. 346, 344.

[it] seems either to have no storyline at all, or to have so many brief, episodic, undeveloped, and seemingly unconnected vignettes that it represents nothing but a motley collection of fragments [...] The text mimics those cosmic rings from which it draws its name: like the rings of Saturn, it is composed of narrative debris and the detritus of memory, held together by certain overriding gravitational forces that lend it an appearance of integrity and atomic unity.

Drawn by these ‘gravitational forces’ into patterns, the debris and detritus compose ‘a series of distinct and identifiable layers that are laminated onto each other in creative and often surprising ways’.¹⁷ These layers are made up of travelogue entries recounting the journey on foot through Suffolk; embedded narratives; fragments; photographs; and extended reflections on historical processes and events. (This list is by no means exhaustive.) The text, then, is uniquely interested in processes of sedimentation and comminution. As such, I will here take a more granulated approach to its critique of empire than has hitherto been usual. *The Rings of Saturn* offers an expansive critique of colonialism and rationalism; it does so by tracing specific imperial histories, unfolding in particular cultural, geographical and archival contexts. In what follows, I read *The Rings of Saturn* as an episodic text, not only in terms of historical and narrative method, but also in terms of formal technique. Sebald’s literary approach, I will argue, shifts along an episodic scale. The text responds to the minute and dispersed characteristics of the localised histories that the narrator gathers together, while querying historiographical models that aspire to a total view. Sebald carefully locates his narrator’s mentality in time, place and culture, and invites readers to consider how this position – a troubled and contingent ‘vantage point’ onto history – informs his account. The narrator discloses, ‘I began in my thoughts to write these pages’ after admission to a hospital in the wake of a nervous breakdown; and, he continues, ‘I begin to assemble my notes, more than a year after my discharge’.¹⁸ He recalls how, walking through Suffolk, he traced complex and violent histories encrypted into the landscape. In doing so, he considers how certain contexts – historical, geographical, cultural, psychic – informed, and continue to inform, his sense of what left these remnants; and he dwells on the ‘rational strategies developed in European culture since the Renaissance and Enlightenment’, examining their role not only in the representation of history, but also in western colonialism and related systems for political and economic domination.¹⁹ The implication is that what Sebald elsewhere calls the ‘appalling reality of collective catastrophe’ in modernity is rooted in specific, and deeply embedded, cultural

¹⁷ Gray, *Ghostwriting*, pp. 274-75.

¹⁸ *Rings*, pp. 125, 3, 5.

¹⁹ Gray, *Ghostwriting*, p. 309.

discourses and forms of social organisation.²⁰ Sebald's narrator, then, seeks actively to describe the 'horrific circumstances of historical and contemporary reality' – and, conscious of the politically fraught risk of 'falsification' implicit in his endeavour, develops 'creative representational strategies *for* this description'.²¹ As we shall see, this writerly effort, no less than his horror for the atrocities he researches, sets in motion an accretive unsettlement of his mental state.

The narrator emphasises that he writes from a particular 'vantage point'.²² As such, *The Rings of Saturn* bears reading in relation to the Indigenous critical theories I discussed in the last chapter. Scholars such as Smith, Byrd, Goeman and Moreton-Robinson work from 'the vantage point of the colonized'; they call for closer attention to 'local histories', and how these shape situated 'forms of knowledge'.²³ Sebald too asserts the importance of what Byrd calls 'positionality' – but he does so 'from within imperial culture'.²⁴ As a subject, his narrator is shaped in particular ways by planet-spanning industrial systems: he recalls internalising, during childhood, certain 'notion[s]' they foment; he is sustained by the wealth they extract; and he is largely insulated from the devastation they effect.²⁵ The narrator is keenly aware of his position in what he perceives as a 'dynamic of centre and periphery that governs the distribution of political power', and of how this dynamic conditions his ability to testify to colonial histories.²⁶ He is dubious as to whether from this position, or indeed any position, it is possible to attain the 'much-vaunted historical overview' – only through a 'falsification of perspective', he argues, do history's survivors 'see everything from above, see everything at once, and still we do not know how it was'.²⁷

The narrator's sceptical attitude towards the 'all-encompassing view that takes in every periphery simultaneously' guides his narrative project.²⁸ Though, as we shall see, he develops special discursive strategies to recount violent colonial histories, he continually expresses mistrust in his ability to do so with 'precision and responsibility', whether due to the limitations of his

²⁰ Sebald, *On the Natural History of Destruction*, trans. by Anthea Bell (London: Penguin, 2004; 1999), p. 50 (hereafter *Destruction*).

²¹ Gray, *Ghostwriting*, p. 359; *Rings*, p. 125.

²² *Rings*, p. 125.

²³ Smith, *Decolonizing*, p. 14; Goeman, *Mark*, p. 135.

²⁴ Byrd, *Transit*, xiii; Leela Gandhi, *Affective Communities: Anticolonial Thought, Fin-de-Siècle Radicalism, and the Politics of Friendship* (Durham, NC: Duke University Press, 2006), p. 5.

²⁵ *Rings*, p. 53.

²⁶ Gray, *Ghostwriting*, p. 347.

²⁷ *Rings*, p. 125.

²⁸ Gray, *Ghostwriting*, p. 356.

sources, or out of a sense of the inhibition of his own outlook.²⁹ Priyamvada Gopal has recently written of anticolonial ‘metropolitan dissidents’ who, through ‘contact with or consciousness of insurgent movements’ in colonised territories, came to ‘a recognition of the narrowness of their own frames of historical and epistemological reference’. Sebald’s narrator is not involved in any such ‘collective organizational efforts’ to undo colonial power; nor does he benefit from what Gopal calls the ‘reverse tutelage’ of ‘anticolonial interlocutors’.³⁰ Rather, happening upon certain presences in the landscape, he seeks to unravel the histories behind them, and in doing so finds stories that run counter to prevailing narratives of empire. These stories are surrounded by ‘powerful silences’; within dominant historiographies, they are ‘unthinkable’.³¹ The narrator, deeply influenced by these silences and historiographies, is often left confounded by his research. As he tries to tell the stories embedded in the landscape, he is frequently gripped by anxiety that in his account, too, a ‘cycle of silences’ circulates.³² Sebald, then, enquires into how the pervasive ‘institutional forgetting’ of the imperial past in Europe affects his narrator, cognitively and discursively.³³ As I shall argue, his recursive pattern of ‘providing representations and then calling these representations into doubt’ draws into view something akin to what Tuck and Yang call an ‘ethic of incommensurability, which recognizes what is distinct’.³⁴

It is worth emphasising that by reading Sebald alongside Indigenous practitioners, I am not working to ‘indigenize’ Sebald studies. Indigenization ‘means change led by Indigenous people to bring Indigenous ways of knowing, being and doing into spaces that are not designed for those ways’.³⁵ It does not mean British literary scholarship influenced by Indigenous critical work on empire. By juxtaposing Sebald, Harkin and Scarce, I seek to map and interpret cultural work from separate points along interlinked nuclear colonial infrastructures. Nuclear knowledges are always situated; here, nuclear knowledge pertains to British imperial legacies, as experienced from culturally localised, geographically dispersed and politically interconnected positions. For Sebald, a distinct sense of place – where culture is inseparable from colonialism, and land entangled in violent legacies – deeply informs strategies for the aesthetic representation of

²⁹ *Destruction*, p. 53.

³⁰ Gopal, *Insurgent*, pp. 21-24.

³¹ Gopal, *Insurgent*, p. 10; Trouillot, *Silencing the Past: Power and the Production of History* (Boston: Beacon, 1995), p. 72.

³² Trouillot, *Silencing*, p. 26.

³³ Abdul Janmohamed and David Lloyd, ‘Introduction: Toward a Theory of Minority Discourse’, *Cultural Critique*, 6 (1987), 5-12, <www.jstor.org/stable/1354253> [accessed 14 September 2020], p. 8.

³⁴ Carter, ‘Ethics’, p. 739; Tuck and Yang, ‘Decolonization’, p. 28.

³⁵ Indigenous students, faculty and staff at Memorial University, ‘Indigenization is Indigenous’, *Memorial University Gazette*, 12 February 2019, <bit.ly/39nzqJQ> [accessed 14 September 2020].

history. Sense of place in the work of Harkin and Scarce is bound up with the ‘intimate activism’ involved in living with toxicants from layered nuclear pasts and presents.³⁶ They each publish and exhibit work in which a contemporary Aboriginal historical gaze is ‘staring back’ at ongoing settler violence, outlasting attempts at erasure.³⁷ Sebald’s narrator has neither this particular contextual understanding of colonialism, nor this bodily knowledge of radioactive harm. He speaks from relatively uncontaminated territory; and he is saturated in dominant western imperial and nuclear imaginaries. Here, apocalypse (including nuclear apocalypse) did not begin centuries (decades) ago, but may strike at an unspecified moment in the future. As we shall see, in his work on Orford Ness Sebald broaches the absence of the ‘tests’ from the European nuclear imagination, performing and disrupting a fascination – an ‘excessive preoccupation’ – with global apocalypse.³⁸ In one sense then, I am reading these dispersed nuclear literatures as ‘evidentiary’ work – as mediating and commenting upon radically uneven experiences of colonialism, and associated ‘regimes of perceptibility’ for toxicity.³⁹ Sebald replicates conventional western nuclear imaginaries – but unlike, for example, Nevil Shute in *On the Beach* (1957) or Russell Hoban in *Riddley Walker* (1980), he does so critically. For Sebald, as for Harkin and Scarce, it is simplistic to approach nuclear knowledge as a collective, evenly understood category. Harkin, Scarce and Sebald, then, respond aesthetically to emergent experiences of life in what is called the ‘nuclear age’ as ‘a kind of varied enmeshment and enfleshment in infrastructures’.⁴⁰ Harkin and Scarce craft what Leane calls ‘First Nations realisms’, representing lived experiences of radioactive toxicity.⁴¹ Conversely, for Sebald’s narrator, an encounter with some physical remnants of Britain’s nuclear project only underscores the *imaginative* character of European nuclear experience. Though they do so in very different ways and from very different places, these bodies of work unearth buried traces, look into gaps in the nuclear archive, and disturb dominant nuclear imaginaries. This chapter draws them closer in order better to understand rifts in nuclear memory and perception, and how they run through the literatures of nuclear colonial power.

~

³⁶ Tironi, ‘Hypo-interventions: Intimate activism in toxic environments’, *Social Studies of Science*, 48.3 (2018), 438-55 <doi:10.1177/0306312718784779>, p. 439.

³⁷ Corr, ‘Snugglepot and Cuddlepie in the Ghost Gum’, *Sydney Review of Books*, 11 February 2019, <bit.ly/2VFJ6eD> [accessed 14 September 2020].

³⁸ Fisher, *Weird*, p. 17.

³⁹ Liboiron, Tironi and Calvillo, ‘Toxic politics’, p. 339; Murphy, *Syndrome*, p. 10.

⁴⁰ Murphy, ‘Alterlife’, p. 498.

⁴¹ Leane, ‘Towards’.

In his 1993 book *Culture and Imperialism*, Edward Said describes what he elsewhere calls empire's 'imaginative geography': a 'theoretical mapping and charting of territory that underlies Western fiction, historical writing, and philosophical discourse'.⁴²

There is first the authority of the European observer – traveller, merchant, scholar, historian, novelist. Then there is the hierarchy of spaces by which the metropolitan centre and, gradually, the metropolitan economy are seen as dependent upon an overseas system of territorial control, economic exploitation, and a socio-cultural vision; without these stability and prosperity at home – 'home' being a word with extremely potent resonances – would not be possible.

Said famously argues that many important works of modern western literature maintain a comfortable atmosphere by 'effacing the reality' of this vast 'overseas system'. For example, though the Northamptonshire estate that provides the setting for Jane Austen's 1814 *Mansfield Park* runs on wealth from the sugar industry, the novel 'sublimates the agonies of Caribbean existence to a mere half-dozen passing references to Antigua. And much the same processes occur in other canonical writers of Britain and France'.⁴³ In *The Rings of Saturn*, Sebald experiments with this circumscribed literary sensibility, both reproducing and disrupting it in order to explore the persistence in the contemporary European psyche of colonial habits of mind. Walking through Suffolk, the narrator returns time and again to the theme of European colonial power, 'the nature and origins of that power', and 'the imperialist mentality that resulted from it'. As we shall see, though he repeatedly isolates and critiques instances of this 'mentality', the narrator nonetheless remains conscious that he cannot fully disentangle himself from certain notions 'with which we grew up'.⁴⁴ Corr, in a recent essay on the settler-colonial narratives embedded in Australian children's literature, describes a similar feeling: 'I can name the colonial complexes and impulses which structure these texts but it doesn't change the fact that I was raised on these books too'.⁴⁵ The narrator observes that colonial power persists structurally, as well as culturally. For example, after describing how the 'enormous profits' generated through slavery and the sugar industry were, in Britain, 'largely lavished on the building, furnishing and maintenance of magnificent country residences', he outlines another way of 'legitimizing this kind of money': 'patronage of the arts'. As paintings and sculptures, he notes, the 'capital

⁴² Said, *Orientalism* (London: Penguin, 2003; 1978), p. 55; Said, *Imperialism*, p. 69.

⁴³ Said, *Imperialism*, pp. 69-70.

⁴⁴ *Rings*, pp. 129, 53.

⁴⁵ Corr, 'Snugglepot'.

amassed in the eighteenth and nineteenth centuries through various forms of slave economy is still in circulation [...] still bearing interest'. *The Rings of Saturn*, then, concerns the historical and ongoing implication of the English landscape into 'networks of a complexity that goes far beyond the power of any one individual to imagine', and the narrator's psychic responses to the 'history of colonialism, most of it not yet written'. If Harkin and Scarce respond to the deadly entanglement of Aboriginal lands in British imperial systems, then Sebald enquires into specific forms of colonial consciousness – including nuclear colonial consciousness – that take shape in what he calls 'centres of power'.⁴⁶

The sixth chapter of *The Rings of Saturn* begins with crossings, and a mystery. 'Not far from the coast', writes the narrator, 'between Southwold and Walberswick, a narrow iron bridge crosses the River Blyth where a long time ago ships heavily laden with wool made their way seaward'. This bridge, he continues, was 'built in 1875 for a narrow-gauge railway'; the train that ran on it, according to 'local historians', 'had originally been built for the Emperor of China'. The events underlying this enigmatic presence remain unknown: 'Precisely which emperor had given this commission I have not succeeded in finding out, despite lengthy research; nor have I been able to find out why the order was never delivered or why this diminutive imperial train [...] ended up in service on a branch line of the Great Eastern Railway'.⁴⁷ There follows an extended and digressive account of the interlinked nineteenth century histories of the British and Chinese Empires, containing the narrator's speculations about the train's provenance. As he recounts:

In 1837 the Chinese government had taken measures to prevent opium trading, whereupon the East India Company [...] felt that one of its most lucrative ventures was in jeopardy. The subsequent declaration of war began the opening up, by force of arms, of the Chinese Empire, which for two hundred years had remained closed to foreign barbarians.⁴⁸

During his ensuing descriptions of the Opium Wars and their bloody aftermath, the narrator pauses to consider why, in 1860, British soldiers looted and incinerated the 'legendary landscaped gardens' of Yuan Ming Yuan.⁴⁹ His interpretation of this incident crystallises the text's concern with 'forms of knowledge that derive from rigid structures or inflexible systems', and with how

⁴⁶ *Rings*, pp. 194, 91, 118, 134.

⁴⁷ *Rings*, pp. 137-38.

⁴⁸ *Rings*, p. 141.

⁴⁹ *Rings*, p. 144.

they often paradoxically ‘promote destruction and disorder’.⁵⁰ As the narrator understands it, the garden subjected the soldiers’ ingrained assumptions about the ‘superiority’ of western ‘intellectual and material achievements’ to extreme pressure. Beautiful and sophisticated, it ‘immediately annihilated any notion of the Chinese as an inferior and uncivilised race’, rendering it ‘an irresistible provocation’.⁵¹ Michel-Rolph Trouillot suggests that when ‘reality does not coincide with deeply held beliefs, human beings tend to phrase interpretations that force reality within the scope of these beliefs’, devising ‘formulas to repress the unthinkable and to bring it back within the realm of accepted discourse’.⁵² The garden of Yuan Ming Yuan prevented the ‘smooth’ application of the ‘taxonomic order’ according to which these men arranged their experiences; its destruction, the narrator implies, was a way to ‘repress the unthinkable’, a recuperative act of erasure.⁵³

In his account of the destruction of the garden, Sebald ‘not only seeks to *voice* a critique of reason, but [...] also *performs* this critique in the aesthetic make-up of his own work’.⁵⁴ Wary of replicating ‘disembodied’ systems for historical representation, the narrator carefully contextualises his account.⁵⁵ He describes how, walking near the Suffolk coast, he encountered a vestige of colonial power. This description occasions a formal and generic shift, opening into embedded passages, scholarly discourse, and more compounded reflections. Through this shift, the narrator signals his inability to comprehend his surroundings – and in particular, their historic integration into vertiginous colonial networks – from the immediate perspective of the walker. In order to situate himself he must, paradoxically, assume the less explicitly located persona of the researcher. The narrator often uses this literary method; it allows him to allude to the documentary authority of testimonies left by those present at the violent events in which, he finds, the Suffolk landscape is entangled. The train episode exemplifies what Gray calls Sebald’s ‘poetics of history’, in which he ‘interweaves subjective history – that is, the *personal experience* of historical events – with the objective history of [...] factual occurrences’. Yet even (or especially) ‘objective history’ is subjected to exacting scrutiny.⁵⁶ The knowledge offered here, the narrator insists, consists only of what he has been able to gather during his research (it is worth bearing in

⁵⁰ Gray, *Ghostwriting*, p. 325.

⁵¹ *Rings*, pp. 142-44.

⁵² Trouillot, *Silencing*, p. 72.

⁵³ Byrd, *Transit*, xiii; Gray, *Ghostwriting*, p. 334; Trouillot, *Silencing*, p. 72.

⁵⁴ Gray, *Ghostwriting*, p. 346.

⁵⁵ Moreton-Robinson, ‘Burden’, p. 413.

⁵⁶ Gray, *Ghostwriting*, p. 280.

mind that he cannot determine which emperor ordered the train, why, or how it ended up in Suffolk). He does not seem altogether convinced of the trustworthiness of his source material:

despite lengthy research [...] uncertain sources [...] a fairly complete taxonomy [...] the accounts of what happened in those October days are not very reliable [...] according to Charles George Gordon [...] as rumour had it [...] according to various sources.⁵⁷

And so on. By way of aborting his enquiries, he proposes wearily that the past exists ‘merely as memory’.⁵⁸ From this failure, or perhaps refusal, to give a definitive account, we might turn to John Wylie’s observation that ‘Sebald’s texts and images highlight the impossibility and even the moral inadequacy, the mendacity, of writings that purport simply to document truth empirically and factually’.⁵⁹ We might also remember Harkin’s anticolonial work to ‘unsettle linear modes of history-making which claim the ability to recover the past objectively, wholly and completely’.⁶⁰ Sebald does not simply confront readers with records of systemic imperial abuses. He alerts them to historical events as mediated through their surviving traces, and the contested fields of memory that surround these traces. Memory, here, is subject to the emphases and redactions that powerful archives impose. It is also shaped by certain inherited ‘complexes and impulses’ – for example, those which drive expectations that historical writing should conjure up a ‘clear picture’ of the past.⁶¹ Dissatisfied with discursive procedures for generating illusions of comprehensiveness and clarity, not least because of what inevitably, and often deliberately, goes excluded from this genre of representation, the narrator turns to the unacknowledged trace, the oblique association and the averted gaze.

Throughout his progress, then, the narrator reckons with the particular challenges involved in attesting with ‘precision and responsibility’, from his position in the metropole, to the ‘continuing oppression, exploitation, enslavement and destruction, across the borders of social class and race, of those [...] furthest from the centres of power’.⁶² The text arguably considers itself an inappropriate vehicle for such histories, concerning itself rather with the psychic and discursive effects of the ‘individual and collective amnesia’ that structure imperial consciousness

⁵⁷ *Rings*, pp. 138, 139, 145, 148.

⁵⁸ *Rings*, p. 154.

⁵⁹ John Wylie, ‘The spectral geographies of W.G. Sebald’, *cultural geographies*, 14 (2007), 171-88 <doi.org/10.1177/1474474007075353>, p. 184.

⁶⁰ Harkin, ‘Memory’, p. 5.

⁶¹ Corr, ‘Snugglepot’; *Rings*, p. 126.

⁶² *Destruction*, p. 53; *Rings*, p. 134.

in Europe. In his 1999 discussion of the legacies of the Allied air war, *Luftkrieg und Literatur (On the Natural History of Destruction)*, Sebald writes that ‘silence about the past’ in post-war Germany failed to dam up a ‘stream of psychic energy’ with ‘its source in the well-kept secret of the corpses built into the foundations of our state’.⁶³ *The Rings of Saturn* contains a similar image; the narrator describes how Konrad Korzeniowski, later to publish under the pseudonym of Joseph Conrad, on returning from the Congo to Brussels ‘now saw the capital of the Kingdom of Belgium, with its ever more bombastic buildings, as a sepulchral monument erected over a hecatomb of black bodies, and all the passers-by in the streets seemed to him to bear that dark Congolese secret within them’. On reading Roger Casement’s 1903 account of the ‘utterly merciless exploitation’ involved in the Belgian colonial project, Conrad is reported to have said that Casement ‘could tell things that he, Korzeniowski, had long been trying to forget’. We shall return to these images of entombment and burial. What matters for my immediate purposes is Sebald’s interest in Conrad’s guilt, ‘incurred by his mere presence in the Congo’; his memory of empire; and his attempts to forget.⁶⁴ Sebald is here interested not only in the fact of imperial violence, but also in the forces that condition the suppression of that violence in European cultural memory.

In his research into the stories behind layered ‘traces of destruction’ in the Suffolk landscape, the narrator aggregates ‘concrete and documentary’ sources; asks what they reveal, and what they hide; and organises them into a narrative following the course of his walk.⁶⁵ As a result, the account radiates outward from the British Isles. The narrator does not approach Suffolk as a ‘contained space’, but as somewhere marked with traces of colonial organisational structures – traces which remain, to a certain extent, legible.⁶⁶ The text’s ‘tendency [...] to break apart into seemingly disconnected and independent episodes’, interrupting the continuity of the narrator’s route, is thus intimately connected with his attempt to write a history of empire from a shifting East Anglian vantage point.⁶⁷ In an essay on the ‘literary description of total destruction’, Sebald claimed that any ‘attempt to write a literary account of collective catastrophes inevitably, if it is to claim validity, breaks out of the novel form that owes its allegiance to bourgeois concepts’, resisting the ‘temptation to integrate that is perpetuated in traditional literary forms’. Sebald’s

⁶³ *Destruction*, pp. 9, 7, 13.

⁶⁴ *Rings*, pp. 122, 127, 120.

⁶⁵ *Rings*, p. 3; *Destruction*, p. 59.

⁶⁶ Goeman, *Mark*, p. 206.

⁶⁷ Gray, *Ghostwriting*, p. 275.

references here to ‘the novel’ and ‘traditional literary forms’ are somewhat underspecified.⁶⁸ Presumably, he has in mind what Ghosh calls ‘serious fiction’: a genre committed to the representation of ‘measurable, discrete universes’ and ‘the regularity of bourgeois life’. Ghosh connects such books with ‘a way of thinking that deliberately excludes things and forces [...] that lie beyond the horizon of the matter at hand’. In *The Rings of Saturn*, Sebald meddles with this ‘horizon’.⁶⁹ His narrator maps ‘connections among seemingly disconnected histories’ across an imperial ‘hierarchy of spaces’, and scrutinises his ability accurately to testify to these histories.⁷⁰ This demanding method, no less than his unsettling subject matter, gives rise to his frequent moods of ‘paralysing horror’.⁷¹ As we shall see, during the Orford Ness episode the narrator struggles to adopt what Sebald elsewhere calls a ‘synoptic and artificial view’, in which a particular place or text is situated within a familiar historical landscape.⁷² Describing his approach to Orford, he records some of the ‘irrepressible rumours’ in circulation around the military research conducted in the region; and he recalls (in language that bears the marks of considerable anguish) being caught up in a sandstorm. Having described the crossing to the ‘island’ itself, the narrator ultimately refuses to settle on a conclusive interpretation for this place, instead ruminating on his insistent sense, ‘that day at Orfordness’, of estrangement and uncertainty.⁷³

~

While *The Rings of Saturn* critiques the role of the network in the violent history of modernity, it is itself an intricately patterned text, composed of an elaborate narrative and historical meshwork, and seething with intercommunicating allusions. Approaching Orford, the narrator also nears the Suffolk house where during the late 1930s, a team of scientists ‘developed radar, which now spreads its invisible net throughout the entire airspace’.⁷⁴ This net is braided into further ‘invisible military spaces’ and technologies: ‘the area between Woodbridge and the sea remains full of military installations [...] weapons are concealed in camouflaged hangars and grass-covered bunkers, the weapons with which, if an emergency should arise, whole countries

⁶⁸ Sebald, ‘Between History and Natural History: On the literary description of total destruction’, in Sebald, *Campo Santo*, ed. by Sven Meyer, trans. by Bell (London: Penguin, 2006), pp. 68-101 (p. 89).

⁶⁹ Ghosh, *Derangement*, pp. 58-61, 56.

⁷⁰ Goeman, *Mark*, p. 207; Said, *Imperialism*, p. 69.

⁷¹ *Rings*, p. 3.

⁷² *Destruction*, p. 26.

⁷³ *Rings*, pp. 231, 237.

⁷⁴ *Rings*, p. 227.

and continents can be transformed into smoking heaps of stone and ash in no time'.⁷⁵ The narrator constellates these weapons with 'secret projects [...] pursued in the military research establishments around Orford' during the Second World War and the post-war era. According to rumour, these included 'an invisible web of death rays', 'biological weapons designed to make whole regions uninhabitable', and 'a system of pipes extending far out to sea, by means of which a petroleum inferno could be unleashed'.⁷⁶ In *On the Natural History of Destruction*, Sebald describes how military authorities in early 1940s Britain entertained increasingly 'fantastic' solutions to their 'desperate [...] situation', giving serious consideration to 'ideas verging on the improbable'. These included 'invisible rays', an 'unsinkable aircraft carrier made out of a kind of artificially reinforced ice called pykrete', and the atomic bomb, then seemingly a technology beyond the 'realm of feasibility'.⁷⁷ In *The Rings of Saturn*, the narrator excavates a similar prehistory of nuclear technology, and sets loose the rumours surrounding it, by way of contextualising his visit to Orford Ness. Sebald seems here to have made a deliberate decision to avoid words like 'nuclear' and 'atomic', and their distinctly Cold War atmospheres. The narrator never names nuclear weapons directly – writing of Orford Ness, he refers not to the Atomic Weapons Research Establishment, but rather to fictionalised 'Secret Weapons Research Establishments'. It falls to readers to link his preoccupation with powerful technologies for 'mass destruction', and the aforementioned 'smoking heaps of stone and ash', with the cultural force of nuclear bombs.⁷⁸

In order to infer the presence of nuclear weapons in *The Rings of Saturn*, then, an act of decryption is required. The text introduces them not through their familiar tropes, but in relation to a locally specific history, consisting mostly of speculations, with its origins in a weakened and traumatised wartime Britain. Here, nuclear weapons emerge in association with networks and toxicity – with a submarine 'system' for unleashing 'inferno', with an 'invisible net' and a lethal 'web', and with technologies for rendering 'whole regions uninhabitable'.⁷⁹ While the narrator does not explicitly describe Orford Ness' position in British nuclear colonial networks, there is nonetheless a background concern here with violent and secretive infrastructures, and the unstable memory of those infrastructures. The narrator moves from this early history of nuclear technology to discuss Orford Ness during the 'Cold War era'.⁸⁰ He does not trace its history

⁷⁵ Matthew Flintham, 'Military-Pastoral Geometries', *Matthew Flintham*, <bit.ly/3cx11di> [accessed 14 September 2020]; *Rings*, pp. 227-28.

⁷⁶ *Rings*, p. 231.

⁷⁷ *Destruction*, p. 16.

⁷⁸ *Rings*, pp. 233, 227, 231.

⁷⁹ *Rings*, pp. 227-231.

⁸⁰ *Rings*, p. 233.

during this time as minutely as he traces Britain's imperial history in China – or in Ireland, or Belgium's in the Congo. Nor do his allusions to nuclear colonialism have the specificity that characterises his references to Britain's imperial history in the Caribbean, or in South America. This comparative vagueness pertains, I believe, to Sebald's decision to depict certain species of imagination that have powerfully informed the representation of nuclear power. In order to write of memories of destruction with 'precision and responsibility', Sebald wrote in *On the Natural History of Destruction*, it is necessary to attend closely to 'the form – including the literary form – in which they are expressed'.⁸¹ Writing about Orford Ness in *The Rings of Saturn*, he establishes a specific context, and conducts literary experiments on the moods and narratives that shaped nuclear knowledge in Cold War Europe. These imaginative forces surface as the narrator nears Orford, in the form of a 'notion' of nuclear annihilation that 'took possession of me when I was hit by a sandstorm'.⁸²

Matthew Flintham has written of how during the Cold War, military sites in the British Isles came to be 'defined by their acute difference and detachment from civil space: they were highly secure, wilfully secretive and in many cases controlled by a foreign power (principally the USA)'. He continues, the 'presence of nuclear weapons (or even an association with such weapons) invested many of these spaces with an apocalyptic charge: the triple-fenced perimeters and the "sterile" zones around the hardened bunkers all spoke of difference, exclusion and ultimately the absence of life on earth'.⁸³ Flintham's work on cultural responses to militarised zones in Cold War Britain invites us once more to consider nuclear discourse as directed by popular fascination with a possible, but neurotically mythologised, future. Masco has even proposed that during the Cold War, emergent forms of 'mass hallucination' around nuclear weapons, at once 'inchoate and easily directed', enabled 'new kinds of social control':

nuclear weapons do not have to be detonated to have profound cultural effects. Indeed, one illustration of the social control enabled by the phantasmagoria of nuclear war is a general inability to see the effects of the nuclear complex itself on everyday life. The hypnotic focus on nuclear annihilation during the Cold War provided a sensory

⁸¹ *Destruction*, pp. 53, 81.

⁸² *Rings*, p. 228.

⁸³ Flintham, 'The Military-Pastoral Complex: Contemporary Representations of Militarism in the Landscape', *Tate Papers*, 17 (2012), <goo.gl/P1JhNi> [accessed 14 September 2020].

distraction [...] one that displaced the everyday consequences of life within a nuclear economy.⁸⁴

The narrator, caught in a freak weather event, moves rapidly from the observation of nuclear infrastructures around Woodbridge to powerful fantasies of collective destruction. Having passed by the ‘military installations’, he approaches Rendlesham Forest, where he is engulfed in a cloud of dust and undergoes apprehensions consistent with the ‘apocalyptic sensibility’ described above.⁸⁵

Suddenly, in the space of a few minutes, the bright sky darkened and a wind came up, blowing the dust across the arid land in sinister spirals [...] darkness closed in from the horizon like a noose being tightened [...] the sun, which was at its zenith, remained hidden behind the banners of pollen-fine dust that hung for a long time in the air. This, I thought, will be what is left after the earth has ground itself down.⁸⁶

This passage approaches allegory: dreamlike and oracular, it sets in motion a slippage of things into signs. It also recalls certain texts from the British ‘nuclear 1980s’.⁸⁷ The child protagonist of Louise Lawrence’s 1985 *Children of the Dust*, for example, is terrified by visions of ‘the dust of fall-out blowing across the ruins of their civilization, burying buildings and people’.⁸⁸ The 1984 film *Threads* took Sheffield as a setting for nuclear winter: contaminated dust accumulates in the upper atmosphere, sealing off the planet’s surface from sunlight. It is worth lingering momentarily with that ‘pollen-fine’ dust.⁸⁹ It recalls the ‘strange blight’ that settles, in the form of a ‘white granular powder’, upon a town in the heart of America in Carson’s infamous ‘Fable for Tomorrow’.⁹⁰ The dust also has affinities with the ‘filthy, insidious pollen’ of persistent chemicals in *The Peregrine*, and it seems to carry an allusion to palynology, practitioners of which develop ‘images of past landscape ecologies from the layers of sediment. It is a kind of archaeology, a work of archivism’.⁹¹ Does the narrator here, like the geologist Jan Zalasiewicz, foresee a

⁸⁴ Masco, *Borderlands*, pp. 15-16, 332.

⁸⁵ *Rings*, p. 227; Masco, *Borderlands*, p. 13.

⁸⁶ *Rings*, pp. 228-29.

⁸⁷ Cordle, ‘British nuclear fiction’, p. 655.

⁸⁸ Louise Lawrence, *Children of the Dust* (London: Lions Tracks, 1986), p. 19.

⁸⁹ *Rings*, p. 229.

⁹⁰ *Spring*, pp. 21-22.

⁹¹ *Peregrine*, p. 32; Richard Skelton interviewed by Joseph Burnett, ‘Nature Eclipses Culture: An Interview with Richard Skelton’, *The Quietist*, 12 March 2014, <goo.gl/xj6GrG> [accessed 14 September 2020].

‘posthuman’ researcher poring over the remains of present societies?’⁹² I will return to this question. Of greater importance for my argument, at present, is what Masco calls nuclear-apocalyptic ‘overstimulation’.⁹³ The narrator of *The Rings of Saturn* struggles to articulate dispersed nuclear colonial legacies as an integral part of British history not only because of a colonial ‘horizon of perception’, but also due to an ‘excessive preoccupation’ with threat; he does not understand nuclear damage as an ongoing reality, but fixates on it as an ultimate doom.⁹⁴

Though the narrator offers an explanation for the apparition (‘further inland, as I later learnt, a heavy thunderstorm had broken’), this does little to dispel the hallucinatory atmosphere of this unnerving incident. He reports that after the dust storm subsided, ‘I walked the rest of the way in a daze. All I remember is that my tongue was stuck to the roof of my mouth and that I felt as if I were walking on the spot’. Elsewhere, his writerly procedures allow him at least to contextualise and interpret his encounters. Here, he is muted, as though immobilised, his progress halted and his literary process choked. ‘This, I thought, will be what is left after the earth has ground itself down’: the narrator is dispersed between the time of memory, the time of remembering, and an imagined future, psychically pressing but resistant to understanding. We pass from the indexical gesture of ‘This’, to the retrospective narrative distance of ‘I thought’. Tangled syntax contorts linear time: ‘will [...] is [...] after [...] has’ – immediate perception, and the later inscription of that perception, are conditioned by an apocalyptic neurosis.⁹⁵ By ‘altering the temporal order dictated by normative syntax’, Sebald here produces what Sianne Ngai has called ‘thick speech’ – a language of shock or grief that ‘initially suggests an inability to respond or speak at all’. In thick speech, Ngai suggests, clear formal distinctions of ‘quality or kind’ give way to ‘moody differences – unqualified, temperamental, and constantly shifting’.⁹⁶ When expression stumbles in this way, writes Robert Macfarlane, a ‘drastic slowdown and recursion of language occurs [...] Tenses work against one another. There is a “back-flowing”, a loss of causal drive, a gathering of hesitations and stutters’.⁹⁷ This is the opposite of what Sebald, discussing eyewitness accounts of bombed German cities, identifies as a ‘rather unreal’ type of writing, ‘curiously untouched’ by its traumatising subject matter, in which ‘everyday language [goes] on functioning as usual’.⁹⁸ Where such texts shelter inside the ‘bounds of verbal

⁹² See Jan Zalasiewicz, ‘Buried Treasure’, *New Scientist*, June 1998, <goo.gl/54gXZe> [accessed 14 September 2020].

⁹³ Masco, *Borderlands*, p. 14.

⁹⁴ Farrier, *Anthropocene Poetics*, p. 52; Fisher, *Weird*, p. 17.

⁹⁵ *Rings*, p. 229.

⁹⁶ Sianne Ngai, *Ugly Feelings* (Harvard: Harvard University Press, 2005), pp. 249-52.

⁹⁷ Macfarlane, *Underland*, p. 364.

⁹⁸ *Destruction*, pp. 25, 11, 26.

convention’, near Woodbridge the narrator, exposed to ‘the numbing terror of nuclear apocalypse’, struggles to keep to ordered structures and patterns, undergoing a ‘breakdown of language’.⁹⁹ Ngai’s description of language that responds to and induces a ‘layered’ experience of time, while working to ‘erode’ formal boundaries, also allows us to detect continuities between Sebald’s formal technique here, and what he elsewhere calls the ‘slow disintegration of all material forms’.¹⁰⁰ As the narrator approaches Orford Ness, his impressions of a ‘grainy whirl’ of matter that has gradually ‘ground itself down’ intermingle with apprehensions of ‘systematic destruction [...] arising from the development of the means and modes of industrial production’.¹⁰¹ In Chapter Four, I observed how Baker’s wintry landscapes in *The Peregrine* are laced with nuclear dread: ‘New horizons stood up bleached and stark, plucked out by the cold talons of the gale [...] ducks’ heads smouldered [...] luminous, seething [...] burning [...] hissing’.¹⁰² Sebald similarly responds to how fear of nuclear war triggers ‘changes in the medium of contemporary perception’, such that new horrors haunt experience, memory and expression.¹⁰³

~

This atmosphere of uncertainty, obscurity and terror stays with the narrator as he crosses to Orford Ness. Sebald uses the language of cartography to illustrate the sandstorm’s disorienting effects: the narrator describes how ‘contours disappeared in the greyish-brown’, ‘landmarks that a short while ago still stood out clearly’ vanish into ‘swirling and ever denser obscurement’; he ‘could soon not distinguish any line or shape’. Opposite his account of the crossing, he reproduces a map of the Suffolk coast, containing a representation of the Ness. Describing the ‘curious coastal land formations at Orford’, the narrator links this charted shape with drift: ‘Stone by stone, over a period of millennia, it had shifted down from the north across the mouth of the River Alde, in such a way that the tidal lower reaches, known as the Ore, run for some twelve miles just inside the present coastline before flowing into the sea’.¹⁰⁴ In the map, the Ness is ‘apportioned into regular quadrants that form a superimposed grid’; this documentary form

⁹⁹ *Destruction*, p. 25; Cordle, ‘British nuclear fiction’, p. 654; Ali Smith, ‘Loosed in Translation’, in *After Sebald: Essays and Illuminations*, ed. by Jon Cook (Woodbridge: Full Circle Editions, 2014), pp. 71-83 (p. 71).

¹⁰⁰ Ngai, *Ugly Feelings*, p. 250; Sebald, *Vertigo*, trans. by Hulse (New York: New Directions Press, 2000; 1990), p. 223.

¹⁰¹ *Rings*, p. 229; *Destruction*, p. 65.

¹⁰² *Peregrine*, p. 78.

¹⁰³ Benjamin, ‘Reproduction’, p. 172.

¹⁰⁴ *Rings*, pp. 228-229, 233.

fails to capture its ‘restlessly lively’ and ‘startlingly dynamic’ geomorphological properties.¹⁰⁵ The Ness, the narrator writes, has an ‘extraterritorial quality about it’ – not only because it exists offshore, but also because of specific political regimes:

during the Cold War era, the Ministry of Defence continued to maintain Secret Weapons Research Establishments on the coast of Suffolk, and imposed the strictest silence on the work carried out in them. The inhabitants of Orford, for example, could only speculate about what went on at the Orfordness site, which, though perfectly visible from the town, was effectively no easier to reach than the Nevada desert or an atoll in the South Seas.¹⁰⁶

Sebald here alludes to Orford Ness’ important position in Britain’s nuclear colonial network, which, as James Purdon has noted, itself had an ‘archipelagic character’.¹⁰⁷ The British military orchestrated twenty-four subterranean nuclear explosions inside Western Shoshone land in Nevada. They also detonated nine nuclear bombs, including thermonuclear bombs, on Kiritimati and on Malden Island, places the British state now recognises as belonging to the Republic of Kiribati. *The Rings of Saturn* registers how Orford Ness is ‘entangled’ (to borrow Corr’s use of this word to describe relations between British and Australian terrains) in nuclear colonialism.¹⁰⁸ However, in an elision typical of nuclear discourse produced in Britain, it does not mention the twelve detonations in Australia. Absences of this kind riddle the narrator’s descriptions of Orford Ness, reproducing the ‘manifold silences and lacunae’ in the public understanding of Britain’s nuclear colonial past, and of its ‘lethal afterlives’.¹⁰⁹ Here, colonial registers and apocalyptic fixations continue to condition perception, though, as we shall see, the site troubles these ways of thinking.

J.J. Long has described how ‘roaming over the island’, the narrator ‘invests it with myriad cultural meanings. Metaphor after metaphor is produced’.¹¹⁰ As he draws close to Orford Ness, he is haunted by apocalyptic nuclear fear. The allusions to Nevada and Pacific atolls alert readers

¹⁰⁵ Gray, *Ghostwriting*, p. 334; Macfarlane, ‘Should this tree have the same rights as you?’, *The Guardian*, 2 November 2019, <bit.ly/2uGLB4R> [accessed 14 September 2020].

¹⁰⁶ *Rings*, p. 233.

¹⁰⁷ James Purdon, ‘The Meaning of Monte Bello’, in *Cold War Legacies: Systems, Theories, Aesthetics*, ed. by John Beck and Ryan Bishop (Edinburgh: Edinburgh University Press, 2016), pp. 85-101 (p. 100).

¹⁰⁸ Corr, ‘Grass’.

¹⁰⁹ Gopal, *Insurgent*, vii-viii.

¹¹⁰ Long, *W.G. Sebald*, pp. 134-35.

that he is aware, at least in general, of the history of nuclear ‘tests’. Subsequently, however, he mentions nuclear activities only indirectly. Indeed, he imagines the Ness as an ahistorical space:

It was as if I were passing through an undiscovered country [...] I had not a single thought in my head. With each step that I took, the emptiness within and the emptiness without grew ever greater and the silence more profound.¹¹¹

Solnit has described how early settlers ‘read [...] transcendence into the desert’ in Nevada. In the irradiated craters that now pockmark that land, she suggests, those same ideas of transcendence have been ‘written’.¹¹² Similarly, Jonathan Dunk has discussed how settler literatures often insist upon what Marcus Clarke famously called the ‘weird melancholy’ of Australian landscapes.¹¹³ By clearing supposedly ‘vacant’, ‘open’ places of their history, writers absolve themselves of their violent heritage.¹¹⁴ Indigenous peoples, across contexts, have long resisted these mappings, excisions and inscriptions. Goeman has written of how Indigenous storytellers ‘mediate and refute colonial organizing of land, bodies, and social and political landscapes’, drawing upon the ‘simultaneously metaphoric and material capacities of map making’ to articulate ‘layered geographies’.¹¹⁵ The narrator initially represents Orford Ness in ways that recall settler descriptions of colonised territories: it is ‘undiscovered country’, an ‘outpost in the middle of nowhere’ that torments visitors with its ‘god-forsaken loneliness’. Here, a desert on England’s frayed east edge, adrift from ‘the gentle slopes of the inhabited land’, is subjected to the optic of annihilation: read as *terra nullius*. At one level, the narrator’s sense of Orford Ness as an ‘extraterritorial’ space responds to its unusual topography, which wrong-foots certain expectations of the English landscape. His awareness of the site’s implication in nuclear colonial histories also powerfully informs his perception of it. Indeed, there is something hallucinatory in the remark that during the Cold War Orford Ness, though ‘perfectly visible’ from across the Ore, was ‘no easier to reach than the Nevada desert or an atoll in the South Seas’; it is as though he perceives these places superimposed.¹¹⁶ For the narrator Orford Ness renders visible, just offshore from the English mainland, practices of political domination that he associates with the

¹¹¹ *Rings*, p. 234.

¹¹² Solnit, *Savage Dreams*, p. 66.

¹¹³ Jonathan Dunk, paper presented at the roundtable ‘From Grassroots to Text’, at *Climate Fictions / Indigenous Studies*, 24 January 2020; see Ken Gelder, ‘Australian Gothic’, in *The Routledge Companion to Gothic*, ed. by Catherine Spooner and Emma McEvoy (London: Routledge, 2007), pp. 115-24 (p. 116).

¹¹⁴ Dunk, ‘Park’, *Sydney Review of Books*, 20 July 2018, <bit.ly/32QWJcr> [accessed 14 September 2020].

¹¹⁵ Goeman, *Mark*, pp. 3-4.

¹¹⁶ *Rings*, p. 233.

‘periphery’ – with ‘overseas’ domains.¹¹⁷ This uncanny surfacing disturbs his ‘hierarchy of spaces’, rupturing the ‘enclosed space’ of a ‘familiar European world’.¹¹⁸ We might then read his imaginative smoothing of Orford Ness as an act of recuperative dissociation, a retreat from these uncomfortable apprehensions, and ‘back within the realm of accepted discourse’.¹¹⁹ Detecting an ‘emptiness without’ allows for his ‘emptiness within’, so that the site’s violent past dissolves.¹²⁰

Gopal has discussed a pervasive ‘figuring of metropolitan dissidents as in some sense intrinsic exiles who responded to local pressures’, lacking contact with ‘movements in the colonies’. Such representations, she notes, suggest empire is a ‘self-correcting system that arrives at emancipation or decolonization without regard to the resistance of its subjects’. While Sebald’s narrator might aptly be described as an ‘intrinsic exile[]’, here, empire does not smoothly ‘self-correct[]’.¹²¹ Even as the narrator critiques the ‘imperialist mentality’, such powerful cultural currents, and intersecting ‘elisions and silences’, infiltrate his perceptions.¹²² I have already described how the narrator comes to mistrust the idea that from a ‘vantage point’ in the colonial metropolis, it is possible to arrive at a comprehensive understanding of the imperial past. Sebald explicitly aligns this focus on historical outlook with interment tropes: ‘Are we standing on a mountain of death? Is that our ultimate vantage point? Does one really have the much-vaunted historical overview from such a position?’¹²³ For Sebald, the view of the past from the summit of a ‘mountain of death’ (or from above the ‘corpses built into the foundations of our state’, or inside a ‘sepulchral monument erected over a hecatomb of black bodies’) demands a specific interpretative and literary approach.¹²⁴ In *A Billion Black Anthropocenes or None* (2019), Yusoff considers the ‘racism inherent in the construction of Europe’, and traces a violent ‘shadow geology’ underneath the dominant ‘origin stories’ told about the Anthropocene. Scholars continue to debate when the Anthropocene began; a range of stratigraphic signatures are under consideration, dating from the prehistoric period to the mid-twentieth century. Many of these signals – the atmospheric traces left in polar ice by the ecological fallout of the European invasion of the Americas; the residues of fossil fuel economies; radioisotopes – are inseparable from histories of empire. And yet, as Yusoff argues, when set within the dispassionate ‘grammar of geology’ – a discipline seamed with unexamined colonial legacies – this violence tends to recede from view. How, she asks,

¹¹⁷ Gray, *Ghostwriting*, p. 347; Said, *Imperialism*, p. 69.

¹¹⁸ Said, *Imperialism*, p. 69; Said, *Orientalism*, p. 63.

¹¹⁹ Trouillot, *Silencing*, p. 72.

¹²⁰ *Rings*, p. 234.

¹²¹ Gopal, *Insurgent*, pp. 19-20.

¹²² *Rings*, p. 129; Gopal, *Insurgent*, p. 17.

¹²³ *Rings*, p. 125.

¹²⁴ *Rings*, pp. 122, 125; *Destruction*, p. 13.

does a ‘rupture of bodies, flesh, and worlds become buried’ in this way? How too might scholars redress origin stories that ‘bury as much as they reveal about material relations and their genealogies’, learning to describe, perhaps in spite of their disciplinary training, the ‘role of race in the production of the global spaces that constitute the Anthropocene?’¹²⁵ In *The Rings of Saturn*, Sebald asks similar questions. Orford Ness stirs with buried pasts. Writing of this place, Sebald reproduces imperial habits of mind, depicting their aggregation and persistence in the contemporary European psyche, and suggesting the complexity and difficulty involved in ‘un-learning’ them.¹²⁶ He also represents the cultural effects of what Masco calls a ‘hypnotic focus on nuclear annihilation’, considering how this hallucinatory sensibility interacts with older, ingrained colonial imaginaries.¹²⁷ Through his narrator, Sebald registers the anxiety, even trauma, involved in refusing to avert one’s gaze from traces of unacknowledged harm.

When first approaching the remains of the ‘former research establishment’, the narrator imagines them as sepulchres:

From a distance, the concrete shells, shored up with stones, in which for most of my lifetime hundreds of boffins had been at work devising new weapons systems, looked (probably because of their odd conical shape) like the tumuli in which the mighty and powerful were buried in prehistoric times with all their tools and utensils, silver and gold.¹²⁸

Having imagined Orford Ness as devoid of cultural presence, the narrator perceives its relic laboratories as tombs, noting also that some resemble ‘pagodas’ and ‘temples’. Then rapidly, his perspective shifts once more, and the site transforms into the scene of an apocalyptic ‘future catastrophe’.¹²⁹ Here, Sebald builds a layered and unstable sense of place and time; unlike a ‘mountain of death’, Orford Ness does not confer the illusion of a neat ‘historical overview’.¹³⁰ After having described its restless geomorphology, the narrator alludes to its enmeshment in a dispersed array of sites used for ‘secret’ military purposes. Then he imagines it from a colonial perspective, as ‘undiscovered country’.¹³¹ Subsequently, he perceives it as an ancient ‘isle of the

¹²⁵ Yusoff, *Billion*, pp. 40-41, 24, 32, 30, 58, 61.

¹²⁶ Gopal, *Insurgent*, p. 22

¹²⁷ Masco, *Borderlands*, p. 15.

¹²⁸ *Rings*, pp. 235-36.

¹²⁹ *Rings*, p. 236-37.

¹³⁰ *Rings*, p. 125.

¹³¹ *Rings*, pp. 231, 234.

dead’, before envisioning a ‘latter-day stranger’ inspecting the remnants of modern society after its ‘extinction’. I shall return to these flickers in interpretation. First, I will give closer attention to the narrator’s sense of Orford Ness as an ‘isle of the dead’, and to Sebald’s adoption of a speculative, apocalyptic register.¹³²

As Alan Itkin has noted in his work on Sebald’s ‘underworlds of memory’, the narrator is conveyed across the Ore by ‘a boatman reminiscent of Charon, who carries the spirits of the dead across the river Styx in the classical underworld’.¹³³ In one sense, ‘the dead’ here are kin to the mythic dead of Greek and Roman story cycles. These allusions to ghosts, underworlds and burials also interact with other presences in the text, such as the ‘mountain of death’, and the ‘hecatomb of black bodies’ Conrad detects under Brussels; and they recall the military histories of Orford Ness.¹³⁴ Here, not only during the Cold War but also throughout the First and Second World Wars, technicians developed weapons to inflict ‘injuries incompatible with life’.¹³⁵ These weapons were used in multiple contexts, to lethal effect. Shortly before relating his envelopment in the sandstorm, the narrator imagines the battlefield of the First World War: ‘a zeppelin like an airborne whale appeared [...] train after train with troops and equipment rolled to the front, whole tracts of land were ploughed up by mortar fire, and the death strip between the front lines was strewn with phosphorescent corpses’.¹³⁶ This is warfare as industrial procedure: the maintenance of a complex supply chain, landscapes ironically ‘ploughed’ by bombs, and the chemical transformation of ‘human material’ in the ‘death strip’.¹³⁷ The narrator also describes the ‘bombing raids [...] launched on Germany from the sixty-seven airfields that were established in East Anglia after 1940’: ‘cities going up in flames, the firestorms setting the heavens alight, and the survivors rooting about in the ruins’.¹³⁸ Here, as Benjamin wrote in 1935, instead of ‘draining rivers, society directs a human stream into a bed of trenches; instead of dropping seeds from airplanes, it drops incendiary bombs over cities’.¹³⁹ Both of these passages allude to emergent forms of ‘shock-experience’ inflicted through the harnessing of technologies initially celebrated for their utopian potential – flight, mechanical reproduction and industrial

¹³² *Rings*, p. 237.

¹³³ Alan Itkin, *Underworlds of Memory: W.G. Sebald’s Epic Journeys Through the Past* (Evanston, IL: Northwestern University Press, 2017), p. 65.

¹³⁴ *Rings*, pp. 237, 125, 122.

¹³⁵ Macfarlane and Stanley Donwood, *Ness* (Oxford: Quive-Smith Editions, 2018), unpaginated.

¹³⁶ *Rings*, p. 226.

¹³⁷ *Rings*, p. 226; Benjamin, ‘Reproduction’, p. 195.

¹³⁸ *Rings*, p. 38.

¹³⁹ Benjamin, ‘Reproduction’, p. 195.

chemistry – for ‘scientifically executed destruction’ in the wars of the twentieth century.¹⁴⁰ Sebald invites readers to situate nuclear terror in relation to this cumulative history of technical achievement, destruction and horror. Here, Orford Ness directs attention to an ‘invisible web’ of military-industrial power, ensnaring not only European battlefields and ruins, but also imperial geographies including ‘the Nevada desert’, ‘atoll[s] in the South Seas’, and unmentioned sites in South Australia.¹⁴¹

In *On the Natural History of Destruction*, Sebald dwells on the idea that a ‘proper understanding of the catastrophes we are always setting off is the first prerequisite for the social organization of happiness’, and verges on issuing a ‘serious call to work for the future in defiance of all calculations of probability’. Nonetheless, he notes, it is ‘difficult to dismiss the idea’ that the ‘systematic destruction [...] arising from the means and modes of industrial production hardly seems to justify the principle of hope’. Reflecting on the momentum of allied munitions production during the Second World War, he speculates about the ‘inevitability’ of the horrors of the air war: ‘so much intelligence, capital and labour went into the planning of destruction that, under the pressure of all the accumulated potential, it *had* to happen in the end’.¹⁴² Similarly, a character in Pynchon’s *Gravity’s Rainbow* suggests it is possible to consider ‘war itself as a *laboratory*’.¹⁴³ The narrator of *The Rings of Saturn*, sensing the laboratory’s proximity to the ‘death strip’, nears a no less twisted insight.¹⁴⁴ The cross-fade between laboratory and tomb responds to an accelerated, propulsive temporality. It is a metaphor for the ‘monstrous complexity’ of what Sebald elsewhere calls a ‘cycle of operations’ – a military, industrial and colonial cycle in which we find ‘the machinery of annihilation operating on an industrial scale’. Because the procedures conducted at Orford Ness ‘pre-empted’ atrocities elsewhere, its landscape, with its sepulchral laboratories, encrypts traces of that harm.¹⁴⁵ These ‘concrete shells’ are also suggestive of the narrator’s interest in an older set of ‘strange vessels’. Early in *The Rings of Saturn*, he discusses *Urne-Buriall*, Thomas Browne’s 1658 ‘discourse on sepulchral urns found in a field near Walsingham in Norfolk’, and catalogues the varieties of ‘ornament or utensil’ that, as Browne records, were placed in these containers. Later, describing his visit to the Ness, he uses a similar phrase, imagining the derelict laboratories as barrows loaded with ‘tools and utensils, silver and gold’. These particular ‘tools and utensils’, even as they recall the contents of Browne’s urns, also

¹⁴⁰ Leslie, *Synthetic*, pp. 127, 22.

¹⁴¹ *Rings*, pp. 231, 233.

¹⁴² *Destruction*, pp. 64–65.

¹⁴³ Pynchon, *Gravity’s Rainbow*, p. 57.

¹⁴⁴ *Rings*, p. 226.

¹⁴⁵ *Destruction*, pp. 65, 97, 64.

elicit the destructive instruments tested at Orford Ness; ‘silver and gold’ likewise imply the global flows of capital that wind through the narrator’s account. Here, the narrator’s earlier discussion of entombment comes into contact with, and is invested with new meaning by, his sense of Orford Ness as a site ‘tied into’ violent transcontinental infrastructures. As his earlier impressions of ‘emptiness’ give way, the narrator evokes the Ness as a densely storied place, and even, by way of allusions to interment and worship, as hallowed ground.¹⁴⁶ He apprehends Orford Ness as a site haunted by displaced violence – and, importantly, as somewhere that attests forcefully to the systematicity of that violence.

Sebald’s writing here responds to the ‘organization of perception’ under certain social and technological conditions.¹⁴⁷ The superimposition of laboratory and tomb attests to the narrator’s sense of the entanglement of distant places in colonial networks; the trajectory, force and speed of the modern industrial process; and the deadly repercussions of these forces. Elsewhere in *The Rings of Saturn*, the narrator works archivally to trace colonial and industrial histories. For example, after detailing the encounter with the train, he sets in motion a formal and generic shift, ‘spiralling’ up from the persona of the walker into that of the researcher.¹⁴⁸ Thus ‘borne aloft’ by his source material, he can ponder what a ‘synoptic and artificial view reveals’.¹⁴⁹ Describing Orford Ness, however, the narrator remains leaden-footed; he does not develop his horrific intimations into historical narratives, and offers only memories of his visit. Here, violent histories are not transmitted through detailed accounts, but rather have a blurred and uncertain presence, accomplished through resonances between separate episodes within the text, underspecified allusions, and metaphors. Through this technique, Sebald registers his narrator’s limited understanding of the nuclear colonial past, drawing attention to the elisions and distractions that make up nuclear colonial memory in Europe. While the narrator recognises Orford Ness as a site of displaced violence, his knowledge of this violence remains inhibited. Here, Sebald reflects on the cognitive influence of ‘cultural formations’ for ‘effacing the reality’ of empire.¹⁵⁰ Meanwhile, because of a ‘*nuclear phantasmagoria*’ the narrator struggles to conceive of atomic detonation as anything other than apocalyptic.¹⁵¹ Sebald’s concern, then, is not with nuclear colonial history as such. It is rather with how nuclear colonial history *appears* to the narrator in this place.

¹⁴⁶ *Rings*, pp. 235, 24–25, 236, 91, 234.

¹⁴⁷ Benjamin, ‘Reproduction’, p. 172.

¹⁴⁸ *Rings*, p. 19.

¹⁴⁹ *Rings*, p. 19; *Destruction*, p. 26.

¹⁵⁰ Said, *Imperialism*, p. 69.

¹⁵¹ Masco, *Borderlands*, p. 16.

Intriguingly, *The Rings of Saturn* was published shortly after an important moment in the story of Maralinga, when nuclear legacies dispersed throughout South Australia surfaced in London. Purdon has argued that after a brief period in the public eye thanks to an ‘energetic programme of official nuclear self-fashioning’ in the 1950s, irradiated places became culturally ‘marginal once more’ in Britain.¹⁵² However, during the early 1990s, South Australian Aboriginal lands reached the centre of British political power, and entered once more into national discourse. In 1993, the *New Scientist* published an article called ‘Britain’s dirty deeds at Maralinga’, by the distinguished science journalist Ian Anderson. The story appeared five days before talks in London between the Australian and British governments, arranged by the Australian government in order to request payment for Maralinga’s latest clean-up. It ‘marked the first time that the extent of plutonium contamination at the desert test range was made public’; ‘several UK newspapers [...] cited it’ in their coverage of the negotiations. Meanwhile, a delegation of Pitjantjatjara and Yankunytjatjara activists arrived in London ‘bearing sand’ from Maralinga, ‘which they placed on the steps of the British Houses of Parliament’. As ministers in the Palace of Westminster insisted Britain ‘should not and would not pay’ because the 1967 clean-up had been effective, a decontamination team wearing hazmat suits arrived to remove the sand. Eventually the British government, under intensifying pressure, gave in and contributed twenty million pounds (under half the cost of the flawed 1996 remediation operation).¹⁵³ While Sebald was writing *The Rings of Saturn*, then, Australian writers and activists, settler and Aboriginal, intervened representationally in the nuclear culture of the United Kingdom. The Aboriginal activists in particular developed ways to ‘plot and give figurative shape to formless threats whose fatal repercussions are dispersed across space and time’, confronting British society with its nuclear colonial heritage, and complicating the British government’s attempts to abdicate ‘all liabilities and responsibilities’ for empire’s afterlives.¹⁵⁴ It is uncertain whether Sebald knew of these incidents, and I am not here claiming that they influenced his work. Nonetheless, it is worth correlating the concern with nuclear colonial memory in *The Rings of Saturn* with the events of 1993 – events charged by a ‘dynamic of centre and periphery’, and which subverted the ‘politics of a violent invisibility’.¹⁵⁵ By carrying wounded land from Maralinga to London, the delegation imparted onto British officials something of the concrete reality of living on irradiated earth every day (though the sand

¹⁵² Purdon, ‘Meaning’, pp. 85-86.

¹⁵³ Tynan, *Thunder*, pp. 275-76, 288-89, 286; for an account of the 1996 clean-up see Parkinson, ‘Clean-Up’, pp. 79-81.

¹⁵⁴ Nixon, *Slow Violence*, p. 10; Minister of State for the Armed Forces Archie Hamilton, quoted in Tynan, *Thunder*, p. 292.

¹⁵⁵ Gray, *Ghostwriting*, p. 347; Nixon, *Slow Violence*, p. 160.

left on the palace steps was not, in fact, radioactive).¹⁵⁶ They closed the gap between periphery and centre, asserting a relationship of ‘reverse tutelage’ between themselves and the British state.¹⁵⁷ Conversely, in *The Rings of Saturn*, radioactive violence has an unfixed presence, at once distant and insistent, manifested through a gradual accumulation of unfocused allusions. At Orford Ness, the narrator perceives how the site is tied into imperial infrastructures, but the other places in this network stay spectral.

The narrator of *The Rings of Saturn* selects elements from the ‘history of Western political, economic, and social ascendancy – for which the episodes dealing with Western colonialism are especially emblematic’ – and reconfigures them into a form in which they are ‘at odds with their traditional and accepted interpretations’.¹⁵⁸ The text is deeply preoccupied by uneven experiences of colonial power, and with associated dilemmas of narrative responsibility. That, even as he alludes to cycles of nuclear colonial violence, the narrator renders irradiated geographies only vaguely present, should be read in relation to these concerns. The narrator’s bewildered account of his day at Orford Ness can plausibly be read as a representation of the traces left in western culture by the suppression of certain nuclear histories. Sebald also considers how a ‘hypnotic focus on nuclear annihilation’ acts on his narrator’s curtailed sense of this history, as well as on his broader perception and thought.¹⁵⁹ For the narrator, Orford Ness comes to seem increasingly unlike a mere ‘research establishment’. It raises old, powerful concerns: burial and afterlife; disaster and destruction; memory’s decay chain. Here then, Sebald is interested in how emergent technological and geopolitical contexts modify ancient preoccupations. Having registered Orford Ness as densely storied, but slyly encrypted, the narrator moves swiftly to evoke an apocalyptic future in Europe:

But the closer I came to these ruins, the more any notion of a mysterious isle of the dead receded, and the more I imagined myself amidst the remains of our own civilization after its extinction in some future catastrophe. To me too, as for some latter-day stranger ignorant of the nature of our society wandering about among heaps of scrap metal and defunct machinery, the beings who had once lived and worked here were an enigma.¹⁶⁰

¹⁵⁶ Tynan, *Thunder*, p. 289.

¹⁵⁷ Gopal, *Insurgent*, p. 8.

¹⁵⁸ Gray, *Ghostwriting*, p. 304.

¹⁵⁹ Masco, *Borderlands*, p. 15.

¹⁶⁰ *Rings*, pp. 235, 237.

Earlier, by imagining ‘pollen-fine’ dust as fallout from a nuclear attack, Sebald draws palynology alongside chemical persistence, inviting readers to ‘undertake a retrospective reading’ of an imagined atomic event.¹⁶¹ Now, he repeats this imaginative move. The narrator does not work to decipher the nuclear histories concealed in the snarls of rusting metal and abandoned equipment. Rather, he undergoes a compulsive vision of a catastrophic future, flickering on these ruins. As he does so, some familiar apocalypse tropes stir, alongside a ‘version of the “last man” presence that haunted nineteenth-century extinction narratives’ – and yet, because these tropes describe a place wound up with historical instances of nuclear devastation, a horror alien to conventional disaster fantasies emanates from them.¹⁶² This apocalyptic intimation, both ‘terrifying and banal’, mutates in contact with the narrator’s preceding sense of the violent systems that riddle the site.¹⁶³ Having undergone a disorienting sequence of interlocking affective and interpretative shifts (lively geomorphic entity, to secretive research establishment, to undiscovered country, to isle of the dead, to apocalyptic wasteland) the narrator ultimately disclaims insight into the Ness. No less an ‘enigma’ than ‘the beings who had once lived and worked here’, he declares, is ‘the purpose of the primitive contraptions and fittings inside the bunkers, the iron rails under the ceilings, the hooks on the still partially tiled walls, the ramps and the soakaways’. ‘Where and in what time I truly was that day at Orfordness I cannot say’, he continues, ‘even now as I write these words’.¹⁶⁴

~

Early in *The Rings of Saturn*, the narrator recounts a visit to the mansion Somerleyton Hall, and remarks on the cumulative effect of its ‘bygone paraphernalia’ (‘bedpans, hussars’ sabres, African masks, spears, safari trophies, hand-coloured engravings of Boer War battles’):

one is not quite sure whether one is in a country house in Suffolk or some kind of no-man’s land, on the shores of the Arctic Ocean or in the heart of the dark continent. Nor can one readily say which decade or century it is, for many ages are superimposed here and coexist.¹⁶⁵

¹⁶¹ *Rings*, p. 229; Macfarlane, *Underland*, p. 78.

¹⁶² Macfarlane, *Underland*, p. 78.

¹⁶³ Masco, *Borderlands*, p. 14.

¹⁶⁴ *Rings*, p. 237.

¹⁶⁵ *Rings*, pp. 35-36.

This description of spatio-temporal disarray interacts, through internal ‘processes of reflection the text sets up’, with the narrator’s disorientation at Orford Ness.¹⁶⁶ Similarly, recalling an encounter with a ‘dark-skinned man’ while walking up a road in The Hague ‘past the Bristol Bar, Yuksel’s Café, a video library, Aran Turk’s pizza place, a Euro-sex-shop, a halal butcher’s, and a carpet store’, the narrator remarks, in words that echo in a later description of the Ness, that he found this to be a ‘somehow extraterritorial part of town’.¹⁶⁷ As Carter has suggested, Sebald here depicts ‘the colonial imaginary’s hierarchy of spaces in a state of confusion: in the Hague the distinction between centre and periphery can no longer be maintained’. These disconnected but isomorphic episodes – Somerleyton Hall, Orford Ness, The Hague – each concern challenges to the narrator’s ‘synchronizing and thematizing gaze’, and to the ‘symbolic divisions’ on which it relies.¹⁶⁸ Though not explicitly linked, they nonetheless tessellate, such that a constellation emerges. As a result of such associations, the walk through Suffolk can appear less as a conventional plot device than as a pretext allowing Sebald to dramatize the narrator’s historical investigations. When the subsurface allusive networks that run through *The Rings of Saturn* emerge, interrupting and qualifying immediate narrative activity, the text reminds its readers that it is always threatening to break ‘out of the novel’.¹⁶⁹

As Long has observed, such patterned writing demands ‘non-linear reading strategies’. The correspondences between the narrator’s dilatory reminiscences and enquiries hinder forward narrative momentum, absorbing readers into an ‘excess of textual material beyond what is necessary to the presentation of plot, milieu, or character’. This impedes ‘easy consumption of the narrative’, enforcing detours and reorientations; though it sometimes bears reading as a travelogue, *The Rings of Saturn* is also a mosaic of historical vignettes, or an assembly of notes written by a narrator undergoing a mental breakdown.¹⁷⁰ Indeed, surrounded by a mass of documentary material, proliferating as though of its own accord, the narrator often appears less as a ‘creative writer bringing order to discrepancies in the wide field of reality by arranging them in his own version’, than as an curator involved in ‘panic-stricken attempts to create some kind of order’. The entangling experience of reading *The Rings of Saturn* mirrors the narrator’s labour as walker, writer and archivist. Just as readers must discern how dispersed episodes are interlinked in order to arrive at viable interpretations, the narrator strives to understand how his life is

¹⁶⁶ Andrew Bowie ‘Problems of Historical Understanding in the Modern Novel’, (unpublished doctoral thesis, University of East Anglia, 1979), quoted in Sebald, ‘Between’, p. 100.

¹⁶⁷ *Rings*, pp. 80-82.

¹⁶⁸ Carter, ‘Ethics’, p. 740.

¹⁶⁹ Sebald, ‘Between’, p. 89.

¹⁷⁰ Long, *W.G. Sebald*, pp. 140-41.

connected to complex networks, and violent, partially-understood incidents – or what Sebald elsewhere calls ‘personal involvement in collective experience’.¹⁷¹ As readers, then, we might ask why Sebald has his narrator align certain episodes according to the ‘crumbling geographical divisions of colonial discourse’.¹⁷² Through the narrator’s reference to the ‘heart of the dark continent’, later echoing in Conrad’s horror for the ‘dark Congolese secret’ under Brussels, and his inability to recognise immigrant communities as internal to Dutch society, readers are directed to continuities between racist colonial discourse, and a contemporary European ‘spatial imaginary’.¹⁷³ Sebald here conceptualises culture as developing (like an archive or a shingle spit) in additive and accretive ways, such that ‘many ages are superimposed [...] and coexist’.¹⁷⁴ The narrator, investigating this dynamic of layering and persistence, cannot do so from a detached position, but is embedded in what he studies. At Orford Ness, Sebald’s expansive study into how inherited forms of imperial consciousness condition his narrator – and, by extension, European culture – is modified and intensified by an association with shocks exerted upon modern perception by industrialised warfare, especially by the nuclear complex.

The Rings of Saturn has a somewhat archaic table of contents, which sketches the narrator’s progress chapter by chapter. It charts the episodes that have concerned me here as follows:

Through the desert – Secret weapons of destruction – In another country¹⁷⁵

This is the language of pilgrimage and exodus; conspiracy and war; displacement and exile. It allows us to see how the narrator imagines nuclear activity as something that happens in ‘another country’ – in places to which he alludes, but that remain largely ‘out of sight’ – and how this informs his sense of Orford Ness as an ‘extraterritorial’ space.¹⁷⁶ We might also take ‘another country’ to refer to the insistent apocalyptic turn towards ‘our own civilization after [...] some future catastrophe’.¹⁷⁷ Perhaps most importantly here, the narrator’s visit to Orford Ness, and his failed attempts to comprehend it by drawing on contextual knowledge, set in motion a shift in his wider sense of cultural belonging. He describes waiting for the ferryman to return:

¹⁷¹ Sebald, ‘Between’, pp. 89, 93.

¹⁷² Carter, ‘Ethics’, p. 740.

¹⁷³ *Rings*, pp. 36, 122; Goeman, *Mark*, p. 18.

¹⁷⁴ *Rings*, p. 36.

¹⁷⁵ *Rings*, Contents.

¹⁷⁶ *Rings*, Contents, p. 233; Nixon, *Slow Violence*, p. 2.

¹⁷⁷ *Rings*, Contents, p. 237.

The tide was advancing up the river, the water was shining like tinplate, and from the radio masts high above the marshes came an even, scarcely audible hum. The roofs and towers of Orford showed among the tree tops, seeming so close that I could touch them. There, I thought, I was once at home. And then, through the growing dazzle of the light in my eyes, I suddenly saw, amidst the darkening colours, the sails of the long-vanished windmills turning heavily in the wind.¹⁷⁸

That ‘even, scarcely audible hum’ from the radio masts draws us back into radar’s invisible mesh, and from here into a wickedly complex network of colonial, industrial and technological associations. From his final vantage point at Orford Ness, the narrator does not see its history ‘all together’, as though from ‘an imaginary position some distance above the earth’.¹⁷⁹ He is blinded and bedazzled, feels estranged, and even hallucinates. Sebald here implies that it is precisely this position, and the structural and discursive forces that subtend it, that western commentators on nuclear colonialism must acknowledge if they are to proceed in their work with the ‘precision and responsibility’ that it demands.¹⁸⁰

How useful is this approach for contemporary scholarship on the memory of nuclear colonialism in Britain? In his 2019 article ‘Slow violence and toxic geographies: “out of sight” to whom?’, Davies observes that a ‘politics of *indifference* about the suffering of marginalized groups helps to sustain environmental injustice’, and writes of the importance of ‘putting the perspectives of people who co-exist with pollution at the centre of accounts of slow violence’.¹⁸¹ Discussing Nixon’s argument that the work of activist-writers is to render threats of slow violence ‘apprehensible to the senses through [...] scientific and imaginative testimony’, he notes that ‘such a translation can be viewed as an invasive narrative; a reworking of pollution that becomes distant from the people who are actually impacted by toxic geographies’.¹⁸² Such acts of translation can lack attention to what Indigenous scholars call ‘positionality’. Toxic materials, as we have seen throughout this dissertation, are physically distributed through ‘infrastructures of chemical violence’; they are also suspended in powerful cultural currents.¹⁸³ The politically opportune pursuit of ‘arresting stories, images, and symbols’ for toxicants risks ignoring these currents, and how they condition representation; and, as Liboiron notes, the ‘representation of a

¹⁷⁸ *Rings*, p. 237.

¹⁷⁹ *Rings*, pp. 237, 83.

¹⁸⁰ *Destruction*, p. 53.

¹⁸¹ Davies, ‘Slow violence’, pp. 12-13.

¹⁸² Nixon, *Slow Violence*, p. 14; Davies, ‘Slow violence’, p. 12.

¹⁸³ Murphy, ‘Alterlife’, p. 496.

problem forecloses some forms of action while allowing others to make sense'.¹⁸⁴ *The Rings of Saturn* is useful here precisely because of its intense focus on the positionality of its narrator. Sebald does not seek to render the radionuclides released through the forty-five nuclear detonations orchestrated by the British military 'apprehensible to the senses' from afar, but rather draws into view the forces that shape his narrator's limited understanding of nuclear colonial power.¹⁸⁵ Literary critical work on nuclear colonial memory in Britain should heed Davies' insistence that 'we must deeply engage with people who are already experiencing the drawn-out havoc of environmental pollution [...] It is *their* knowledge that should be at the forefront of writings about violence, be it slow, fast, or superficially hidden'.¹⁸⁶ For literary scholars, this means close engagement with texts produced in toxified geographies, and attention to the problems of representation that this work often entails. This does not mean shunning nuclear texts produced in Britain. Rather, it means situating them in relation to nuclear colonial networks, and associated cultural redactions and distractions. In this regard *The Rings of Saturn*, with its obsessive emphasis on intricate systems, the illusory, and the forgotten, deserves to be read as a core text in the history of nuclear colonial memory in Britain, 'most of it not yet written'.¹⁸⁷

¹⁸⁴ Nixon, *Slow Violence*, p. 3; Liboiron, 'Redefining', p. 88.

¹⁸⁵ Nixon, *Slow Violence*, p. 14.

¹⁸⁶ Davies, 'Slow violence', p. 14.

¹⁸⁷ *Rings*, p. 118.

PART FOUR

Nonfiction and Toxicity in the USA, 1962-Present

7. Writing the Carcinogenosphere

Silent Spring / Mill Town / The Undying

Rachel Carson's *Silent Spring* begins in a world turning strange around its inhabitants. The narrator describes a town poisoned by a creeping 'blight': 'Some evil spell had settled on the community'. Livestock sicken. Songbirds are found dying. Vegetation withers. Families fall ill. 'I know of no community that has experienced all the misfortunes I describe', she writes, but 'every one of these disasters has actually happened somewhere'. Her book, she continues, is an 'attempt to explain' these emergent conditions.¹ To trace the causes of these deadly shifts, her narrator travels alongside toxicants – pesticides, radioactive fallout, and other harmful substances – and carefully observes and describes their bodily effects. She sinks underground into a 'dark, subsurface sea', and rises to join the 'teeming populations that exist in the dark realms of the soil'; she pulses through rivers, drifts with aerial sprays, and moves, finally, into the 'ecology of the world within our bodies'.² Distinguished by its synthesis of a 'vast amount of research in widely separated fields', its clarity of description and argumentation, and its eerie atmospherics, *Silent Spring* was recognised on publication in 1962 as an urgent text.³ Carson's critique of industrial toxicity, as is well-documented, had immediate and enduring cultural and political consequences. A wave of public pressure forced the tighter regulation of organochlorine and organophosphate insecticides. John F. Kennedy, after reading *Silent Spring*, ordered a federal enquiry into pesticide misuse. The investigation influenced ensuing shifts in administrative practice, which in turn led to the foundation of the Environmental Protection Agency (EPA) in 1970.⁴ Some commentators even claim that *Silent Spring* inaugurated the modern environmentalist movement.⁵ As a cultural phenomenon and a regulatory catalyst, *Silent Spring* has few parallels in the history of modern literature, perhaps none. Contemporary activists, scholars and politicians still celebrate its success. It is generally associated with the identification of harm, and its swift and decisive counteraction; with perilous conditions overturned.

¹ *Spring*, pp. 21-22.

² *Spring*, pp. 53, 62, 169.

³ *Spring*, p. 170.

⁴ See Hepler-Smith, 'Molecular Bureaucracy', pp. 541-47.

⁵ For a list of these claims see Waddell, 'The Reception of *Silent Spring*: An Introduction', in *No Birds*, ed. by Waddell, pp. 1-16 (pp. 1-3).

In referring to *Silent Spring*, then, we invoke a set of political and cultural legacies, as much as the contents of the text itself. The tone is often celebratory, and justly so. ‘Very few books change the course of history’, as Linda Lear, Carson’s biographer, observes in a 1998 afterword.⁶ It bears repeating Lutts’ summary of the history of *Silent Spring*, from which I quoted earlier in this dissertation: ‘Never before or since has a book been so successful in alerting the public to a major environmental pollutant, rooting the alert in a deeply ecological perception of the issues, and promoting major public, private, and governmental initiatives to correct the problem’.⁷ On the basis of such descriptions, one might expect to find profound differences between contemporary ecological and regulatory conditions, and those in which Carson wrote. And yet, the worlds that Carson describes – worlds in which ‘every human being is now subjected to contact with dangerous chemicals, from the moment of conception until death’ – remain disconcertingly familiar.⁸ *Silent Spring*’s successes should, of course, be celebrated. That American farmers may no longer legally dust their crops with DDT – a persistent and possibly carcinogenic toxicant – is welcome.⁹ The EPA is (or rather, could be) an essential institution in the struggle for an ecologically healthy and environmentally just world. But too close a focus on these successes distracts from the persistence of certain dangers that Carson identified. Too forceful an emphasis on *Silent Spring*’s triumphs risks downplaying its contemporary relevance; amplifying its enquiries into bygone problems, while muting its discussions of those still to be resolved. *Silent Spring* situates its descriptions of the biological influence of certain poisons – chlordane, dieldrin, malathion – within a broader critique of the toxic industries and permissive regulatory structures of the USA in the mid-twentieth century. While these particular substances have since, in certain contexts, been subjected to safer regulations, those industries and structures – or rather, their twenty-first century descendants – are yet to be dismantled and replaced.

Silent Spring is often, writes Sandra Steingraber, ‘remembered for the birds’:

When I ask people to name words, phrases, or images that Rachel Carson’s book evokes for them, ‘thin eggshells’ is among the most frequent responses. Yet this consequence of pesticide exposure – bird eggs so fragile they crush under the airy weight of their own brooding parents – is scarcely mentioned in *Silent Spring*. Perhaps we like to equate

⁶ Linda Lear, ‘Afterword’, in *Spring*, p. 258.

⁷ Lutts, ‘Fallout’, p. 17.

⁸ *Spring*, p. 31.

⁹ Takanori Harada et al., ‘Toxicity and Carcinogenicity of Dichlorodiphenyltrichloroethane (DDT)’, *Toxicological Research*, 32.1 (2016), 21-33 <doi:10.5487/TR.2016.32.1.021>.

Carson with eggshell thinning because it is a problem that largely fixed itself after DDT and a handful of other pesticides were finally restricted for domestic use. In this way, Carson's predictions of disaster can be simultaneously viewed as both prophetic and successfully averted. A comfortable reckoning.¹⁰

Silent Spring is not, Steingraber implies, remembered for its chapters on what Carson called the 'chemical origin of cancer'. Carson here describes a sickening world – a world in which 'exposures to cancer-producing chemicals [...] are uncontrolled and they are multiple'.¹¹ Like Carson's critiques of industrial and regulatory structures, these chapters do not fit into the reassuring historiographies that I describe above. Throughout this dissertation, I have drawn upon discourses created by activists, scholars and poisoned communities working to understand the altered geochemical worlds of the twentieth and twenty-first centuries, to map their industrial roots, and to ascertain their effects on ecological and public health. In this chapter, I consider how certain participants in these discourses have worked to describe the relationship between toxic pollution and cancer, focusing on *Silent Spring* and two recent literary texts. These books – Kerri Arsenault's *Mill Town: Reckoning with What Remains* (2020), and Anne Boyer's *The Undying: A Meditation on Modern Illness* (2019) – locate themselves in a tradition of writing about toxicity and cancer in which *Silent Spring* occupies an important, even formative, position. Like *Silent Spring*, they respond to the political questions that surface once cancer is understood as an industrially-induced disease. Carson included detailed proposals for social reform along ecological principles in *Silent Spring*; she wrote anticipating that she might stir a slumbering public into action by alerting them to concealed facts. Part of Carson's project was to release information hitherto 'soundproofed' within governmental, industrial and scientific documents into public discourse.¹² Since the 1960s, toxic discourse has shifted. Now, as Boyer writes, 'the challenge is not to speak into the silence, but to learn to form a resistance to the often obliterating noise'. The chemical industry and their allies responded to *Silent Spring* with a barrage of rebuttal, invective and mockery, seeking to cast doubt on Carson's work, and on the research on which she drew. This work of 'mystification', as Boyer calls it, continues, and it shapes perceptions of toxicity in the present.¹³ Arsenault describes how the complexity of the relationship between pollution and cancer in the town in Maine where she grew up – a working-class town built around a paper mill

¹⁰ Steingraber, *Downstream*, p. 30.

¹¹ *Spring*, pp. 194, 209.

¹² Steingraber, *Downstream*, p. 18.

¹³ Anne Boyer, *The Undying: A Meditation on Modern Illness* (London: Allen Lane, 2019), pp. 8, 41 (hereafter *Undying*).

– can give way, through the ‘contortion of language’, to uncertainty. This debilitating ambiguity – precipitated by the difficulty of tracing industrial residues, intensified by unclear legislation, and further clouded by ‘toxic and invisible deceit’ – powerfully influences the positions from which Arsenault and Boyer write.¹⁴ Strong continuities exist between the worlds that Carson described, and those we now inhabit – worlds scarred by powerful industrial lobbies and permissive regulations; the planetary dispersal of persistent and hazardous substances; disintegrating ecosystems and poisoned lives. Carson, as I shall soon discuss in more detail, invited her readers to imagine an alternative world, calling for ‘new, imaginative, and creative approaches to the problem of sharing our earth’.¹⁵ By comparison, contemporary writers can seem guarded, even jaded.

In what follows, I sketch the history of industrial toxicity in the USA since 1962, and ask how this history should inform contemporary readings of Carson’s future-oriented writing in *Silent Spring*. I then attend to how *Mill Town* and *The Undying* blend activist-writing with more melancholic or speculative registers, similar to those that I discussed in chapters Three and Four. Arsenault and Boyer have crafted experimental literary forms that directly respond to the USA’s intransigent regulatory conditions, and to how these drive the slow, cumulative degradation of its environmental and public health. These texts consider the aptitudes and pitfalls of inherited activist forms in contemporary political contexts. They engage in new writerly practices that have not yet received substantial critical attention, emphasising the urgent need for political and ecological transformations, but also responding formally to how literary work on toxicity tends to have a limited ‘impact’. ‘So if the law fails us, what else can we do? I’m not sure I know’, writes Arsenault.¹⁶ Similarly, Boyer cautions against expecting too much from a literary text: ‘Visibility doesn’t reliably change the relations of power’.¹⁷ To what extent, then, have the politics of the literary practice of imagining worlds outside of toxic capitalism changed since 1962? How might those writing in the present build upon *Silent Spring*’s partial successes? What is an adequate form, and an appropriate set of political expectations, for the contemporary literature of toxicity?

~

¹⁴ *Mill*, pp. 36, 59.

¹⁵ *Spring*, p. 256.

¹⁶ *Mill*, p. 280.

¹⁷ *Undying*, p. 159.

On the first page of *The Undying*, Boyer discusses Carson, cancer and silence:

Rachel Carson is diagnosed with breast cancer in 1960, at the age of fifty-three, while in the process of writing *Silent Spring*, among the most important books in the cultural history of cancer. Carson does not speak publicly of the cancer from which she dies in 1964.

Boyer links this silence with pervasive difficulties and refusals of articulation in the literature of breast cancer. Quoting from the novelist Fanny Burney's first-person account of her mastectomy, she writes:

Breast cancer exists uneasily with the 'I' that might 'speak of this terrible business' and give 'this miserable account'. This 'I' is sometimes annihilated by cancer, but sometimes preemptively annihilated by the person it represents, either by suicide or by an authorial stubbornness that does not permit 'I' and 'cancer' to be joined in one unit of thought.¹⁸

In the conventions of mid-twentieth century science writing, authoritative, disembodied narrators explain objective facts to their readers, who are expected to absorb the information efficiently and submissively. The narrator of *Silent Spring* subverts these inflexible expectations – she addresses her readers as intellectually and imaginatively active beings, voicing ironical asides, crafting arresting images, and summoning up uncanny atmospheres – but she does not depart from them entirely. Carson uses the first person to define her narrator's argumentative position: 'It is not my contention [...] I do contend [...] I contend, furthermore'.¹⁹ This position is buttressed by substantial corroborative sources – as one early reviewer put it, she 'presents her evidence like a public prosecutor, with a relentless battery of testimony'.²⁰ 'I', here, is used not to express an interior world, but to make a case. When convenient, the narrator disengages from this use of the first person. In order to make toxicity perceptible, Carson had to write across multiple scales, many of which exceed direct sensory apprehension, crossing from the molecular to the planetary. A conventional 'I' – its measure, the human body – cannot enter easily into these domains. Carson evidently relished such writing; as Janet Montefiore has suggested, unlike

¹⁸ *Undying*, pp. 3, 5.

¹⁹ *Spring*, p. 29.

²⁰ Miles Smith, 'A Review of *Silent Spring*, by Rachel Carson', *Press*, 6 November 1962, quoted in Carol B. Gartner, 'When Science Writing Becomes Literary Art: The Success of *Silent Spring*', in *No Birds*, ed. by Waddell, pp. 103-25 (p. 106).

most ‘nature writers’, she is at her best ‘not on her own observations, fine though these are, but on things that neither she nor any human has seen and that can only be imagined’.²¹ In *Silent Spring*, then, the first person crystallises and dissolves as and when it suits Carson’s purposes. As Teju Cole has written, ‘every worthwhile first-person narrator [...] has a suggestive and imprecise identification’ with her author.²²

Boyer writes that the ‘agonies’ of breast cancer ‘are not only about the disease itself, but about what is written about it, or not written about it, or whether or not to write about it, or how. Breast cancer is a disease that presents itself as a disordering question of form’. *Silent Spring* is a virtuosic illustration of ecological science, and it is a forceful critique of certain industrial practices; it is also a deeply politicised and finely calibrated response to this ‘disordering question’.²³ Steingraber has described how after her diagnosis, Carson built a ‘fortress of secrecy’, forbidding ‘any discussion, public or private, about her illness’.²⁴ As Ellen Leopold has discussed, breast cancer was a ‘taboo subject’ in the mid-century USA.²⁵ Carson was also conscious that the chemical industry, should they become aware of her cancer, would use this knowledge to undermine her work. After *Silent Spring* was published, Carson was attacked on the basis that she had no doctorate; that she had no institutional affiliation; that she was ‘probably a Communist’; that she was a ‘fanatic’; that she was a ‘spinster with no children’ and ‘an hysterical woman’.²⁶ If her decision not to write about or publicly discuss her illness was, as Boyer suggests, a kind of self-annihilation, it was also a strategic move made in hostile political conditions, ‘intended to retain the appearance of scientific objectivity as she was documenting the human cost of environmental contamination. She wished to yield her enemies in industry no further ground from which to launch their attacks’.²⁷

‘Carson’s reluctance to link [herself] to the disease has now become replaced with an obligation, for those women who have it, to always do so’, argues Boyer.²⁸ Arsenault and Boyer

²¹ Janet Montefiore, ‘“The fact that possesses my imagination”: Rachel Carson, Science and Writing’, *Women: A Cultural Review*, 12.1 (2001), 44-56 <doi:10.1080/09574040110034110>, p. 48.

²² Teju Cole, ‘Double Negative’, in Cole, *Known and Strange Things* (London: Faber and Faber, 2016), pp. 69-73 (pp. 69-70).

²³ *Undying*, p. 7.

²⁴ Steingraber, *Downstream*, p. 28.

²⁵ Ellen Leopold, *A Darker Ribbon: Breast Cancer, Women, and Their Doctors in the Twentieth Century* (Boston: Beacon Press, 1999), p. 203.

²⁶ See Lear, ‘Afterword’, pp. 261-62; Former Secretary of State for Agriculture Ezra Taft Benson is reputed to have remarked that Carson was ‘probably a Communist’ in a letter to Dwight D. Eisenhower, quoted in Lear, *Rachel Carson: Witness for Nature* (New York: Mariner Books, 1997; 2009), p. 429.

²⁷ Steingraber, *Downstream*, p. 28.

²⁸ *Undying*, p. 8.

have crafted embodied voices that exist in the midst of the wounding conditions Carson described. These voices can be understood as correctives to the ‘uninhabited language’ that often passes as responding to poisoned places and bodies – in toxic release inventories, for example, or in industry reports.²⁹ The narrators of such documents often read as though ‘speaking from nowhere’.³⁰ These simplified formal and generic conventions allow ‘regulators, scientists, and industry and environmental advocates to cut through the complexity of environmental toxicity to mobilize evidence’.³¹ The literary tropes of the agency report, the press release, or the policy proposal can be useful, for industrial representatives and environmental activists alike. Even so, as Arsenault asks, ‘do all these documents about pollutants to land, air, and water tell the whole story, half a story, or even a sixteenth?’³² Much of the cumulative, lived experience of toxicity does not fit into this kind of writing. Carson, writing in the early 1960s, was aware of this problem – that all too often, to ‘cut through’ complexity means ignoring it, resulting in consequential simplifications and misrepresentations.³³ ‘Man, however much he may like to pretend the contrary, is part of nature’, she observes in *Silent Spring*. ‘Can he escape a pollution that is now so thoroughly distributed throughout our world?’ In articulating toxic stories, it is important to speak with a voice that does not ‘pretend’ to exist apart from the contemporary world, with all its ensnaring legacies and lingering residues.³⁴

Carson, though she does not use ‘T’ and ‘cancer’ together, made plain to her 1960s readers that together, they lived immersed in a ‘sea of carcinogens’.³⁵ Boyer writes that cancer is generally ‘held apart’ from the systems that organise the everyday. There is a need, she argues, to bring the disease ‘inside of history’; to characterise it less as a sickness attributable mainly to genetics or lifestyle choices, and more as a form of collective suffering induced by an industrially-generated ‘*carcinogenosphere*’.³⁶ In this call to recognise cancer as an ‘ecological disease’ and, in doing so, to re-politicise it, Boyer builds upon an often-underrepresented aspect of Carson’s work in *Silent Spring*.³⁷ Writing in 2020, it is possible to access data showing how cancer rates rose exponentially in the decades following the Second World War; an ‘epidemic in slow motion’, its incidence in

²⁹ Nixon, *Slow Violence*, p. 169.

³⁰ Latour, ‘instability’, p. 32.

³¹ Hepler-Smith, ‘Molecular Bureaucracy’, p. 536.

³² *Mill*, p. 296.

³³ Hepler-Smith, ‘Molecular Bureaucracy’, p. 536.

³⁴ *Spring*, pp. 168-69.

³⁵ Wilhelm Hueper, letter to Carson, quoted in *Spring*, p. 211.

³⁶ *Undying*, pp. 123, 105, 78.

³⁷ Steingraber, *Downstream*, p. 277.

the USA increased by eighty-five per cent between 1950 and 2001.³⁸ During these years, the production of synthetic materials increased according to a similar pattern. In 1950, the petrochemical industry produced two million tonnes of plastics annually. In 2015, the figure was three hundred and eighty million tonnes.³⁹ Plastics have two main structural features: polymers, long, strong chains of molecules; and monomer additives – individual molecules, not clasped into the chains, but held in their mesh. These latter materials – phthalates, bisphenol A, polychlorinated biphenyls – are added to plastics to give them colour, flexibility, or other useful qualities.⁴⁰ As a discarded polythene container ages, it disintegrates into minute fragments. These fragments circulate; suspended in riverine currents, for example, or resting in the sediments of an estuary. Granules of polymer, as they travel, will come into contact with other synthetic contaminants, such as biocides, chemical coolants or flame retardants. Plastic grains readily absorb these oily substances, which are chemically similar to monomer additives; and so, they often host unpredictable mixtures. When a fish ingests a plastic fragment, then, it also ingests any residues that the fragment has absorbed. These residues may accumulate in its tissues and, invisibly, move through the food chain.⁴¹ Steingraber describes a graph showing the annual production of all synthetics – polymers, their additives, biocides – in the USA from 1900-2009. It looks like a ‘cliff face’, production doubling every seven to eight years after 1940.⁴² Certain synthetic toxicants, such as dioxins and phenoxy herbicides, have been shown to interfere with the human endocrine system, increasing susceptibility to hormone-sensitive cancers, such as breast cancer and prostate cancer.⁴³ Some toxicologists have estimated that in the USA, five to ten per cent of the synthetic substances in commercial use – four to eight thousand different chemicals – ‘might reasonably be considered human carcinogens’.⁴⁴ And yet, as Steingraber

³⁸ Hueper and W.D. Conway, *Chemical Carcinogenesis and Cancers* (Springfield, IL: Charles Thomas, 1964), p. 17; R.W. Clapp, Genevieve K. Howe and Molly M. Jacobs, ‘Environmental and Occupational Causes of Cancer Re-visited’, *Journal of Public Health Policy*, 27.1 (2006), 61-76 <doi:10.1057/palgrave.jphp.3200055>, p. 67.

³⁹ Roland Geyer, Jenna R. Jambeck and Kara Lavender Law, ‘Production, use, and fate of all plastics ever made’, *Science Advances*, 3.7 (2017), 1-5 <doi:10.1126/sciadv.1700782>, p. 1.

⁴⁰ Liboiron, ‘Redefining’, pp. 95-97.

⁴¹ In this description of how synthetic substances move through ecosystems I draw from Liboiron, ‘Redefining’, pp. 99-101. See also Walter R. Waldman and Matthias C. Rillig, ‘Microplastic Research Should Embrace the Complexity of Secondary Particles’, *Environmental Science and Technology*, 54 (2020), 7751-53 <doi:10.1021/acs.est.0c02194>; Hugo Jacob et al., ‘Effects of Virgin Micro- and Nanoplastics on Fish: Trends, Meta-Analysis, and Perspectives’, *Environmental Science and Technology*, 54.8 (2020), 4733-45 <doi:10.1021/acs.est.9b05995>, pp. 4733-42.

⁴² Steingraber, *Downstream*, p. 91. The graph can be found in R.C. Thompson et al., ‘Our Plastic Age’, *Philosophical Transactions of the Royal Society B*, 364 (2009), 1973-76 <doi:10.1098/rstb.2009.0054>, p. 1974.

⁴³ A.C. Gore et al., ‘Executive Summary to EDC-2: The Endocrine Society’s Second Scientific Statement on Endocrine-Disrupting Chemicals’, *Endocrine Reviews*, 36.6 (2015), 593-602 <doi:10.1210/er.2015-1093>, pp. 597-99.

⁴⁴ Steingraber, *Downstream*, p. 128. Steingraber is paraphrasing Victor A. Fung, J. Carl Barrett and James Huff, ‘The Carcinogenesis Bioassay in Perspective: Application in Identifying Human Cancer Hazards’, *Environmental Health Perspectives*, 103 (1995), 680-83 <doi:10.1289/ehp.95103680>, pp. 681-82.

writes, the ‘environment keeps falling off the cancer screen’. Carson wrote at a tipping point in the entwined histories of synthetic technology, the living world and cancer. She documented ‘what she believed were the beginnings of a cancer epidemic’.⁴⁵

Carson invited her readers to consider cancer alongside diseases more commonly understood as ‘environmental health problems’. In the final quarter of the nineteenth century, she writes, Louis Pasteur was ‘demonstrating the microbial origin of many infectious diseases’. At this time, only ‘a half-dozen sources of industrial carcinogens were known’, but this would soon change:

the twentieth century was to create countless new cancer-causing chemicals and to bring the general population into intimate contact with them [...] No longer are exposures to dangerous chemicals occupational alone; they have entered into the environment of everyone – even of children as yet unborn. It is hardly surprising, therefore, that we are now aware of an alarming increase in malignant disease.

In a chapter called ‘The Human Price’, Carson describes how the ‘infinite number of man-made substances that now pervade our world’ interact unpredictably, and often harmfully, with the interior of the human body.⁴⁶ In a subsequent chapter, ‘One In Every Four’, she considers rising cancer mortality rates (incidence data were not then available) in relation to recent industrial history.⁴⁷ In the USA, Carson writes, cancer ‘accounted for 15 per cent of the deaths in 1958 compared with only 4 per cent in 1900’. She juxtaposes these statistics with tendencies in widely-used insecticides and herbicides – DDT, aminotriazole, IPC – to produce tumours when tested on dogs, rats and other animals. Carson here identified a correlative pattern suggestive of causal relationship; she also provided evidence that certain substances provoke ‘malignant’ effects under laboratory conditions.⁴⁸ She could not, however, offer irrefutable proof that certain synthetic materials recently introduced into ecological circulation were responsible for cancerous growths in human bodies. This lack of information was in no small part due to the enduring difficulties involved in developing testing methodologies adequate to this emergent, labyrinthine and volatile context. The effect of a chemical exposure, Carson explains, is often ‘delayed’, and so ‘seemingly unrelated to the cause’. Moreover, in the ‘unseen world’ within the human body, ‘minute causes produce mighty effects’; often, the effect appears ‘in a part of the body remote

⁴⁵ Steingraber, *Downstream*, pp. 49, 44.

⁴⁶ *Spring*, pp. 168, 194-95, 174.

⁴⁷ Steingraber, *Downstream*, p. 44.

⁴⁸ *Spring*, pp. 195, 198.

from the area where the original injury was sustained'. Cause and effect, here, 'are seldom simple and easily demonstrated relationships. They may be widely separated both in space and time'. Further complications arise when one considers that exposures are 'cumulative over long periods of time', and that 'a human being, unlike a laboratory animal living under rigidly controlled conditions, is never exposed to one chemical alone'.⁴⁹ In this context, to prove a link between a cancer case and a particular exposure one can only very rarely, as in a laboratory, follow a cause directly to its effect; instead one must almost always, like a detective, work backwards from an effect to its cause.

Silent Spring may be understood, at one level, as an attempt to communicate research indicating the relationship between industrial toxicity and cancer. At another, it may be understood as a literary text written to voice the traumas of a world 'puzzled by new kinds of sickness' – not only rising rates of cancer, but also unexplained cases of paralysis, or of convulsions, even sudden deaths.⁵⁰ Ronda has suggested that when reading *Silent Spring*, we look through a portal into 'a fairy-tale world of enchantment and evil spells', in which 'toxic effects are disaggregated from their source'.⁵¹ Slowly, it dawns that this world is our own; the portal is, in fact, a mirror. Carson portrays a society in thrall to advertising, addicted to contaminated products, and preyed upon by virulent entities of its own design, while ecosystems wither. 'Our attitude towards poisons', her narrator suggests, 'has undergone a subtle change'; where once toxins were 'kept in containers marked with skull and crossbones', 'rows upon rows of insecticides' now appear in 'homey and cheerful' displays, or are spectrally dispersed throughout living environments.⁵² As, '[l]ulled by the soft sell and the hidden persuader', 'mesmerized' citizens are induced to transport lethal chemicals from commercial to domestic spaces; as the 'suburbanite', innocently spraying his garden, raises the 'level of air pollution above his own grounds to something few cities could equal'; as families gather to eat meals marked by the 'sinister touch of the poison' – all are exposed to pesticides in 'daily, slow, and pervasive ways'.⁵³ Carson demonstrates to her readers how exposures bring on 'mysterious maladies' that strike at 'everyday people' – a 'professional man', a 'housewife', a 'college student'.⁵⁴ '*Silent Spring* works well', writes Carol B. Gartner, 'because Carson has analyzed her potential audience, chosen literary and rhetorical techniques to reach them, and pragmatically organized the presentation of her ecological philosophy so that it

⁴⁹ *Spring*, pp. 169-70, 174.

⁵⁰ *Spring*, p. 21.

⁵¹ Ronda, *Remainders*, p. 47.

⁵² *Spring*, pp. 142, 158.

⁵³ *Spring*, pp. 158, 28, 161, 142; Ronda, *Remainders*, p. 47.

⁵⁴ *Spring*, pp. 21, 200-02.

will fit her reader's beliefs, concerns, and self-interest'.⁵⁵ These are the kind of readers who might identify with the inhabitants of a 'town in the heart of America where all life seemed to live in harmony with its surroundings'.⁵⁶ Carson's implied readers, in short, are 'implicitly white and Anglo', the prosperous inhabitants of small-town and suburban 1960s America. Though her text focuses on the social effects of pesticide exposure, it does not mention 'the mainly Latino farm workers of California and Florida, who were directly exposed to pesticides in their work in the fields'.⁵⁷

Carson begins *Silent Spring* by describing its specific *raison d'être* – to work towards a public 'in full possession of the facts', and so more capable of facing the challenges of a toxified world.⁵⁸ That she does not mention poisoned Latino workers suggests either that she was ignorant of these particular facts (unlikely, given the depth of her research); that she did not care about them; or that her strategy to compose an informed, indignant and effective public involved targeting white middle-class suburbia, while disregarding more vulnerable, but less politically powerful groups. Purdy has recently written about how the USA's racist histories have 'riven environmentalism, compromising and even poisoning its promise'.⁵⁹ He describes how influential figures in American conservationism, such as Madison Grant and Theodore Roosevelt, imaginatively aligned wilderness protection with what they thought of as the 'conservation of that race which has given us the true spirit of Americanism'.⁶⁰ Purdy traces continuities between this early-twentieth century racism, and the priorities of powerful environmentalist groups, such as the Sierra Club, during the 1970s. Many 'environmentalist habits of thought', he shows, 'arose in an argument restricted to prosperous white people, some of them bigots and racial engineers'. *Silent Spring* does not argue for the supremacy of the so-called white race. Even so, in its racialised omissions, it testifies to how the 'history of environmentalism is a microcosm of American history generally'; as Purdy suggests, *Silent Spring* 'can seem to prove [...] the narrowness as well as the power of mainstream environmentalism'.⁶¹ As part of their efforts to compose truly collective publics, contemporary climate and environmental justice movements reckon with these divisive legacies. Later, I will discuss this work in more detail. For now, I want to give some more attention to Carson's literary treatment

⁵⁵ Gartner, 'Science Writing', p. 120.

⁵⁶ *Spring*, p. 21.

⁵⁷ Purdy, *Land*, p. 125.

⁵⁸ *Spring*, p. 30.

⁵⁹ Purdy, *Land*, p. 111.

⁶⁰ Henry Fairfield Osborn, 'Preface', in Madison Grant, *The Passing of the Great Race* (New York: Charles Scribner's Sons, 1916), ix, quoted in Purdy, *Land*, p. 113.

⁶¹ Purdy, *Land*, pp. 123, 110, 125.

of the scientific work of attaching effects to causes. Crucially, even as she offers explanations, she does not exorcise the disturbing atmospheres that surround ‘insidious’ toxic networks.⁶² Interspersing her logically precise argumentation and proposals for practical solutions – of which more shortly – with gothic episodes, she lures readers into what Ronda calls ‘refractory’ enclaves, horrifying and unsettling them. If the ‘rhetorical tone of *Silent Spring* is one of empirical explanation and calls to action’, writes Ronda, ‘the prevailing mood is one of uncertainty’, highlighting ‘the persistent difficulties involved in perceiving the complexity of emergent ecological threats’.⁶³

Literary texts about industrial toxicity often shuttle between two positions. From one, all seems clear: as Carson observed, ‘plain common sense’ indicates the connection between the dispersal of a substance associated with a certain disease, and increases in that disease’s occurrence.⁶⁴ The other position is one of bewilderment and unease. When lacking crucial epidemiological data, to claim that certain industrial practices and certain sicknesses are linked can feel unscientific, speculative, perhaps even paranoid. This oscillating dynamic, then, is powerfully influenced by gaps in research – by ‘undone science’.⁶⁵ Early research in industrial toxicology did not receive federal funding; it came about through the collaborative work of public health scholars, activists and unions.⁶⁶ Only when the Toxic Substances Control Act (TSCA) passed into law would the EPA (which, of course, did not exist when Carson was writing) attain some legal powers to test synthetic materials for toxicity. Drafted in 1971, the TSCA did not pass until 1976:

By this time, negotiations with the Department of Commerce and Congress had diluted the [...] powers that TSCA conferred upon the agency. The final law did not provide [sufficient] resources to conduct toxicity testing, the power to require manufacturers to test their own products, or the leeway to make rules without substantial evidence of toxicity and exposure.⁶⁷

The EPA funnelled its efforts into screening new industrial chemicals. Those already in use – some sixty-two thousand substances – were legally exempt from testing.⁶⁸ One of the TSCA’s

⁶² *Spring*, p. 49.

⁶³ Ronda, *Reminders*, pp. 5, 47.

⁶⁴ *Spring*, p. 172.

⁶⁵ Gwen Ottinger, ‘Crowdsourcing Undone Science’, *Engaging Science, Technology, and Society*, 3 (2017), 560-74 <doi:10.17351/ests2017.124>.

⁶⁶ Purdy, *Land*, p. 128.

⁶⁷ Hepler-Smith, ‘Molecular Bureaucracy’, p. 547.

⁶⁸ Hepler-Smith, ‘Molecular Bureaucracy’, p. 547; Purdy, *Land*, p. 31.

enduring legacies, as Purdy observes, is that the ‘safeness or danger of most of the industrial economy is opaque’; it is still effectively ‘no one’s job’ to know how the majority of the eighty thousand or so industrial chemicals now in circulation in the USA interact with the human body.⁶⁹ In this ambiguously poisonous world, writes Boyer, we are ‘abandoned by cause, left to guess at the effect, and in our guesses, we are abandoned by truth, left only to error, permitted metaphysics but never really wanting them in the first place’.⁷⁰ Ambiguity, writes Arsenault, leaves sickened people ‘helpless, paranoid, confused, angry, incredulous, psychologically adrift’.⁷¹

In a 1959 letter to her editor, Paul Brooks, Carson explained that her intention in *Silent Spring* was to ‘give principal emphasis to the menace to human health, even though setting this within the general framework of disturbances to the basic ecology of all living things’. Through a ‘synthesis of widely scattered facts’, she would construct ‘a really damning case against the use of these chemicals’.⁷² Carson wrote under the conviction that an informed public, armed with ironclad facts, would pressurise government and industry to implement meaningful structural change. ‘The task is by no means a hopeless one’, her narrator declares in *Silent Spring*. The recognition that ‘our world [is] filled with cancer-producing agents’ was ‘of course dismaying and may easily lead to reactions of despair and defeatism’ – but obvious regulatory and industrial solutions existed.⁷³ M. Jimmie Killingsworth and Jacqueline S. Palmer have suggested that in order to convince her 1960s readers that remedial action was viable, Carson mobilised science fiction tropes. In their reading of the text, intrusive chemical entities threaten to undermine socioecological stability in a way that ‘resonates with the Gothic mode’.⁷⁴ *Silent Spring* begins with the apocalyptic ‘Fable for Tomorrow’, in which the ‘grim spectre’ of toxic contamination plagues a rustic community.⁷⁵ It concludes in less morbid style. Killingsworth and Palmer observe that *Silent Spring* takes a ‘millennialist turn’: late in the text, the narrator ‘begins to consider alternatives and solutions’, outlining a modernist programme for action based on a philosophy of ‘millennial ecology’. Gothic peril yields, then, to Carson’s ‘heroic ecological vision’.⁷⁶ Across this arc, the narrator dismantles the ‘concepts and practices of applied entomology’ (relics, she scoffs,

⁶⁹ Purdy, *Land*, pp. 31-32.

⁷⁰ *Undying*, p. 201.

⁷¹ *Mill*, p. 46.

⁷² Carson, letter to Paul Brooks, quoted in Brooks, *The House of Life: Rachel Carson at Work* (Boston: Houghton, 1972), pp. 243-44.

⁷³ *Spring*, pp. 211-13.

⁷⁴ M. Jimmie Killingsworth and Jacqueline S. Palmer, ‘*Silent Spring* and Science Fiction: An Essay in the History and Rhetoric of Narrative’, in *No Birds*, ed. by Waddell, pp. 174-204 (p. 178).

⁷⁵ *Spring*, p. 22.

⁷⁶ Killingsworth and Palmer, ‘Science Fiction’, pp. 185, 188, 202, 188.

of the ‘Stone Age of science’); provides comprehensive data showing the harmful effects of synthetic toxicants; demonstrates the inadequacy or complicity of certain institutions; and puts forward alternative, ecologically sound techniques for controlling plants and insects.⁷⁷ Carson’s proposals are couched in an appeal to progress ‘as an upward historical trajectory, made by pulses of efficiency and innovation’.⁷⁸ Here, the measure of progress is not profit, but ‘successful adaptation’ to ecological limits through the systemic adoption of ‘alternative technologies’.⁷⁹

This must have seemed implausible to some of *Silent Spring*’s first readers. For many in the USA during the early 1960s, DDT and other biocides were themselves ‘heroes, fruits of a new age of science and technology that promised to make life more safe, comfortable, and convenient than ever before’.⁸⁰ Such attitudes were supported not only by lurid advertisements paid for by the chemical industry, but also by government-sponsored research that demonstrated how useful these chemicals were: they protected human health against insect-borne diseases, and they killed pests and weeds, increasing agricultural yields and profits.⁸¹ The chemical industry was wealthy and powerful, it had strong links with government, and using sprays to eradicate unwanted plants and insects, whether in soybean fields or on domestic patios, had become an entrenched part of American life. To query whether pesticides were safe, and to ask whether those promoting their virtues had been wholly honest with their customers or citizens, was to contradict the orthodoxies of the Cold War USA – to suggest that something was rotten in the state of prosperity, progress and freedom. Predictably, *Silent Spring* was met with much hostility, especially by industry representatives and certain government officials. And yet, it set in motion a period of considerable, if not radical, possibility in American environmental law. In the 1960s, federal policymakers started to pay attention to evidence that pesticides, as well as other chemicals, threatened public health.⁸² Their work underpinned a sequence of 1970s environmental laws – not only the TSCA, but also the National Environmental Policy Act, the Clean Air Act, the Clean Water Act, the Endangered Species Act, and laws governing waste disposal.⁸³ These laws, though important, are far from adequate. They do not address how the USA’s classist and racist social structures shape the distribution of environmental harm. They do

⁷⁷ *Spring*, p. 257.

⁷⁸ Bathsheba Demuth, *Floating Coast: An Environmental History of the Bering Strait* (New York: W.W. Norton & Company, 2019), p. 8.

⁷⁹ Killingsworth and Palmer, ‘Science Fiction’, p. 192.

⁸⁰ Cheryl Glotfelty, ‘Cold War’, *Silent Spring: The Trope of War in Modern Environmentalism*, ed. by Waddell, pp. 157-73 (p. 158).

⁸¹ Glotfelty, ‘Cold War’, p. 159; Hepler-Smith, ‘Molecular Bureaucracy’, p. 542.

⁸² Hepler-Smith, ‘Molecular Bureaucracy’, pp. 541-44.

⁸³ Purdy, *Land*, p. 107.

little to curb, let alone prevent, the large-scale manufacture and dispersal of toxic and persistent materials, or dependencies on fossil fuel infrastructures, or voracious habitat destruction. Liboiron, Tironi and Calvillo have argued that in many national contexts, ‘democratic and liberal modes of action’ against toxicants have long been ‘incomplete and insufficient [...] they are clearly neither working nor accessible to a wide variety of people and groups’.⁸⁴ Critiquing ‘narratives of volition, mobilization and publicness’ as historically exclusive – and here, in particular, remember the middle-class whiteness of Carson’s assumed readers – they call for ‘other modes of action that are often missed or dismissed as possible ways to expand environmental politics’.⁸⁵ I discussed such modes of action in detail in Chapter Five. First Nations peoples in South Australia certainly have not relied upon the settler-colonial state in their work to survive and resist empire’s toxic legacies. Here, I want to turn towards recent calls in the USA (and in many other national contexts) to compose new publics from across deeply divided societies – for ‘unions, social movements, Indigenous peoples, racial justice groups, and others to take back public power’, towards implementing policy that combines ‘climate action with attacks on social inequalities’.⁸⁶ What happens to our appreciation of texts like *Silent Spring*, *Mill Town* and *The Undying* when we situate ourselves at a possible political crossroads, as well as inside the structural inertias and chronic aftermaths of late-stage capitalism?

From this vantage point, *Silent Spring* comes into view through the cumulative environmental history of the past six decades. This prompts some searching questions about its popular reputation (it is worth considering why in her novel *Before the Flood*, Atwood transforms Carson into a saint worshipped by a post-apocalyptic eco-cult). Almost ‘fifty years ago [...] U.S. lawmakers passed national laws in response to the pollution and extinction crises that had arisen from the post-Second World War acceleration of human impact on the planet’. These 1970s legislators ‘assumed that they could retool national capitalism’; meanwhile, ‘activist and radical wings of organized labor talked about striking to enforce environmental and health and safety standards’. For all the cultural charge of the Green New Deal, this history can feel remote; ‘so far gone now’, Purdy writes, ‘that it is hard to recover the sense of possibility’.⁸⁷ Carson wrote at the onset of this time. To read her work today is to be reminded of its familiar successes – and to be struck by its failures. At the start of the 1960s, she urged her readers to grasp a ‘golden opportunity’ to ‘eliminate those carcinogens that now contaminate our food, our water supplies,

⁸⁴ Liboiron, Tironi and Calvillo, ‘Toxic politics’, pp. 336-37.

⁸⁵ Tironi, ‘Hypo-interventions’, p. 440; Liboiron, Tironi and Calvillo, ‘Toxic politics’, p. 337.

⁸⁶ Kate Aronoff et al., *A Planet to Win: Why We Need a Green New Deal* (London: Verso, 2019), p. 7.

⁸⁷ Purdy, *Land*, pp. 89-90, 135

and our atmosphere [...] for those not yet touched by the disease and certainly for the generations as yet unborn, prevention is the imperative need'.⁸⁸ This opportunity was missed. In its final form, the TSCA conferred few meaningful powers onto the EPA; production intensified, and the 'carcinogenosphere' thickened.⁸⁹ For decades now, the EPA has been 'underfunded, understaffed, and often industry-friendly'.⁹⁰ Under the Trump administration, its 'capacity to confront polluting industries and promote public and environmental health' has been more deeply undermined. The agency has been all but 'captured by those it should regulate'.⁹¹ Those working for a Green New Deal seek to integrate aspects of mainstream environmentalism with the work of the environmental justice movement, which, since its beginnings in the 1980s, has opposed industrial toxicity as an 'insidious form of racism'.⁹² While this emergent movement is gaining in force, it is yet to gain control of the levers of power.

Under these conditions, perhaps especially for those raised to appeal uncritically to the 'modern humanist political subject', the work of writing about toxicity shifts.⁹³ As contemporary lawmakers erode specific protections – cancelling measures to prevent coal plants from dumping toxic wastewater into rivers; working to lift laws obliging the oil and gas industry to report methane leaks – a strong sense of unaccountability and political paralysis sets in, one effect of which is to pressurise the already fragile notion that a book might wield decisive influence.⁹⁴ This unfolds inside the white noise of planetary ecological crisis and systemic deregulation. In this atmosphere, misinformation and various species of denialism thrive. These political conditions have imaginative consequences. In a recent article for *Emergence* magazine, Roy Scranton writes doomily that the 'future is utterly unprecedented, an impenetrable obscurity, a vast and dismal cloud of unknowing'.⁹⁵ As Naomi Klein writes, dominant perceptions of ecological crisis have long 'suffered from this imaginative asphyxiation':

⁸⁸ *Spring*, p. 213.

⁸⁹ *Undying*, p. 119.

⁹⁰ *Mill*, p. 281.

⁹¹ Lindsey Dillon et al., 'The Environmental Protection Agency in the Early Trump Administration: Prelude to Regulatory Capture', *American Journal of Public Health*, 108.S2 (2018), S89-S94 <doi:10.2105/AJPH.2018.304360>, p. S93.

⁹² Commission for Racial Justice, *Toxic Wastes and Race*, x.

⁹³ Liboiron, Tironi and Calvillo, 'Toxic politics', p. 337.

⁹⁴ Dana Nuccitelli, 'The Trump EPA strategy to undo Clean Power Plan', *Yale Climate Collections*, 21 June 2019, <bit.ly/37oog77> [accessed 14 September 2020]; Nuccitelli, 'Key facts about the new EPA plan to reverse the Obama-era methane leaks rule', *Yale Climate Collections*, 9 September 2019, <bit.ly/3cRl6Kw> [accessed 14 September 2020].

⁹⁵ Roy Scranton, 'Beginning with the End', *Emergence*, April 2020, <bit.ly/2xAkeey> [accessed 14 September 2020].

Almost every vision of the future that we get from best-selling novels and big-budget Hollywood films takes some kind of ecological and social collapse for granted. It's almost as if a great many of us have collectively stopped believing that there is a future, let alone that it could be better, in many ways, than the present.⁹⁶

Under late capitalism, to recognise that systemic change is necessary is also, often, to despair that such change is possible. *Mill Town* and *The Undying* respond to this imaginative and political bind. *Silent Spring*'s eerie atmospheres, summoned up to distress its implicitly white readers, shape its work as an analytical survey of scientific research into ecology and toxicity, and its case for industrial reforms. Its primary object is 'education in the service of persuasion', persuasion in turn serving action.⁹⁷ If *Silent Spring* seeks to clarify – to expose concealed facts – then *Mill Town* and *The Undying* respond formally to terrifying conditions in which relevant information is absent, or contested, or else proliferates excessively. Carson did not allow autobiography to mix with her history of cancer and its causes, but Arsenault and Boyer write about 'bod[ies] in history' *as* bodies in history; their narrators are dazed, devastated, medicalized, grief-stricken, angry.⁹⁸ Arsenault and Boyer are interested in what Leslie Jamison calls the 'present tense of [...] aftermath'.⁹⁹ They are wary, even sceptical, of narratives in which 'wounds [...] point backwards, to the answer, and the answer is always there'.¹⁰⁰ Such narrative forms, with their reliable mechanisms and predictable trajectories, do not accommodate the bewilderment, grief, and unanswered questions that toxic exposures and cancers involve. *Mill Town* and *The Undying* both name industry as a motor of modern sickness. However, they do not confine themselves to establishing proof or urging political change; while they discuss carcinogens and their paths, they are also concerned with the cognitive and social effects of toxicity's denials, uncertainties and traumas.

~

Arsenault grew up in the town of Mexico, Maine, where there has been a paper mill since 1902. Her mother and father worked at the mill; so did her grandfathers, her grandmothers, and her great-grandfathers. Arsenault herself has never worked at the mill, and left Maine shortly after

⁹⁶ Klein, 'Foreword', in Aronoff et al., *A Planet to Win*, ix-xiii (xi).

⁹⁷ Gartner, 'Science Writing', p. 120.

⁹⁸ *Undying*, p. 261.

⁹⁹ Leslie Jamison, 'Grand Unified Theory of Female Pain', *Virginia Quarterly Review*, 90.2 (2014), <bit.ly/37A7hPH> [accessed 14 September 2020].

¹⁰⁰ Jenn Ashworth, *Notes Made While Falling* (London: Goldsmiths Press, 2019), p. 12.

she graduated from school. *Mill Town* is a memoir about these family and community legacies. It is also a work of local history, concerned with migration, invasion and settlement; with industrialisation, with labour struggles, and with the economic decline of a mostly white, working-class community. Questions about inheritance often surface. From these background preoccupations, some influential lines of enquiry emerge. Early in the text, following an account of a brief and disturbing visit home in 2009, the narrator describes a ‘cumulative and persistent nagging that had been growing in me, a slow dawning something back home just wasn’t right [...] fortified by my mother’s emails that included a never-ending loop of obituaries containing the phrase “Died after a battle with cancer”’. Cancer in Mexico, Maine is so ubiquitous that the region has been called ‘Cancer Valley’. “People in the area accept cancer almost the way you’d accept getting a cold. It’s just a part of life”, a resident explains.¹⁰¹ The paper mill emits carcinogens – notably, dioxin, which behaves as an ‘unequivocal carcinogen’ in laboratory settings.¹⁰² And yet, as Arsenault writes, it is very difficult, even impossible, to provide legally admissible proof that the residues dispersed from the mill are even partially responsible for high local rates of cancer. *Mill Town* is an attempt to understand, and a formal response to, the traumas and uncertainties of living in a sacrifice zone in the contemporary USA. It does not read as a conventionally ‘finished’ text, but runs, like the polluted river on whose banks the mill stands, into ‘pauses or eddies’, taking ‘unpredictable detours’ and ‘picking up flotsam and jetsam’.¹⁰³ Stories of contamination and cancer, Arsenault implicitly suggests, are not often linear, proceeding confidently from causes to effects; rather, they concern that which seeps, lingers or, suddenly and without explanation, shifts. Her book tells stories of toxic pollution with the voices of people who have lived intimately, for decades, with industrial poisons.

Throughout this dissertation, I have written about texts in which ‘a familiar place is rendered unrecognizable by climate change or corporate action: the home become unhomey around its inhabitants’.¹⁰⁴ *Mill Town* is about the accretive and disordering process of coming to recognise ‘what was invisible to me my whole life: the mill’s pollutants hovering low over the naturally formed glacial bowl of our valley’. It articulates lived dimensions of the histories and laws that I have, in this chapter, been describing from afar. The narrator describes how ‘when people tried to link the mill’s pollution with [...] illnesses, logic was met with justification, personal experience with excuse, stories with statistics, disease with blame’:

¹⁰¹ *Mill*, pp. 77, 20, 28.

¹⁰² Steingraber, *Downstream*, p. 224.

¹⁰³ *Mill*, pp. 1-2.

¹⁰⁴ Macfarlane, *Underland*, p. 317.

There's a lag between exposure and diagnosis, experts declared. People could be exposed from other sources, scientists explained. There were uncertainties, decried environmental agencies.

Continued follow-up is needed, said the mill. Meanwhile, people quit jobs or school to care for sick family members; lose health insurance because they lose their jobs; and put canisters on pizza shop countertops to pay for medical bills.¹⁰⁵

Here, legal standards of proof require complainants to trace individual cancers back to specific toxic exposures, and to demonstrate definitive causal relationships. This kind of work is costly, complex, and mostly yields unclear results. Industrial toxicity is inherently complicated, especially when it comes to measuring the effects of particular substances within a given community. Because common carcinogens, such as dioxin or PCBs, are so widely dispersed, no unexposed populations remain for researchers to use as controls; because there are ‘hundreds of industrial chemicals [...] in a person’s body at any given time’, it is difficult to isolate the biological influence of a specific compound.¹⁰⁶ As Steingraber puts it, ‘confounding factors abound’; exposures are multiple, aggregative and mostly unmonitored.¹⁰⁷ Existing US regulations on toxic substances use models based on data from ‘single chemical exposures in controlled conditions’, and do not register the ‘complexity and heterogeneity of lived human exposures’.¹⁰⁸ Ongoing efforts to develop more sensitive models ‘have yet to shape chemical regulation’.¹⁰⁹ There is, then, a gap between certain strands of recent research, and current regulatory practice. Slow violence, as Liboiron, Tironi and Calvillo have observed, does not ‘register easily within [existing] regulatory metrics’, and it is often beyond the means of poisoned communities and the scope of dominant research methods to provide the ‘exact (but never exact enough) forms of evidence requested by the state’.¹¹⁰ Arsenault describes how, in communities who live close to polluting infrastructure, these legal arrangements corrode trust. ‘Humans generally prefer unambiguous situations’, she writes, but contested definitions of toxicity generate uncertainty. For people who live in sacrifice zones, this uncertainty may intensify an overriding ‘feeling of suspicion, which is [...] debilitating’. When ‘combined with actual illness’, these tensions ‘can eventually cause us to

¹⁰⁵ *Mill*, pp. 94-95.

¹⁰⁶ Liboiron, ‘Redefining’, p. 98.

¹⁰⁷ Steingraber, *Downstream*, p. 224; Liboiron, ‘Redefining’, p. 98.

¹⁰⁸ Wylie, Shapiro and Liboiron, ‘Grassroots’, p. 404; see also Hepler-Smith on ‘structure-activity relationship modelling’ in ‘Molecular Bureaucracy’, pp. 549-50.

¹⁰⁹ Wylie, Shapiro and Liboiron, ‘Grassroots’, p. 404.

¹¹⁰ Liboiron, Tironi and Calvillo, ‘Toxic politics’, pp. 338-39.

distrust medicine, scientists, doctors, facilitators, lawyers, government officials, neighbors, everyone, and everyone else even if they seem to have our best interests at heart'.¹¹¹

In *Silent Spring*, Carson writes that when 'the public protests, confronted with some obvious evidence of damaging results of pesticide applications, it is fed little tranquillizing pills of half truth'. There is, she continues, an urgent need for 'an end to these false assurances, to the sugar coating of unpalatable facts'.¹¹² In the decades since *Silent Spring* was published, polluting industries have continued, legally and illegally, to disperse hazardous substances, denying that such activities damage public health. Arsenault describes how when the inhabitants of Mexico, Maine ask about connections between local industrial emissions and cancers, they are informed that 'risks can be controlled, that industry is not to blame, and we are not to worry about things we can't see'.¹¹³ While toxic harm is palpable in the USA's poisoned places, structural barriers – the uneven allocation of research funding, regulatory intransigence, sickness and trauma – hinder its conversion into genres of information that can be 'leveraged for state or industry accountability'. These alienating conditions leave concerned members of exposed communities without 'useable data', demanding the deeper investigation of the unknown.¹¹⁴ Arsenault's narrator describes how people in such situations may 'deploy coping mechanisms like hypervigilance, blame, and nonempirical belief systems, or develop traumatic neurosis like PTSD'. In this, she suggests, they share attributes with other groups who 'chase something that's near impossible to prove'. She mentions Bigfoot hunters and anti-vaxxers, arguing that suspicious belief systems of this kind cannot simply be explained away as expressions of 'ignorance or sociopathy', but are socially and historically rooted.¹¹⁵

Sedgwick, in a celebrated essay on paranoia, suggests that paranoiacs place 'an extraordinary stress on the efficacy of knowledge per se – knowledge in the form of exposure [...] paranoia for all its vaunted suspicion acts as though its work would be accomplished if only it could finally, this time, somehow get its story truly known'. The USA's poisoned landscapes and regulatory structures are conducive to this kind of paranoia. Toxicified communities urgently require, and are mostly denied, a very specific kind of 'story' – the kind that registers legally.¹¹⁶ Arsenault's narrator describes working for years to find practically useful information, digging into old

¹¹¹ *Mill*, pp. 45-46.

¹¹² *Spring*, p. 29.

¹¹³ *Mill*, p. 45.

¹¹⁴ Wylie, Shapiro and Liboiron, 'Grassroots', pp. 402-03.

¹¹⁵ *Mill*, pp. 45, 308, 285, 304.

¹¹⁶ Sedgwick, *Touching*, p. 138.

Department of Environmental Protection files, for example, or interviewing industry representatives. While *Mill Town* is an investigative work, it also registers that inside a ‘system that has already been identified as acutely constraining and harmful’, successful legal challenges do not comprise the only meaningful kind of story, or of agency.¹¹⁷ The narrator does not set out only to “‘prove” readily apparent harms’; she also tells and hopes to learn from ‘unverifiable stories’.¹¹⁸ While relaying facts, she gives rein to grief, rage or despair. *Mill Town*, then, ‘shape-shifts as the current of time presses forward’. Listening to the voices of those without data (or, without the right kind of data), the narrator enquires into toxicity’s moods, as well as its structures, asking what happens within a community when toxic exposures are systematically denied, or when they become practically necessary in the interest of short-term economic security. Having exhausted her investigation, she finds ‘no smoking gun, no magic bullet, no conspiracy’. Instead, she asks what ‘brutish landscapes must do to a mind, a body, a spirit over years, decades, across generations. Cumulatively’.¹¹⁹ *Mill Town*, then, might be considered as an example of what Mary Cappello calls the ‘detour’ – a literary mode that ‘make[s] possible a kind of truth telling otherwise barred by writing that fails to allow for wandering, accident, estuarial swerve, or straying from a purported centre’.¹²⁰ Because of its drifting, winding course, it can interact with and take seriously toxic realities that less fluid texts bypass.

Arsenault’s work also asks us to consider the formal strategies involved in dominant methods for producing data on industrial toxicity. When industry, state or other monitors convert poisoned landscapes into information, they use particular representational practices, which allow some presences in these places to be visualised clearly, while occluding others. In her 2006 book *Sick Building Syndrome and the Problem of Uncertainty*, Murphy historicises how once-imperceptible entities, ‘such as germs, immune systems, subatomic particles, diseases [...] came into being as recognizable objects via historically specific circumstances’. These things entered into modern discourse through particular ‘practices of truth-telling – laboratory techniques, instruments, methods of observing, modes of calculating, regimes of classification, and so on’. Such techniques came to define the boundaries of the ‘perceptible or imperceptible, existent or nonexistent’, arbitrating ‘what counts as truth’.¹²¹ They can allow for the careful description of complex phenomena, ‘polish[ing] the gift of seeing’ and allowing for precise orientation in

¹¹⁷ Liboiron, Tironi and Calvillo, ‘Toxic politics’, p. 342.

¹¹⁸ Wylie, Shapiro and Liboiron, ‘Grassroots’, p. 401; *Mill*, p. 285.

¹¹⁹ *Mill*, pp. 282, 296, 18.

¹²⁰ Mary Cappello, ‘Contact’, in *Writing otherwise: Experiments in cultural criticism*, ed. by Jackie Stacey and Janet Wolff (Manchester: Manchester University Press, 2013), pp. 34-44 (p. 44).

¹²¹ Murphy, *Syndrome*, pp. 7-8.

turbulent and unpredictable worlds, guiding action.¹²² They do not, however, always create detailed and comprehensive pictures. Murphy describes how contemporary findings on chemical exposures, ‘often originating in corporate laboratories, are contested by other communities of experts or by laypeople claiming to suffer chemical injury’:

The science on chemical exposures is simply unreliable by our contemporary standards of scientific truth [...] Over the course of the twentieth century imperceptibility itself became a quality that could be produced through the design of experiments or monitoring equipment in order to render claims of chemical exposures uncertain. Other groups of laypeople and experts have nonetheless developed their own practices and technologies to produce evidence for the reality of harmful chemical exposures.¹²³

Arsenault mobilises literary nonfiction as a descriptive technology for a wounded place. By braiding the memoir with investigative journalism, and through a commitment to polyvocal storytelling, *Mill Town* listens and responds to stories of systemic exposure that fall outside the scope of most monitoring methods, offering detailed descriptions of chronic worlds in which couples ‘age in place, see their kids grow old, watch their friends get picked off by cancer one by one’. *Mill Town* arranges ‘one voice layered over another in a symphony of complaint and community’; extended quotations from millworkers, hairdressers or doctors are embedded into the narration.¹²⁴ In turn, the narrator’s voice is ‘unsettled and remade throughout’, moving with a ‘sense of drift’: in early chapters, she speaks from 2009; subsequent passages flow through time until, late in 2019, the text ‘debouches’.¹²⁵ While Arsenault threads her account with a recurrent evidentiary question – ‘is the pollution from our mill connected to the diseases in our town?’ – she allows it to unfold through collective stories, shifting between registers.¹²⁶ In this way, she works to broaden what counts as toxic information. Given that ‘chemical exposures are only regulatable and litigable as specific entities’, and given that it is extremely difficult to isolate such entities, why abide only by state standards of truth?¹²⁷ There is more to learn, the narrator suggests, from those who perceive toxic exposure as an unavoidable everyday presence, bound

¹²² Robin Wall Kimmerer, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants* (Minneapolis: Milkweed Editions, 2013), p. 48.

¹²³ Murphy, *Syndrome*, pp. 9-10.

¹²⁴ *Mill*, pp. 125, 243.

¹²⁵ Emily LaBarge, ‘Pain as Revolution: On Anne Boyer’s “The Undying”’, *Los Angeles Review of Books*, 25 October 2019, <bit.ly/2YrKscj> [accessed 14 September 2020]; Cole, ‘A Conversation with Aleksandar Hemon’, in Cole, *Known and Strange Things*, pp. 78-92 (p. 85); *Mill*, p. 314.

¹²⁶ *Mill*, p. 296.

¹²⁷ Murphy, ‘Regimes’, pp. 700-01.

up with the ‘the evisceration and erasure of home’, than from certain institutionalised observational procedures. The text insists that listening to such stories, in which the truth about pollution both exists self-evidently *and* ‘will always be provisional’, is vital in order accurately to understand toxic legacies, and how they persist.¹²⁸

~

The word ‘undying’ seems ‘to fit the world right now, which we are always being told is ending, but which we wake up to each day, the no-future future that is always unfurling right before our eyes, in which we have to go to work, wash dishes, and otherwise endure when we are told that the conditions that support life on the planet are becoming quickly inhospitable’. Boyer chose it as a title, she said in conversation with Shoshana Olidort, in part because she wanted to ‘rip’ it out of the ‘sentimental contexts’ to which it is usually confined. ‘Undying’ might also be taken to refer to the undying substances that have been made to pervade the living world; materials with half-lives, their lethality at once evident and contestable. *The Undying* is, too, about ‘the *process* of undying – that is, of both being subjected to a catastrophic, medically-induced process of mass cell death via chemotherapy’, and of ‘not entirely dying’.¹²⁹ Though *The Undying* does draw on Boyer’s experiences as a breast cancer patient, it emphatically rejects what she calls ‘breast cancer’s narrative conventions’.¹³⁰ As Emily LaBarge writes:

Boyer does not hear or see herself, or the realities of her world, in ‘Your Oncology Journey’, a binder filled with images of grateful and grinning bald women who reveal no pain; nor in ‘survivor’ memoirs that emphasize heroism and the singular, triumphant voice; nor in the pink-ribbon stories of self-care and juice fasts and positive thinking and cosmetic tutorials and good-attitudes-will-be-rewarded blogs spun across the web.¹³¹

None of the women in these stories, Boyer writes, have ‘a voice or much else to distinguish them in particular except they were surely once distinguishable people and by the time they made it into the books, weren’t’. Her speaker, or narrator, or voice – the text troubles this kind of terminology – insists, ‘I do not want to tell the story of cancer in the way that I have been taught

¹²⁸ *Mill*, pp. 2, 46.

¹²⁹ Boyer in conversation with Shoshana Olidort, ‘Undying and Reparative Magic: A Conversation with Anne Boyer’, *Poetry Foundation*, 23 September 2019, <bit.ly/37t6sbk> [accessed 14 September 2020].

¹³⁰ *Undying*, p. 9.

¹³¹ LaBarge, ‘Pain’.

to tell it'. *The Undying* works against 'sanitized' representations of cancer.¹³² It is sceptical of narratives that omit cancer's industrial and environmental histories, its uneven distribution by race and class, and its intimacies with corporate mechanisms for profit. In such accounts, as Leopold observes, the 'external world is taken as given, a backdrop against which the personal drama is played out'.¹³³ Boyer refuses to represent cancer as a 'deathlike state to which no politics, no collective action, no broader history might be admitted'. 'The history of illness', she writes, 'is not the history of medicine – it is the history of the world – and the history of having a body could well be the history of what is done to most of us in the interest of the few'.¹³⁴

Boyer's speaker is situated inside a set of historical particulars. She tells what it is like to have breast cancer in the USA in the 2010s – to submit her body to be read by medical instruments, to be baffled by an excess of online information, to negotiate an exploitative private healthcare system, to be infused with chemotherapy drugs, to be in fear and in pain. In its search for a 'form appropriate to experience', *The Undying* responds to procedures or networks of information not commonly understood as 'texts'.¹³⁵ Some of these belong to the domain of medical expertise. Radiology, the speaker writes, 'turns a person made of feelings and flesh into a patient made of light and shadows'. Medicine produces representations of the body – sonograms, magnetic resonance images, microscope slides – and interprets them. Patients turn toward these interpretations 'hoping to meet a vocabulary with which to speak of suffering [...] If that suffering does not meet sufficient language, those who endure that suffering must come together to invent it'. This gives rise to another discourse of illness, which 'wanders from the bounds of medicine', and much of which resides in messageboards, vlogs, or YouTube and Facebook comments.¹³⁶ Made up of the restless interpretative work involved in becoming a cancer patient, *The Undying* draws upon these forms. Here, cancer emerges as produced by modern imaging methods, and also as it appears in internet chatrooms, or in television shows, or in breast cancer awareness campaigns. In its multiformity cancer feels, to the speaker, like 'a dream that is a document and a container for both waking and sleep, any pleasure and all pain, the unbearable nonsense and with it all erupted meaning, every moment of the dream too vast to forget and every recollection of it amnesiac'. She draws contemporary experiences of cancer into relation with older strategies for interpreting illness – notably, Roman techniques for gathering

¹³² *Undying*, pp. 117, 115, 40.

¹³³ Leopold, *Ribbon*, pp. 254-55.

¹³⁴ *Undying*, pp. 10, 30.

¹³⁵ Boyer, 'Conversation'.

¹³⁶ *Undying*, pp. 15, 18.

medical instructions from dreams conveyed by gods. What prognoses, she implies, do dominant representations of cancer expect their users, or viewers, or target audiences to draw? Many such texts invite their readers to imagine cancer as an enemy to be defeated, or as a genetic misfortune; less direct attention to pain, or to the ‘carcinogenosphere’.¹³⁷

Some of the toxic substances in *The Undying* are chemotherapy medicines. Boyer was injected with Adriamycin, a drug known as ‘the red death’ that ‘destroys tissue if it escapes the veins’. A ‘generalist in its destructions’, Adriamycin can cause leukaemia, organ failure and brain damage. The speaker traces its history in detail: scientists discovered the red bacterium *Streptomyces peucetius* in soil harvested from beneath the Castel del Monte, a medieval structure of uncertain purpose ‘built in a rare octagonal shape’. Boyer was also given cyclophosphamide, ‘a medicalized form of a chemical weapon already developed by Bayer under the name LOST’, better known as mustard gas.¹³⁸ While the speaker researches the histories and somatic effects of chemicals used to treat her cancer, she cannot isolate those that caused it. She writes that her cancer ‘probably just came from exposure to radiation or random carcinogens’, observing that the difficulty of tracing carcinogens is one of cancer’s many ‘brutal mystifications’.¹³⁹ *The Undying* is populated by ‘celebrants’, ‘imagelings’ and ‘incubants’; its vocabulary, as LaBarge writes, is speculative, hovering ‘between the ancient and the futuristic’.¹⁴⁰ It also uses the language of ‘Marxism and the Frankfurt School: enchantment, mystification, ideology, the real, the negative – grounding the work in a particular politics’.¹⁴¹ Mystification, for the speaker, ‘blurs the simple facts of the shared world to prevent us from changing it’.¹⁴² Like *Mill Town*, *The Undying* works to give aesthetic shape to what Murphy calls a ‘chemical regime of living in which it is commonplace and legally acceptable for [...] molecular relations to escape state regulation or the spotlight of research’.¹⁴³ As a result of the ‘effort that has gone into obscuring, rather than revealing, synthetic molecular relations’ in the USA – such as the construction of laws that exempt many chemicals from thorough safety testing, or that make companies, rather than independent agencies, responsible for monitoring emissions – data on toxicity and exposures is incomplete.¹⁴⁴ Boyer’s speaker responds to the difficulty when living under this ‘regime’ of connecting causes

¹³⁷ *Undying*, pp. 28, 119.

¹³⁸ *Undying*, pp. 57-58, 63.

¹³⁹ *Undying*, pp. 131, 6.

¹⁴⁰ *Undying*, pp. 123, 16, 11; LaBarge, ‘Pain’.

¹⁴¹ LaBarge, ‘Pain’.

¹⁴² *Undying*, p. 41.

¹⁴³ Murphy, ‘Regimes’, p. 698.

¹⁴⁴ Murphy, ‘Regimes’, p. 698; Purdy, *Land*, p. 31; *Mill*, p. 43.

and effects.¹⁴⁵ Her auratic experience of toxic phenomena recalls Orwell's evocations of synthetic vertigo in *Coming Up for Air*. Like George Bowling, who is bewildered by a new environment in which 'everything's made out of something else', she cannot follow things back to their origins.¹⁴⁶ 'We do not often', she writes, 'know the source of the things of the world and so are mostly left to imagine their lineage':

We are given only the noisy half of probability that its cause is located inside ourselves and never the quiet part of probability that cancer's source pervades our shared world. Our genes are tested: our drinking water isn't. Our body is scanned, but not our air.¹⁴⁷

She gives close attention to this poisoned but unmonitored air:

Karl Marx wrote, 'All that is solid melts into air', which is true, as it is also true that all that is air becomes, under a later version of those same conditions, too polluted to breathe. We imagine that this air could fall on us as rain, and that it is also in us, it falls away from us as tears and sweat and urine. Respiration is a refeeding of what is abstract into what is so tangible it changes our form, at least slightly. Then it dissipates, again, we never know as what.¹⁴⁸

Boyer here forms a poetics for toxic uncertainty under late capitalism. These conditions are rooted, as Leslie writes, in 'chemistry's efforts to turn waste matter into value', which began late in the nineteenth century and intensified during the Second World War; they now manifest, as I have discussed throughout this dissertation, as indelible, uneven and often unpredictable biochemical changes in the living world.¹⁴⁹ Permissive regulatory structures and undone research powerfully inform our capacity to understand toxicity; they shape the kind of sensory perception that Boyer (recalling Hargrave, Baker, Harkin and Carson) describes above, in which unknown toxicants are suspected to pass between air, rain and bodies, but cannot definitively be identified. The speaker provides a detailed inventory of her medicines: '*Cyclophosphamide, doxorubicin, paclitaxel, docetaxel, carboplatin, steroids, anti-inflammatories*', and others. By contrast, she describes carcinogens in underspecified language: they appear at 'random', air is simply 'too polluted' –

¹⁴⁵ Murphy, 'Regimes', p. 698.

¹⁴⁶ *Air*, p. 24.

¹⁴⁷ *Undying*, pp. 201, 27.

¹⁴⁸ *Undying*, pp. 201-02.

¹⁴⁹ Leslie, *Synthetic*, p. 7.

such materials, the speaker registers, are always present, but ‘we never know as what’. Angered, she turns against these conditions. ‘As one of the undying’, she announces, ‘I will now try to conjure up not the undying soul but instead an undying substance, reground the atmospheric as new evidence’.¹⁵⁰ The register here, with its confident procedural flourish, is in the style of the academic article; it is the kind of formalised declaration that usually sets in motion a settled pattern of cause and effect, argument and evidence. And yet, the speaker produces no proof.

‘I am sorry that I was not able to write down everything’, she writes as *The Undying* ends. It begins with an epigraph from *The Iliad*: ‘Not even if I had ten tongues and ten mouths’. Boyer is, of course, responding to ‘the difficulties of writing about the experience of sickness’, but sicknesses and their difficulties, as she argues throughout, should not be held apart from the systems that organise the world.¹⁵¹ The infrastructures of the chemical industry are important to these systems, and they too present challenges to articulation. As Murphy writes of our ‘new forms of chemical embodiment’, historians are ‘struggling to find conceptual tools through which to capture this complex and uncertain set of phenomena’. *The Undying* registers impulses to ‘capture’ emergent molecular relations in language; it also registers how these impulses cannot often be satisfied.¹⁵² In the last chapter, I suggested that Sebald’s concern in *The Rings of Saturn* is not with nuclear colonial history as such, but with how nuclear colonial history appears to his narrator at Orford Ness. Similarly, Boyer does not write about industrial toxicity in order to prove anything; rather, she describes what it is like to be unable to identify the exact ‘source’ of one’s cancer, even as daily, thousands of tonnes of known or suspected carcinogens are legally introduced into environmental circulation.¹⁵³ This effort requires many voices and forms. *The Undying* might be imagined as less a work of prose nonfiction, than an anthology or a collection. Though first intended to be ‘straightforward’, Boyer told Olidort, ‘it kept swaying and bending toward poetry. Ultimately, I just let it bend and sway’.¹⁵⁴ It borrows from ancient dream journals and early-modern prose works; some passages ‘float like prose poems, while others read as chapters, short essays, or disquisitions, sometimes instructions or imperatives’.¹⁵⁵ The writerly voice shifts as it travels through these forms. Sometimes the speaker adopts the register of science writing: ‘In the United States, breast cancer death rates slowly increased every year until 1975, held steady until 1989, and then began to decrease after that, except in the case of patients

¹⁵⁰ *Undying*, pp. 161, 131, 201-202.

¹⁵¹ *Undying*, p. 291, epigraph, p. 44.

¹⁵² Murphy, ‘Regimes’, pp. 696, 701.

¹⁵³ *Undying*, p. 201.

¹⁵⁴ Boyer, ‘Conversation’.

¹⁵⁵ LaBarge, ‘Pain’.

younger than fifty, whose death rates have been relatively level since 2007'. At other instances – for example, in the poem 'communiqué from an exurban satellite clinic of a cancer pavilion named after a financier', which is embedded into the text – she speaks through what we might think of as the revolutionary letter:

Pull your pubic hair out in clumps from the root and send it in unmarked envelopes to technocrats. Leave your armpit hair at the Superfund site you once lived near, your nose hairs for any human resources officer who denies you leave.¹⁵⁶

Whether these two excerpts should be read as the work of one narrator is questionable. In its polyvocality, *The Undying* refuses breast cancer's dominant 'story of "surviving" via neoliberal self-management – the narrative is of the atomized individual'. As the speaker remarks, 'few of us exist most of the time as just one person', and 'something called "a body" does not end at the end of its flesh'.¹⁵⁷ Moving between multiple forms and voices allows Boyer accurately to articulate something of what it is like to exist, through time, inside the interlocking systems – medical, atmospheric, informational – that together comprise contemporary experiences of breast cancer in the USA. It also allows her to combine critique, historicism and rage:

Immobilized in bed, I decide to devote my life to making the socially acceptable response to news of a diagnosis of breast cancer not the corrective 'stay positive', but these lines from Diane di Prima's poem 'Revolutionary Letter #9': '1. kill head of Dow Chemical / 2. destroy plant / 3. MAKE IT UNPROFITABLE FOR THEM to build again.'¹⁵⁸

The poems in di Prima's 1969 *Revolutionary Letters*, writes Ronda, are mostly 'epistles addressed in second person to the reader', calling on her to 'reflect on her own position in relation to an oppressive system'. Throughout the collection, Ronda continues, the mode of address slips 'from "you" to "we", from the enclosures of individualism and capitalist growth to an expanded [...] vision of being-in-common'.¹⁵⁹ Boyer uses similar formal strategies in her communiqué. The second-person, instructional address forecloses a distanced readerly stance:

¹⁵⁶ *Undying*, pp. 189, 48.

¹⁵⁷ *Undying*, pp. 9, 239, 241.

¹⁵⁸ *Undying*, p. 124.

¹⁵⁹ Ronda, *Reminders*, pp. 77-80.

Negotiate for what you need because you will need it now more than ever. If these negotiations fail you, yank your hair out of your head in front of who would deny you, leave clumps of your hair in the woods, on the prairies, in QuikTrip parking lots, in front of every bar at which your conventionally feminine appearance earned you and your friends pitchers of domestic beer.¹⁶⁰

Here, ‘you’ is specifically ill, specifically gendered, and emplaced in the USA’s late-capitalist landscapes; or, the speaker addresses American women with cancer. Other readers, as a side effect, are refused easy imaginative access; they are made to consider their place within divisive societal structures, complicating the work of sympathy, or of identification. *The Undying’s* ‘onco-surrealist’ passages, then, interact with the sections where the speaker adopts the informative techniques of nonfiction, explaining how the lethality of ‘the collection of diseases called “breast cancer” is influenced by income, education, gender, family status, access to health care, race, and age’.¹⁶¹ By setting multiple forms, genres and voices in counterpoint, Boyer both equips her readers with important information, and demands complex imaginative responses from them. If a ‘vision of being-in-common’ emerges, then it reckons with legacies left by long histories of social injustice, and how they open rifts in the ways that cancer, and specifically breast cancer, is distributed, researched and treated.¹⁶²

Silent Spring’s political vision favours ‘scientific and technological innovation as providing solutions to the problems of pollution and ecosystemic toxicity’.¹⁶³ Carson’s rhetorical techniques, as we have seen, suggest that her strategy for implementing these solutions was to turn white, middle-class America against pesticides, composing a powerful but exclusive public. We have also seen that *Silent Spring’s* agenda is often mischaracterised, abstracted from the domain of public health; and that its regulatory influence is frequently overstated. These last two framings of the book distract from the enduring relevance of the political stance at its core: opposition to the chemical industry’s ‘right to make a dollar at whatever cost’. In considering *Silent Spring* as an analysis of cancer’s industrial and ecological roots, it is essential to attend to how the text was shaped by histories of race and class in the post-war USA – which is to say, by the history of the post-war USA. *Silent Spring* does not attend to the uneven distribution, along these fault-lines, of environmental harm. Though readers are told that the ‘chemical death rain’

¹⁶⁰ *Undying*, p. 47.

¹⁶¹ *Undying*, pp. 189, 287.

¹⁶² Ronda, *Remainders*, p. 80.

¹⁶³ Ronda, *Remainders*, p. 79.

falls ‘indiscriminately’, the text does not mention poisonings in specifically Indigenous, Black, Latino or working-class communities. Its primary landscapes are the ‘checkerboard of prosperous farms’, or the provinces of the ‘unsuspecting suburbanite’.¹⁶⁴ *Silent Spring*, then, contains its own ‘domains of imperceptibility’; toxicity is characterised as an industrial and ecological problem crossing between local and global scales, but not as a form of slow violence visited, in its most deadly manifestations, on the poor and the racially oppressed.¹⁶⁵ Today, *Silent Spring* should be read in light of the critiques of mainstream environmentalism that have, since the 1980s, been developed by environmental justice scholars and activists. It needs to be disaggregated from its iconic reputation, and resituated as an early, pathfinding and deeply influential analysis of industrial toxicity, marked by the USA’s systemic racism. This kind of critical work might drive wider recognition of how, despite *Silent Spring*’s important regulatory influence, toxic industries retained power; it might draw attention to how *Silent Spring* and the movement it helped to build interact with other kinds of toxicity, no less pervasive and persistent; and it might contribute to ongoing projects to rectify these problems, building solidarity by broaching histories of division.

In *Trace*, Savoy asks how influential cultures of environmentalism that have historically done little to include non-white humans in their ‘sphere of ethical relevancy’ might ‘meet and answer to’ anti-racist discourse. Her narrator strives to ‘imagine it possible to refrain from dis-integrated thinking and living, from a fragmented understanding of human experience on this continent’:

Possible to refuse what alienates and separates. To see in fugitive pieces the forces that have shaped the land and ourselves in it. Of course, there is always a danger of fooling myself. But if it is possible, then perhaps a larger sense of who we are as interconnected ecological, cultural, and historical beings could begin to grow [...] The health of the human family could, in part, be an intergenerational capacity for locating ourselves within many inheritances.¹⁶⁶

Mill Town and *The Undying* both position themselves as heirs to Carson’s work in *Silent Spring*. In their analyses of the USA, however, they depart from it decisively. In *Silent Spring*, national regulatory frameworks are characterised as inadequate, more than complicit: ‘despite the supposed safeguards provided by legislation’, Carson writes, ‘the public can be exposed to a

¹⁶⁴ *Spring*, pp. 29, 28, 87, 21, 161.

¹⁶⁵ Murphy, *Syndrome*, p. 10.

¹⁶⁶ Savoy, *Trace*, pp. 41, 47.

known carcinogen for several years before the slowly moving legal processes can bring the situation under control'.¹⁶⁷ For Arsenault and Boyer, by contrast, 'the state and its related systems are part of the structure of toxicity that allows the ubiquity and tonnage of toxicants to be produced and circulate in the first place'.¹⁶⁸ In *Mill Town*, the recognition that legal structures allow companies to produce and disperse dangerous toxicants, generating obscene profits for some while devastating workers and their communities, wrenches at the narrator's sense of collective identity: 'I had believed in the American Dream at one point. My family lived it. But at what cost?' Millworkers, she writes, face a choice between work and hazardous exposure, or unemployment, 'which isn't really a choice at all. It's an inevitability'. Neoliberal federal and state policies, she observes, built the regulatory environment that allowed her town to be 'kidnapped by industry, held hostage to its wages and benefits', and poisoned.¹⁶⁹ The narrator's experience of industrial toxicity unsettles her sense of local and national inheritance, remaking her relationships with the past. Boyer's speaker is perhaps less attentive to such difficult questions of social and cultural legacy, and how they underlie contemporary white American experience. She is, however, emphatic in her opposition to, or refusal of, contemporary political conditions: '*Fuck white supremacist capitalist patriarchy's ruinous carcinogenosphere*'.¹⁷⁰ These visions of the USA define the scope for meaningful political action in these texts: here, powerful institutions appear more as impediments to justice than its 'slowly moving' motors, and the 'forces that have shaped the land and ourselves in it' are historical, as well as industrial and ecological.¹⁷¹

¹⁶⁷ *Spring*, p. 197.

¹⁶⁸ Liboiron, Tironi and Calvillo, 'Toxic politics', p. 336.

¹⁶⁹ *Mill*, pp. 95, 55, 222.

¹⁷⁰ *Undying*, p. 78.

¹⁷¹ *Spring*, p. 197; Savoy, *Trace*, p. 47.

Coda

The recent film *Dark Waters*, directed by Todd Haynes, begins in a town in the heart of America – in this case, Parkersburg, West Virginia, where DuPont (a powerful chemical company) has a long history as a major employer. From the 1950s to the 1990s, DuPont dumped over seven thousand tonnes of polyfluorooctanoic acid, or PFOA, into unlined pits near Parkersburg. It bled into the water table. *Dark Waters* tells this story by narrating the lawyer Rob Bilott's quest to hold DuPont accountable after a local farmer, a friend of his grandmother's, made him aware of the situation. In this, he was eventually successful. In 2001, on behalf of all those in Parkersburg whose drinking water was contaminated with PFOA, Bilott filed a class-action lawsuit against DuPont. In 2004, DuPont decided to settle: they paid a total of seventy million dollars to complainants, agreed to fund a study into links between PFOA and illness, and promised, if such links were proven, to fund the medical monitoring of exposed people in Parkersburg. Bilott's legal team decided to insist that before collecting their share of the money, each of the seventy thousand people they represented should undergo a full medical examination. As a result, the DuPont-funded investigation into PFOA's health effects drew upon an unprecedented wealth of epidemiological data. In 2011, the scientists working on the study declared there was a 'probable link' between PFOA exposure and local illnesses including testicular cancer, kidney cancer and thyroid disease.¹ In 2017, DuPont agreed to pay six hundred and seventy one million dollars in compensation to over three thousand five hundred people.² The film describes barriers to this kind of legal result ('The system is rigged! They want us to think it will protect us but that's a lie. We protect us!'), and its end credits remind viewers that PFOA has entered into the bodies of almost every creature on the planet ('... including humans').³ Even so, the prevailing mood is one of satisfaction at justice done in spite of the odds. This is of course reasonable, given Bilott's extraordinary achievement. While in no way wishing to detract from its celebration of Bilott's work, I want here to consider how *Dark Waters* builds this satisfied mood through specific narrative techniques, and the storytelling traditions in which it hereby locates itself. Here, an individual (white, male, professional but locally rooted and somewhat renegade) possesses the power to overturn systemic toxic injustice through diligent investigative work. *Dark Waters* reiterates a foundational story in white American

¹ See the article on which *Dark Waters* is based: Nathaniel Rich, 'The Lawyer Who Became DuPont's Worst Nightmare', *The New York Times Magazine*, 6 January 2016, <nyti.ms/31y15X9> [accessed 24 September 2020].

² Arathy S. Nair, 'DuPont settles lawsuits over leak of chemical used to make Teflon', *Reuters*, 13 February 2017, <reut.rs/2VCdA03> [accessed 6 October 2020].

³ *Dark Waters*, dir. by Todd Haynes (Willi Hill and Killer Content, 2020).

identity: that of the lone defender of justice, resisting corrupt state, federal and corporate organisations. Despite its anti-institutional energies, *Dark Waters* ultimately rehabilitates the USA's legal system, reconciling it with a libertarian vision of agency and community. When, as the film closes, DuPont are forced to pay up, the law becomes the tool with which 'we, the citizens, will protect ourselves'.⁴

Dark Waters, then, structures its account of slow violence in West Virginia through a familiar set of narrative, even mythic, conventions. These conventions, in turn, shape how the film characterises industrial toxicity. In order to execute the conventions of the legal thriller – intrigue, successful investigation, individual heroism and, crucially, resolution – *Dark Waters* depends on a delimitation of historical scope, and an accelerated timescale. *Dark Waters* does not ground its story in the important context of the environmental justice movement, or mention the ongoing denial of environmental protection to the majority of poisoned communities in the USA. It does not clarify quite how rare it is for communities and their lawyers successfully to hold polluting companies to account; insulated from much of toxicity's wider history, its narrative mechanisms play out uninterrupted by any questions that a broader contextual focus would introduce. Similarly, its suspenseful narrative arrangement prevents it from lingering with some of the quotidian effects of long-term exposure in Parkersburg. Many people died before the results of the epidemiological study were published. While *Dark Waters* acknowledges this part of the story, it cannot, because of the rules of its genre, attend in detail to such experiences. We might here recall how in *Slow Violence*, Nixon calls for 'creative ways of drawing public attention to catastrophic acts that are low in instant spectacle but high in long-term effects', emphasising a need for narrative forms that infuse 'amorphous calamities' with 'dramatic urgency'.⁵ *Dark Waters* certainly meets Nixon's criteria – but in doing so, what aspects of the contemporary experience of industrial toxicity in the USA does it exclude?

In *Mill Town* and *The Undying*, readers are 'dragged down into a space of narrative' where reality is terrifying, bewildering, lethal, and recalcitrant to change.⁶ These books register how for many poisoned people, a clear course of reparative action does not present itself. Even if it does, injured parties may decide against pursuing legal redress because of fatigue, intimidation, or for other reasons – as Boyer's speaker explains, regarding a pharmaceutical company's failure to disclose a cancer treatment's side effects, 'I was unable to stomach devoting my survival to a

⁴ *Dark Waters*.

⁵ Nixon, *Slow Violence*, p. 10.

⁶ Cole, 'Conversation', p. 80.

lawsuit'.⁷ This kind of storytelling scrupulously describes the ambient, everyday realities of those who suffer 'amorphous calamities'.⁸ Here, toxic worlds usually (and accurately) articulated in the schematic language of 'processes' and 'systems' appear in more vivid detail. This may, as Boyer suggests, allow readers already familiar with these worlds to 'feel less alone'.⁹ It also engages in the creation of a 'shared vocabulary', opening paths between 'fragmented ways of seeing, valuing, and using nature, as well as human beings'.¹⁰ Tironi has critiqued how some definitions of environmental politics are 'anchored to the assumptions, aesthetics and settings of liberal democracy'. Mostly, he writes, poisoned communities experience toxicity not through 'mobilization' or the theatre of the courtroom, but rather 'in the rhythm of ordinary corrosion and decay, in the nondescript temporality of chronicity and continuity'. Describing how poisoned communities engage every day in 'minute and unspectacular interventions' against these circumstances, he gives careful scholarly consideration to the 'actual inventory of doings and responses with which people confront damage and violence'.¹¹ Arsenault and Boyer have crafted narrative forms sensitive to such rhythms, interventions and doings, bringing their readers into imaginative contact with lived realities not often articulated in literature, film or scholarly discourse. In doing so, they implicitly draw attention to why many of the USA's toxified groups have historically had to work outside the apparatus of the state, coping with hostile conditions and developing practices such as civil disobedience, grassroots science and activist art. This kind of work draws upon deep, cumulative knowledge of industrial toxicity, embedded in the USA's broader social histories.¹² *Mill Town* and *The Undying* respond to the particular aesthetic and political questions that such situated experiences of toxicity ask of literary expression. While both owe much to *Silent Spring*, they do not resort to Carsonian strategies: neither strive to compose publics. They do not offer theories of change, or hopeful visions of ecological renewal. Rather, they dwell on toxic pollution as a source of some of the dominant moods of the contemporary: exhaustion, intransigence, uncertainty. The narrators of *Mill Town* and *The Undying* speak from melancholic places; they foreground the solidity and strength of the specific industrial systems against which they write. Here, as Ronda has suggested of Spahr's poetry, 'knowledge – cultural, political, ecological – does not necessarily lead to action or change'.¹³

⁷ *Undying*, pp. 174-75.

⁸ Nixon, *Slow Violence*, p. 10.

⁹ Boyer, 'Conversation'.

¹⁰ Boyer, 'Conversation'; Savoy, *Trace*, p. 42.

¹¹ Tironi, 'Hypo-Interventions', p. 440-43.

¹² See Commission for Racial Justice, *Toxic Wastes and Race*, ix-x; Hoover, *River*, pp. 7-14; Purdy, *Land*, pp. 108-09.

¹³ Ronda, *Remainders*, p. 110.

These books, alongside others that I have discussed in this dissertation, might be understood as engaged in a kind of literary cartography, using experimental storytelling practices to map toxic worlds. Such texts work to change how toxicity is popularly narrated and understood. They give expression to experiences that cannot easily be conveyed in the technical, polemical and fantastical forms that have, since the 1960s, come to be most closely associated with environmental disaster. Macfarlane has written about densely named topographies, such as the Outer Hebrides or Apache lands in Western Arizona, where place-names anthologize ‘local history, anecdote and myth, binding story to place’. These ‘specialized vocabularies’ are distinguished by their ‘extreme situatedness’ and ‘descriptive precision’, such that when spoken, they permit ‘imaginative journeying within a known landscape’. To ‘speak out a run of these names’, Macfarlane proposes, ‘is therefore to create a story of travel – an act of naming that is also an act of wayfinding’.¹⁴ Over the last two years, three glossaries for the Anthropocene have been published: *Earth Emotions*, *An Ecotopian Lexicon*, and *Counter-Desecration*.¹⁵ These books work to equip their readers with new vocabularies, and thereby to allow for accurate ‘wayfinding’ within worlds made strange by violent and disorienting upheavals.¹⁶ The glossaries bring together new coinages for environmental shifts that exceed traditional place-languages, and so resist expression – let alone comprehension and mitigation.

Polluting industries deploy differently ‘specialized’ vocabularies.¹⁷ Arsenault writes that many academic papers on cancer are written in a ‘forgettable language’, mastered by trained experts, but inaccessible to most. She also describes studying ‘charts’ pertaining to the mill: they ‘feel complex by design [...] even careful readers like myself are stalled by technical, abstruse language and cut off from what the public (me) needs to know’.¹⁸ This kind of discourse is fenced off from common experience and understanding. Its effect is often to disorientate, rather than situate; to conceal, rather than illuminate; and to exclude, rather than invite in. *Mill Town* counters it by recrafting an older language, adapting collectively-available stories and terminologies so that they describe newly toxic landscapes. The texts I have discussed in this

¹⁴ Macfarlane, *Landmarks* (London: Penguin, 2016; 2015), pp. 20-23.

¹⁵ Glenn A. Albrecht, *Earth Emotions: New Words for a New World* (Ithaca, NY: Cornell University Press, 2019); *An Ecotopian Lexicon*, ed. by Matthew Schneider-Mayerson and Brent Ryan Bellamy (Minneapolis: University of Minnesota Press, 2019); *Counter-Desecration: A Glossary for Writing Within the Anthropocene*, ed. by Linda Russo and Marthe Reed (Connecticut: Wesleyan University Press, 2018).

¹⁶ Macfarlane, *Landmarks*, p. 21.

¹⁷ Macfarlane, *Landmarks*, p. 23.

¹⁸ *Mill*, pp. 284, 144.

dissertation all do similar work. Some examine ‘uninhabited language’.¹⁹ We might here recall Orwell’s interest in ‘ready-made phrases’, which, in turn, recalls George Bowling’s aversion to ‘phantom stuff’, and his discomfort with an emergent world in which ‘nothing matters except slickness and shininess and streamlining’.²⁰ Likewise, when Ballard worked at *Chemistry & Industry*, ‘sailing with [...] jaws open through a great sea of delicious plankton’, he charted the complex imaginative landscapes within ‘invisible literatures – scientific journals, technical manuals, pharmaceutical company brochures’.²¹ By engaging creatively with such instrumentalised language, it is possible to plot the mentalities, as well as linguistic strategies, of extractive regimes.

Conversely, by describing poisoned places with lovingly particular language, it is possible to disturb fraudulent claims that the earth has a limitless ‘carrying capacity’, while pushing back against woeful narratives that all such sites have been reduced to dead zones.²² As Macfarlane notes, when things ‘go unnamed they go to some degree unseen’. He is here describing a systemic amnesia for the names of ‘natural phenomena and entities’, but this observation also applies to industrial toxicants.²³ Representations of apocalyptic wastelands or faraway ‘spills’ are relatively common. By characterizing pollution as an aberration, such depictions of poisoned sites make it difficult to conceive of toxicity as a constitutive fact of everyday life in the twenty-first century. Many toxic substances are extremely long-lived; their dispersal is not accidental, but systematic; it elicits complex and pressing questions of responsibility. A collective, nuanced vocabulary to document toxic industrial infrastructures is therefore needed. While Anthropocene glossaries log this emergent language, in texts such as those I have discussed in this study, it exists in a more vital form. From here, we might remember Baker’s fierce documentation of the shifting chemical landscapes of 1960s Essex, and his disgust for the ‘lullaby language of indifferent politicians’.²⁴ We might also turn back to Harkin’s representations of Maralinga. Her archival-poetic methods, she argues, ‘allow us to creatively re-map events and landscapes, piece together lives fragmented and heal our wounds’.²⁵ These texts meet the challenges toxicity poses to narration, as well as to verbalisation. For many, ecological and climate crises often appear as though inconceivably vast; beyond sensory and imaginative ken. Localised stories about

¹⁹ Nixon, *Slow Violence*, p. 169.

²⁰ Orwell, ‘Politics’, p. 150; *Air*, p. 22.

²¹ Ballard, ‘Voiceover’; Ballard, ‘Ballard’, p. 94.

²² Lawrence Summers, quoted in Kimmerer, *Braiding*, p. 308.

²³ Macfarlane, *Landmarks*, p. 24.

²⁴ Baker, ‘Essex’, p. 215.

²⁵ Harkin, ‘Memory’, p. 4.

industrial toxicity, whether contemporary or decades-old, contest this way of thinking. They bring the *historicity* and the *systematicity* of planetary disaster into focus. At their sharpest, these stories momentarily denaturalize the powerful forces that are consuming the living world – describing precisely what they have done, and indicating what they may yet do, but subverting the worn-out stories in which they seem irresistible.

Bibliography

Adorno, Theodor, *Minima Moralia: Reflections from Damaged Life*, trans. by E.F.N. Jephcott (London: Verso, 2020; 1951)

Agard-Jones, Vanessa, 'Bodies in the System', *small axe*, 42 (2013), 182-92, <doi:10.1215/07990537-2378991>

-----, 'Spray', *Somatosphere: Science, Medicine and Anthropology*, (2014), <bit.ly/2Wx6qIZ> [accessed 14 September 2020]

Albrecht, Glenn A., *Earth Emotions: New Words for a New World* (Ithaca, NY: Cornell University Press, 2019)

-----, 'Solastalgia, a New Concept in Human Health and Identity', *Philosophy Activism Nature*, 3 (2005), 41-55

Aldiss, Brian, *Billion Year Spree: The History of Science Fiction* (London: Weidenfeld and Nicholson, 1973)

Alexievich, Svetlana, *Voices from Chernobyl: Chronicle of the Future*, trans. by Antonia W. Bouis (London: Aurum, 1999)

Allen, Chadwick, *Trans-Indigenous: Methodologies for Global Native Literary Studies* (Minneapolis: University of Minnesota Press, 2012)

Alonso, Laura Alejandra, and Parker Asmann, 'Glyphosate Alone Won't Fix Colombia's Complex Coca Woes', *InSight Crime*, 14 March 2019, <bit.ly/2HyCRlO> [accessed 1 September 2020]

Altman, Rebecca, 'Time-Bombing the Future', *Aeon*, 2 January 2019, <goo.gl/eY9UU5> [accessed 14 September 2020]

-----, Twitter correspondence, 14 January 2019

----, 'American Petro-topia', *Aeon*, 11 March 2015, <bit.ly/251RbWT> [accessed 1 September 2020]

'Amber, n. and adj.', *OED Online*, <goo.gl/agCNdY> [accessed 31 August 2020]

Anderson, Ian, 'Britain's dirty deeds at Maralinga', *New Scientist*, 12 June 1993, <bit.ly/2RETYqt> [accessed 14 September 2020]

'Anne Boyer', *Poetry Foundation*, <bit.ly/3e0d6be> [accessed 14 September 2020]

The Anthropocene Working Group of the Subcommittee on Quaternary Stratigraphy, 'When did the Anthropocene begin? A mid-twentieth century limit is stratigraphically optimal', *Quaternary International*, 383 (2015), 1-8 <[doi:10.1016/j.quaint.2014.11.045](https://doi.org/10.1016/j.quaint.2014.11.045)>

Armstrong, Tim, 'Social Credit Modernism', *Critical Quarterly*, 55.2 (2013), 50-55 <[doi:10.1111/criq.12049](https://doi.org/10.1111/criq.12049)>

Aronoff, Kate, et al., *A Planet to Win: Why We Need a Green New Deal* (London: Verso, 2019)

Arsenault, Kerri, 'Growing Up in Maine's "Cancer Valley"', *Literary Hub*, 12 April 2019, <bit.ly/3hlW4GB> [accessed 14 September 2020]

----, *Mill Town: Reckoning with What Remains* (St. Martin's Press: New York, 2020) (Advanced Readers' Edition)

Art gallery of South Australia, *TARNANTHI 2015 – Yhonnie Scarce*, online video recording, YouTube, 27 September 2017, <bit.ly/36Lo2VY> [accessed 14 September 2020]

Ashworth, Jenn, *Notes Made While Falling* (London: Goldsmiths Press, 2019)

Atwood, Margaret, *Before the Flood* (London: Virago, 2010)

-----, 'Margaret Atwood: the road to Ustopia', *The Guardian*, 14 October 2011, <bit.ly/2W7tv1D> [accessed 14 September 2020]

Ausglass, Ybonnie Scarce, *Artist Talk*, online video recording, YouTube, 10 August 2015, <bit.ly/2u3X7HB> [accessed 14 September 2020]

Australian Radiation Protection and Nuclear Safety Agency, *Australian Strontium-90 Testing Program 1957-1978* (Sydney: ARPANSA, 2001)

Bailey, Stuart, and Robin Kinross, eds., *God's Amateur: The Writing of E.C. Large* (London: Hyphen Press, 2008)

Baker, J.A., *The Peregrine* (London: William Collins, 2017; 1967)

-----, *The Peregrine* (New York: New York Review, 2005; 1967)

Balayannis, Angeliki, and Brian Robert Cook, 'Suicide at a distance: The paradox of knowing self-destruction', *Progress in Human Geography*, 40.4 (2016), 530-45
<[doi:10.1177/0309132515587469](https://doi.org/10.1177/0309132515587469)>

Ballard, J.G., *A User's Guide to the Millennium: Essays and Reviews* (New York: Picador, 1997)

-----, *The Complete Short Stories*, 2 vols (London: Fourth Estate, 2014)

-----, *The Crystal World* (London: Fourth Estate, 2011; 1966)

-----, *The Drowned World* (London: Fourth Estate, 2014; 1962)

-----, 'J.G. Ballard: Voiceover Transcription' [transcript of Ballard's commentary in *Shanghai Jim*, prod. by James Runcie (BBC Bookmark, 1991)], *Ballardian*, 27 August 2007, <bit.ly/3jRTYzr> [accessed 7 October 2020]

Barry, Andrew, 'Introduction', at *Chemical workshop*, Institute of Advanced Studies and the Department of Geography at UCL, 6 June 2019

Baxter, Jeanette, ed., *J. G. Ballard: Contemporary Critical Perspectives* (London: Continuum, 2008)

Beck, John, and Ryan Bishop, eds., *Cold War Legacies: Systems, Theories, Aesthetics* (Edinburgh: Edinburgh University Press, 2016)

Beller, Thomas, 'Wearing the Lead Glasses', *Places Journal*, May 2019, <bit.ly/2S09xYE> [accessed 1 September 2001]

Bellin, Joshua David, 'Us or Them!: *Silent Spring* and the "Big Bug" Films of the 1950s', *Extrapolation*, 50.1 (2009), 145-68 <[doi:10.3828/extr.2009.50.1.10](https://doi.org/10.3828/extr.2009.50.1.10)>

Bellucci, Jeremy J., and Antonio Simonetti, 'Nuclear forensics: searching for nuclear device debris in trinitite-hosted inclusions', *Journal of Radioanalytical and Nuclear Chemistry*, 293.1 (2012), 313-19 <[doi:10.1007/s10967-012-1654-9](https://doi.org/10.1007/s10967-012-1654-9)>

Benjamin, Walter, *Illuminations*, ed. by Hannah Arendt, trans. by Harry Zohn (New York: Mariner Books, 2019; 1968)

-----, *Selected Writings*, 4 vols, ed. by Michael W. Jennings et al., trans. by Rodney Livingstone et al. (Cambridge MA: Belknap Press, 1999)

Bennett, Jane, *Vibrant Matter: a political ecology of things* (Durham: Duke University Press, 2010)

Benton, E., 'Vitalism in Nineteenth-Century Scientific Thought: A Typology and Reassessment', *Studies in the Philosophy and History of Science*, 5.1 (1974), 17-48 <[doi:0.1016/0039-3681\(74\)90017-X](https://doi.org/10.1016/0039-3681(74)90017-X)>

Bergman, Åke, et al., *State of the Science of Endocrine Disrupting Chemicals 2012: Summary for Decision-Makers* (Geneva: World Health Organization, 2013)

Bermúdez Liévano, Andrés, 'Colombia will spray Chinese glyphosate to control coca', *Diálogo Chino*, 1 August 2019, <bit.ly/3gC62Dj> [accessed 1 September 2020]

Bingham, Adrian, “‘The Monster’? The British popular press and nuclear culture, 1945-early 1960s”, *British Journal for the History of Science*, 45.4 (2012), 609-24
<doi:10.1017/S0007087412001082>

Blaine, Gilbert, *Falconry* (London: P. Allan, 1936)

Bogost, Ian, ‘Latour Litanizer: Generate your own Latour Litanies’, *Ian Bogost*, 16 December 2009, <bit.ly/33wBBch> [accessed 31 August 2020]

Bookchin, Murray, *Post-Scarcity Anarchism* (London: Wildwood House, 1974; 1971)

Brooks, Paul, *The House of Life: Rachel Carson at Work* (Boston: Houghton, 1972)

Buchan, John, *Always a Countryman* (London: Hale, 1953)

Bonsall, Mike, ‘J.G. Ballard’s Experiment in Chemical Living’, *Ballardian*, 1 August 2007, <bit.ly/2H9ALH4> [accessed 14 September 2020]

Botar, Oliver A.I., and Isabel Wünsche, eds., *Biocentrism and Modernism* (Farnham: Ashgate, 2011)

Bowie, Andrew, ‘Problems of Historical Understanding in the Modern Novel’ (unpublished doctoral thesis, University of East Anglia, 1979)

Boyd, Natasha, “‘Total Strike’”: On Anne Boyer’s “‘The Undying’”, *Los Angeles Review of Books*, 4 November 2019, <bit.ly/3hvVCWH> [accessed 14 September 2020]

Boyer, Anne, *Garments Against Women* (London: Penguin, 2019; 2015)

-----, *The Undying: A Meditation on Modern Illness* (London: Allen Lane, 2019)

-----, ‘What Cancer Takes Away’, *The New Yorker*, 8 April 2019, <bit.ly/3dWp45X> [accessed 14 September 2020]

The Broadsheet, 2.13 (August 1926), London School of Economics, Youth Movement Archives / Kibbo Kift, 168 (a)

Brown, Judith, 'Cellophane Glamour', *Modernism/modernity*, 15.4 (2008), 605-26
<doi:10.1353/mod.0.0035>

Brown, Kate, *Manual for Survival: A Chernobyl Guide to the Future* (London: Allen Lane, 2019)

Bud, Robert, et al., eds., *Being Modern: The Cultural Impact of Science in the Early Twentieth Century* (London: UCL Press, 2018). UCL Discovery ebook

Buell, Lawrence, 'Toxic Discourse', *Critical Inquiry*, 4.3 (1998), 639-65 <doi:10.1086/448889>

Burwick, Frederick, and Paul Douglass, *The crisis in modernism: Bergson and the vitalist controversy* (Cambridge: Cambridge University Press, 1992)

Byrd, Jodi, *The Transit of Empire: Indigenous Critiques of Colonialism* (Minneapolis: University of Minnesota Press, 2011)

Cappello, Mary, *Awkward: A Detour* (New York: Bellevue Literary Press, 2007)

Cariou, Warren, and Isabelle St-Amand, 'Introduction: Environmental Ethics through Changing Landscapes: Indigenous Activism and Literary Arts', *Canadian Review of Comparative Literature*, 44.1 (2017), 7-24

Carpenter, Ele, ed., *The Nuclear Culture Source Book* (London: Black Dog Publishing, 2016)

Carpentier, Martha C., 'Orwell's Joyce and Coming Up for Air', *Joyce Studies Annual*, (2012), 131-153 <muse.jhu.edu/article/516512> [accessed 31 August 2020]

Carson, Rachel, *Silent Spring* (London: Penguin, 2000; 1962)

----, 'Silent Spring – I', *The New Yorker*, 3 January 2017, <bit.ly/37r0V4X> [accessed 14 September 2020]

Carter, Josephine, 'W.G. Sebald and the Ethics of a Guilty Conscience', *International Journal of Postcolonial Studies*, 16.5 (2014), 730-49, <doi:10.1080/1369801X.2013.858972>

Catling, Jo, and Richard Hibbitt, eds., *Saturn's Moons: W. G. Sebald – A Handbook* (Leeds: Modern Humanities Research Association and Maney Publishing, 2011)

Cave, Steven, 'The age of Anthropocene: Masters of the Earth', *Financial Times*, 12 December 2014, <on.ft.com/2L2i8Jt> [accessed 1 September 2020]

Clapp, R. W., Molly M. Jacobs, and Edward L. Loechler, 'Environmental and Occupational Causes of Cancer: New Evidence 2005-2007', *Reviews on Environmental Health*, 23.1 (2008), 1-37 <bit.ly/2AYZ3US> [accessed 14 September 2020]

Clapp, Genevieve K. Howe, and Jacobs, 'Environmental and Occupational Causes of Cancer Re-visited', *Journal of Public Health Policy*, 27.1 (2006), 61-76 <doi:10.1057/palgrave.jphp.3200055>

Clare, John, *John Clare: Poems Selected by Paul Farley*, ed. by Paul Farley (London: Faber, 2007)

Clark, J.F.M., 'Pesticides, Pollution and the UK's *Silent Spring*, 1963-64: Poison in the Garden of England', *Notes and Records: The Royal Society Journal of the History of Science*, 71 (2017), 297-327 <doi:10.1098/rsnr.2016.0040>

Clarke, Jim, 'Reading Climate Change in J.G. Ballard', *Critical Survey*, 25.2 (2013), 7-21 <doi:10.3167/cs.2013.250202>

Cohen, Josie, 'Glyphosate: A victory for corporate lobbying, not science', *Pesticide Action Network*, 10 January 2018, <bit.ly/2S1MpZC> [accessed 14 September 2020]

Cole, Teju, *Known and Strange Things* (London: Faber and Faber, 2016)

----, *Open City* (London: Faber, 2011)

Coleman-Cooke, John, *The Harvest that Kills: An Urgent Warning about Man's Use of Toxic Chemicals on the Land* (London: Odhams Books Ltd., 1965)

Cook, Jon, ed., *After Sebald: Essays and Illuminations* (Woodbridge: Full Circle Editions, 2014)

Cordle, Daniel, 'Protect/Protest: British nuclear fiction of the 1980s', *British Journal for the History of Science*, 45.4 (2012), 653-69 <doi:10.1017/S0007087412001112>

Corr, Evelyn Araluen, 'Learning Bundjalung on Tharawal', *Overland*, 223 (2016), <bit.ly/3aRFpHH> [accessed 14 September 2020]

-----, 'Text in the Grass: The Fallacy of Form in Indigenous Literary Studies', paper presented at the roundtable 'From Grassroots to Text', at *Climate Fictions / Indigenous Studies*, Cambridge, 24 January 2020

-----, 'Snugglepot and Cuddlepie in the Ghost Gum', *Sydney Review of Books*, 11 February 2019, <bit.ly/2VFJ6eD> [accessed 14 September 2020]

Cowden Clarke, Charles, *Shakespeare-characters: chiefly those subordinate* (London: Smith, Elder, 1863)

Cox, James H., and Daniel Heath Justice, eds., *The Oxford Handbook of Indigenous American Literature* (Oxford: Oxford University Press, 2014). Oxford Handbooks Online

Cramp, S., and P.J. Conder, *The deaths of birds and mammals connected with toxic chemicals in the first half of 1960: Report No. 1* (London: RSPB/BTO, 1961)

Cramp, Conder and J.S. Ash, *Deaths of birds and mammals from toxic chemicals: Report No. 2* (London: RSPB/BTO in collaboration with the Game Research Association, 1962)

Craven, Josef, 'Redskins in Epping Forest: John Hargrave, The Kibbo Kift and the Woodcraft Experience' (unpublished PhD thesis, University College London, 1998)

Crutzen, Paul J., 'Geology of mankind', *Nature*, 415 (2002), 23 <doi:10.1038/415023a>

-----, and Eugene Stoermer, 'The Anthropocene', *International Geosphere-Biosphere Newsletter*, 41 (2000), 17-18 <bit.ly/2ZOpkyV> [accessed 18 September 2020]

Darby, William J., 'Silence, Miss Carson', *Chemistry & Industry: Weekly Publication of the Society of Chemical Industry*, 13 October 1962, 1782-84

Davies, Jeremy, *The Birth of the Anthropocene* (Oakland: University of California Press, 2016)

Davies, Thom, 'Slow violence and toxic geographies: "Out of sight" to whom?', *Politics and Space*, 0.0 (2019), 1-19 <[doi:10.1177/2399654419841063](https://doi.org/10.1177/2399654419841063)>

-----, and Alice Mah, eds., *Toxic Truths: Environmental justice and citizen science in a post-truth age* (Manchester: Manchester University press, 2020)

Davis, Jeffrey Sasha, 'Representing Place: "Deserted Isles" and the Reproduction of Bikini Atoll', *Annals of the Association of American Geographers*, 95.3 (2005), 607-25
<www.jstor.org/stable/3693959> [accessed 14 September 2020]

Dee, Tim, *Four Fields* (London: Vintage, 2014)

Demuth, Bathsheba, *Floating Coast: An Environmental History of the Bering Strait* (New York: W. W. Norton & Company, 2019)

Derrida, Jacques, *Archive Fever: A Freudian Impression*, trans. by Eric Prenowitz (Chicago: University of Chicago Press, 1996; 1995)

DeSilvey, Caitlin, *Curated Decay: Heritage Beyond Saving* (Minneapolis: University of Minnesota Press, 2017)

Dillon, Lindsey, et al, 'The Environmental Protection Agency in the Early Trump Administration: Prelude to Regulatory Capture', *American Journal of Public Health*, 108.S2 (2018), S89-S94 <[doi:10.2105/AJPH.2018.304360](https://doi.org/10.2105/AJPH.2018.304360)>

Dini, Rachele, “‘Resurrected from its Own Sewers’: Waste, Landscape, and the Environment in J.G. Ballard’s 1960s Climate Fiction’, *ISLE: Interdisciplinary Studies in Literature and Environment*, 0.0 (2019), 1-23 <doi:10.1093/isle/isz003>

Douglas, C.H., *Economic Democracy* (London: Cecil Palmer, 1920)

Douglas, Mary, *Purity and Danger: An Analysis of the Concepts of Pollution and Taboo* (New York: Routledge, 1984; 1966)

Dungy, Camille T., ed., *Black Nature: Four Centuries of African American Nature Poetry* (London: The University of Georgia Press, 2009)

Dunk, Jonathan, paper presented at the roundtable ‘From Grassroots to Text’, at *Climate Fictions / Indigenous Studies*, Cambridge, 24 January 2020

-----, ‘Park’, *Sydney Review of Books*, 20 July 2018, <bit.ly/32QWJcr> [accessed 14 September 2020]

Eaton, J.K., ‘General Requirements for Pesticide Emulsions’, *Chemistry & Industry: Weekly Publication of the Society of Chemical Industry*, 10 November 1962, 1914-1916

Eby, Nelson, et al., ‘Trinitite – the atomic rock’, *Geology Today*, 26.5 (2010), 180-85 <doi.org/10.1111/j.1365-2451.2010.00767.x>

Eckermann, Ali Cobby, ‘Thunder raining poison’, *Poetry*, 208.2 (2016), 150-51 <www.jstor.org/stable/44016115> [accessed 20 October 2020]

-----, ‘Thunder raining poison’, *Soundings: A journal of politics and culture*, 65 (2017), 136-40

Edwards, Gareth A.S., Louise Reid, and Colin Hunter, ‘Environmental justice, capabilities, and the theorization of well-being’, *Progress in Human Geography*, 40.6 (2016), 754-67 <doi:10.1177/0309132515620850>

‘The Emergency’, *Extinction Rebellion*, <bit.ly/2IiF99X> [accessed 14 September 2020]

'Ep. #35 – Vanessa Agard-Jones' (podcast), *Cultures of Energy: The Energy Humanities Podcast*, Center for Energy and Environmental Research in the Human Sciences, 29 September 2016, <goo.gl/zgc19z> [accessed 14 September 2020]

Fanshawe, John, email correspondence, 19 June 2019

'FAO to Hold Conference on Pesticides', *Chemistry & Industry: Weekly Publication of the Society of Chemical Industry*, 20 October 1962, 1834

Farrier, David, *Anthropocene Poetics: Deep Time, Sacrifice Zones, and Extinction* (Minneapolis: University of Minnesota Press, 2019)

Fehily, Toby, 'Through a Glass Darkly', *Broadsheet*, 16 June 2014, <bit.ly/2UdeIr0> [accessed 14 September 2020]

Fenichell, Stephen, *Plastic: The Making of a Synthetic Century* (New York: HarperCollins, 1996)

'Fifth International Pesticide Conference', *Chemistry & Industry: Weekly Publication of the Society of Chemical Industry*, 6 October 1962, 1739

Finlay, J.T., 'John Hargrave, The Green Shirts, and Social Credit', *Journal of Contemporary History*, 5.1 (1970), 53-71 <www.jstor.org/stable/259980> [accessed 14 September 2020]

Fisher, Mark, *Capitalist Realism: Is There No Alternative?* (Winchester: Zero Books, 2009)

-----, *K-Punk: The Collected and Unpublished Writings of Mark Fisher (2004-2016)*, ed. by Darren Ambrose (London: Repeater, 2018)

-----, *The Weird and the Eerie* (London: Repeater, 2016)

Flintham, Matthew, 'The Military-Pastoral Complex: Contemporary Representations of Militarism in the Landscape', *Tate Papers*, 17 (2012), <goo.gl/P1JhNi> [accessed 14 September 2020]

-----, 'Military-Pastoral Geometries', *Matthew Flintham*, <bit.ly/3cx11di> [accessed 14 September 2020]

Frankel, D., 'An Account of Aboriginal Use of the Yam Daisy', *The Artefact*, 7.1-2 (1982), 43-45

Fraser, Antonia, ed., *The Pleasure of Reading* (London, Bloomsbury, 1992)

Frondele, Judith W., 'Amber Facts and Fancies', *Economic Botany*, 22.4 (1968), 371-82
<www.jstor.org/stable/4252998> [accessed 31 August 2020]

Fuchs, Anne, and J.J. Long, eds., *W.G. Sebald and the Writing of History* (Würzburg: Königshausen & Neumann, 2007)

Fung, Victor A., J. Carl Barrett and James Huff, 'The Carcinogenesis Bioassay in Perspective: Application in Identifying Human Cancer Hazards', *Environmental Health Perspectives*, 103 (1995), 680-83 <[doi:10.1289/ehp.95103680](https://doi.org/10.1289/ehp.95103680)>

Gandhi, Leela, *Affective Communities: Anticolonial Thought, Fin-de-Siècle Radicalism, and the Politics of Friendship* (Durham, NC: Duke University Press, 2006)

Gasiorek, Andrzej, *J.G. Ballard* (Manchester: Manchester University Press, 2005)

Geyer, Roland, Jenna R. Jambeck and Kara Lavender Law, 'Production, use, and fate of all plastics ever made', *Science Advances*, 3.7 (2017), 1-5 <[doi:10.1126/sciadv.1700782](https://doi.org/10.1126/sciadv.1700782)>

Ghosh, Amitav, *The Great Derangement: Climate Change and the Unthinkable* (London: University of Chicago Press, 2016)

Gibb, Rory, 'A Crushing Embrace with the Earth: Ecological Sound in 2015', *The Quietus*, 3 December 2015, <bit.ly/2x2Dduq> [accessed 1 September 2020]

Giorgiadis, Philip, 'Bayer outlines widening lawsuits over weedkiller cancer allegations', *Financial Times*, 25 April 2019, <on.ft.com/2xHrodf> [accessed 14 September 2020]

Gloag, John, and Grace Lovat Fraser, *Plastics and Industrial Design* (London: George Allen and Unwin, 1945)

Goeman, Mishuana, *Mark My Words: Native Women Mapping Our Nations* (Minneapolis: University of Minnesota Press, 2013)

Goldman, Aaron, 'The Resurgence of Antisemitism in Britain during World War II', *Jewish Social Studies*, 46.1 (1984), 37-50 <www.jstor.org/stable/4467242> [accessed 31 August 2020]

Gopal, Priyamvada, *Insurgent Empire: Anticolonial Resistance and British Dissent* (London: Verso, 2019)

Gore, A.C., et al., 'Executive Summary to EDC-2: The Endocrine Society's Second Scientific Statement on Endocrine-Disrupting Chemicals', *Endocrine Reviews*, 36.6 (2015), 592-602 <[doi:10.1210/er.2015-1093](https://doi.org/10.1210/er.2015-1093)>

Gorman, Alice, 'trace fossils – the silence of Ediacara, the shadow of uranium', *The Conversation*, 2 February 2017, <bit.ly/3aXjK0Q> [accessed 14 September 2020]

Gramaglia, Christelle, 'Watching Pollution with Sentinel Species in Fos-sur-Mer (France): Can Participative Biomonitoring become Cosmopolitical Experiments?', at *Chemical* workshop, Institute of Advanced Studies and the Department of Geography at UCL, 7 June 2019

Grant, Madison, *The Passing of the Great Race* (New York: Charles Scribner's Sons, 1916)

Gray, Richard T., *Ghostwriting: W.G. Sebald's Poetics of History* (London: Bloomsbury Academic, 2017)

Green, Jim, 'Radioactive Waste and Australia's Aboriginal People', *Angelaki: Journal of the Theoretical Humanities*, 22.3 (2017), 33-50 <[doi:10.1080/0969725X.2017.1387364](https://doi.org/10.1080/0969725X.2017.1387364)>

Griffiths, Michael, *The Distribution of Settlement: Appropriation and Refusal in Australian Literature and Culture* (Perth: UWA Publishing, 2018)

Grigson, Geoffrey, 'Authentic and False in the New "Romanticism"', *Horizon*, 17.99 (1948), 203-13

Grossman, Michelle, ed., *Blacklines: Contemporary Critical Writing by Indigenous Australians* (Melbourne: Melbourne University Press, 2003)

Grusin, Richard, ed., *The Nonhuman Turn* (Minnesota: University of Minnesota Press, 2015)

Hammer, Martin, and Christina Lodder, *Constructing Modernity: The Art and Career of Naum Gabo* (London: Yale University Press, 2000)

Harada, Takanori, et al, 'Toxicity and Carcinogenicity of Dichlorodiphenyltrichloroethane (DDT)', *Toxicological Research*, 32.1 (2016), 21-33 <doi:10.5487/TR.2016.32.1.021>

Haraway, Donna J., 'Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective' *Feminist Studies*, 14.3 (1988), 575-99 <doi:10.2307/3178066>

-----, *Staying with the Trouble: Making Kin in the Chthulucene* (London: Duke University Press, 2016)

Harding, Sandra, ed., *The feminist standpoint theory reader: Intellectual and political controversies* (New York: Routledge, 2004)

Hargrave, John, *The Confession of the Kibbo Kift: A Declaration and General Exposition of the Work of the Kindred* (London: Duckworth, 1927)

-----, *The Great War Brings It Home: The Natural Reconstruction of an Unnatural Existence* (London: Constable & Co., 1919)

-----, 'The Lodge of Instruction', Museum of London Kibbo Kift Collection, L72/H.9

-----, 'MODERN LITERATURE COMES OF AGE', London School of Economics, Hargrave Papers, Box 46, File 5

-----, 'Notes on The Typographical Set-out of "SUMMER TIME ENDS"', Hargrave Papers, Box 46, File 5

-----, 'A Short Exposition on the Philosophic Basis of the Kibbo Kift', *The Nomad*, 12.2 (May 1925), 281-284

-----, 'Steinbeck and *Summer Time Ends*' (typescript of an article published in *Steinbeck Quarterly*, 6 (1973), 67-73), Hargrave Papers, Box 40

-----, 'Special Notes (A): "SUMMER TIME ENDS"', Hargrave Papers, Box 46, File 5

-----, *Summer Time Ends* (London: Constable & Co, 1935)

-----, "SUMMER TIME ENDS", (manuscript), Hargrave Papers, HARGRAVE 1/1-7

-----, 'SUMMER TIME ENDS: Not a Novelist', Hargrave Papers, Box 46, File 5

-----, *They Can't Kill the Sun*, (typescript), Hargrave Papers, Box 62

Harkin, Natalie, *Archival-Poetics* (Melbourne: Vagabond Press, 2019)

-----, *Dirty Words* (Melbourne: Cordite Books, 2015)

-----, 'In her pocket she carries her heart', *Southerly*, 18 April 2017, <bit.ly/2RMUjXJ> [accessed 22 September 2020]

-----, 'On coalitions for hopeful futures', *Overland*, 224 (2016), <bit.ly/2RSM7EE> [accessed 14 September 2020]

-----, 'On grandmother stories and creative resilience', *Overland*, 223 (2016), <bit.ly/2Of3yhS> [accessed 14 September 2020]

-----, 'On responsibility', *Overland*, 226 (2017), <bit.ly/2GCjjvb> [accessed 14 September 2020]

-----, 'On storm musings by candlelight', *Overland*, 225 (2016), <bit.ly/37FtGKt> [14 September 2020]

-----, 'Projecting Decolonial Love', *Southerly*, 3 May 2013, <bit.ly/3hRQYB2> [accessed 22 September 2020]

-----, 'The Poetics of (Re)Mapping Archives: Memory in the Blood', *JASAL: Journal for the Association of the Study of Australian Literature*, 14.3 (2014), 1-14

-----, 'This is not a time to be silent', *Southerly*, 27 April 2017, <bit.ly/3mLbYgm> [accessed 22 September 2020]

Harrington, Anne, *Reenchanted Science: Holism in German Culture from Wilhelm II to Hitler* (Princeton, NJ: Princeton University Press, 1996)

Harrison, Robert Pogue, *The Dominion of the Dead* (Chicago: University of Chicago Press, 2003)

Harrison, Ruth, *Animal Machines: The New Factory Farming Industry* (London: Vincent Stuart, 1962)

Hauser, Kitty, *Shadow Sites: Photography, Archaeology and the British Landscape, 1927-1955* (Oxford: Oxford University Press, 2007)

Haynes, Todd, dir., *Dark Waters*, (Willi Hill and Killer Content, 2020)

Hecht, Gabrielle, *Being Nuclear: Africans and the Global Uranium Trade* (London: MIT Press, 2012)

-----, 'The Work of Invisibility: Radiation Hazards and Occupational Health in South African Uranium Production', *International Labour and Working-Class History*, 81 (2012), 94-113 <www.jstor.org/stable/23258372> [accessed 14 September 2020]

Hepler-Smith, Evan, 'Molecular Bureaucracy: Toxicological Information and Environmental Protection', *Environmental History*, 24.3 (2019), 534-60 <[doi:10.1093/envhis/emy134](https://doi.org/10.1093/envhis/emy134)>

Herber, Lewis (Bookchin), *Our Synthetic Environment* (London: Jonathan Cape, 1963; 1962)

Hickling, Ronald, ed., *Enjoying Ornithology* (London: T & AD Poyser, 1983)

'Hitler's Jew-Hate! The Nazis' Scapegoat', *Attack!*, 9 December 1933

'Hitler's Jew-Hate! The Nazis' Scapegoat', *Attack!*, 9 December 1933. Photograph by author, at the British Library, <UIN:BLL01001134064>

Hoban, Russell, *Riddley Walker* (London: Bloomsbury, 2012; 1980)

Holmes, Colin, *Anti-Semitism in British Society, 1876-1939* (London: Edward Arnold, 1979)

Hoover, Elizabeth, *The River Is in Us: Fighting Toxics in a Mohawk Community* (London: University of Minnesota Press, 2017)

Hoskin, Teri, 'Yhonnie Scarce breathing, and the sound of knuckles cracking', *fine print*, 9 (2016), <bit.ly/315HefR> [accessed 14 September 2020]

Hueper, Wilhelm, and W. D. Conway, *Chemical Carcinogenesis and Cancers* (Springfield, IL: Charles Thomas, 1964)

Hui, Barbara, *Litmap*, <bit.ly/3aMM7hk> [accessed 14 September 2020]

Indigenous students, faculty and staff at Memorial University, 'Indigenization is Indigenous', *Memorial University Gazette*, 12 February 2019, <bit.ly/39nzqJQ> [accessed 14 September 2020]

Iseke-Barnes, Judy, 'Unsettling Fictions: Disrupting Popular Discourses and Trickster Tales in Books for Children', *Journal of the Canadian Association for Curriculum Studies*, 7.1 (2009), 24-57

Itkin, Alan, *Underworlds of Memory: W.G. Sebald's Epic Journeys Through the Past* (Evanston, IL: Northwestern University Press, 2017)

Jacob, Hugo, et al., 'Effects of Virgin Micro- and Nanoplastics on Fish: Trends, Meta-Analysis, and Perspectives', *Environmental Science and Technology*, 54.8 (2020), 4733-45
<doi:10.1021/acs.est.9b05995>

James, Colin, 'The Advertiser: Maralinga Dossier', <bit.ly/3aTghAB> [accessed 14 September 2020]

Jameson, Fredric, 'Periodising the 60s', *Social Text*, 9.10 (1984), 178-209
<www.jstor.org/stable/466541> [accessed 14 September 2020]

Jamie, Kathleen, *Sightlines* (London: Sort Of Books, 2012)

Jamison, Leslie, 'Grand Unified Theory of Female Pain', *Virginia Quarterly Review*, 90.2 (2014),
<bit.ly/37A7hPH> [accessed 14 September 2020]

Janmohamed, Abdul, and David Lloyd, 'Introduction: Toward a Theory of Minority Discourse', *Cultural Critique*, 6 (1987), 5-12, <www.jstor.org/stable/1354253> [accessed 14 September 2020]

Jas, Nathalie, 'The Politics of (In-)visibilisation: Organophosphate Pesticides' acute Toxicity in the Trente Glorieuses France', paper presented at *Chemical* workshop, Institute of Advanced Studies and the Department of Geography at UCL, 7 June 2019

Jay, Martin, 'Taking on the Stigma of Inauthenticity: Adorno's Critique of Genuineness', *New German Critique*, 97 (2006), 15-30 <www.jstor.org/stable/27669153> [accessed 31 August 2020]

Jayaraj, Ravindran, Pankajshan Megha, and Puthur Sreedev, 'Organochlorine pesticides, their toxic effects on living organisms and their fate in the environment', *Interdisciplinary Toxicology*, 9.3-4 (2016), 90-100 <doi:10.1515/intox-2016-0012>

Kepes, György, ed., *The New Landscape in Art and Science* (Chicago: Paul Theobald, 1956)

Khindria, S.K., Sanjeev Mittal, and Urvashi Sukhija, 'Evolution of Denture Base Materials', *The Journal of Indian Prosthodontic Society*, 9.2 (2009), 64-69 <doi:10.4103/0972-4052.55246>

Kibbo Kift Vita Sancta banner, 1921, Museum of London Kibbo Kift Collection, 2012.72/465, © Kibbo Kift Foundation, <bit.ly/32BkLK4> [accessed 16 September 2020]

Kimmerer, Robin Wall, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants* (Minneapolis: Milkweed Editions, 2013)

Kinlog interior, illustrated by Kathleen Milnes, Museum of London Kibbo Kift Collection, 2012.2/474, © Kibbo Kift Foundation, <bit.ly/2RxVDO4> [accessed 16 September 2020]

Klee, Louis, 'Dwelling and the Wound: Architectures of Association in W.G. Sebald's *Austerlitz*', (unpublished paper, 2019)

-----, 'Unthinking Modernity: on the Great Derangement', *Overland*, 18 May 2018, <bit.ly/2E1cQc9> [accessed 14 September 2020]

Klein, Naomi, 'Let Them Drown: The Violence of Othering in a Warming World', *London Review of Books*, 38.11 (2016), <bit.ly/2Pnfgap> [accessed 14 September 2020]

Klingan, Katrin, et al., eds., *Textures of the Anthropocene: Grain Vapor Ray*, 4 vols (London: MIT Press, 2014)

Konkol, Margaret, 'Prototyping Mina Loy's Alphabet', *Feminist Modernist Studies*, 1.3 (2018), 294-317 <[doi:10.1080/24692921.2018.1505273](https://doi.org/10.1080/24692921.2018.1505273)>

Krieger, Anja, 'Plastic, the size of a virus', (podcast), *Plastisphere Podcast*, September 2018, <goo.gl/LzZBSk> [accessed 14 September 2020]

LaBarge, Emily, 'Pain as Revolution: On Anne Boyer's "The Undying"', *Los Angeles Review of Books*, 25 October 2019, <bit.ly/2YrKscJ> [accessed 14 September 2020]

Large, E.C., *Sugar in the Air* (London: Hyphen, 2008; 1938)

Last, Angela, 'Fruit of the cyclone: Undoing geopolitics through geopoetics', *Geoforum*, 64 (2015), 56-64 <[doi:10.1016/j.geoforum.2015.05.019](https://doi.org/10.1016/j.geoforum.2015.05.019)>

Latour, Bruno, *Facing Gaia: Eight Lectures on the New Climatic Regime*, trans. by Catherine Porter (Cambridge: Polity, 2017)

Lawrence, Christopher, and Anna-K. Mayer, *Regenerating England: Science, Medicine and Culture in Inter-War Britain* (Amsterdam and Atlanta: Rodopi, 2000)

Lawrence, Louise, *Children of the Dust* (London: Lions Tracks, 1986)

Laybourn-Langton, Laurie, Leslie Rankin and Darren Baxter, *This Is a Crisis: Facing Up to the Age of Environmental Breakdown* (London: Institute for Public Policy Research, 2019)

Le Guin, Ursula K., *The Left Hand of Darkness* (London: Gollancz, 2018; 1969)

Leane, Jeanine, 'Other peoples' stories', *Overland*, 225 (2016), <bit.ly/3aR30bP> [accessed 14 September 2020]

-----, paper presented at the roundtable 'Towards a Transnational Indigenous Imaginary' at *Climate Fictions / Indigenous Studies*, Cambridge, 25 January 2020

Lear, Linda, *Rachel Carson: Witness for Nature* (New York: Mariner Books, 1997; 2009)

Leopold, Ellen, *A Darker Ribbon: Breast Cancer, Women, and Their Doctors in the Twentieth Century* (Boston: Beacon Press, 2000)

Leslie, Esther, *Synthetic Worlds: Nature, Art and the Chemical Industry* (Kings Lynn: Reaktion, 2005)

-----, 'Waste in Time and the Radioactivity of Objects', *Technosphere*, 15 January 2018, <goo.gl/gckVnk> [accessed 14 September 2020]

Levinas, Emmanuel, *De l'existence à l'existant* (Paris: Fontaine, 1947)

Liboiron, Max, 'Anti-Colonial Science and the Ubiquity of Plastics', *FrankNews*, 9 January 2019, <goo.gl/t1G7FJ> [accessed 14 September 2020]

-----, 'Redefining pollution and action: The matter of plastics', *Journal of Material Culture*, 21.1 (2016), 87-110 <doi:10.1177/1359183515622966>

-----, Manuel Tironi, and Nerea Calvillo, 'Toxic politics: Acting in a permanently polluted world', *Social Studies of Science*, 48.3 (2018), 331-49 <doi:10.1177/0306312718783087>

Loften, Adam, and Emmanuel Vaughan-Lee, 'Counter-Mapping', *Emergence*, 1 (2018), <bit.ly/37QQMhv> [14 September 2020]

Lofthouse, Robert A., *Vitalism in Modern Art, C. 1900-1950: Otto Dix, Stanley Spencer, Max Beckmann, and Jacob Epstein* (Lampeter: Edwin Mellen Press, 2005)

Long, J.J., *W.G. Sebald: Image, Archive, Modernity* (New York: Columbia University Press, 2007)

Lopez, Barry, *Arctic Dreams* (London: Vintage, 2014; 1986)

Lorimer, Jamie, 'The Anthro-scene: A guide for the perplexed', *Social Studies of Science*, 47.1 (2017), 117-42 <doi:10.1177/0306312716671039>

Lyons, Kristina, 'Chemical warfare in Colombia, evidentiary ecologies and *senti-actuando* practices of justice', *Social Studies of Science*, 48.3 (2018), 414-37 <doi:10.1177/0306312718765375>

Macdonald, Helen, *Falcon* (London: Reaktion, 2016; 2006)

-----, "'What makes you a scientist is the way you look at things": ornithology and the observer 1930-1955', *Studies in History and Philosophy of Biological and Biomedical Sciences*, 33 (2002), 53-77 <doi:10.1016/S1369-8486(01)00034-6>

Macfarlane, Robert, 'The eeriness of the English countryside', *The Guardian*, 10 April 2015, <bit.ly/1XwUSmN> [accessed 14 September 2020]

-----, email correspondence, 7 November 2018

-----, 'Generation Anthropocene: How humans have altered the planet forever', *The Guardian*, 1 April 2016, <goo.gl/KxgRFz> [accessed 1 September 2020]

-----, *Landmarks* (London: Penguin, 2016; 2015)

-----, 'Should this tree have the same rights as you?', *The Guardian*, 2 November 2019, <bit.ly/2uGLB4R> [accessed 14 September 2020]

-----, *Underland: A Deep Time Journey* (London: Hamish Hamilton, 2019)

-----, 'What lies beneath', *The Guardian*, 20 April 2019, <bit.ly/314NLaE> [accessed 14 September 2020]

-----, and Stanley Donwood, *Ness* (Oxford: Quive-Smith Editions, 2018)

MacNeice, Louis, *Selected Poems* (London: Faber and Faber, 2007; 1988)

Martin, J.L., Ben Nicholson, and N. Gabo, eds., *Circle: International Survey of Constructive Art* (London: Faber and Faber, 1937)

Masco, Joseph, *The Nuclear Borderlands: The Manhattan Project in Post-Cold War New Mexico* (Oxford: Princeton University Press, 2006)

Matejka, Ladislav, and Krystyna Pomorska, eds., *Readings in Russian Poetics: Formalist and Structuralist Views* (Cambridge, MA: MIT Press, 1971)

McKibben, Bill, *The End of Nature: Humanity, Climate Change and the Natural World* (London: Bloomsbury, 2003; 1990)

Meikle, Jeffrey, *American Plastic: A Cultural History* (New Brunswick, NJ: Rutgers University Press, 1995)

Mellanby, Kenneth, *Pesticides and Pollution* (London: Collins, 1967)

Merewether, Charles, ed., *The Archive* (London: Whitechapel Gallery, 2006)

Miller, Joe, 'Bayer to pay up to \$10.9bn to settle US Roundup lawsuits', *Financial Times*, 24 June 2020, <on.ft.com/2DhKKMH> [accessed 1 September 2020]

Milthorpe, Naomi, *Evelyn Waugh's Satire: Texts and Contexts* (London: Fairleigh Dickinson University Press, 2016)

Momaday, N. Scott, *House Made of Dawn* (New York: Harper and Row, 1989; 1969)

Monbiot, George, 'Dare to declare capitalism is dead – before it takes us all down with it', *The Guardian*, 25 April 2019, <bit.ly/2vmC0x6> [accessed 14 September 2020]

Montefiore, Janet, "'The fact that possesses my imagination": Rachel Carson, Science and Writing', *Women: A Cultural Review*, 12.1 (2001), 44-56 <[doi:10.1080/09574040110034110](https://doi.org/10.1080/09574040110034110)>

Moore, Jason W., *Capitalism in the Web of Life: Ecology and the Accumulation of Capital* (London: Verso, 2015)

Moreton-Robinson, Aileen, 'The White Man's Burden: Patriarchal White Epistemic Violence and Aboriginal Women's Knowledges within the Academy', *Australian Feminist Studies*, 26.70 (2011), 413-31 <[doi:10.1080/08164649.2011.621175](https://doi.org/10.1080/08164649.2011.621175)>

Morgan, Peter, 'The Sign of Saturn: Melancholy, Homelessness and Apocalypse in W.G. Sebald's Prose Narratives', *German Life and Letters*, 58.1 (2005), 75-92 <[doi:10.1111/j.0016-8777.2005.00305.x](https://doi.org/10.1111/j.0016-8777.2005.00305.x)>

Morris, Rosalind, ed., *Can the subaltern speak? Reflections on the history of an idea* (New York: Columbia University Press, 2010; 1988)

Mossman, Susan, ed., *Early Plastics: Perspectives, 1850–1950* (London: Leicester University Press, 1997)

Murphy, Michelle, 'Alterlife and decolonial chemical relations', *Cultural Anthropology*, 32.4 (2017), 494-503 <doi:10.14506/ca32.4.02>

-----, 'Alterlife in the Ongoing Afterlives of Chemical Exposure', *Michelle Murphy*, <bit.ly/2CaltDC> [accessed 20 September 2020]

-----, 'Chemical Regimes of Living', *Environmental History*, 13.4 (2008), 695-703 <www.jstor.org/stable/25473297> [accessed 14 September 2020]

-----, *Sick Building Syndrome and the Problem of Uncertainty: Environmental Politics, Technoscience, and Women Workers* (Durham NC: Duke University Press, 2006)

Muzigirwa Munganga, Bonaventure, 'Every (un)thinkable world is (un)thinkable: ecological thinking, the aesthetics and poetics of the uncanny and epistemic issues in Alexis Wright's *The Swan Book*', paper at *Climate Fictions / Indigenous Studies*, Cambridge, 25 January 2020

The National: New Australian Art, 'Curator Wayne Tunnicliffe on Yonnie [sic] Scarce "Death Zephyr"', *Soundcloud*, 2017, <bit.ly/2S4EWJU> [accessed 14 September 2020]

Nair, Arathy S., 'DuPont settles lawsuits over leak of chemical used to make Teflon', *Reuters*, 13 February 2017, <reut.rs/2VCdA03>

Ngai, Sianne, *Ugly Feelings* (Harvard: Harvard University Press, 2005)

NGV Melbourne, *Blood on the wattle: Yhonnie Scarce*, online video recording, YouTube, 23 March 2017, <bit.ly/2RDlnUY> [accessed 14 September 2020]

Nicholson, Max, *The art of bird watching: A practical guide to field observation* (London: E. Witherby, 1931)

Nixon, Rob, 'All Tomorrow's Warnings', *Public Books*, 13 August 2020, <bit.ly/31ficwz> [accessed 14 September 2020]

-----, *Slow Violence and the Environmentalism of the Poor* (London: Harvard University Press, 2011)

Nixon, Sean J., 'Vanishing Peregrines: J. A. Baker, Environmental Crisis and Bird-Centred Cultures of Nature, 1954-73', *Rural History*, 28.2 (2017), 205-26
<doi:10.1017/S0956793317000115>

Nokise, James, 'The Day of Two Suns', (radio programme), *BBC Radio 4*, 24 February 2020, <bbc.in/2x4zy2n> [accessed 14 September 2020]

Nuccitelli, Dana, 'Key facts about the new EPA plan to reverse the Obama-era methane leaks rule', *Yale Climate Collections*, 9 September 2019, <bit.ly/3cRl6Kw> [accessed 14 September 2020]

-----, 'The Trump EPA strategy to undo Clean Power Plan', *Yale Climate Collections*, 21 June 2019, <bit.ly/37oog77> [accessed 14 September 2020]

Olidort, Shoshana, 'Undying and Reparative Magic: A Conversation with Anne Boyer', *Poetry Foundation*, 23 September 2019, <bit.ly/37t6sbk> [accessed 14 September 2020]

Orwell, George, *Coming Up for Air* (London: Penguin, 2000; 1939)

-----, *The Complete Works of George Orwell*, ed. by Peter Davison, 10 vols (London: Secker & Warburg, 1998)

-----, *Inside the Whale and other essays* (London: Penguin, 1957)

-----, *The Road to Wigan Pier* (London: Penguin, 2001; 1936)

Ottinger, Gwen, 'Crowdsourcing Undone Science', *Engaging Science, Technology, and Society*, 3 (2017), 560-74 <doi:10.17351/ests2017.124>

'Our Demands', *Extinction Rebellion*, <bit.ly/2UOfjw6> [accessed 14 September 2020]

Parenti, Christian, 'A Radical Approach to the Climate Crisis', *Dissent*, Summer 2013, <bit.ly/2Vtpo71> [accessed 14 September 2020]

Parkinson, Alan, 'Maralinga: The Clean-Up of a Nuclear Test Site', *Medicine and Global Survival*, 7.2 (2002), 77-81

Pascoe, Bruce, *Dark Emu: Aboriginal Australia and the birth of agriculture* (Melbourne: Scribe, 2018)

Pendray, G. Edward, *The Book of Record of the Time Capsule of Cupaloy* (East Pittsburg, PA: Westinghouse Electric and Manufacturing Company, 1939)

Péttursdóttir, Póra, and Bjørnar Olsen, 'Theory adrift: The matter of archaeological theorizing', *Journal of Social Archaeology*, 18.1 (2018), 97-117 <doi:10.1177/1469605317737426>

The Pleasure of Light: György Kepes and Frank Malina at the intersection of Science and Art (Budapest: The Ludwig Museum, 2010)

Pollen, Annebella, *The Kindred of the Kibbo Kift: Intellectual Barbarians* (London: Donlon Books, 2015)

Powell, Devin, 'Riddle of the sands scattered around Trinity atomic test site', *The Guardian*, 18 June 2013, <bit.ly/2uMnfqy> [accessed 14 September 2020]

Punter, David, *The Hidden Script: Writing and the Unconscious* (London: Routledge, 1985)

Purdy, Jedediah, 'The Long Environmental Justice Movement', *Ecology Law Quarterly*, 44.4 (2018), 809-64 <doi:10.15779/Z382F7JR1V>

-----, *This Land Is Our Land: The Struggle for a New Commonwealth* (Oxford: Princeton University Press, 2019)

Pynchon, Thomas, *Gravity's Rainbow* (London: Vintage, 2013; 1973)

Priestley, J.B., *English Journey* (London: Heinemann, 1984; 1934)

Qugana, Hana, and Simon Layton, 'Primitive Liberals and Pirate Tribes: Black Flag Radicalism and the Kibbo Kift', *The Journal of Imperial and Commonwealth History*, 46.5 (2018), 984-1008 <doi:10.1080/03086534.2018.1519247>

Rabbitt Roff, Sue, 'Cold War exhibition tries to airbrush Britain's dark history of nuclear testing', *The Conversation*, 1 May 2019, <bit.ly/2uP99oo> [accessed 14 September 2020]

Ratcliffe, Derek, *The Peregrine Falcon* (London: T & AD Poyser, 2000; 1980)

-----, 'The Status of the Peregrine in Great Britain', *Bird Study*, 10.2 (1963), 56-90 <doi:10.1080/00063656309476042>

Reynolds, Elizabeth Lee, 'Tracing the *Silent Spring* in *The Peregrine*', *Zoomorphic*, 18 September 2016, <bit.ly/2XtmwTy> [accessed 14 September 2020]

Rich, Nathaniel, 'The Lawyer Who Became DuPont's Worst Nightmare', *The New York Times Magazine*, 6 January 2016, <nyti.ms/31y15X9> [accessed 24 September 2020]

Richter, Gerhard, ed., *Benjamin's Ghosts: Interventions in Contemporary Literary and Cultural Theory* (Stanford, CA: Stanford University Press, 2002)

Rodden, J., ed., *The Cambridge Companion to George Orwell* (Cambridge: Cambridge University Press, 2007)

Ronda, Margaret, *Remainders: American Poetry at Nature's End* (Stanford: Stanford University Press, 2018)

Russo, Linda, and Marthe Reed, eds., *Counter-Desecration: A Glossary for Writing Within the Anthropocene* (Connecticut: Wesleyan University Press, 2018)

Sacks, Peter, *The English Elegy: Studies in the Genre from Spenser to Yeats* (London: Johns Hopkins University Press, 1985)

Said, Edward, *Culture and Imperialism* (London: Vintage, 1994; 1993)

-----, *Orientalism* (London: Penguin, 2003; 1991)

Sánchez-Bayo, Francisco, and Kris A.G. Wyckhuys, 'Worldwide decline of the entomofauna: A review of its drivers', *Biological Conservation*, 232 (2019), 8-27 <doi:10.1016/j.biocon.2019.01.020>

Sartre, Jean-Paul, *Being and Nothingness: An Essay on Philosophical Ontology*, trans. by Hazel E. Barnes (London: Routledge, 1969)

-----, *L'Être et le Néant* (Paris: Gallimard, 1999; 1943)

-----, *Nausea*, trans. by Robert Baldick (London: Penguin, 2000; 1938)

Saunders, Hetty, *My House of Sky: The Life and Work of J.A. Baker* (Toller Fratrum: Little Toller Books, 2017)

Savoy, Lauret, *Trace: Memory, History, Race, and the American Landscape* (Berkeley: Counterpoint, 2015)

Sayer, Karen, 'Animal Machines: The Public Response to Intensification in Great Britain, c. 1960-1973', *Agricultural History*, 87.4 (2013), 473-501 <doi:10.3098/ah.2013.87.4.473>

Scarce, Yhonnie, 'Artist: Yhonnie Scarce', *National Gallery of Australia*, <bit.ly/3aYSi32> [accessed 14 September 2020]

-----, *Death Zephyr* (installation view at Art Gallery of New South Wales), hand blown glass yams, nylon and steel armature, courtesy Yhonnie Scarce and THIS IS NO FANTASY + dianne tanzer gallery, © Yhonnie Scarce, photograph Felicity Jenkins, Art Gallery of New South Wales, <bit.ly/31aov2G> [accessed 14 September 2020]

-----, 'Strontium 90', *THIS IS NO FANTASY: dianne tanzer + nicola stein* <bit.ly/2GEJPDU> [accessed 14 September 2020]

-----, *Thunder Raining Poison* (National Gallery of Australia), hand blown glass yams, metal armature, courtesy Yhonnie Scarce and THIS IS NO FANTASY + dianne tanzer gallery, © Yhonnie Scarce, photograph National Gallery of Australia, <bit.ly/33wsYhE> [accessed 14 September 2020]

-----, and Browning, Daniel, 'The human fallout from Maralinga', (radio programme), *ABC Radio Australia*, 24 September 2016, <ab.co/2S7awq9> [accessed 14 September 2020]

-----, and Kulovic, Nermina, 'Yhonnie Scarce: In Love with Glass', *Rooms Magazine*, 14 May 2013, <bit.ly/2RHIV0x> [accessed 14 September 2020]

Schmelzer, Matthias, *The Hegemony of Growth: The OECD and the Making of the Economic Growth Paradigm* (Cambridge: Cambridge University Press, 2016)

Schneider-Mayerson, Matthew, and Brent Ryan Bellamy, eds., *An Ecotopian Lexicon* (Minneapolis: University of Minnesota Press, 2019)

Scranton, Roy, 'Beginning with the End', *Emergence*, April 2020, <bit.ly/2xAkeey> [accessed 14 September 2020]

Sebald, W.G., *Campo Santo*, ed. by Sven Meyer, trans. by Anthea Bell (London: Penguin, 2006)

-----, *On the Natural History of Destruction*, trans. by Bell (London: Penguin, 2004; 1999)

-----, *The Rings of Saturn*, trans. by Michael Hulse (New York: New Directions Press, 1998; 1995)

-----, *Vertigo*, trans. by Hulse (New York: New Directions Press, 2000; 1990)

Sedgwick, Eve Kosofsky, *Touching feeling: affect, pedagogy, performativity* (Durham: Duke University Press, 2003)

Seed, David, 'Seven Days to Noon: containing the atomic threat', *British Journal for the History of Science*, 45.4 (2012), 641-52 <[doi:10.1017/S0007087412001100](https://doi.org/10.1017/S0007087412001100)>

Sellars, Simon, and Dan O'Hara, eds., *Extreme Metaphors: Selected Interviews with J.G. Ballard, 1967-2008* (London: Fourth Estate/HarperCollins, 2012)

Sentance, Nathan, 'Disrupting the Colonial Archive', *Sydney Review of Books*, 18 September 2019, <bit.ly/312YN05> [accessed 14 September 2020]

Shapiro, Nicholas, 'Attuning to the Chemosphere: Domestic Formaldehyde, Bodily Reasoning, and the Chemical Sublime', *Cultural Anthropology*, 30.3 (2015), 368-93 <[doi:10.14506/ca30.3.02](https://doi.org/10.14506/ca30.3.02)>

Shiach, Morag, *Modernism, Labour and Selfhood in British Literature and Culture, 1890–1930* (Cambridge: Cambridge University Press, 2004)

Shute, Nevill, *On the Beach* (London: Vintage, 2009; 1957)

Simpson, Leanne Betasamosake, *Islands of Decolonial Love: Stories and Songs* (ARP Books: Winnipeg, 2015)

-----, Keynote Address at *Climate Fictions / Indigenous Studies*, Cambridge, 25 January 2020

Sinclair, Upton, excerpt from 'Technicians Awake!', *The New English Weekly*, 15 December 1938, pp. 153-54, reprinted as an unpaginated pamphlet in Large, *Sugar in the Air*.

Skelton, Richard, and Joseph Burnett, 'Nature Eclipses Culture: An Interview with Richard Skelton', *The Quietus*, 12 March 2014, <goo.gl/xj6GrG> [accessed 14 September 2020]

Skelton, and Autumn Richardson, 'Succession', 10 September 2013, <bit.ly/2YzCRHF> [accessed 14 September 2020]

Smith, Linda Tuhiwai, *Decolonizing Methodologies: Research and Indigenous Peoples*, 2nd edn (London: Zed books, 2012; 1999). VLeBooks ebook

Smith, Miles, 'A Review of *Silent Spring*, by Rachel Carson', *Press*, 6 November 1962

Smyth, Richard, 'Nature writing's fascist roots', *New Statesman*, 3 April 2019, <bit.ly/2YOCqtR> [accessed 1 September 2020]

Soga, Masashi, and Kevin J. Gaston, 'Shifting baseline syndrome: causes, consequences, and implications', *Frontiers in Ecology and Environment*, 16.4 (2018), 222-30 <[doi:10.1002/fee.1794](https://doi.org/10.1002/fee.1794)>

Solnit, Rebecca, *Savage Dreams: A Journey into the Hidden Wars of the American West* (London: University of California Press, 2014; 1994)

Spahr, Juliana, *well then there now* (Boston: Black Sparrow, 2011)

Spargo, Clifton, *The Ethics of Mourning: Grief and Responsibility in Elegiac Literature* (London: Johns Hopkins University Press, 2004)

Spooner, Catherine, and Emma McEvoy, *The Routledge Companion to Gothic* (London: Routledge, 2007)

Stacey, Jackie, and Wolff, Janet, eds., *Writing otherwise: Experiments in cultural criticism* (Manchester: Manchester University Press, 2013)

Stained glass yams from *Thunder Raining Poison*. © 2020 This Is No Fantasy, <bit.ly/2ZEVixi> [accessed 16 September 2020]

Steingraber, Sandra, *Living Downstream: An Ecologist's Personal Investigation of Cancer and the Environment*, 2nd edn (Cambridge, MA: Da Capo Press, 2010; 1997)

Stengers, Isabelle, *In Catastrophic Times: Resisting the Coming Barbarism*, trans. by Andrew Goffey (London: Open Humanities Press, 2015). Open Humanities Press ebook

'The Stolen Generations', *Common Ground*, <bit.ly/3gk5yRX> [accessed 14 September 2020]

Stone, Dan, *The Holocaust, Fascism and Memory: Essays in the History of Ideas* (Basingstoke: Palgrave Macmillan, 2013)

Tait, Adrian, 'Nature Reclaims Her Own: J.G. Ballard's *The Drowned World*', *Australian Humanities Review*, 57 (2014), 25-41 <bit.ly/2DYczqu> [accessed 14 September 2020]

Taylor, Andrew, 'Tarnanthi Festival: How a bomb blast inspired glass artist Yhonnie Scarce', *Sydney Morning Herald*, 25 August 2015, <bit.ly/2U6RuTD> [accessed 14 September 2020]

Taylor, N.A.J., 'Situated Nuclear Knowledges: an Ecology of Antipodean Nuclear Art', *Unlikely Journal for Creative Arts*, 5 (2018), <bit.ly/2IpXy61> [accessed 12 October 2020]

Thompson, Carl, 'The Picturesque at Home and Abroad', *British Library*, (undated), <bit.ly/2XIeCKt> [accessed 1 September 2020]

Thompson, R. C., et al., 'Our Plastic Age', *Philosophical Transactions of the Royal Society B*, 364 (2009), 1973-1976 <[doi:10.1098/rstb.2009.0054](https://doi.org/10.1098/rstb.2009.0054)>

Thomson, John Arthur, *The Outline of Science: A Plain Story Simply Told*, 4 vols (New York: G.P. Putnam's Sons, 1922; 1921)

Tironi, 'Hypo-interventions: Intimate activism in toxic environments', *Social Studies of Science*, 48.3 (2018), 438-55 <[doi:10.1177/0306312718784779](https://doi.org/10.1177/0306312718784779)>

Toomey, Diane, 'An Inside Look at How Trump Turned the EPA into an Industry Subsidiary', *Yale Environment 360*, 4 October 2018, <bit.ly/2RtkEIZ> [accessed 14 September 2020]

Trotter, David, *Literature in the First Media Age: Britain Between the Wars* (Cambridge, MA: Harvard University Press, 2013)

-----, *The Uses of Phobia: Essays on Literature and Film* (Oxford: Wiley-Blackwell, 2010)

Trouillot, Michel-Rolph, *Peasants and Capital: Dominica in the World Economy* (Baltimore: Johns Hopkins University press, 1988)

-----, *Silencing the Past: Power and the Production of History* (Boston, MA: Beacon, 1995)

Tsing, Anna Lowenhaupt, et al., eds., *Arts of Living on a Damaged Planet* (Minneapolis: University of Minnesota Press, 2017)

Tuck, Eve, 'Suspending Damage: A Letter to Communities', *Harvard Educational Review*, 79.3 (2009), 409-27

-----, and K. Wayne Yang, 'Decolonization is not a metaphor', *Decolonization: Indigeneity, Education and Society*, 1.1 (2012), 1-40

Tynan, Elizabeth, *Atomic Thunder: British Nuclear Testing in Australia* (Yorkshire: Pen and Sword, 2018)

United Church of Christ Commission for Racial Justice, *Toxic Wastes and Race in the United States: A National Report on the Racial and Socio-Economic Characteristics of Communities with Hazardous Waste Sites* (New York: United Church of Christ, 1987)

Updike, John, 'Satan's Work and Silted Cisterns', *The New Yorker*, 17 October 1988

Vale, V., and Andrea Juno, eds., *Re/Search: J.G. Ballard* (San Francisco: V/Search, 1984)

Waddell, Craig, ed., *And No Birds Sing: Rhetorical Analyses of Silent Spring* (Carbondale and Edwardsville: Southern Illinois University Press, 2000)

Waldman, Walter R., and Matthias C. Rillig, 'Microplastic Research Should Embrace the Complexity of Secondary Particles', *Environmental Science and Technology*, 54 (2020), 7751-53
<doi:10.1021/acs.est.0c02194>

Walker, Brett L., *Toxic Archipelago: A History of Industrial Disease in Japan* (London: University of Washington Press, 2010)

Weisenburger, Steven, *A Gravity's Rainbow Companion: Sources and Contexts for Pynchon's Novel* (Athens: University of Georgia Press, 2006)

Weizman, Eyal, *Forensic Architecture: Violence at the Threshold of Detectability* (New York: Zone Books, 2017)

Williams, Keith, “‘The Unpaid Agitator’: Joyce’s Influence on George Orwell and James Agee’, *James Joyce Quarterly*, 36.4 (1999), 729-63 <www.jstor.org/stable/25474084> [accessed 14 September 2020]

Williams, Raymond, *Marxism and Literature* (Oxford: Oxford University Press, 1977)

Williamson, Henry, *The Peregrine’s Saga and other Wild Tales* (London: W. Collins, 1923)

Wilson, E.O., *The Meaning of Human Existence* (London: W.W. Norton, 2014)

Wilson, Louise K., ed., *A Record of Fear* (Salisbury: B.A.S. Printers Ltd, 2005)

Wright, Alexis, ‘Politics of Writing’, *Southerly*, 62.2 (2002), 10-20

-----, ‘We all smell the smoke, we all feel the heat. This environmental catastrophe is global’, *The Guardian*, 17 May 2019, <bit.ly/2L2RgcA> [accessed 1 September 2020]

Wylie, John, ‘The spectral geographies of W.G. Sebald’, *cultural geographies*, 14 (2007), 171-88 <doi.org/10.1177/1474474007075353>

Wylie, Sarah, Shapiro, and Liboiron, ‘Making and Doing Politics Through Grassroots Scientific Research on the Energy and Petrochemical Industries’, *Engaging Science, Technology and Society*, 3 (2017), 393-425 <[doi:10.17351/ests2017.134](https://doi.org/10.17351/ests2017.134)>

Yagoub, Mimi, ‘US Calls to Revive Colombia Coca Fumigation Could Damage Peace Process’, *InSight Crime*, 14 June 2017, <bit.ly/2XtJSxb> [accessed 1 September 2020]

Yancy, George, ed., *The centre must not hold: White women philosophers on the whiteness of philosophy* (Lanham, MD: Lexington, 2010). ProQuest ebook

