

ENTANGLED TIMES, BODIES, TEXTS
Mathematical Form in Contemporary Anthropocene Poetry

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ABSTRACT

This creative-critical thesis explores the entanglements of times, bodies and texts, and the strategies of form and scale, that comprise a poetics of the Anthropocene. Consisting of three critical chapters and a collection of poetry, the thesis interrogates ecocritical ideas about contemporary poetics, taking inspiration from the fields of science and mathematics. Through the analysis of mathematically inspired forms in the work of Inger Christensen, Alice Fulton, and Stephanie Strickland, and the use of repeating forms in my own collection, *The Auspices & Other Futures*, I seek to establish how the vast, disconcerting scale of our physical and temporal entanglements with the more-than-human world can be represented, or illuminated, through form in contemporary poetry.

In Chapter One, I analyse Christensen's 1981 poetry collection, *Alphabet*, through the lens of Daniel Cordle's work on nuclear anxiety (2008, 2017), Jacques Derrida's work on spectrality (1994), and David Farrier's writing on the poetics of 'thick time' (2019). I put forward a theory of an 'irradiated poetics' that reflects the complexity and scale of geological deep time through temporally-distorting alphabetical, mathematical, and repeating formal structures. In Chapter Two, I turn to Fulton's 1995 collection, *Sensual Math*, and her essays on a fractal poetics inspired by the work of mathematician Benoit Mandelbrot (1977). Drawing on the ecocritical work of Donna Haraway (2003, 2008) and literary theories of monstrosity from Jeffrey Jerome Cohen (2006), Mikhail Bakhtin (1984) and Derrida (1988), I argue that a poetics inspired by fractal shapes can formally enact the monstrous, physical entanglement of human bodies in the Anthropocene. My third chapter examines formal connection in Strickland's *V*, a poem which exists variously as two print books (2002, 2014), an app and a digital programme, through the lens of 'constellation' – the act of making meaning through constructed association (Krauß 2011). With reference to Roland Barthes' work on the woven text (1975, 1977), Nicholas Royle's literary theory of veering (2011), and Derrida's work on iteration and the unreadable text (1974, 2004), I argue that *V* brings to light various formal strategies of connectedness that can be used to establish a poetics of constellation that captures the complex interconnected nature of our Anthropocene existence. I conclude the thesis by arguing that a poetics of the Anthropocene must also be a poetics of the future. Drawing on Farrier's work on 'future fossils' (2020), and Kate Rigby's proposal of Anthropocene poetry as 'prophetic witness' (2009), I look to the revelatory potential of an Anthropocene poetics that makes use of spectral, monstrous, constellating strategies of form.

This critical-creative thesis is an inextricably entangled web of research, a multi-genre knot that echoes the multi-species, multi-temporal nature of life in the Anthropocene. The critical chapters are in constant dialogue with my own poetic practice; my collection *The Auspices & Other Futures* is, therefore, to be read as both a response to, and in constellation with, the poetry of Christensen, Fulton, and Strickland, as well as the myriad theoretical and critical voices found in the first three chapters. Stephen Benson and Clare Connors argue that ‘the marking in writing of our reading or looking or listening’ is ‘the heart of all criticism’ (Benson and Connors, 2014: 3). This thesis is thus the marking in critical and creative writing of my encounters with works of Anthropocene literature, as I seek to uncover and interrogate the entangled forms of Anthropocene times, bodies, and texts.

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‘FORM IS NOT AN OPTIONAL ADD-ON’ Introducing the Thesis as an Entangled Text

‘AND OF SUCH IS THE KINGDOM OF GOD. April 12, 1870’.¹ This particular piece of graffiti, made by Victorian archaeologist J. Gascoyne, is etched into the wall of Church Hole, one of a series of caves at Creswell Crags, a limestone gorge that straddles the borders of Nottinghamshire and Derbyshire.² Gascoyne’s biblical proclamation is just one example of the many inscriptions found in the caves at Creswell Crags. As well as nineteenth century inscriptions, Church Hole is home to the oldest Palaeolithic cave art in Britain, in the form of prehistoric etchings of bison, birds, and reindeer.³ Robin Hood Cave, across the gorge from Church Hole, houses the largest collection of seventeenth century apotropaic markings found in Britain to date; PM, VV, I, a palimpsest of ladders, crosses, mazes and lines is scratched haphazardly, almost frantically, in thick layers across the walls.⁴ Amongst these historic etchings, we find modern graffiti – ‘MIA’, ‘NOAH’, ‘MR T’, ‘SAVE BEES’.⁵ The rock is inscribed with more-than-human languages, too – stalactites write themselves from the slow drip of mineral deposits; the red walls are dotted with a braille of fossilized bones; the floors bear the scratches of Early Modern cow hooves; cave spiders write their spinning impressions of web and silk in every nook. Outside, the wind and rain have been slowly writing pits and pocks, holes the size of pinpricks, eyes, or even fists into the limestone, and ivy writes itself into curtains that drape from the brink of the cliffs. The bridleway is an alphabet of hoofprints, pawprints, footprints, rootprints, and the bank is stamped with the bricked ‘n’ of a fireplace, the only remnant of the historic hamlet of Creswell. There are ghostly inscriptions too – the bridleway still contains the trace of the B6042, re-routed in 2007, and the gorge is split by the spectral division of county lines. Even the gorge itself is an inscription, written a millennium ago, by the slow, unstoppable slide of a glacier.

¹ The inscription is a quotation from the New Testament. The full verse reads: ‘But when Jesus saw it, He was greatly displeased and said to them, “Let the little children come to Me, and do not forbid them; for of such is the kingdom of God.”’ Mark 10. 14. (New King James Version).

² Paul Bahn, ‘The Historical Background to the Discovery of Cave Art at Creswell Crags’, in *Palaeolithic Cave Art at Creswell Crags in European Context*, ed. by Paul Pettitt, Paul Bahn, and Sergio Ripoll (Oxford: Oxford University Press, 2007), pp. 1-13, p. 3.

³ Bahn, pp. 2-3.

⁴ Paul Baker, ‘Largest Discovery of Witch Marks in Britain at Creswell Crags’, *Creswell Crags* (2019) <<https://www.creswell-crags.org.uk/2019/02/15/largest-discovery-of-witch-marks-in-britain-at-creswell-crags/>> [accessed 14 November 2020]. Interestingly, PM, VV and I are all, in a sense, Biblical quotations too – PM stands for Pace Maria and VV for Virgo Virginum, both of which are references to the Virgin Mary, and I stands for the Greek letter Iota, which represents the J of Jesus Christ.

⁵ These quotations come from my own observations of the caves during a six-month residency at Creswell Crags in the first half of 2020.

Creswell Crags is, therefore, an entanglement of times, bodies, and inscriptions. In much the same way, this thesis is also an entanglement – of times, voices, and texts, an entanglement of genres and disciplines, of scientists, philosophers, poets, critics, ecologists – all irradiated in the nuclear light of the Anthropocene. As I discuss in this introduction, the Anthropocene demands a reconsideration of the scale of our temporal, bodily and environmental connections. This critical-creative thesis seeks to establish how these scalar connections can be represented, or illuminated, through form in contemporary Anthropocene poetry. Through the analysis of the mathematically inspired formal strategies of Inger Christensen’s *Alphabet*, Alice Fulton’s *Sensual Math*, Stephanie Strickland’s *V*, and the use of repeating forms in my own collection of poetry, *The Auspices & Other Futures* (a significant portion of which was written during a six-month residency at Creswell Crags), I aim to show that poetry that makes use of formal devices inspired by patterns found in the natural world, such as Fibonacci-patterned lineation, fractal repetition, and intertextual constellation, open up new ways of thinking about the haunted, monstrous, entangled form and scale of life in the Anthropocene.⁶

In this introduction, I first explore the concept of the Anthropocene, and its impact on our ways of thinking about the relationship between the human and the more-than-human, with reference to contemporary ecocritics such as David Farrier, Donna Haraway, and Timothy Morton. I then consider the specific interventions of contemporary poetry in the Anthropocene, with a focus on experimental and scientifically inspired poetics. I introduce the mathematical elements of this thesis, namely the fractal geometry and chaos theory of the twentieth century, and their implications for scalar thinking, before considering how this thesis draws on the work of critics such as Jacques Derrida and Roland Barthes to apply this scalar lens to literary texts. I conclude this introduction with a brief outline of the three critical chapters and my own poetry collection, and an explanation of the hybrid form of this critical-creative thesis as a vehicle for both exploring and enacting ecocritical ideas of entanglement and connection.

⁶ Throughout the thesis I make use of a variety of scientific and mathematical terminology as a lens for thinking critically and creatively about the poetic text. Many of these terms have multiple meanings – spectrality, for example, is a term from both literary criticism and physics. As I explore in the subsequent chapters, words hold multiple meanings concurrently, with different nuances surfacing in different contexts. This thesis is situated in the field of critical and creative writing; I am therefore engaging with these concepts from the perspective of a writer.

The Anthropocene Turn: Introducing the Anthropocene

The term ‘Anthropocene’ first rose to academic consciousness after the publication of Paul Crutzen and Eugene Stoermer’s brief article, ‘The “Anthropocene”’, and achieved widespread popularization following Crutzen’s reiteration of the term in the article ‘Geology of Mankind’, in *Nature* in 2002.⁷ Crutzen and Stoermer argued that the geological era of the Holocene had come to an end, and that our current time should instead be formally recognised on the official Geological Time Scale (GTS) as the ‘Anthropocene’ – the era of man – in order to ‘emphasize the central role of mankind in geology and ecology’.⁸ Crutzen and Stoermer’s proposal has been met with widespread debate, from the validity of the Anthropocene as a distinct geological time period, to the specific starting date of the Anthropocene epoch, and the name ‘Anthropocene’ itself.⁹ Consequently, as Pieter Vermeulen points out, ‘the name [Anthropocene] is less a rigid designator with a stable referent [...] than a rubric that has, since the beginning of the century, increasingly come to cluster concerns over the human impact on the planet’.¹⁰ This is the sense in which this thesis uses the term ‘Anthropocene’; not as a fixed, geological term with a single definition, but as a term that encompasses a range of disciplines and debates that reflect a changing understanding of the role and responsibility of humans in a time of climate crisis.

The basis of Crutzen and Stoermer’s argument for the addition of the Anthropocene to the GTS lies in the fact that traces of human activity (such as an increasing population, increases in agriculture, urbanisation and fossil fuel use, and the use of toxic chemicals and nuclear technologies) are now found preserved in the geological record of the Earth; human

⁷ Paul Crutzen and Eugene Stoermer, ‘The “Anthropocene”’, *Global Change Newsletter*, 41 (2000), 17-18; Crutzen, ‘Geology of Mankind’, *Nature*, 415.23 (2002), 23.

⁸ Crutzen and Stoermer, p. 17.

⁹ The proposed start date for the Anthropocene is contentious; Crutzen and Stoermer’s original paper suggested the ‘latter part of the 18th century’, but other suggestions include William Ruddiman’s Early Anthropocene Hypothesis (Ruddiman, ‘The Anthropogenic Greenhouse Era Began Thousands of Years Ago’, *Climatic Change*, 61 (2003), 261-293), Simon Lewis and Mark Maslin’s proposal of 1610 and the ‘annexing’ of the Americas (Lewis and Maslin, ‘Defining the Anthropocene’, *Nature*, 519.7542 (2015), 171-180), and Will Steffen, Crutzen and John McNeil’s argument that there are stages of the Anthropocene (Steffen, Crutzen and McNeil, ‘The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?’, *Ambio*, 36.8 (2007), 614-621). Furthermore, the name Anthropocene has been challenged as ‘encouraging species narcissism’ (Rob Nixon, ‘The Anthropocene: The Promise and Pitfalls of an Epochal Idea’, *Edge Effects* (2014) <<https://edgeeffects.net/anthropocene-promise-and-pitfalls/>> [accessed 12 August 2020] (para. 12)), and incorrectly implying that all of humanity is equally responsible for the climate crisis (Andreas Malm and Alf Hornborg, ‘The geology of mankind? A critique of the Anthropocene narrative’, *The Anthropocene Review*, 1.1 (2014), 62-69). Arguments have been made for names that reflect this nuance, including ‘Plantationocene’ and ‘Capitalocene’, terms notably debated by Haraway, who proposes the term ‘Cthulucene’ to reflect the ‘dynamic ongoing sym-cthononic forces and powers of which people are a part’ (Haraway, ‘Anthropocene, Capitalocene, Plantationocene, Cthulucene: Making Kin’, *Environmental Humanities*, 6 (2015), 159-165).

¹⁰ Pieter Vermeulen, *Literature and the Anthropocene* (Oxon: Routledge, 2020), p. 8.

bodies and activities are entangled, physically, with the hydrosphere, the atmosphere, the lithosphere. Jan Zalasiewicz uses the term ‘technofossils’ to describe man-made artefacts such as plastic bottles, bags, pens, buildings, roads, cups, books, and even spacecraft and debris, that comprise a significant component of the proposed Anthropocene strata.¹¹ We might be reminded here of the supermarket plastic bag found in the deepest part of the ocean, the Mariana Trench, or perhaps recent media reports that microscopic plastics have been found not only in the bodies of remote Arctic seabirds, but also in their eggs.¹² We have even left man-made materials on the Moon.¹³ Crucially, these technofossils are not just widespread, but long-lasting, with their effects ‘preservable over geological timescales’ – which are scales of millions, even billions of years.¹⁴ Our collective actions have become, therefore, ‘a significant geological, morphological force’ that will continue to impact the ecosystem for an unfathomable amount of time to come.¹⁵ Our entanglement with the Earth is, therefore, not only physical; we are also entangled with the deep reaches of its future.

Morton has written extensively on ecocritical multi-temporal thinking, describing Styrofoam and plutonium (artefacts that can be counted as ‘technofossils’) as ‘hyperobjects’ – things that ‘exist on almost unthinkable timescales’.¹⁶ Morton describes hyperobjects as ‘viscous’ – everything is connected, everything physically sticks to everything else, across vast stretches of time, as illustrated by his examples of everyday activities:

I start the engine of my car. Liquefied dinosaur bones burst into flame. I walk up a chalky hill. Billions of ancient pulverized undersea creatures grip my shoes. I breathe. Bacterial pollution from some Archean cataclysm fills my alveoli—we call it oxygen. I type this sentence. Mitochondria, anaerobic bacteria hiding in my cells from the Oxygen Catastrophe, spur me with energy. They have their own DNA. I hammer a nail. In consistent layers of ore, bacteria deposited the iron in Earth’s crust. [...] Oil is the result of some dark, secret collusion between rocks and algae and plankton millions and millions of years in the past. When you look at oil you’re looking at the past. Hyperobjects are time-stretched to such a vast extent that they become almost impossible to hold in mind.¹⁷

¹¹ Jan Zalasiewicz, Mark Williams, Colin N. Waters, Anthony D. Barnosky, and Peter Haff, ‘The technofossil record of humans’, *The Anthropocene Review*, 1.1 (2014), 34-43.

¹² Sarah Gibbens, ‘Plastic Bag Found at the Bottom of World’s Deepest Ocean Trench’, *National Geographic* (2018) <<https://www.nationalgeographic.co.uk/environment-and-conservation/2018/05/plastic-bag-found-bottom-worlds-deepest-ocean-trench>> [accessed 17 August 2020]; Josh Gabbatiss, ‘Plastic chemicals discovered inside bird eggs from remote Arctic’, *The Independent* (2019) <<https://www.independent.co.uk/environment/plastic-bird-eggs-pollution-arctic-ocean-chemicals-phthalates-research-a8783061.html>> [accessed 17 August 2020].

¹³ Zalasiewicz et al, p. 39.

¹⁴ Zalasiewicz et al, p. 37.

¹⁵ Crutzen and Stoermer, pp. 17-18.

¹⁶ Timothy Morton, *The Ecological Thought* (Harvard: Harvard University Press, 2010), p. 19.

¹⁷ Morton, *Hyperobjects: Philosophy and Ecology After the End of the World* (Minneapolis: University of Minnesota Press, 2013), p. 58.

Here, Morton demonstrates the ‘unthinkable timescales’ of humanity’s physical geologic entanglement; everything we do, every insignificant daily domestic choice, suddenly becomes deeply and unavoidably significant, infused with an environmental and ethical resonance as we realise the scale of our connections to other times, places, and lives.¹⁸

In *Anthropocene Poetics: Deep Time, Sacrifice Zones, and Extinction*, Farrier builds on Morton’s work, and describes our entanglement with the geology of the Earth as ‘a deep and complex intimacy’.¹⁹ In the light of the Anthropocene, we become entangled with both the far future, and the deep past – as Farrier argues, at once ‘partners with planetary systems shaping Earth’s deep future’ and ‘the inheritors of a legacy of infinitesimal slow change’.²⁰ Farrier’s use of the term ‘deep time’ (first applied to geology by James Hutton in the eighteenth century) refers to the vast timescales of natural history – stretches of thousands, millions, billions of years that we cannot begin to comprehend.²¹ Vermeulen similarly echoes Morton’s work, writing that ‘the Anthropocene warps our apprehension of time’ as we are forced to consider vastly different scales of thinking alongside each other.²² These distorting, warping, unthinkable timescales are, for Morton, ‘horrifying [...] terrifying [...] petrifying [...] a Medusa that turns us to stone’.²³ The deep physical and temporal entanglements of the Anthropocene therefore require us to think of humanity (and our individual selves) as ‘geological agents’, capable of impacting the Earth across vast, unimaginable scales of space and time.²⁴ We become transformed, turned (physically and metaphorically) to stone by the Medusa of the Anthropocene perspective.

Terry Adams refers to this transformation as ‘the human turn’ – a change in perspective that redefines humans as ‘a geological force capable of altering the earth’s ecological structure’.²⁵ To identify the human self with a geological force (and all the temporal and physical entanglements that this entails) is complex, and the supposed binaries or boundaries between the human and the natural, the self and the other, begin to blur. In the

¹⁸ Bird Rose describes the world as being comprised of ‘multi-species knot[s] of ethical time’; our entanglements with other times and species have an ethical dimension (Deborah Bird Rose, ‘Multispecies Knots of Ethical Time’, *Environmental Philosophy*, 9.1 (2012), 127-140, p. 136).

¹⁹ David Farrier, *Anthropocene Poetics: Deep Time, Sacrifice Zones, and Extinction* (Minneapolis: University of Minnesota Press, 2019), p. 15.

²⁰ Farrier, *Anthropocene Poetics*, p. 9.

²¹ Farrier, *Footprints: In Search of Future Fossils* (London: 4th Estate, 2020), loc. 161-171. Kindle edition.

²² Vermeulen, p. 107.

²³ Morton, *Hyperobjects*, p. 60.

²⁴ Dipesh Chakrabarty, ‘The Climate of History: Four Theses’, *Critical Inquiry*, 35.2 (2009), 197-222, p. 206.

²⁵ Terry Adams, ‘To Believe in Things That You Cannot: Dracula and the Unthinkable’, *Gnovis*, 18.2 (2018), 17-27, p. 18. This has resonances of the ‘nonhuman turn’, whereby the ‘human is characterized precisely by [their] indistinction from the nonhuman’ (Richard Grusin, ‘Introduction’, *The Nonhuman Turn*, ed. by Grusin (Minneapolis: University of Minnesota Press, 2015), pp. vii-xxx, p. x).

introduction to *Identity and the Natural Environment: The Psychological Significance of Nature*, Susan Clayton and Susan Opatow argue that we can define our orientation in the natural world and our perception of our interrelationships with the ‘more-than-human-world’ as an ‘environmental identity’.²⁶ The proposition of the Anthropocene requires us to evolve our environmental identity from one where Nature is a distinct and distant entity, to one where, as Paul Gillen writes, ‘we *are* Earth, though a remarkably peculiar part of it’.²⁷ Seeing humanity as a connected part of the natural world is not new to Western environmental thinking (James Lovelock’s Gaia hypothesis, which reconceived humans as a part in the single complex system of Earth, was first proposed in 1972), but Crutzen and Stoermer’s Anthropocene hypothesis has reintroduced, or repopularised, this way of thinking by bringing the vast physical and temporal scale of the effects of collective human activity to the forefront of academic and public consciousness.²⁸

Rob Nixon argues that this new comprehension of humanity as geology ‘shakes the very idea of what it means to be human’.²⁹ How, then, do we begin to make sense of such a fundamental change – of such a horrifying, petrifying, geologic identity? Mary Jacobus, in *Romantic Things: A Tree, A Rock, A Cloud*, suggests that it is poetry, with its ‘metaphoric language’ and ‘regulated speech’, that can open us up to the ‘(im)possibility of knowing about ourselves and our others’ – about what it might be like to be a bat (as Nagel wonders), or a nut, or a tree, or, in the case of the Anthropocene, what it might be like to be geology – to be stone.³⁰

Poetry in a Time of Planetary Derangement: Introducing Contemporary Poetry in the Anthropocene

As Jacobus argues, poetry can open up new ways of knowing – new ways of touching, hearing, or seeing all that is other. Poems are, therefore, spaces of encounter, contact, and connection. As Alice Oswald writes in the introduction to *The Thunder Mutters: 101 Poems*

²⁶ Susan Clayton and Susan Opatow, ‘Introduction’, in *Identity and the Natural Environment: The Psychological Significance of Nature*, ed. by Clayton and Opatow (Cambridge: The MIT Press, 2003), pp. 1-24, p. 6. Clayton and Opatow are using the term ‘more-than-human world’ as per David Abram’s ‘A more-than-human world’, in *An Invitation to Environmental Philosophy*, ed. by Anthony Weston (Oxford: Oxford University Press), pp. 17-42.

²⁷ Paul Gillen, ‘Notes on Mineral Evolution: Life, Sentience and the Anthropocene’, *Environmental Humanities*, 8.2 (2016), 215-234, p. 231.

²⁸ J. E. Lovelock, ‘Gaia as seen through the atmosphere’, *Atmospheric Environment*, 6.8 (1972), 579–580; Lovelock, *Gaia: A New Look at Life on Earth* (Oxford: Oxford University Press, 1982).

²⁹ Nixon, para. 6.

³⁰ Mary Jacobus, *Romantic Things: A Tree, A Rock, A Cloud* (Chicago: University of Chicago Press, 2012), pp. 67-68.

for the Planet, poetry constructs ‘a line of encounter between a human and his context’; when reading poetry about the natural, or more-than-human world, we make contact with an ‘other’, or ‘outer world’, and a ‘transfiguring process’ occurs, in which the reader crosses over, ‘[disintegrates] into the non-human’.³¹ In the context of Anthropocene literature these transformative encounters can (and perhaps must) be challenging, as they demand new ways of thinking about what it means to be a human, confronting us with the unfathomable reality of our geologic identity. Fulton argues that ‘the poet’s purpose is to revise language into a vehicle of unsettlement capable of dismantling assumptions’.³² The purpose of an Anthropocene poetics is therefore to unsettle our preconceived (or assumed) environmental identities, and open up our attention to the vast, warping scale of our physical and temporal entanglements with the more-than-human world.

The Anthropocene (and the resulting human turn) has inspired a wave of creative and critical work responding to ideas central to the Anthropocene, such as scale, time, ecology, and interconnectivity. Margaret Ronda suggests that ‘current poetic works might offer distinctive means for conceptualizing the new subjectifications of the human in a time of generalized planetary crisis’ – that through these poems, we might begin to see what the human (in light of the Anthropocene) has become.³³ Sam Solnick, in *Poetry and the Anthropocene: Ecology, Biology and Technology in Contemporary British and Irish Poetry*, similarly notes that poetry is an ideal vehicle to interrogate human identity the Anthropocene:

Poetry can explore how, in the Anthropocene, the ways we speak, write, think and act are part of the (unpredictable) interrelated processes that constitute local and global ecosystems. It provides ways of conceiving the relations between (human) organisms and their environments at the level of communication and cognition as well as emotion.³⁴

Critically, for Solnick, poetry can explore our geologic, Anthropocene identity by shedding light on the relationships we have with the more-than-human planet. As Solnick notes, ‘notions of interconnectivity have always been at the heart of ecocriticism’ – considerations of how we are connected to the world around us and to its more-than-human inhabitants, have been at the forefront of ecocritical poetic works.³⁵ Contemporary thinking on the human in

³¹ Alice Oswald, ‘Introduction: A Dew’s Harp’, in *The Thunder Mutters: 101 Poems for the Planet*, ed. by Oswald (London: Faber and Faber, 2005), pp. ix-x, pp. ix-x.

³² Jonathan Monroe, Alice Fulton, and Roald Hoffmann, ‘Unsettling Knowledge: A Poetry/Science Dialogue’, *Language and Learning Across the Disciplines*, 154 (2003), 154-180, p. 164.

³³ Margaret Ronda, ‘Anthropogenic Poetics’, *The Minnesota Review*, 83 (2014), 102-111, p. 105.

³⁴ Sam Solnick, *Poetry and the Anthropocene: Ecology, Biology and Technology in Contemporary British and Irish Poetry* (Oxon: Routledge, 2016), p. 57.

³⁵ Solnick, p. 32.

the context of the Anthropocene builds on these ideas of ecological connection, and extends them across extreme scales of space and time, as exemplified by Morton's aforementioned description of starting a car, in which the simple action of turning a key connects us to the time of the dinosaurs and, at the same time, contributes to the ever-increasing effects of greenhouse gases on the deep future of the planet. The construction and expression of these deeply entangled relationships and connections is therefore critical to an Anthropocene identity, and subsequently, to an Anthropocene poetics.

Farrier extends Solnick's questions of interconnection and scale to consider the poem's capacity to express ideas of deep time.³⁶ Farrier argues that the condensed, or concentrated form of a poem provides an ideal textual landscape in which to explore or forge temporal relationships, as the deep past and the deep future can be drawn together in the body of the poem. He writes:

Poetry can compress [...] or perform the kind of bold linkages that it would take reams of academic argument to plot: it can widen the aperture of our gaze or deposit us on the brink of transformation. In short, it can model an Anthropocenic perspective in which our sense of relationship and proximity [...] is stretched and tested against the Anthropocene's warping effects.³⁷

In the brief, compressed space of a poem, the deep past (expressed, perhaps in fossils and stones) is woven alongside the deep future (through the lens of modern technologies and materials, or the use of fossil fuels). For Farrier, these 'intimate' fluctuations between times and scales within the body of a poem can 'admit us to the conditions of flux that distinguish Anthropocene temporalities'.³⁸ Poems are spaces of multi-temporality – the past and the future are inextricable, constantly slipping between each other, and the present moment. These connections, Farrier argues, express the 'viscous textures' of Morton's hyperobjects, and speak to the fluctuating scales and modes of Anthropocene life.³⁹

Tom Bristow, whose work focuses on affect in lyric poetry of the Anthropocene, similarly argues that fluctuations between singular and choral poetic voice allow us to 'oscillate between the selfish and communal worldview'.⁴⁰ This fluctuation of voice, much like fluctuations between time and scale, counters 'the position of human as overlord'; there is no singular perspective or voice that is seen as superior or central.⁴¹ Instead, everything is

³⁶ Farrier, *Anthropocene Poetics*, p. 7.

³⁷ Farrier, *Anthropocene Poetics*, p. 5.

³⁸ Farrier, *Anthropocene Poetics*, pp. 22-23.

³⁹ Farrier, *Anthropocene Poetics*, p. 23, 34, 35.

⁴⁰ Tom Bristow, *The Anthropocene Lyric: An Affective Geography of Poetry, Person, Place* (New York: Palgrave Macmillan, 2015), p. 109.

⁴¹ Bristow, p. 108.

on a continuum, connected, and we find ourselves in direct, viscous contact with the more-than-human. As Jacobus argues, ‘lyric poetry provides a way of thinking about (and linking) material and immaterial things’.⁴² Linking, here, is critical; we do not simply observe the matter of the poem but find ourselves (to reiterate Oswald’s words) ‘in contact with the outer world’, and all the fluctuations and entanglements that this entails.⁴³

Recent texts on Anthropocene poetics, such as Solnick’s *Poetry and the Anthropocene*, Vermeulen’s *Literature and the Anthropocene* and Lynn Keller’s *Recomposing Ecopoetics: North American Poetry and the Self-Conscious Anthropocene*, have begun to explore the question of how experimental compositions, often inspired by science, make use of poetic form to further interrogate and illuminate the entangled (or fluctuating) nature of the Anthropocene. Solnick argues that ‘Form is not an optional add-on to an ecological awareness: form helps generate and organise a poem’s rendering of ecology’.⁴⁴ For Solnick, considerations of form have always been an integral part of ecopoetics; the idea of poetic form being intrinsically related to, for example, biological form or natural structures and processes, was ‘one of the most significant aspects of Romantic poetics – the relation of poetic form to life’s operations’.⁴⁵ Paul Lake, writing in response to Ezra Pound’s statement that ‘some poems may have form as a tree has form, some as water poured into a vase’, refutes the idea that free verse is in some way inherently more ‘organic’, or more representative of natural structures than traditional formal poetry.⁴⁶ Lake argues that ‘the rules of formal poetry generate not static objects like vases, but the same kind of bottom-up, self-organizing processes seen in complex natural systems such as flocking birds, sifting sand dunes, and living trees’.⁴⁷ For Lake, the revelations of fractal geometry and complexity theory changed the way we understand the forms and shapes of natural objects and systems – and subsequently, therefore, our understanding of ‘organic’ or natural forms of poetry.⁴⁸

Anthropocene discourses similarly challenge our notions of scale and complexity (especially with respect to our inter-species, inter-temporal relationships), and these considerations have carried over into discussions of form in contemporary ecopoetics. Solnick, echoing Lake, argues that we now live in a time ‘when the solidity of “Nature” has

⁴² Jacobus, p. 2.

⁴³ Oswald, p. x.

⁴⁴ Solnick, p. 55.

⁴⁵ Solnick, p. 10.

⁴⁶ Paul Lake, ‘The Shape of Poetry’, in *The Measured Word: On Poetry and Science*, ed. by Kurt Brown (Georgia: University of Georgia Press, 2001), pp. 156-180; Ezra Pound, ‘A Retrospect’, in *Pavannes and Divisions* (New York: Alfred A. Knopf, 1918), pp. 95–111, p. 104.

⁴⁷ Lake, ‘The Shape of Poetry’, p. 160.

⁴⁸ Lake’s fractal poetics is discussed in more detail on pp. 13-14.

dissolved into interlinked assemblages of biological systems and inorganic materials'; a tree is not a static, branching shape, but a complex, iterative, fractal assemblage.⁴⁹ Consequently, the task for an Anthropocene poetics, he suggests, is to develop poetic forms that 'interrogate, model, or even attempt to enact ecologically and biologically significant processes at a time when ecological thinking means engaging with feedbacks and relationships'.⁵⁰ An Anthropocene poetics must, therefore, engage with ideas of connection and relationships formally, where form is thought of in terms of systems and feedback, rather than static shape. To date, scholarship has considered poetic forms inspired by a variety of these 'ecologically and biologically significant processes' and human technologies, including evolution, economics, genetics, plasticity, and 'a range of specialist discourses', including 'brain physiognomy, database systems, pharmacology, spacetime, geology and [...] biochemistry'.⁵¹ Seemingly any scientific or sociological framework that lends itself to the considerations of scale and connection has been adopted as a lens through which to view the field of Anthropocene poetics.

For Vermeulen, an Anthropocene poetics that interrogates these issues of scale and connection must necessarily be experimental in form, as it must contrast with (and deliberately work against) "'traditional" pastoral or romantic forms of poetry'.⁵² Vermeulen argues that we have entered a time of 'planetary derangement', where even our scales of thinking are 'warped', disrupted, made strange.⁵³ In order to properly reflect the 'altered reality' of our changing Anthropocene context, Vermeulen argues that a poetics of the Anthropocene must be similarly deranged, and that this derangement can be enacted through experimental form and syntax.⁵⁴ Drawing on Joan Retallack's 'What is Experimental Poetry & Why Do We Need It?', and her argument that 'formal experiment [...] is "a move away from the present state of things"', Keller similarly suggests that it is experimental forms of poetry that will 'contribute to the development of new ways of thinking [...] [and that] formal or linguistic experimentalism is a key resource in this quest'.⁵⁵ Both Keller and Vermeulen

⁴⁹ Solnick, p. 10.

⁵⁰ Solnick, p. 10.

⁵¹ Solnick, p. 14. In *Poetry and the Anthropocene*, Solnick discusses evolutionary adaptive mechanisms in Ted Hughes (pp. 65-105), economics in the work of Derek Mahon (pp. 106-147), and the use of specialist scientific discourses by J. H. Prynne (pp. 148-196). Farrier's *Anthropocene Poetics* includes a discussion of genetics in relation to Christian Bok's *The Xenotext* (pp. 108-123), and Keller covers plasticity in the work of Evelyn Reilly in *Recomposing Ecopoetics* (pp. 61-97).

⁵² Vermeulen, p. 47, 38.

⁵³ Vermeulen, p. 48.

⁵⁴ Vermeulen, p. 38.

⁵⁵ Lynn Keller, *Recomposing Ecopoetics: North American Poetry of the Self-Conscious Anthropocene* (Virginia: University of Virginia Press, 2017), p. 26.

refer to Evelyn Reilly's *Styrofoam* as an example of this formal experimentalism. *Styrofoam*, a meditation on plastic, deathlessness and pollution, features techniques such as 'distorted order and punctuation', sporadic use of italics and brackets, obfuscating scientific language and unintelligible chemical formulae, 'distortions [...] erratic punctuation, the quasi-misprints, and the agglutination of words [...] copy-and-pasting [...] glitches'.⁵⁶ Vermeulen writes of Reilly's work that such 'restless grappling with form', as Reilly oscillates from one technique to the next, 'can help us gain traction on this mutating reality'.⁵⁷ Reilly's formal oscillations are reminiscent of Farrier's description of fluctuating temporalities, and Bristow's work on the oscillating lyric voice; this demonstrates that constant movement or mutation between states is key for communicating the entangled manner of being in the Anthropocene. Reilly herself writes that 'ecopoetics requires the abandonment of the idea of center for a position in an infinitely extensive net of relations', and that it is the task of ecopoetry to develop forms that enact and reflect this 'larger paradigm shift'.⁵⁸ The formal strategies of an Anthropocene poetics must therefore replicate (or indicate) the entangled reality of the Anthropocene world; it must be, itself, entangled, in flux, without a centre.

To date, research that combines mathematical and ecocritical ideas is limited; in this thesis, I build on the work of Farrier, Solnick and Keller, and existing ecocritical scholarship that engages with evolutionary science, biochemistry, and geology, but extend this interdisciplinary methodology to critically examine contemporary poetry through the lens of mathematical ideas of infinity and scale, in order to more deeply interrogate the scalar elements of Anthropocene literary criticism. Specifically, I conduct analyses of three poets who use experimental forms inspired by mathematical patterns found in the natural world (Christensen's *Alphabet*, which is structured according to the Fibonacci sequence, Fulton's *Sensual Math*, which demonstrates formal elements of Fulton's 'fractal poetics', and intertextual 'constellation' in and between the various editions of Strickland's *V*), in order to interrogate the extreme scales of our physical and temporal entanglements in the Anthropocene. Research on these three poets has not yet been conducted through the lens of the Anthropocene; this thesis will be the first to consider how the experimental forms of these three texts enact the vast, fluctuating scales of entangled times and bodies in the Anthropocene, thus opening up the potential for a change in the scope and scale of our

⁵⁶ Vermeulen, pp. 38-40.

⁵⁷ Vermeulen, p. 41.

⁵⁸ Evelyn Reilly, 'Eco-Noise and the Flux of Lux', in *Eco Language Reader*, ed. by Brenda Iijima (Brooklyn: Nightboat, 2010), pp. 255-74, p. 257.

thinking about our physical, temporal and ethical relationships with the more-than-human world.

Infinity, Fractals, Chaos: Introducing Mathematics as an Ecocritical Lens

When we think of the Anthropocene, we reconceive our lives through the lens of geological time – spans of millions, tens of millions, hundreds of millions of years, reaching both back into the past, and forward into the future. These spans of time are more than we can comprehend. They are, to repeat Morton’s words, ‘time-stretched to such a vast extent that they become almost impossible to hold in mind’.⁵⁹ These unimaginable scales now coexist alongside the everyday – the spans of time that we can comprehend. As Farrier points out, in a time of climate crisis ‘we will see ten thousand years of environmental change in fifty-eight years, less than a single lifetime’.⁶⁰ The idea of scale is crucial here; it is only by considering the discrepancies between the scales of geological time and the human lifespan, that we can see the true extent of the catastrophic ecological impacts of human life.

The mid-twentieth century saw a shift in thinking in the field of mathematics, as well as ecology and the social sciences. As Freeman Dyson writes,

A great revolution of ideas separates the classical mathematics of the 19th century from the modern mathematics of the 20th. Classical mathematics had its roots in the regular geometric structures of Euclid and the continuously evolving dynamics of Newton. Modern mathematics began with Cantor’s set theory and Peano’s space-filling curve.⁶¹

Modern mathematics, represented here by Cantor’s set theory and Peano’s space-filling curve (both precursors of Benoit Mandelbrot’s fractal geometry), engages with ecocritical themes of infinity and scale.⁶² Two key movements in twentieth century mathematics were fractal geometry and chaos theory. ‘Fractal’ is a term coined by Mandelbrot to describe a new category of irregular mathematical shapes that can be found to occur naturally throughout the universe, including ‘the shape of a cloud, a mountain, a coastline or a tree’; Mandelbrot described the mathematics involved in the construction of these shapes as ‘a new geometry of nature’.⁶³ Chaos theory, the study of seemingly random behaviour in deterministic systems,

⁵⁹ Morton, *Hyperobjects*, p. 58.

⁶⁰ Farrier, *Footprints*, loc. 202. Kindle edition.

⁶¹ Freeman J. Dyson, ‘Characterizing Irregularity’, *Science*, 200 (1978), 677-678, p. 678.

⁶² Cantor’s set theory can be expressed as a fractal known as Cantor Dust, in which a line is broken into a series of infinitely smaller lines. Peano’s space-filling curve is a curve that can fill a two-dimensional space; it can be used to construct the plane fractal known as the Sierpinski Carpet. Both fractals are built by removing smaller copies of a shape from itself an infinite number of times.

⁶³ Benoit Mandelbrot, *The Fractal Geometry of Nature* (New York: W. H. Freeman, 1977), p. 1.

was similarly born from a study of the natural – the infamous ‘butterfly effect’ principle is drawn from Edward Lorenz’s work on atmospheric weather patterns.⁶⁴ Both fractal geometry and chaos theory require a reconsideration of the relationship between the categories of parts and whole, and how they interact at different scales of magnification, or time. As well as their inherent conceptual links to the natural world, fractal geometry and chaos theory therefore also demonstrate the kind of considerations of scale present in Anthropocene literature.

To date there has been research conducted into mathematical patterns and poetry, poetry as a chaotic system, and poetry as a fractal space.⁶⁵ The most notable of these is Marcia Birken and Anne Coon’s *Discovering Patterns in Mathematics and Poetry*, which considers how sequential, symmetrical and fractal patterns found in the natural world can be translated into a poetics using formal strategies such as the visually focused lineation of shaped or concrete poetry. This scholarship has not yet been fully extended to explicitly consider the relationship between mathematical patterns and poetic form in the context of the Anthropocene, and the scalar (re)considerations that it demands. Lake, writing on poetry as a chaotic system, argues that ‘the law governing the growth of trees [...] is the same law that governs the growth of human organs, snowflakes, tornadoes, bird wings – and, I will argue, the elegant, broken symmetries of formal verse’.⁶⁶ For Lake, the form of a poem does not have to be ‘organic’ or ‘free’ in order to enact the patterns inherent in the natural world. Instead, Lake argues that ‘symmetrical’ forms such as sonnets, villanelles, and ballads are not ‘static “received forms”’; they evolve, like plants, through a process of iteration and feedback’, and therefore mimic the chaotic, fractal patterning of the natural world.⁶⁷ While a formal poetics based on natural patterns is, therefore, not necessarily metrical, or dependent on rhyme and lineation, these strategies are not excluded from consideration by virtue of their regularity.

In contrast, Fulton, whose ‘fractal poetics’ was inspired by the work of Mandelbrot and his observations of the shapes found in the natural universe, seeks to establish the ‘deep

⁶⁴ Edward Lorenz, ‘Deterministic Nonperiodic Flow’, *Journal of the Atmospheric Sciences*, 20.2 (1963), 130–141.

⁶⁵ Marcia Birken and Anne Christine Coon, *Discovering Patterns in Mathematics and Poetry* (New York: Rodopi, 2008); Lake, ‘Disorderly orders: Free verse, chaos, and the tradition’, *The Southern Review*, 34.4 (1998), 780-803; Lake, ‘The Shape of Poetry’, pp. 156-180; Fulton, ‘Fractal Amplifications: Writing in Three Dimensions’, in *Feeling as a Foreign Language: The Good Strangeness of Poetry* (Minneapolis: Greywolf Press, 1999), pp. 61-82; Rod Romesburg, ‘The Fractal Nature of Gary Snyder’s Mountains and Rivers Without End’, *College Literature*, 37.3 (2010), 1-7; Keller, ‘Singing Spaces: Fractal Geometries in Cole Swensen’s *Oh*’, *Journal of Modern Literature*, 31 (2007), 136–60.

⁶⁶ Lake, ‘The Shape of Poetry’, p. 160.

⁶⁷ Lake, ‘The Shape of Poetry’, p. 169

logic or pattern' present in 'the poetry of irregular form'.⁶⁸ For Fulton, the form of free verse can therefore be linked to the 'eccentrically yet beautifully structured forms of nature'.⁶⁹ The language Fulton uses to describe her fractal poetics reflects this intrinsic relationship between poetic and natural form; linguistic 'clusters' are linked to the celestial ('in astronomy', Fulton notes, 'a *cluster* is a group of galaxies') while 'canopies' is an arboreal reference (for Fulton, a poem is comparable to the complex system of a rainforest that recycles its components).⁷⁰ As Aaron M. Moe writes in *Ecocriticism and The Poiesis of Form: Holding On to Proteus*, 'mathematics is the language of nature'.⁷¹ Drawing on this link between nature and mathematics, this thesis therefore seeks to establish a poetics of the Anthropocene that is rooted in both the natural and the mathematical sciences.

Taking existing scholarship by Birken and Coon and Lake in new directions, I argue that this relationship between mathematics, nature, and poetics is intrinsically linked to questions of form and scale. In particular, the three critical chapters of this study propose that the mathematical properties of Christensen, Fulton and Strickland's compositions engage with the 'unthinkable' concepts of scale and infinity through their use of forms inspired by mathematics and mathematical patterns found in the natural world. The Fibonacci sequence that structures Christensen's *Alphabet*, for example, is an infinitely increasing sequence of numbers. Fractals, as found in Fulton's fractal poetics, introduce ideas of infinite smallness (a fractal shape magnified reveals the same shape, only smaller, and digitally constructed fractal sets, such as the Mandelbrot set, are infinitely regressive).⁷² Constellations, which inspired the digital iteration of Strickland's *V*, also suggest ideas of infinity, as the numbers involved in astronomical sciences are so unimaginably large that they cannot be comprehended. In challenging readers to adjust the scale of their reading, I argue that Christensen, Fulton and Strickland are also challenging readers to adjust the scale of their thinking about their connections to the more-than-human world.

⁶⁸ Fulton, 'Fractal Amplifications', pp. 62-63.

⁶⁹ Fulton, 'Fractal Amplifications', p. 63.

⁷⁰ Fulton, 'Fractal Amplifications', pp. 80-81.

⁷¹ Aaron M. Moe, *Ecocriticism and The Poiesis of Form: Holding on to Proteus* (Oxon, Routledge, 2019), p. 177. To date, Moe's publication is the only monograph to engage explicitly with fractal geometry and ecocriticism. For Moe, the fractal, as a symbol of both mathematical and natural shapes, expresses a tension between the finite and the infinite, and demonstrates what Moe calls 'protean energy' – an energy of making (or *poiesis*) that is similarly found in poetry.

⁷² For examples of infinite digitally fractals, see David Eck's *Mandelbrot Viewer* <<https://math.hws.edu/eck/js/mandelbrot/MB-info.html>> [accessed 14 October 2020].

‘Scale as a Force of Deconstruction’: Introducing Eco-Deconstruction

Timothy Clark argues that scalar thinking is ‘a force of deconstruction’.⁷³ With reference to Derek Woods’ term, ‘scale critique’, Clark argues that an awareness of the conflicting individual and global scales of our environmental impact changes the way we think about supposedly familiar conceptual issues (such as the ethics of reproduction, or deforestation).⁷⁴ Citing Derrida, Clark defines these scale effects as ‘a thing, or force, or more precisely a difference of things and forces, with decisive effects while remaining “that which in the presence of the present does not present itself”’.⁷⁵ Scale effects are, therefore, ‘spectral agencies’ comparable to Derrida’s concept of *différance*, or *pharmakon*; like the spectral traces of signification within a text that are defined by difference and relation, scale effects cannot be seen, or perceived as things in themselves.⁷⁶ Despite this, they continue to influence our everyday patterns of thinking and decision making.⁷⁷ Clark argues that even if we cannot fully comprehend the scale of our physical, temporal, and ethical connections, we must still attempt to factor them into our critical thinking and decision making, in order to uncover and challenge our preconceived scalar assumptions (and their effects), and attempt to see beyond our limited human scales of perception.⁷⁸

Vermeulen also cites Derrida in *Literature and the Anthropocene*, arguing that although ‘the deconstruction of Jacques Derrida [...] is traditionally taken to exemplify everything that ecocriticism opposed’, it has a clear relevance to contemporary ecocritical thinking.⁷⁹ Vermeulen is referring to the apparent (or perceived) disconnect between ‘High Theory’ and the real, material world, most aptly summarised by Derrida’s statement from *Of Grammatology*, ‘*il n’ya pas de hors-texte*’, translated by Gayatri Chakravorty Spivak as ‘there is no outside of the text’.⁸⁰ For Matthias Fritsch, Philippe Lynes and David Wood, this statement can (and has) been read to imply that we cannot move from the text to reality, with any reference to the material world being ‘rendered impossible’, and replaced by ‘linguistic

⁷³ Timothy Clark, ‘Scale as a Force of Deconstruction’, in *Eco-Deconstruction: Derrida and Environmental Philosophy*, ed. by Matthias Fritsch, Phillippe Lynes and David Wood (New York: Fordham University Press, 2018), pp. 81-97, p. 81. For ‘scale critique’, see Derek Woods, ‘Scale critique for the Anthropocene’, *Minnesota Review*, 83 (2014), 133-42.

⁷⁴ Clark, p. 81.

⁷⁵ Clark, p. 86. Clark references Derrida in *Points... Interviews, 1974-1994*, trans. by Peggy Kamuf (Stanford: Stanford University Press, 1995), p. 83.

⁷⁶ Jacques Derrida, *Of Grammatology*, trans. by Gayatri Chakravorty Spivak (Baltimore: Johns Hopkins University Press, 1974). For more on *différance*, see Chapter One, p. 38 and Chapter Two, pp. 67-68.

⁷⁷ Clark, p. 87.

⁷⁸ Clark, p. 90.

⁷⁹ Vermeulen, p. 49.

⁸⁰ Derrida, *Of Grammatology*, p. 158.

and textual traces'.⁸¹ Like Vermeulen, they note that it is therefore surprising that a number of ecocritics are turning to Derrida's work, as ecocritical literary discourse necessarily engages with the material, the more-than-human, the outside of the text. Vermeulen argues that this is due to Derrida's 'emphasis on incalculable complexity, uncertain authorship, the instability of humanist meaning, and the threat of unreadability'.⁸² These qualities, he suggests, make theories of deconstruction an appropriate choice for criticism that engages with incalculably complex relationships of time and place, and is centred in a real-world context of environmental uncertainty and threat.⁸³ Furthermore, Vermeulen argues that the statement that 'there is no outside of the text' is highly relevant for 'a time defined by the human capacity to promiscuously leave traces in the chemical and climatological make-up of the planet'.⁸⁴ In the Anthropocene, humanity is defined by the geological record of our actions, which can (and is, and will) be read, by us, by computers, and by our ancestors, transforming the Earth into a text: 'there is no part of the earth system that is *not* affected by the traces our daily actions leave', argues Vermeulen – there is nothing outside of the text that is the Earth.⁸⁵

Following Clark and Vermeulen, I therefore turn to the work of Derrida, specifically his work on spectrality, monstrosity, and the unreadable text, to consider how a literary text can enact and reveal on a formal level the scalar discrepancies of our Anthropocene identity, deconstructing not just the binary thinking that divides human from animal, but also the binaries of self and other, nature and culture, human and non-human (or more-than-human), past and future, and part and whole, to generate new ways of thinking about entanglement and connection in an Anthropocene poetics.⁸⁶

⁸¹ Fritsch, Lynes and Wood, 'Introduction', in *Eco-Deconstruction*, pp. 1-26, p. 7.

⁸² Vermeulen, p. 49.

⁸³ Vermeulen, p. 49.

⁸⁴ Vermeulen, p. 26.

⁸⁵ Vermeulen, p. 26. In the same vein (but on a larger scale), this relates to the astrophysical idea that there is nothing outside of the universe, as the universe contains everything physical.

⁸⁶ Derrida, *Specters of Marx: The State of the Debt, the Work of Mourning and the New International*, trans. by Peggy Kamuf (Oxon: Routledge, 2006; first publ. London: Routledge, 1994); Derrida, 'Signature Event Context', in *Margins of Philosophy*, trans. by Alan Bass (Chicago: University of Chicago Press, 1982), pp. 301-330; Derrida, 'Geschlecht II: Heidegger's Hand', trans. by John P. Leavey Jr., in *Deconstruction and Philosophy: The Texts of Jacques Derrida*, ed. by John Sallis (Chicago: University of Chicago Press, 1988), pp. 161-196; Derrida, 'Living On', trans. by James Hulbert, in *Deconstruction and Criticism* (London: Bloomsbury Academic, 2004), pp. 62-142.

Ghosts, Monsters, Constellations: Introducing the Critical Chapters

In the first chapter, I focus on haunting and spectrality in Christensen's nuclear text, *Alphabet* (1981). A celebrated poet, novelist and essayist, Christensen is renowned for her experimental work and unconventional use of form. She wrote *Alphabet*, a collection of poetry structured according to the Fibonacci sequence, in 1980, during the final stages of the Cold War. Consequently, *Alphabet* deals explicitly with themes of nuclear weapons, and the possibility of a nuclear winter – a period of ecological devastation, and the end of the human world. I argue that *Alphabet* exemplifies an early Anthropocene poetics; the AWG designated the mid-twentieth century as the start of the Anthropocene era, corresponding with (and in part due to) the detonation of the first nuclear weapons. I draw on Daniel Cordle's work on nuclear anxiety and the pervading cultural fears of the atomic age, and Derrida's literary theory of spectrality, to put forward a theory of an 'irradiated' Anthropocene poetics that reflects the complexity and scale of human action within the context of geological deep time through the use of temporally distorting alphabetical, mathematical and repetitious formal structures.

In Chapter 2, I turn from ghosts to monsters. Fulton is a contemporary American poet, novelist and essayist. In this chapter, I focus on her fifth collection, *Sensual Math* (1995), and her essays on 'fractal poetics' (1986, 1997, 1998) – Fulton's term for the 'deep logic' of irregular free verse, inspired by the work of Mandelbrot. As outlined above, fractal geometry is representative of the ideas of scale that are integral to the Anthropocene; Fulton's fractal poetics reflects the same sensitivity to scale that is prevalent in Anthropocene discourse. Drawing on definitions of monsters from Jeffrey Jerome Cohen, Mikhail Bakhtin, Derrida and Georg Hegel, I compare literary monstrosity to the 'pathological' monstrosity of the fractal shape, and the monstrosity of the entangled, assembled, hybrid body of the human in the Anthropocene. Through a close reading of the intertextual linkings that exist throughout *Sensual Math*, I argue that a poetics inspired by fractal shapes can formally enact the physical entanglement of humans in the Anthropocene. I explore the ways that changing the scale of our attention as part of a formal fractal poetics can lead to new understandings of what it means to live in the Anthropocene.

Throughout the thesis I argue that an Anthropocene poetics is one of connection, but also one of revelation. An Anthropocene poetics is one that uncovers, or reveals, some previously unconsidered aspect of our identity – perhaps our spectral identity, or our geologic identity. It is a poetics of looking up, away, beyond, and outside our preconceived notions of self; my third and final chapter therefore looks to the sky, as a space of portent, prophecy, and

revelation. Where the first and second chapters examine specific effects of interconnection within a text, namely spectrality and monstrosity, my third chapter examines formal poetic connection in Strickland's *V* (2002, 2014), a poem which exists variously as two print books, an app and a digital programme, through the lens of 'constellation' – the act of making meaning through constructed association. Strickland, a contemporary American poet whose work often engages with digital formats, is the only one of my chosen poets who wrote during what Keller terms the 'self-conscious Anthropocene' – 'the period of *changed recognition* when the responsibility humans bear for the condition of the planet and for the fates of Holocene species is widely understood', and the 'the pervasive cultural awareness of anthropogenic planetary transformation' following Crutzen and Stoermer's introduction of the term in 2000.⁸⁷ With reference to Barthes' work on the woven text, Nicholas Royle's literary theory of veering, and Derrida's work on iteration and the unreadable text, I argue that *V* exemplifies various formal strategies of connectedness that can be used to establish a poetics of constellation that captures the complex interconnected nature of our self-conscious Anthropocene existence. By reading 'between' the various versions of *V*, I demonstrate that the text can be, as Barthes writes, 'comparable to a sky', and that in the same way that we create constellations, drawing together distant and disparate elements of the sky that have no objective physical connection, so too do we constellate meaning in poems.⁸⁸

I conclude the thesis with an introduction – an introduction to the future.

Anthropocene texts are haunted by the future, in the same way that we are haunted by the unstable future of a planet in the grip of a climate crisis. As Farrier points out, 'our present is saturated with things that will endure into the deep future'.⁸⁹ At a time when the climate crisis is reaching new levels of catastrophe, and the unknowability of the future is becoming increasingly, cripplingly evident, we are compelled to look to the future, to the 'what might be', to the 'yet-to-come'. Drawing on Kate Rigby's work on Anthropocene poetry as 'prophetic witness', I look to the revelatory potential of an Anthropocene poetics that makes use of spectral, monstrous, constellating strategies of form. As well as introducing ideas of futurity and revelation, this concluding introduction opens onto to the creative element of the thesis, a collection of my own poetry entitled *The Auspices & Other Futures*.

⁸⁷ Keller, *Recomposing Ecopoetics*, pp. 2, 8-9.

⁸⁸ Roland Barthes, *S-Z*, trans. by Richard Miller (London: Cape, 1975).

⁸⁹ Farrier, *Footprints*, loc. 312. Kindle edition.

The Auspices & Other Futures: Introducing the Creative-Critical Thesis

‘Form’, Solnick argues, ‘is not an optional add-on to an ecological awareness: form helps generate and organise a poem’s rendering of ecology’.⁹⁰ The form of this thesis is likewise crucial to the generation and organisation of its ideas. As Stephen Benson and Clare Connors point out in their introduction to *Creative Criticism: An Anthology and Guide*, creative-criticism is ‘nothing new’, having emerged ‘most visibly over the last four or so decades’ in the work of critics such as Hélène Cixous, Sarah Wood, Royle, and Derrida himself.⁹¹ The form of this thesis, as an assemblage of critical chapters and a collection of poetry, is written in the context of such works – works which are rigorously, fiercely, and creatively critical, making, in the words of Benson and Connors, ‘sidelong connections across great distances’.⁹² As John Wood argues, these different modes of research (including creative practice) provide access to ‘different ways of knowing, thinking, imagining, acting, feeling, doing and making in new ways that makes new sense’.⁹³ Woods’ statement resonates with Vermeulen’s claim that we need a ‘new syntax and new forms’ suitable for our new reality of ‘planetary derangement’.⁹⁴ Though creative criticism is itself not a new practice, the creative-critical, or critical-creative thesis is still a relatively recent addition to doctoral scholarship. Just as Vermeulen argues that experimental poetics reflect Anthropocene ideas of flux and change, the form of this thesis engages with ideas of connection and intertextuality in an interdisciplinary mode that provokes new ways of thinking and writing about the challenges of scale and connection in the Anthropocene.

It is, therefore, the deeply connected nature of the critical-creative thesis that makes it an appropriate form for research on ecological, temporal, and poetic entanglement. The human in the Anthropocene can be understood as a multi-species knot, an entanglement of times, places, and lives; the critical-creative form of this thesis can likewise be understood as a multi-genre knot, its critical and creative bodies entangling to form a single assemblage of meaning. Existing in constant dialogue with each other, the two halves of the thesis are inextricably entangled in a knotted web of research – not just with themselves, but with their Anthropocene context, and their theoretical and literary contexts, too. They can therefore be read (or encountered) in any order, as the thesis exists in the space between the two texts.

⁹⁰ Solnick, p. 55.

⁹¹ Stephen Benson and Clare Connors, ‘Introduction’, in *Creative Criticism: An Anthology and Guide*, ed. by Benson and Connors (Edinburgh: Edinburgh University Press, 2014), pp. 1-47, p. 2.

⁹² Benson and Connors, p. 4.

⁹³ John Wood, ‘In the Cultivation of Research Excellence, is Rigour a No-Brainer?’, *Journal of Writing in Creative Practice*, 5.1 (2012), 11-26, p. 11.

⁹⁴ Vermeulen, p. 47, 38.

Furthermore, as Benson and Connors point out, creative-criticism requires the writer to ‘approach literature from what Anne Carson dubs “the sleep side” where it is tousled and blurry but apt to dream still, and make odd, inspired connections’.⁹⁵ Writing both creatively and critically about the Anthropocene means that ‘odd, inspired connections’ appear throughout the thesis; here, nuclear warfare, fractals and stars sit side by side with rooks, trees, and stones; here, mathematics tangles with literary theory, with ecology, geology, anthropology, to present an interdisciplinary, multi-modal interrogation of contemporary Anthropocene poetics.

Benson and Connors argue that when we read critically, we experience an ‘event or encounter or happening’.⁹⁶ These textual encounters are transformative events: ‘To encounter is to be turned’, they write, ‘whether for a moment or for life; to encounter is [...] to be provoked or unsettled into losing one’s place’.⁹⁷ This has resonances of Oswald’s description of poetry as ‘a line of encounter between a human and his context’; for Oswald, too, to encounter is to be transformed. In the era of the Anthropocene, being provoked and unsettled by moments of encounter (with literature, or with nature) can therefore challenge our perceptions of scale and time, causing us to lose our place at the centre of our thinking. Poetic or textual encounters also transform our writing; when you read, or closely encounter a text ‘it becomes part of you, its idiom weaving itself into the fabric of your own response to it, or to other things you read, look at or hear, so that it’s not always clear where it stops and you start’.⁹⁸ This thesis is, therefore, a response to my encounters with the poetry of Christensen, Fulton, and Strickland, as well as the theoretical works of Derrida, Royle, and Barthes, and the writing of ecocritics such as Farrier, Haraway, and Morton. Their writings are woven, inextricably, into the fabric of my own writing – both the critical chapters and the poems found in *The Auspices & Other Futures* are irradiated with Christensen’s atomic whiteness, haunted by repetitions of sound and image. They are made monstrous through fractal clusters of meaning and interconnection; they form strange, veering constellations with Strickland’s *V*, with the myriad of texts that have influenced and informed this research. As Benson and Connors argue, ‘This is surely at the heart of all criticism: the marking in writing of our reading or looking or listening; the making of a relation between a work and an act of writing’.⁹⁹ This thesis is the marking in writing of reading, looking, and listening at works of

⁹⁵ Benson and Connors, p. 26.

⁹⁶ Benson and Connors, p. 2.

⁹⁷ Benson and Connors, p. 5.

⁹⁸ Benson and Connors, p. 4.

⁹⁹ Benson and Connors, p. 3.

Anthropocene literature, in order to uncover, interrogate, and perhaps eventually understand the entangled forms of Anthropocene times, bodies, and texts.

DOVES, DOVES, THE ABSENCE OF DOVES
Inger Christensen's *Alphabet* as an Irradiated Text

1.
apricot trees exist, apricot trees exist
2.
bracken exists; and blackberries, blackberries;
bromine exists; and hydrogen, hydrogen
3.
cicadas exist; chicory, chromium,
citrus trees; cicadas exist;
cicadas, cedars, cypresses, the cerebellum
4.
doves exist, dreamers and dolls;
killers exist, and doves, and doves;
haze, dioxin, and days; days
exist, days and death; and poems
exist; poems, days, death¹

In the first eleven lines of Christensen's poetry collection *Alphabet*, twenty-one things exist: apricot trees, bracken, blackberries, bromine, hydrogen, cicadas, chicory, chromium, citrus trees, cedars, cypresses, the cerebellum, doves, dreamers, dolls, killers, haze, dioxin, days, death and poems.² These twenty-one things weave together the natural (trees, bracken, cicadas, etc.) with the inherently human (dioxin, dolls, poems), and establish the key themes of Christensen's collection: poetics, time, and death – specifically the death and destruction caused by warfare and nuclear weaponry. Christensen's references to war become explicit later in the collection, but even these opening lines contain hidden, insidious traces of the nuclear. Hydrogen, the fifth thing to be listed, carries with it the weight of the H-bomb. Dioxin, mentioned in line nine, is a synthetic chemical, notably used for herbicidal warfare during the Vietnam War. Then, it was known as Agent Orange. Written in 1980, Christensen describes *Alphabet* as a collection of poems from 'the Cold War [...] at its very coldest'; *Alphabet* is a collection haunted by the pervading cultural fears of that era, including fears of

¹ Inger Christensen, *Alphabet*, trans. by Susanna Nied (New York: New Directions, 2000), pp. 11-14.

² In the original Danish, 'citrus trees' reads '*citrontræer*', which literally translates as lemon trees. Similarly, 'hydrogen' is '*brinten*', 'killers' is '*dræberne*', 'haze' is '*dis*', and 'poems' is '*digtene*'; the original therefore adheres much more strictly to the alphabetical patterning, though the English translation has been adapted to fit as closely to the constraint as possible – 'citrus' trees, rather than lemon trees, for example, and 'bracken' instead of 'ferns', which would be the literal translation of '*bregnerne*'.

nuclear warfare and ecological destruction.³ In this chapter, I argue that Christensen's work can be read as a parallel to contemporary Anthropocene poetry, which is haunted by the spectres of imminent global climate disaster and widespread species destruction. Nuclear technologies hold a special significance in ecocritical studies of Anthropocene literature, with the Trinity Test being identified by some critics as the moment that defines the beginning of the Anthropocene.⁴ I therefore examine how the form of *Alphabet*, with its alphabetical and mathematical constraints and its repeated words and motifs, can be read as an irradiated text, haunted by its nuclear context. Furthermore, I argue that Christensen's formal strategies can helpfully inform the development of an Anthropocene poetics that engages with ideas of irradiation, contamination, and entangled time.

Christensen was a celebrated Danish poet, novelist, and essayist, who wrote from the 1960s to the 1990s.⁵ *Alphabet*, Christensen's fifth collection, was published in 1981, when the Cold War was entering its final phase. The 1980s saw an increase in public awareness of the potential long-term and far-reaching effects of nuclear technologies, including the spread of nuclear fallout, radiation sickness, and the possibility of birth defects in subsequent generations.⁶ Cordle argues that this led to a resurgence of the nuclear fears that had been dominant in the 1940s and 1950s.⁷ Similarly, Sarah Daw notes that the Cold War triggered a 'seismic shift' in the way Americans understood their relationship with the environment, and that this cognitive shift is reflected in the literature of that period.⁸ These nuclear preoccupations, or 'nuclear anxiety', as Cordle names them, are characterised by 'a profound and acute consciousness of vulnerability in the face of nuclear threat'.⁹ This feeling of vulnerability pertains to more than the instant physical impact of nuclear weapons on the immediate victims and vicinities; it is an awareness of the vulnerability of the human species, and the planet as a whole. As Cordle writes, 'rather than simply being about personal mortality, *nuclear anxiety is about species death*, or, at least, *about the end of civilisation*.'

³ Christensen, 'It's All Words', in *The Condition of Secrecy*, trans. by Susanna Nied (New York: New Directions, 2018), pp. 50-60, p. 57.

⁴ Keller, *Recomposing Eco-poetics*, p. 6.

⁵ Christensen's collection of essays, *Hemmelighedstilstanden*, or *The Condition of Secrecy*, was originally published in 2000 (and translated into English in 2018), but the essays themselves were all written during this thirty-year period.

⁶ Daniel Cordle, *Late Cold War Literature and Culture: The Nuclear 80s* (London: Palgrave Macmillan, 2017), p. 4. Cordle is writing with specific reference to British and US prose but considering Denmark's position as part of the Western Bloc, and as a member of NATO alongside Britain and the US in the Cold War, Cordle's research is helpful in understanding the context of Christensen's writing.

⁷ Cordle, *Late Cold War Literature and Culture*, p. 4.

⁸ Sarah Daw, *Writing Nature in Cold War American Literature* (Edinburgh: Edinburgh University Press, 2018), p. 2, 10.

⁹ Cordle, *Late Cold War Literature and Culture*, p. 48.

[...] Frequently conflated with this trope, and closely related to it, is another: *nuclear anxiety is about the imperilled planet and the end of the world*'.¹⁰ In light of the threat of global catastrophe (exacerbated by policies such as Mutually Assured Destruction), human extinction became a real, and terrifying possibility.¹¹

Rachel Carson famously wrote about the effects of nuclear fallout in *Silent Spring*, published in 1962 (and translated into Danish in 1963). An often-quoted passage details the effects of Strontium 90, a radioactive isotope produced as a by-product of nuclear fission (the technology used in atomic bombs such as those dropped on Hiroshima and Nagasaki) that is known as a 'bone-seeker', meaning it accumulates in the bones and the bone marrow:

Strontium 90, released through nuclear explosions into the air, comes to earth in rain or drifts down as fallout, lodges in soil, enters into the grass or corn or wheat grown there, and in time takes up its abode in the bones of a human being there to remain until his death. Similarly, chemicals sprayed on croplands or forests or gardens lie long in the soil, entering into living organisms, passing from one to another in a chain of poisoning and death.¹²

This paragraph represents two of the key motifs of nuclear anxiety: fear of an invisible, insidious infiltration of the body, and fear of an unstoppable 'chain' of contamination. What makes nuclear anxiety distinct from the fears of other types of warfare is that this 'chain of poisoning and death' extends across unfathomable stretches of time, as well as space. Exposure to nuclear fallout does not just put the mortality of an individual at risk – instead, this risk is also inherited by the earth, crops, the food chain, unborn children, their descendants, the descendants of their descendants. The half-life of plutonium is 24,100 years; nuclear weapons therefore threaten the future – the future life of the individual, but also the geologic deep future of our species, and even the planet.¹³

Cordle writes that for many environmentalists, 'nuclear policy was not an isolated aberration: it was symptomatic of structural deficiencies in humans' relation to the natural world'.¹⁴ This idea of relation, and specifically human-nature relation, is one that was evolving through the 1960s-1980s, and is reflected in the mathematical, scientific, and environmental developments of the era. Key works included Mandelbrot's 1967 publication, 'How long is the coast of Britain? Statistical self-similarity and fractal dimension', which

¹⁰ Cordle, *States of Suspense: The Nuclear Age, Postmodernism, and United States Fiction and Prose* (Manchester: Manchester University Press, 2008), p. 30.

¹¹ Cordle, *Late Cold War Literature and Culture*, p. 127.

¹² Rachel Carson, *Silent Spring* (Middlesex: Penguin, 1965), p. 23.

¹³ Morton, *Hyperobjects*, p. 138. The idea of the 'deep future' borrows from James Hutton's concept of 'deep time', a term he used to describe the vast geologic timespan of the earth.

¹⁴ Cordle, *Late Cold War Literature and Culture*, p. 115.

introduced the concepts of self-similarity at magnified scales and fractal dimensionality, and Lorenz's paper, 'Deterministic Nonperiodic Flow', published in 1963, which explored the sensitivity of deterministic nonlinear systems (such as the weather), and introduced the idea of 'chaotic attractors' – known to the public as the butterfly effect.¹⁵ There was also an increase in studies into complex systems (systems where properties of the system cannot be determined by the properties of its individual parts), with V. Rao Vemuri's *Modelling of Complex Systems: An Introduction* published in 1978, and the Santa Fe Institute founded in 1984.¹⁶ As Anne Gry Haugland points out, a common feature of complexity theory, chaos theory and fractal geometry is scale: all involve a deep consideration of how the part and the whole relate and interact at different perceptions of scale.¹⁷

This growing awareness of scalar relations was not limited to pure mathematics; attitudes were also changing toward the relationship between humanity and the Earth. The space race in the 1950s and 60s brought about 'this idea of the earth as a single entity [that] is crucial to modern environmental consciousness'.¹⁸ The publication of photographs of the Earth from space (notably, the 'Earthrise' image taken by Apollo 8 in 1968, and 'The Blue Marble', taken by the crew of the Apollo 17 mission in 1972) led to a new awareness of the Earth as something fragile, small, and united.¹⁹ Philip Leonard describes the world as being 'born again for the first time' with the publication of each of these photographs, describing their impact on public perception as 'revealing the earth as an isolated and vulnerable biosphere, an integrated and organic ecology that is threatened by the population that is seeing this precarity for the first time'.²⁰ Frank White termed this cognitive shift of perspective the 'Overview Effect', writing that, from the perspective onboard an airplane or space shuttle, 'the message that scientists, philosophers, spiritual teachers, and systems theorists have been trying to tell us for centuries was obvious: everything is interconnected

¹⁵ Mandelbrot, 'How long is the coast of Britain? Statistical self-similarity and fractal dimension', *Science*, 156.3775 (1967), 636-638; Lorenz, 130-141. The term 'butterfly effect' was also used in Ray Bradbury's short story 'A Sound of Thunder', published in *Collier's* magazine in 1952. Lorenz himself first used the analogy of a seagull to describe his theory, but later swapped to the butterfly effect.

¹⁶ V. Rao Vemuri, *Modelling of Complex Systems: An Introduction* (New York: Academic Press, 1978). The Santa Fe Institute in New Mexico, America, is 'the world's leading research centre for complex systems science'. Their mission statement is to 'understand and unify the underlying, shared patterns in complex physical, biological, social, cultural, technological, and even possible astrobiological worlds'. <<https://www.santafe.edu/about>> [accessed 20 October 2020].

¹⁷ Anne Gry Haugland, 'Native and Deep-Rooted: Positions in Inger Christensen's Philosophy of Nature', *Romantik*, 3 (2014), 91-97, p. 91.

¹⁸ Cordle, *States of Suspense*, p. 113.

¹⁹ Philip Leonard, *Orbital Poetics: Literature, Theory, World* (London: Bloomsbury Academic, 2019), pp. 2-3.

²⁰ Leonard, pp. 2-3.

and interrelated, each part a subsystem of a larger whole system'.²¹ Though White's book was not published until 1987, we can retrospectively consider his theory alongside the public awareness of space flight, and the role of the Space Race between the United States and the Soviet Union during the Cold War. Cordle also notes the prominence of Lovelock's Gaia hypothesis (that the earth can be understood as a single, complex system, like an organism) during the 1980s.²²

What we can see from these examples is that the Western world was undergoing a shift; the boundary between the individual and the species was becoming blurred, and humanity was increasingly perceived as one entangled part of a complex, interrelated ecosystem. Furthermore, against the contextual background of the Cold War and the threat of nuclear disaster, humanity as a species was vulnerable – a 'common, imperilled humanity'.²³ For Cordle, this new species awareness rendered human beings 'fragile' and 'ephemeral', as our entire systems of civilization were threatened by the potential for global nuclear war.²⁴ Historian Dipesh Chakrabarty argues that although we know we are a species in a logical or intellectual sense, human beings 'never experience ourselves as a species'.²⁵ Both nuclear warfare and the global climate crises prompt us to perceive this collective identity, however; as Chakrabarty writes, 'the anxiety global warming gives rise to is reminiscent of the days when many feared a global nuclear war', as the climate crisis confronts us with the consequences of our collective actions and the vulnerability of our species in the face of ecological disaster.²⁶ For Cordle, humanity's fragility in the face of the nuclear threat paradoxically 'calls into existence a common cause through which humanity might challenge the structures and ways of thinking that lead to division'.²⁷ By foregrounding the collective identity of the human species, nuclear or environmental threats therefore also call attention to the potential power of the species to drive change, and reject binary thinking.

It is important to note, however, that this rejection of thinking in terms of binaries and divisions, and acceptance of ecological, political, and other forms of interconnectedness, is not a solely modern (or post-nuclear) perspective in Western thinking. Christensen was heavily inspired by the German poet and philosopher Novalis, who wrote in the eighteenth

²¹ Frank White, *The Overview Effect: Space Exploration and Human Evolution*, 3rd edn (Virginia: American Institute of Aeronautics and Astronautics, 2014), p. 2.

²² Cordle, *Late Cold War Literature*, p. 115.

²³ Cordle, *Late Cold War Literature*, p. 51.

²⁴ Cordle, *Late Cold War Literature*, pp. 50-51.

²⁵ Chakrabarty, p. 220.

²⁶ Chakrabarty, pp. 221-222.

²⁷ Cordle, *Late Cold War Literature*, p. 135.

century and argued for ‘the inter-relatedness of all things’, and dismissed ‘division, dismemberments’ and ‘splittings’ as ‘the morbid disposition of modern men’.²⁸ Christensen herself writes that our world is one of relationships – we exist, she writes, as a ‘whole web of relationships among all the phenomena that make up our world’.²⁹ This resonates with contemporary Anthropocene thinking; as outlined in the introduction to this thesis, understanding human beings as geological entities requires a recognition of the fact that we are physically and ethically entangled across deep stretches of time, and across both macroscopic and microscopic physical systems.³⁰ As Haugland notes, ‘Christensen’s writings represent a time when new scientific discoveries [...] reshaped the perception of nature from viewing the human mind as something radically different from nature towards an understanding of human action and mind being part of nature’.³¹ It is in the context of this wide-spread cultural shift toward thinking about interrelatedness in the sciences and the humanities that we can place *Alphabet*.

In what follows, I argue that *Alphabet* reflects the spectral, entangled qualities of its Cold War context in its form and structure. Identifying four common trends within late postmodern Cold War literature, Cordle points to ‘an interrogation and refusal of conventional forms of closure’.³² I argue that Christensen’s use of the Fibonacci sequence and an abecedary framework exemplify this refusal of closure, and that this, in turn, reflects the nuclear anxieties of the age. Charlotte Melin, writing on the impact of the Cold War on German poetics, similarly argues that Cold War poetry exhibits a tendency to demonstrate an ‘appreciation for experimental literary forms’.³³ Melin, referring to Morton’s conception of nuclear materials as ‘hyperobjects’, argues that post-1945 poetry reflects the scalar disruptions of nuclear hyperobjects, and the challenge of reconciling varying scales (including ‘local and global perspectives’) into a comprehensible narrative of existence.³⁴ I

²⁸ Klaus Müller-Wille, ‘Dispersion, Countersymbols and Mutual Representation: Inger Christensen’s *Det* and Novalis’ *Die Lherling zu Sais*’, *Romantik*, 3 (2014), 99-109, p. 107. Eighteenth Century German Romantic philosopher and writer Novalis drew inspiration from a variety of disciplines, including philosophy, science, engineering, mathematics, literature and naturalism. Christensen quotes directly from Novalis in both her poetry and her critical writing, and his influence is clear on her ecocritical ideas.

²⁹ Christensen, ‘The Condition of Secrecy’, in *The Condition of Secrecy*, pp. 37-44, p. 44.

³⁰ For more detail on our physical, temporal, and ethical entanglements, refer to Introduction, pp. 4-5.

³¹ Haugland, p. 91.

³² Cordle, *Late Cold War Literature and Culture*, p. 184.

³³ Charlotte Melin, ‘Cold War Nature: Transforming German Poetry’, *Studies in 20th and 21st Century Literature*, 43.1 (2018), 1-19, pp. 1-2). While Cordle’s research on nuclear literature focuses on British and American prose, Melin has written on the effect of the Cold War on German poetics. As Christensen was, by her own admission, heavily influenced by German Romanticism (or *Naturlyrik*), and more specifically the work of German poet and philosopher Novalis, this is helpful for an analysis of Christensen’s work during this period.

³⁴ Melin, p. 2. For more on hyperobjects, see Introduction, pp. 4-5.

argue that the experimental forms chosen by Christensen to shape *Alphabet* demonstrate the same kind of spectral, scalar disruptions caused by both the nuclear, and the Anthropocene.

Alphabet as a Catalogue of the Universe

Alphabet is a series of 14 interconnected poems, each with an increasing number of lines in accordance with the Fibonacci sequence (an increasing series of numbers where each number is the sum of the two preceding numbers – 0, 1, 1, 2, 3, 5, 8, 13...). The first poem consists of one line, the second of two, the third three, and so on, up until the fourteenth poem, which consists of 610 lines. There is also second, overlaying formal constraint – the alphabet. Each poem begins by listing things beginning with a specific letter of the alphabet. The first poem lists things that begin with ‘a’ (‘apricot trees exist, apricot trees exist’), the second lists things that begin with ‘b’ (‘bracken exists; and blackberries, blackberries’), and so on, until the final poem of the collection, ‘n’, which opens with ‘nights exist, nightshade exists’.³⁵ The two formal constraints of *Alphabet*, I argue, work together to construct the illusion of an infinite textual universe that, when read in a nuclear context, is seen to be under threat of destruction.

The Fibonacci sequence, named after mathematician Leonardo of Pisa, is known for recurring unexpectedly, emerging in poetry, music, and wildlife.³⁶ Birken and Coon illustrate this with the example of flowers; the number of petals on a significant number of flowers is a Fibonacci number – the lily, for example, has three, the buttercup has five, the daisy has thirty-four.³⁷ Once you start to look, Fibonacci numbers emerge everywhere: the scales of pinecones and pineapples, the seeds in a sunflower, the spiralling buds on a branch of pussy willow, the bifurcation of a frond of brown algae, the plates on a turtle’s shell, the physiological structure of a spider, the five-fold form of the starfish, the pentagonal internal bonds of water, the spiral shapes of shells, hurricanes, and galaxies, the size ratios between the bones of your fingers, the number of teeth in a human mouth, the proportional position of an adult’s navel.³⁸ Fibonacci numbers even feature in planetary relationships, with Venus making a ‘fivefold rosette’ pattern around the Earth every eight years (which equates to every thirteen years on Venus).³⁹ There is an intricate and inextricable link between the Fibonacci

³⁵ Christensen, *Alphabet*, p. 11, 12, 62.

³⁶ Though the Fibonacci sequence is named after Leonardo of Pisa (also known as Fibonacci), this series of numbers has a much older history – as Parmanand Singh writes, it was used as a metrical device in Sanskrit poetry as long ago as 600 AD (Parmanand Singh, ‘The So-Called Fibonacci Numbers in Ancient and Medieval India’, *Historia Mathematica*, 12 (1985), 229-244).

³⁷ Birken and Coon, pp. 54-56.

³⁸ See Birken and Coon, pp. 54-59, and Scott Olsen, *The Golden Section: Nature’s Greatest Secret* (Somerset: Wooden Books, 2006), pp. 10-20.

³⁹ Olsen, p. 46.

numbers and the natural world; in choosing to structure *Alphabet* using this particular sequence, Christensen is therefore foregrounding the poem as part of the natural world.

John Stout argues that the combination of the naturally occurring Fibonacci sequence and the ‘man-made’ arbitrary ordering of the alphabet, ‘suggests a harmony to be achieved or rediscovered, between human activity and the natural world’.⁴⁰ This is supported by Christensen’s own critical writing, in which she sets out her philosophy of language and her belief that human language (and therefore poetry) is ‘part of that biology project’ that is the ‘self-expression’ of the universe.⁴¹ In the critical essay ‘The Regulating Effect of Chance’, she argues that we mistakenly ‘often regard nature and the man-made world as two separate entities, irreconcilable’.⁴² For Christensen, humans, and all their ‘forms of culture’ and expression – including poetry – are ‘forms of nature’, two harmonious parts of the same whole, and there should be no distinction between them.⁴³ ‘My expressing myself’, Christensen writes, ‘is no different in principle from a tree growing leaves’.⁴⁴ Similarly, in *Alphabet*, she describes the various languages of the natural world – the ‘clouds’ tranquil script’, ‘the heavy / alphabet of waves / their threads of foam’, bringing together the artifice of the alphabet with the unaffected forms of nature.⁴⁵ As Stout notes, the choice of the Fibonacci sequence formally reflects this harmony between human and natural languages.

The Fibonacci sequence also formally introduces ideas of infinity. Christensen writes that she saw the Fibonacci sequence as a ‘wordless universal poem’, analogous with the Big Bang – an ‘exponential curve travelling at top speed toward infinity’.⁴⁶ This suggests that the structure of *Alphabet* is a literary expression of creation, bringing ‘apricot trees’, ‘bracken’ and ‘bromine’ into existence. Furthermore, through the increasing proliferation of lines per section, *Alphabet* formally expresses the incomprehensible breadth and motion of the universe and its infinite multitude of components; by choosing a mathematical structure without end, Christensen therefore implies that the poem, too, could be infinite, echoing the vast scale of the universe in words.⁴⁷

⁴⁰ John C. Stout, ‘Experimenting with Letters: Alphabetical Sequences in Contemporary Innovative Poetry. Bök, Silliman, Mullen and Christensen’, *The Modern Language Review*, 111.3 (2016), 613-632, p. 632.

⁴¹ Christensen, ‘It’s All Words’, p. 59.

⁴² Christensen, ‘The Regulating Effect of Chance’, in *The Condition of Secrecy*, pp. 66-93, p. 87.

⁴³ Christensen, ‘The Condition of Secrecy’, pp. 43-44.

⁴⁴ Christensen, ‘The Naïve Reader’, in *The Condition of Secrecy*, pp. 61-65, p. 61.

⁴⁵ Christensen, *Alphabet*, p. 59.

⁴⁶ Christensen, ‘It’s All Words’, p. 58.

⁴⁷ If *Alphabet* continued all the way to ‘z’, it would be over half a million lines long in total (514,227), more than double the length of the Mahābhārata, the longest poem on record.

The abecedary structure of *Alphabet* similarly implies infinity. An abecedary is a poem or sequence that is structured in accordance with the alphabet, historically used in religious texts but now more commonly associated with children’s books. Norman Gottwald argues that we may ‘instinctively feel that in naming the whole alphabet, one comes as close as man may to a total development of any theme or the complete expression of any emotion or belief’.⁴⁸ What we can helpfully draw from this is that the abecedarian structure of *Alphabet* can be interpreted as being representative of a totality – a completeness – that is interrupted. The poem does not reach the anticipated, concluding ‘z’; instead, Christensen abandons the sequence at ‘n’, in order to ‘imply [...] an unfinished series of poems’.⁴⁹ Though Christensen never explicitly confirms the symbolism of ‘n’, it is not insignificant that n is used mathematically to denote the ‘nth term’ of a sequence – an unspecified term, used as the latest in a chain to denote the potentiality of an infinite continuation of the sequence (for example, 2, 4, 6, 8 ... n). The final section of *Alphabet* therefore emphasises more than unfinishedness, or abandonment, but a suspended potentiality for the collection to continue infinitely.⁵⁰

Like Christensen, Carolyn Forché uses an abecedary structure for her poem ‘On Earth’, included in her 2003 collection *Blue Hour*.⁵¹ Forché notes that she used an alphabetic structure ‘to organize what would otherwise be a completely chaotic distribution of thought’.⁵² The alphabetical organization of ‘On Earth’ is complex; the lines are structured alphabetically according to the first, and then second letters of each line, resulting in alphabets within alphabets. ‘A’, for example, begins with ‘a barnloft of horse dreams’, which progress to ‘a yellow mosaic of remains’.⁵³ This is then followed by ‘above a pacific slumber of white horses’, and so on, until ‘A’ concludes with ‘awakening *dans le vrai*’.⁵⁴ The concluding line of ‘On Earth’ is simply ‘zero’; it is the first and only line to begin with ‘z’.⁵⁵ Consisting of just one word, this final line reads like the end to a countdown – like a moment of detonation, perhaps. Crucially, although Forché repeatedly delays the inevitable ‘z’, it is

⁴⁸ Norman Gottwald, *Studies in the Book of Lamentation* (Eugene: Wipf and Stock, 1954), p. 29.

⁴⁹ Christensen, ‘It’s All Words’, p. 58. As Marie Silkeberg has established through archival research, Christensen did begin to draft an ‘o’ poem, which begins with ‘Oil exists’. A complete draft would have been 987 lines long. (Ailbhe Darcy, ‘Alphabet’, BBC Radio 4, 23 February 2020, 4.30pm.)

⁵⁰ We might be reminded here of Derrida’s work on unreadability. For more on unreadability, see Chapter 3, p. 85.

⁵¹ Carolyn Forché, ‘On Earth’, *Blue Hour* (Newcastle Upon Tyne: Bloodaxe Books, 2003), pp. 28-74.

⁵² Forché and Ed Block, ‘Interview with Carolyn Forché’, *Renascence*, 68.2 (2016), 144-167, p. 163.

⁵³ Forché, ‘On Earth’, pp. 30-35.

⁵⁴ Forché, ‘On Earth’, pp. 35-40.

⁵⁵ Forché, ‘On Earth’, p. 74.

still the ultimate conclusion of the poem. Christensen, however, denies that concluding moment altogether, ending (or abandoning) the collection at ‘n’, leaving the anticipated ‘z’ eternally deferred. This abandonment is reinforced by the lack of punctuation: *Alphabet* has no full stops. Where the Fibonacci structure of the lines gives *Alphabet* a sense of exponential growth, it is, therefore, the incomplete alphabetization that gives the collection its sense of being truly unfinished. We move from ‘a’ to ‘b’, then ‘c’, onward; the reader anticipates ‘z’ as they read. With the infinite deferral of sections ‘o’ through to ‘z’, the reader is therefore left poised in a state of suspense that speaks directly to the nuclear context of *Alphabet*.

‘Star time is so enormously slow’: Nuclear Temporality in *Alphabet*

For Cordle, this ‘sense of sustained but unfulfilled anticipation’ is ‘characteristic of nuclear culture’, as it manifests the ‘perception of being poised before nuclear disaster’.⁵⁶ Cordle terms this the ‘state of suspense’ – the state of living in the shadow of ‘withheld but constantly threatened destruction’.⁵⁷ In a nuclear context, the permanent inconclusion of *Alphabet* therefore reads as time suspended, as a poetic or textual world poised on the threshold of destruction. Karen Barad has written on the impact of the nuclear on our perception of time, reflecting that upon the bombing of Hiroshima, ‘time died in a flash’, citing the multiple clocks and watches that stopped dead at 8.15.⁵⁸ These stopped clocks represent the strange nature of nuclear time, where, ‘In a flash of an eye (a blinding flash, a flash that has been known to melt eyes), the explosion is over but forever lives on’.⁵⁹ Time, through the lens of the nuclear, becomes strange; the present moment is, paradoxically, both ended and eternally unending. ‘The temporality of radiation exposure is not one of immediacy’, writes Barad; ‘rather, it reworks this notion, which must then include generations before and to come’.⁶⁰ In the (blinding) light of the nuclear, the immediate ‘present’ becomes entangled with the past and the future. As Barad phrases it,

‘now’ is always already thick with possibilities [...] Each moment is thickly threaded through with all other moments, each a holographic condensation of specific diffraction patterns created by a plethora of virtual wanderings, alternative histories of what is/might yet be/have been.⁶¹

⁵⁶ Cordle, *Late Cold War Literature and Culture*, p. 193.

⁵⁷ Cordle, *States of Suspense*, p. 1.

⁵⁸ Karen Barad, ‘No Small Matter: Mushroom Clouds, Ecologies of Nothingness and Strange Topologies of Spacetime-mattering’, in *Arts of Living on a Damaged Planet: Ghosts and Monsters of the Anthropocene*, ed. by Anna Tsing, Heather Swanson, Elaine Gan and Nils Bubandt (Minneapolis: University of Minnesota Press, 2017), pp. 103-120, p. 103.

⁵⁹ Barad, p. 109.

⁶⁰ Barad, p. 109.

⁶¹ Barad, p. 113.

The present is therefore laden with the weight of all moments that have come before – and the suspended, anticipated weight of all those that have yet to come. We can therefore read *Alphabet* as being suspended indefinitely in this paradoxical state of nuclear time – both ended, and eternally unending, each section ‘thickly threaded’ with the contents of the prefacing and appending sections, and the sections as yet unwritten.⁶²

Barad is not the only critic to use ‘thick’ as a descriptor of time. Borrowing from Barad’s ‘spacetimemattering’, Stacy Alaimo’s ‘transcorporeality’, and Gilles Deleuze’s work on temporal contractions, Astrida Neimanis and Rachel Loewen Walker refer to ‘thick time’ as a ‘transcorporeal stretching between present, future, and past’ that entangles times, bodies and places in ‘a deep intra-activity’ with other times, bodies and places.⁶³ Building on Neimanis and Walker, Farrier writes that the ‘thickening of the present’ can be understood ‘as a point of confluence between deep pasts and deep futures’, and is characteristic of the Anthropocene and Anthropocene discourses.⁶⁴ In this era, we are constantly experiencing the thickening of time through encounters with what Michelle Bastian and Thom Van Dooren refer to as ‘new immortals’ – radioactive waste, microplastics, materials whose existence will far outlast our own.⁶⁵ As Farrier expounds:

We encounter the deep past and the deep future in the most ordinary situations such as through the hundreds of ‘technofossils’ – ballpoint pens, smartphones, plastic bottles, artificial knee joints and heart valves, fiber-optic cables, contact lenses, Styrofoam cups, plastic banknotes – that surround many of us every day.⁶⁶

The incredible longevity of radiation has the same effect on our perception of time as these technofossils, with Kate Brown noting that ‘the geologists of the future [...] one thousand years from now, will be able to trace the beginning of the Anthropocene [...] by locating in the earth’s strata the first man-made radioactive isotopes, dating from about 1942’.⁶⁷

⁶² We must also ask whether this state of suspense is one we desire, or not – while we anticipate, and perhaps wish for ‘z’, for ‘zero’, or the end, we also paradoxically hope to infinitely suspend that end, as it would ultimately mean death. As Derrida asks of nuclear annihilation, ‘Who can swear that our unconscious is not expecting this? Dreaming of it? Desiring it?’ (Derrida ‘No Apocalypse, Not Now (Full Speed Ahead, Seven Missiles, Seven Missives)’, trans. by Catherine Porter and Philip Lewis, *Diacritics*, 14.2 (1984), 20–31, p. 23).

⁶³ Astrida Neimanis and Rachel Loewen Walker, ‘Weathering: Climate Change and the “Thick Time” of Transcorporeality’, *Hypatia*, 29.3 (2014), 558-575, p. 561, 570. For ‘spacetimemattering’ see Barad, pp. 103-120; for ‘transcorporeality’ see Stacy Alaimo, *Bodily Natures: Science, Environment, and the Material Self*, (Bloomington: Indiana University Press, 2010); for temporal contractions, see Gilles Deleuze, *Difference and Repetition*, trans. by Paul Patton (New York: Columbia University Press, 1994), pp. 70-71.

⁶⁴ Farrier, *Anthropocene Poetics*, p. 19, 7.

⁶⁵ Michelle Bastian and Thom Van Dooren, ‘The New Immortals: Immortality and Infinitude in the Anthropocene’, *Environmental Philosophy*, 14.1 (2017), 1-9, p. 1.

⁶⁶ Farrier, *Anthropocene Poetics*, p. 16.

⁶⁷ Kate Brown, ‘Marie Curie’s Fingerprint: Nuclear Spelunking in the Chernobyl Zone’, in *Arts of Living on a Damaged Planet*, pp. 33-50, p. 37.

Radiation and nuclear waste therefore demonstrate a thickening of time – an entangling of the events of the past, with the unknown of the deep future.

I argue that *Alphabet* enacts the thickening, distorting temporality of the nuclear through its list-like structure. Written as a catalogue, a curated list that attempts to capture an illusion of everything that exists, the deep past and the deep future are entangled, knotted together in the body of the poem. For Farrier, this is a textual expression of thick time, as various times are compressed into a singular lyric ‘present’.⁶⁸ In *Alphabet*, ‘Harvest, history and Halley’s // comet exist’ alongside ‘ice ages’ and ‘iron curtains’; ‘Judas’ kiss’ exists, alongside ‘jet planes’ and ‘July / heavy as a bomb’.⁶⁹ These lists capture a vast breadth of timescales, spanning billions of years; the first major ice age on record is the Huronian Glaciation, which occurred 2.4 billion years ago. ‘July / heavy as a bomb’, also enacts this compression of time, speaking to all Julys, and yet simultaneously speaking specifically to July 1945, heavy with the suspended weight of the immediate future, of August 1945. Christensen uses ‘exist’ and ‘exists’ to describe these moments of historical, geologic, cosmic, and nuclear time – they are brought into the present tense, suspended, compressed, made simultaneous, within the text.

Christensen acknowledges the juxtaposition between human and geologic timescales, writing that humans are only ‘in existence for a few seconds in the timescale of life’s evolution’.⁷⁰ She reflects on the disparity between ‘star time’, which is ‘so enormously slow’, and ‘bird space’, which, by contrast, ‘is so short and deep’.⁷¹ For Christensen, time, space and sound are interwoven qualities, intermingling in a manner reminiscent of Barad’s ‘strange topology’ of ‘spacetime mattering’, in which (drawing from quantum physics) ‘bodies, space, time, and the void are not ontologically separate matters’, and every ‘bit’ and thing is ‘specifically entangled inside all others’.⁷² For Christensen, these varying times of stars and birds, comets and ice ages, are woven together, human and geologic timescales compressed into a ‘simultaneity of everything’.⁷³ A disorienting intermingling of shallow and deep times

⁶⁸ Farrier, *Anthropocene Poetics*, pp. 40-43. Farrier’s lyric ‘present’ is a reference to Jonathan Culler’s lyric ‘now’, described in *Theory of the Lyric* as an ‘iterable now’, an instant that can be experienced again and again, a present that can be repeated (Jonathan Culler, *Theory of the Lyric* (Massachusetts: Harvard University Press, 2015), pp. 226, 294).

⁶⁹ Christensen, *Alphabet*, p. 18, 20, 23.

⁷⁰ Christensen, ‘The Seven Within the Die’, in *The Condition of Secrecy*, pp. 115-125, p. 115.

⁷¹ Christensen, ‘The Seven Within the Die’, p. 124. There is a link here to nuclear temporalities, and the ‘slow violence’ of nuclear technologies, enacted over many years and generations. For more on ‘slow violence’, see Nixon, *Slow Violence and the Environmentalism of the Poor* (Cambridge: Harvard University Press, 2013).

⁷² Barad, p. 110.

⁷³ Christensen, ‘The Seven Within the Die’, p. 117.

occurs – though the division is by no means as clear cut as shallow human time and deep ecological time. ‘Bracken / has its own calendar’, Christensen writes, and, if you listen, you can ‘hear [...] the undermost brown / seconds of the spores, ticking’.⁷⁴ Vegetal (and perhaps fungal) times, then, are also brief.

In the ninth section of *Alphabet*, there is a sudden turn from what ‘exists’ in the present, to the futurity of what ‘will exist’:

indeed they will exist, in-
deed we will exist, with oxygen on its crucifix,
as rime we will exist, as wind,
as the iris of the rainbow in the iceplant’s gleaming
growths, the dry tundra grasses, as small beings

we will exist, small as pollen bits in peat,
as virus bits in bones, as water-thyme perhaps,
perhaps as white clover, as vetch, wild chamomile,
banished to a re-lost paradise⁷⁵

Here, the sudden change to ‘they will exist’ and ‘we will exist’ explodes the understanding of temporality that has been constructed so far within the text. Even at the end of *Alphabet*, which depicts a post-apocalyptic society in which computers monitor radiation from ‘the forest that’s still smoking’, Christensen is using the present tense; these future moments are happening now within the text.⁷⁶ In the fifth section (corresponding to ‘e’) ‘spiders / and vinegar exist, and the future, the future’.⁷⁷ The Danish word used for ‘future’ is ‘*eftertiden*’, meaning ‘posterity’, which describes the future generations yet to come. In this sense, the future generations are said to exist, already, in the present. By contrast, we ‘will’ exist, as rime, wind, and water-thyme, is speaking categorically of the future that has not yet arrived. Humanity ‘will’ become nature, become vegetal, microscopic, viral.⁷⁸

To exist as ‘grasses’ or ‘wild chamomile’ could be interpreted as a reference to decomposition, where the cells of decaying bodies become part of the earth in which they are buried, and subsequently provide nourishment to plant life; as Morton writes in *The Ecological Thought*, ‘The hills are teeming with the skeletal silence of dead life forms’.⁷⁹ It also speaks of contamination: ‘as virus bits in bones’ suggests an insidious infiltration or infection, bringing to mind the contamination of the geological and arboreal archives of the

⁷⁴ Christensen, *Alphabet*, p. 36.

⁷⁵ Christensen, *Alphabet*, p. 21.

⁷⁶ Christensen, *Alphabet*, pp. 76-77.

⁷⁷ Christensen, *Alphabet*, p. 15.

⁷⁸ We are reminded here of Jonathan Schell’s post-apocalyptic vision of a ‘republic of insects and grass’, from *The Fate of the Earth; and the Abolition* (Stanford, Stanford University Press, 2000).

⁷⁹ Morton, *The Ecological Thought*, p. 39.

planet with radiation and the markers of chemical warfare.⁸⁰ The references to ice and to ‘pollen bits in peat’ hold similar connotations. Peat is comprised of dead plant and animal material, and forms peat bogs, which are areas of wetlands that have ideal conditions for preserving remains.⁸¹ Pollen grains taken as samples from peat bogs can then be used to identify the plant life that previously existed in that area, and this data is used to construct ‘pollen zones’ – a way of breaking up the current geological age into smaller subdivisions. This preserved record of the changing climate of the earth is known as the ‘peat archive’.⁸² Considering Christensen’s previous mention of ‘ice ages’, it is no stretch to read ‘rime’ as a similar method of preservation and education; ice cores are also used to extract historical geological data about the climate on Earth.⁸³ Ice, as Farrier describes, is ‘the planet’s seat of memory [...] a global archive reaching back hundreds of thousands of years’.⁸⁴ To equate the future of humanity to an existence as pollen or rime can therefore be read as more than the simple decomposition or dispersal of cells – instead, humanity is presented as a brief stage of geologic existence that will one day exist only as a single layer of ice or other geological strata, as a single page in the planetary archive.

In ‘No Apocalypse, Not Now (Full Speed Ahead, Seven Missiles, Seven Missives)’, Derrida argues that the possibility of nuclear warfare threatens the ‘total and remainderless destruction of the archive [...] that is, total destruction of the basis of literature and criticism’.⁸⁵ Derrida is referring here specifically to the ‘juridico-literary archive’ – literature that refers to nothing outside of itself (or the archive), and therefore could not survive if the archive was lost or destroyed. Furthermore, as nuclear catastrophe threatens to ‘irreversibly’ destroy ‘the entire archive and all symbolic capacity’, Derrida argues that all capability for memory and memorial (which, he claims, form ‘the very heart of life’) would also be lost.⁸⁶ In *Late Cold War Literature*, Cordle builds on Derrida’s work, and notes that the 1980s saw a trend of fictional depictions of the destruction of the ‘human technologies’ of writing, books and libraries.⁸⁷ This, Cordle argues, symbolises the ‘horror’ felt at the prospect of ‘words

⁸⁰ For more on dendrochronology, and dendroarchaeology (the processes of ‘reading’ climate data and historical and archaeological data from tree rings), see *Tree Rings, Kings and Old World Archaeology and Environment: Papers Presented in Honour of Peter Ian Kuniholm*, ed. by Stuart W. Manning and Mary Jaye Bruce (Oxford: Oxbow Books, 2009).

⁸¹ Håkan Rydin and John K. Jeglum, *The Biology of Peatlands* (Oxford: University of Oxford Press, 2013), p. 4.

⁸² Sir Harry Godwin, *The archives of the peat bogs* (Cambridge: Cambridge University Press, 1981).

⁸³ Robert Mulvaney, ‘How are past temperatures determined from an ice core?’, *Scientific American* (2004) <<https://www.scientificamerican.com/article/how-are-past-temperatures/>> [accessed 28 August 2018].

⁸⁴ Farrier, *Footprints*, loc. 1501-1510. Kindle Edition.

⁸⁵ Derrida, ‘No Apocalypse, Not Now’, pp. 26-27.

⁸⁶ Derrida, ‘No Apocalypse, Not Now’, p. 26.

⁸⁷ Cordle, *Late Cold War Literature*, pp. 171-172.

becoming meaningless or disappearing' in a post-apocalyptic, post-catastrophic future.⁸⁸ Cordle describes this fear of the erasure of human literature as a 'fear of futurelessness' – the fear that nuclear technologies have the potential to destroy not just humanity as it is now, but also 'the imagination by which the world might be understood from a human perspective'.⁸⁹ Nuclear disaster therefore threatens not just all record of human culture and language, but also any possibility of its future restoration. However, Derrida's 'fourth missive' contains an important distinction; he writes that although nuclear disaster presents the possibility of an 'irreversible' and 'total destruction' of the *literary* archive, this would not necessarily result in the 'destruction of humanity, of the human habitat, nor even of other discourses (arts or sciences), nor even indeed of poetry or the epic'.⁹⁰ These, Derrida suggests, could 'reconstitute their living process and their archive' as they depend on 'a nonliterary memory' – they could re-establish themselves in response to whatever might be left of the physical world.⁹¹

It is the physical world that restores the possibility of a future for humanity in *Alphabet*, too. Here, a fear of futurelessness manifests not in the destruction of literature, but in an expansion of its definition. The archive evolves beyond human conceptions of literature, beyond books and words, to the physical world, where the archive of all human history and action is inscribed into stone and ice and peat, fossilized, like 'the script the Archaeopteryx wrote into stone / across a dizzying sky-blue and clean / eternity / eternity'.⁹² Christensen explicitly links the enduring existence of humanity (*we will exist*), to eternity by returning to the image of pollen thirty-five pages later, describing 'hidden in bogs / indelible pollen laid by / for eternity'.⁹³ This intertextual repetition tells us that the 'pollen bits in peat' will last far into the future – into 'eternity'. Furthermore, 'indelible' refers to markings, or ink, that cannot be erased, suggesting that humanity is being recorded, inscribed like a text, into the physical body of the Earth. Consequently, there can be no fear of losing all trace of human civilization, even in the face of nuclear catastrophe – the Earth will continue to exist, and as long as the Earth exists, so too will the archive, as the Earth itself *is* the archive,

⁸⁸ Cordle, *Late Cold War Literature*, p. 184. For Schell, this eradication of human civilization amounts to a 'second death' – a death over and above the death of the individual (Schell, p. 115).

⁸⁹ Cordle, *Late Cold War Literature*, p. 70.

⁹⁰ Derrida, 'No Apocalypse, Not Now', p. 26.

⁹¹ Derrida, 'No Apocalypse, Not Now', p. 26.

⁹² Christensen, *Alphabet*, p. 59, 56. Haugland suggests that Christensen's philosophy draws from the field of biosemiotics, which was emerging in Denmark in the late eighties, around the time *Alphabet* was written (Haugland, p. 93). For more on biosemiotics, see Paul Cobley, *Cultural Implications of Biosemiotics* (Dordrecht: Springer Netherlands, 2016).

⁹³ Christensen, *Alphabet*, p. 56.

constantly inscribing itself with traces of the human.⁹⁴ We are constantly being written about – documented, memorialized, archived – by trees whose rings are writing an irradiated diary of human warfare, by the ice caps curating a vault of the traces of our viral history, by the peat, the soil, and the oceans that are consigning a hidden record of our plastics, our ‘technofossils’. Even if nuclear technologies one day erase all living human beings, we will still exist, preserved indelibly, as fossils, ghosts, spectral traces within the geological archives of the planet.

The Ghost of Non-Existence: Nuclear Spectrality in *Alphabet*

The editors of *Arts of Living on a Damaged Planet: Ghosts and Monsters of the Anthropocene* write that ‘every landscape is haunted by past ways of life’.⁹⁵ As well as (techno)fossils, skeletons, and pollen bits, post-1945 landscapes are also haunted with traces of radiation. ‘Human-made radiocesium’, write Elaine Gan, Anna Tsing, Heather Swanson and Nils Bubandt, ‘has this uncanny quality: it travels in water and soil; it gets inside plants and animals; we cannot see it even as we learn to find its traces. It disturbs us in its indeterminacy; this is a quality of ghosts’.⁹⁶ The ghosts of a landscape are subtle, hazy, hard to see. For Gabrielle Schwab, the ghostly, indeterminable nature of the nuclear is not limited to its physical properties; it is also socially and psychologically ghostly. In *Radioactive Ghosts*, Schwab outlines what she calls the ‘nuclear unconscious’ – an ‘adaptive feature’ whereby we fail to acknowledge, on a day-to-day basis, that there currently exists the technology to instantly eradicate our species.⁹⁷ Instead, we repress this knowledge, and as a result our societies and psyches are haunted by the destructive potential of nuclear technologies.

To be haunted is not just a property of a landscape, or a mind; a text, too, can be haunted. Spectrality, as outlined in *The Spectralities Reader: Ghosts and Haunting in Contemporary Cultural Theory*, is the study of literary spectres.⁹⁸ From the Latin *spectrum*, meaning appearance or apparition, itself from *spec(io)*, meaning to look at or to behold, a literary spectre is not a ghost, but an encounter (or re-encounter) with new and ‘disturbing

⁹⁴ At least, the ‘earth’ would survive, even if the human conception of ‘Earth’ would not.

⁹⁵ Gan, Tsing, Swanson and Bubandt, ‘Introduction: Haunted Landscapes of the Anthropocene’, in *Arts of Living on a Damaged Planet*, pp. 1-14, p. 2.

⁹⁶ Gan, Tsing, Swanson and Bubandt, p. 1.

⁹⁷ Gabrielle Schwab, *Radioactive Ghosts* (Minneapolis: University of Minnesota Press, 2020), p. 4.

⁹⁸ María del Pilar Blanco and Esther Peeren, ‘Introduction: Conceptualizing Spectralities’ in *The Spectralities Reader: Ghosts and Haunting in Contemporary Cultural Theory*, ed. by Blanco and Peeren (New York: Bloomsbury Academic, 2013), pp. 1-28.

forms of otherness’, and recurring traces within a text.⁹⁹ Derrida defines ‘specters’ as the past re-emerging in the future: ‘one can never distinguish between the future-to-come and the coming-back of a specter’.¹⁰⁰ Here, we are reminded of Barad’s ‘spacetime mattering’, and Farrier’s thick time; in the haunted landscape (or text) of the spectre, time becomes multiple, folding the present, past and future into a singular, thickened, ‘present’ (or the present exploding into a multiplicity of future and past). The ‘spectrality effect’, for Derrida, consists ‘in undoing this opposition’ between past, future, and present.¹⁰¹ The Anthropocene has this spectral effect, (techno)fossils have this spectral effect, and so, too, does *Alphabet*.

Within a text, spectres can be understood as a ‘trace’ – they are the unspoken, unwritten concepts that haunt the past and future of a text. This builds on Derrida’s work on *différance*, the concept that words and signs are not direct signifiers with intrinsic meanings but are instead defined through their opposites – through difference. The word ‘*différance*’ is itself a conjoining of ‘difference’ and ‘defer’ and is a term for the infinite deferral of meaning in writing.¹⁰² Derrida argues that a signifier does not refer to a definite signified – instead, it triggers the production of an infinite chain of signifiers.¹⁰³ Every signifier, every category, is therefore haunted by a ‘trace’ of its opposite; the concept of non-identity haunts identity, the concept of non-existence haunts existence – the text is littered with these unseen, unwritten traces. Schwab similarly writes that when ‘taking the nuclear unconsciousness into account’, we must be ‘attentive to the unsaid, to ellipsis, to catachresis, inconsistencies, and contradiction’; we must ‘[explore] the unconscious resonances that may be hidden at the surfaces of words and images’.¹⁰⁴ It is in these unconscious resonances, these traces, that we see that *Alphabet* is a haunted text – it is irradiated with references to the past-as-present, and the future-as-past. John Bradley writes that the ghosts of Hiroshima still ‘haunt us in many ways’.¹⁰⁵ Christensen’s *Alphabet* is certainly haunted by atomic ghosts, and the ‘phantasm’ of nuclear war – but it is also haunted by the future, by the Anthropocene, with its complications of temporality and threat of ecological catastrophe that would not fully emerge into public consciousness until 19 years after *Alphabet* was published.¹⁰⁶

⁹⁹ Blanco and Peeren, p. 3.

¹⁰⁰ Derrida, *Specters of Marx*, p. 46.

¹⁰¹ Derrida, *Specters of Marx*, p. 48.

¹⁰² Gayatri Chakravorty Spivak, ‘Translator’s Preface’, in Derrida, *Of Grammatology*, loc. 502-2532, loc. 1399. Kindle Edition.

¹⁰³ Derrida, ‘Signature Event Context’, p. 317.

¹⁰⁴ Schwab, p. 7.

¹⁰⁵ John Bradley, ‘Preface’, in *Atomic Ghost: Poets Respond to the Nuclear Age*, ed. by Bradley (Minneapolis: Coffee House Press, 1995), n.p.

¹⁰⁶ ‘Phantasm’ is Derrida’s description of nuclear war, in ‘No Apocalypse, Not Now’, p. 23.

Each of the 14 sections of *Alphabet* opens with a list of things that exist: ‘apricot trees exist’, ‘bracken exists’, ‘cicadas exist’, ‘doves exist’, ‘early fall exists’, ‘fisherbird herons exist’, ‘given limits exist’, ‘whisperings exist’, ‘ice ages exist’, ‘June nights exist’, ‘love exists’, ‘life, the air we inhale exists’, ‘metal, the ore in the mountain, exists’, ‘nights exist’, and in the midst of it all, ‘atom bombs exist’.¹⁰⁷ Repeated 136 times throughout the original Danish text, the word ‘exists’ (*findes*) haunts the pages, an ontological spectre calling attention to itself and the very notion of existence – and, by extension, the trace of its opposite: non-existence, or death. *Alphabet* is therefore more than a catalogue of existing things; it is also haunted by their vulnerability and the threat of their possible (or perhaps imminent) destruction. ‘*Findes*’ is also haunted by more subtle connotations. As Lis Wedell Pape points out, possible translations include ‘be/be there [...] find oneself; be thought of/invented; be found by somebody; be placed; be extant; occur’.¹⁰⁸ For Pape, these additional translations suggest a kind of being or becoming, with the poem building up in a ‘big bang’ of ‘organic beings coming into existence and growing’.¹⁰⁹ At the same time, however, Pape also notes that ‘Thematically *alfabet* is an apocalypse. The texts state the existence of the world of phenomena [...], but from the very start this world is seen to contain its own destruction’.¹¹⁰ Just as *Alphabet* represents the Big Bang, it therefore also ‘ends up as the “big crunch”, melting down into nothingness’.¹¹¹ Pape refers specifically to the inclusion of ‘hydrogen’ in the second section of *Alphabet* as an example of the poem containing its own (nuclear) destruction, but this tension between existence and destruction continues throughout, with doves existing paradoxically alongside ‘the absence of doves’, with ‘tufts of grass’ followed by ‘the grass is all gone’, with a beginning where ‘citrus trees exist’, but an ending where ‘no citrus trees bloom’, and with all 136 instances of existence (or becoming) containing within themselves the spectral trace of non-existence, of destruction.¹¹² This interplay is at the heart of Christensen’s curated universe, something she confesses herself, noting that although *Alphabet* began as a collection of nouns – a collection of ‘concrete phenomena [...]’. It eventually became clear to me that it was a matter of weaving a kind of

¹⁰⁷ Christensen, *Alphabet*, pp. 11-62. This list is comprised of the opening words of each section. In Danish, ‘whisperings’ is ‘*hviskningerne*’, and ‘love’ is ‘*kærligheden*’.

¹⁰⁸ Lis Wedell Pape, ‘Oscillations – on Subject and Gender in Late Modernism’, *Orbis Litterarum*, 53 (1998), 252-268, 262.

¹⁰⁹ Pape, p. 260.

¹¹⁰ Pape, p. 260.

¹¹¹ Pape, p. 260. The Big Crunch is the idea that the universe, after expanding from the singularity of the Big Bang, will eventually collapse, receding back to that same singularity. According to the oscillating universe theory, this is a cycle that goes on infinitely, with each Big Crunch triggering a new Big Bang and vice versa.

¹¹² Christensen, *Alphabet*, p. 70, 45, 54, 13, 66.

spell. A prayer that apricots, doves, melons, and so on, could continue to exist in the world. And at the same time, a prayer that atom bombs, hydrogen bombs, dioxin, and so on, could disappear'.¹¹³

This has resonances of Christensen's earlier work, *It*, published in 1969:

The earth spins And some day it will vanish
Like sand vanishing between fingers
Without any fingers existing
It will just vanish And the sand will vanish
And the image of the earth as sand that will vanish will vanish

But for now the earth is still spinning¹¹⁴

The compulsive repetition of the word 'vanish' reminds us of the repetition of 'exists' in *Alphabet*. Unlike the latent apocalyptic resonances of the word 'exists', however, the threat of earthly destruction is explicit. Here, the eventual destruction of the earth (and specifically the human concept of Earth) is something that will happen in the future. In *Alphabet*, the vulnerability of the earth is a spectre – a trace, found hidden in the infinite chains of signification that entail the word 'exists'. Vermeulen notes that 'in a digital age, everything that happens is obsessively and instantaneously archived [...] this compulsion is often referred to as "archive fever": a manic recording of the present in the face of its imminent disappearance'.¹¹⁵ Vermeulen is writing about vulnerability in the face of the Anthropocene, but the same logic can be applied to the nuclear age. The repetitions of 'exists' and 'vanish' can be read, therefore, as a sort of mania – a compulsive recording of everything that is or was, that is now under threat.

As well as words being haunted by their own infinite and oppositional significations, there is a temporal haunting that occurs in literary spectrality. Spectres are a return; they are the past (re)manifesting in the future, impossible to differentiate from the future manifesting in the past; they are at once a repetition, and something new. Within a text, repetition therefore becomes a critical tool for invoking spectres. Deleuze, in *Difference and Repetition*, argues that immediately, intertextually or intra-textually repeated words, phrases and lines are connected; the text contains the past and the future as dimensions of the present moment, with the past being merely the former-present, and the future existing as a present

¹¹³ Christensen, 'It's All Words', p. 57.

¹¹⁴ Christensen, *It*, trans. by Susanna Nied (Manchester: Carcanet, 2007), p. 86.

¹¹⁵ Vermeulen, p. 28. Vermeulen refers to Derrida, 'Archive Fever', trans. by Eric Prenowitz, *Diacritics*, 25.2 (1995), 9-63.

expectation.¹¹⁶ The present therefore contains the coexisting original and duplicate of any repetition – meaning that ‘neither of these two series can any longer be designated as the original or the derived’.¹¹⁷ Farrier connects spectrality and repetition, arguing that repetition ‘produces a kind of spectral presencing’.¹¹⁸ He argues that the repeated line ‘begins by coming back [...] the immediate repetition produces at the same time a curious sense of the spectral, of a past voice shadowing a present one’.¹¹⁹ This creates a distinct sense of the varying scales of time, which, Farrier argues, can be used poetically to better aid our comprehension of our role in the climate crisis, and the temporal scale of our responsibilities.¹²⁰ Farrier writes that the (re)identification of self as a geological ‘agent of change’ causes a ‘temporal dislocation’, as we are ‘forced to identify with such “deep time” processes, we also conjure the ghosts of those whose lives to come will be shaped in drastic ways by our actions in the present’.¹²¹ Our every action is haunted by not only the past that led us here, but also by all the future implications of those actions. It is precisely this blurring of temporalities that Farrier argues is enacted through repetition within a poem: ‘As the poem progresses, we begin to read the first with an awareness of the repetition to come [...] our ear becomes attuned to a future frequency’.¹²² We see this in the construction of *Alphabet*; from the very first line (‘apricot trees exist’, repeated twice), it is a poem that hinges on repetition – that compels the reader to listen with an ear (and eye) attuned to the future.

‘The Ticking Haze’: Spectres as Textual Radiation

Alphabet is haunted by repetitions; apricot trees, doves, bombs, the ideas of existence and apocalypse all repeat, reiterate, return throughout the text. I argue that this kind of spectral repetition creates a nuclear ‘haze’ of meaning, in which words and images within a poem act as unstable textual atoms, contaminating, or irradiating their surroundings, their future iterations, their linguistic relations, with nuclear or ecocritical implications.¹²³ In the same

¹¹⁶ Deleuze, p. 70.

¹¹⁷ Deleuze, p. 105.

¹¹⁸ Farrier, ‘Like a Stone’: Ecology, *Enargeia*, and Ethical Time in Alice Oswald’s *Memorial*, *Environmental Humanities*, 4 (2014), 1-18, p. 9.

¹¹⁹ Farrier, ‘Like a Stone’, p. 9. This is reminiscent of Prynne’s work on ‘mental ears’: “‘Mental ears’ will hear in older sounds the then new sounds of making and marking a track into forward space: a future in the past’. (J. H. Prynne, ‘Mental Ears and Poetic Work’, *Chicago Review*, 55.1 (2010), 126-157, p. 133). For more on Prynne’s ‘mental ears’ in relation to Anthropocene poetics, see Solnick, p. 169.

¹²⁰ Farrier, ‘Like a Stone’, p. 2.

¹²¹ Farrier, ‘Like a Stone’, p. 2.

¹²² Farrier, ‘Like a Stone’, p. 11.

¹²³ ‘Nuclear’ is an apt name for this type of textual irradiation; nucleus is etymologically derived from the Proto-Indo-European root **kneu*, meaning ‘nut’ or ‘kernel’ – a centre or seed from which something (in this case a proliferation of meanings) can grow.

way that Carson describes the effects of Strontium 90, words are ‘passing [meaning] from one to another in a chain of poisoning’, just as radioactive fallout particles transmit their toxic irradiations.

Perhaps the most explicit instance of this textual irradiation in *Alphabet* is the word ‘white’. On page twenty-one, Christensen writes:

white, it is white, say the children,
the darkness is white, but not
white like the white that existed
when fruit trees existed, their blossoms so white,
this darkness is whiter; eyes melt¹²⁴

This is, arguably, the moment that *Alphabet* becomes explicitly atomic; eyes melting is a known trope of nuclear writing, and alongside the mushroom cloud, a blinding, apocalyptic flash of bright white light is one of the enduring images of the atomic bomb.¹²⁵ When the Trinity Test was conducted in the Jornada del Muerto desert in 1945, the light was so bright that a blind girl 100 miles away was reported to have ‘cried out, at the moment of the first flash, “What was that?”’.¹²⁶ James Conant, who would later be part of the committee that advocated the use of atomic bombs on Japan, described the moment of detonation as ‘the whole sky suddenly full of white light like the end of the world’.¹²⁷ The bright flash motif has been carried forward into both poetic and fictional accounts of atomic bombings. *Atomic Ghost: Poets Respond to the Nuclear Age*, a collection of poems written in response to nuclear warfare, contains numerous references to whiteness, to ‘Light, / unbearable / light’, ‘light so bright / the firmament bucked’, to ‘the white flash’.¹²⁸ Positioned alongside the melting eyes, whiteness in Christensen’s work becomes apocalyptic, destructive – nuclear.

In the essay ‘Silk, the Universe, Language, the Heart’, Christensen describes nouns as ‘crystals, each enclosing its own little piece of our knowledge about the world’.¹²⁹ She argues that nouns resonate with a multiplicity of meanings:

Say the world *silk* and it vanishes with the sound, but your senses, your memory and knowledge cast back an echo. Write it on paper, and it stays there, unmoving, but your thoughts and feelings are already on their way to the farthest corners of the

¹²⁴ Christensen, *Alphabet*, p. 21.

¹²⁵ Cordle, *States of Suspense*, p. 32.

¹²⁶ John Canady, *The Nuclear Muse: Literature, Physics and the First Atomic Bombs* (Madison: University of Wisconsin Press, 2000), p. 85.

¹²⁷ Alex Wellerstein, ‘The First Light of Trinity’, *The New Yorker* (2015)

<<https://www.newyorker.com/tech/elements/the-first-light-of-the-trinity-atomic-test>> [accessed 28 August 2018].

¹²⁸ Bradley, ‘Sailors Shielding Their Eyes During Atomic Bomb Test, Bikini, 1947’ in *Atomic Ghost*, p. 25;

John Balaban, ‘Atomic Ghost’ in *Atomic Ghost*, p. 85; Eleanor Wilner, ‘High Noon at Los Alamos’, in *Atomic Ghost*, p. 185.

¹²⁹ Christensen, ‘Silk, the Universe, Language, the Heart’, in *The Condition of Secrecy*, pp. 29-36, p. 29.

world. [...] *silk* [...] is therefore able at any time to awaken our encapsulated knowledge not only of silk, but of the world itself [...] the summer sky, a flower petal, or the membrane between two muscles in a butchered chicken.¹³⁰

For Christensen, every noun contains not just itself, but the world.¹³¹ Christensen refers to these contained meanings as energy, writing that ‘each individual word is so packed with energy that it contains millions of ways to experience things. [...] Everything is contained in everything’.¹³² Words (or nouns), are therefore comparable to atoms – tiny components of language that are packed with semantic energy that is released on reading, causing the atoms to split and shatter into endless chains of ghostly signification, dispersing themselves throughout the text as a haze, contaminating all other words with what Cordle might call their ‘radioactive legacies’.¹³³

In *Alphabet*, therefore, every instance of whiteness, even the innocent apricot trees that populate the opening lines, becomes (retrospectively or pre-emptively) contaminated, irradiated with the haunting afterimage of atomic bombs: the ‘apricot trees’, the ‘doves’, the ‘eider ducks’, ‘the fleeces of sheep’, ‘the elder tree’s / pale flowers’, the ‘half-moon’, the ‘hydrangeas’ / white, bright-shining’, the ‘ice floes of polar seas’, the ‘polar bears’, ‘Icarus pale as a corpse’, ‘Icarus-children white as lambs’, ‘rime’, ‘bones’, ‘white clover’, ‘milk’, ‘blossoms so white’, ‘the zinc-white nights’, ‘the Milky Way’, ‘jasmine’, ‘salt’, ‘roots’, ‘the sky with its light’, ‘bread’, ‘salt’, ‘steam’, ‘potatoes’, ‘June snow’, ‘pearls’, a ‘clutch of feathers’, ‘hopeless cloud’, ‘the human eye’, ‘the marble of banks’, ‘eggs’, ‘frost-stricken water’, ‘the hydrogen / at the stars’ cores’, ‘a tooth’, ‘an icelocked lake’, the ‘permafrost membrane’, ‘the iceplant’s hairs’, ‘the North Star’s fire’, ‘wild chamomile’, ‘threads of foam’, ‘ripening / lightning’, ‘fog’, ‘the skeleton the nails’, ‘the skull’, ‘the brain’, ‘factory-white / nights’, ‘gulls’, ‘the clouds’ web’, ‘thirty pounds of white paper’, the ‘full moon’, ‘the stars’ / flames’.¹³⁴

Words within a text are not limited to spatial connection; they can also be connected by commonalities of sound, or threads of association that stretch across intertextual space.

¹³⁰ Christensen, ‘Silk, the Universe, Language, the Heart’, p. 29.

¹³¹ Similar arguments have been made by William Reuckert, who compares poems to ‘hydrocarbons’, full of ‘stored energy’ (William Reuckert, ‘Literature and Ecology: An Experiment in Eco-criticism’, in *The Ecocriticism Reader*, ed. by Cheryl Glotfelty and Harold Fromm (Athens: University of Georgia Press, 1996), pp. 105-123, p. 108), by Moe, who writes that ‘a syllable of a poem contains within it numerous possibilities for becoming’ like a seed (Moe, pp. 87-88), and by Solnick, who writes that ‘the figure of the virus’ as something ‘neither dead nor alive’ can be compared to repetition within a poetic text (Solnick, pp. 171-172).

¹³² Christensen, ‘The Condition of Secrecy’, p. 37.

¹³³ Cordle, *Late Cold War Literature*, p. 123.

¹³⁴ Christensen, *Alphabet*, p. 11, 14-16, 18, 20-23, 25, 26, 30, 31, 35, 36, 41, 44-47, 50, 52, 53, 58-61, 63, 70, 71, 75, 76.

We see this demonstrated by the instances of whiteness scattered throughout *Alphabet*, which are neighbours only in the sense that they share a similar property of whiteness, somewhere in their layers (or chains) of meaning and association. Furthermore, as Deleuze argues, repeated words (be it immediate, intertextual, or intra-textual repetitions) are also connected, with any individual iteration containing both itself, and any future or previous instances.¹³⁵ Repetition, then, is a mechanism for contamination: a repeated word infects the words around it with the meanings or connotations accumulated from any previous – or future – use.

When a text is littered with these contaminated and contaminating repetitions, it becomes hazy, unstable – muddled with blurred boundaries of time and signification. In *Alphabet*, Christensen writes of ‘the ticking haze’, ‘the whole / heliocentric haze that has dreamed / these devoted brains’.¹³⁶ A haze, meteorologically, is the dispersal of particles in the air that can be seen as a partially opaque sheen. ‘Haze’ can describe fog, ice, steam, mist, smoke, volcanic ash, dust, sand, snow, and, most significantly here, radioactive fallout. Derived from perhaps either the French *obscure*, or the Latin *obscurus*, it also contains within itself the meanings of obscuring, of darkness, duskiness, of being indistinct. To be hazy is, therefore, to be shadowed, faint, or indistinct, to be hidden, out of sight, or inconspicuous, to be difficult to understand. To be secret, but also close. Nuclear radiation, drifting from the sky as fallout, as radioactive rain, ‘so gently dissolved, gently ionized, / and white’, permeates the meaning of the word haze – it, too, is vague and obscure, indistinct but still impossibly, violently close, transgressing the borders of place, time and body as it spreads and infiltrates the earth, our bones, our brains, the unborn.¹³⁷ There are no boundaries in the irradiated text – no inside and or outside, no past and future, no self and other, no writer and reader, no me and no you.

The irradiated, or hazy text can therefore (somewhat paradoxically) shed light on the nature of human life in the Anthropocene, in which adjusting the scale of our thinking reveals the entangled, hazy nature of our ecological existence. For Lynn Davidson, repetitions of certain key words across a collection, can ‘prompt the reader to “hear” how there is a variation of meaning, connotation and evocation with each new placement’.¹³⁸ This variation is, Davidson argues, demonstrative of the capacity of poetic language to remain ‘open, fluid

¹³⁵ Deleuze, p. 70, 105.

¹³⁶ Christensen, *Alphabet*, p. 18.

¹³⁷ Christensen, *Alphabet*, p. 22.

¹³⁸ Lynn Davidson, ‘Repetition, Return and the Negotiation of Place in The Tree House’, in *Kathleen Jamie: Essays and Poems on Her Work*, ed. by Rachel Falconer (Edinburgh: Edinburgh University Press, 2015), pp. 93-99, p. 93.

and capable of change'.¹³⁹ Poetry can, therefore, 'uniquely enable the conversation about nature and our place within it to remain open and dynamic', as the reader is forced to consider certain human dialogues from multiple settings and points of view.¹⁴⁰ In *Alphabet*, the reader quickly realises that trees are more than just trees – that snow is more than just snow, that waves and bracken and clouds are more than just natural phenomena; they are languages, alphabets, symbols, endless chains of meaning and signification. Confronted with the spectral irradiations of ice and snow and salt, pearls and clouds and apricot blossom, the reader of *Alphabet* is also, therefore, confronted with the sheer scale of the nuclear, and the vulnerability of a world where 'I stand in / my kitchen peeling / potatoes' and, on the very next page, 'atom bombs exist'.¹⁴¹ Reading repetition as an irradiating device therefore opens up the reader to the multiplicity of Anthropocene temporalities, in which the past and the future are deeply, hauntingly, entangled with the present, the mundane, the everyday.

100 Seconds to Midnight: A Spectral Poetics at the End of the World

The same spectres of environmental catastrophe and nuclear apocalypse that haunt *Alphabet* continue to haunt contemporary Anthropocene discourse. In January 2020, the Bulletin of the Atomic Scientists released its annual statement, announcing that the doomsday clock (which measures the likeliness of global catastrophe) stood at 100 seconds to midnight – a time never before reached in the history of the clock, which was established in 1947 in response to the increasing threat of nuclear disaster.¹⁴² 'Humanity', it announced, 'continues to face two simultaneous existential dangers—nuclear war and climate change'.¹⁴³ As previously discussed, nuclear warfare holds a special significance in ecocritical studies of Anthropocene literature; the currently unfolding climate crisis and the possibility of 'civilization-ending nuclear war' both leave us in states of suspense and anxiety.¹⁴⁴ In a manner reminiscent of Cordle's 'state of suspense', Deborah Bird Rose describes the 'looming sense of fatality' that we experience in the time of the Anthropocene – the 'creeping awareness that nothing can be

¹³⁹ Davidson, p. 69.

¹⁴⁰ Davidson, p. 69.

¹⁴¹ Christensen, *Alphabet*, pp. 24-25.

¹⁴² When this chapter was first drafted in 2018, the doomsday clock stood at two minutes to midnight – a measure only reached once before in 1953, when the United States and the Soviet Union began testing nuclear weapons as part of the Cold War. At the time of editing (January 2021) the clock still stood at 100 seconds to midnight.

¹⁴³ John Mecklin, 'Closer than ever: It is 100 seconds to midnight', *Bulletin of the Atomic Scientists* (2020) <<https://thebulletin.org/doomsday-clock/current-time/>> [accessed 03 November 2020].

¹⁴⁴ Mecklin, para. 7.

put right'.¹⁴⁵ Schwab further elucidates this parallel between the Anthropocene and the nuclear, writing that nuclear technologies have made humans into 'agents of the ultimate death of planetary life', burdened with the 'unimaginable responsibility for the destiny not only of their own species but of other species as well'.¹⁴⁶ This is equally applicable to human activities driving the climate crisis. Furthermore, as Schwab notes, 'to think and care about planetary futures' in the way that the nuclear demands, 'ultimately requires humans to relinquish their anthropocentric rootedness in a temporal thinking that focuses on conceivable human lifespans'.¹⁴⁷ This, too, is a core tenet of Anthropocene thinking; we must adjust the scale of our thinking to encompass a complicated, entangled temporality that stretches deep into the future.

To develop a poetics of the Anthropocene, we must therefore look to a poetics of the nuclear, to poetic forms that expresses the insidious contamination, and the entangled, hazy, haunting temporalities of nuclear time. Reading Christensen's *Alphabet* makes clear the role of form and repetition in such a poetics; there is a tension between the exponentially expanding universe of an infinite catalogue of phenomena, and the oncoming, never quite arriving spectre of 'z', zero, apocalypse, that positions *Alphabet* in a permanent state of suspense, a moment of indrawn breath in which words become isotopic, and meanings and times become multiple, thickened, indistinct. In the hazy, atomic light of this text, we are exposed to the haunting nature of the Anthropocene self – a future fossil, a future ghost.¹⁴⁸ This informs future readings, as it compels us to consider what insidious, or unconscious traces we can pick out, what irradiations, what hazes, what ghosts can we parse from within the nuclear, or the Anthropocenic text.

¹⁴⁵ Bird Rose, 'Anthropocene Noir', *Arena Journal*, 41/42 (2013), 206-219, 215.

¹⁴⁶ Schwab, p. 21.

¹⁴⁷ Schwab, p. 34.

¹⁴⁸ Farrier defines a 'future fossil' as the traces of our everyday activities that will last into the deep future. Farrier, *Footprints*. Kindle edition.

‘A GALLERY OF MONSTERS’
An Ecocritical Reading of Alice Fulton’s Fractal Poetics

Fractal poetics is interested in that point of metamorphosis, when structure is incipient, all threshold, a neither-nor.¹

– Alice Fulton

And the monster is dangerous, a form suspended between forms.²

– Jeffrey Jerome Cohen

In the classic tale of Daphne and Apollo, Daphne is transformed into a tree: her ‘arms were branches, and her speedy feet / Rooted and held [...] Everything gone except her grace’, and ‘the heart still beating / Under the bark’.³ This myth has undergone a multitude of poetic retellings, with Daphne’s body repeatedly transforming into the body of a tree or being trapped within the trunk. In Louise Glück’s ‘Mythic Fragment’, Daphne ‘was nowhere [...] was in a tree forever’.⁴ Anne Sexton’s Daphne, in ‘Where I Live in this Honourable House of the Laurel Tree’, laments ‘how I wait / here in my wooden legs and O / my green hands’.⁵ Jacquelyn Ardam writes that Daphne is a metamorphic icon that exists ‘in a sort of spectrum, with treeness at one end [...] and humanness [...] at the other’.⁶ In Fulton’s ‘Give’, however, Daphne’s metamorphosis is not a simple transformation from human to tree; her skin does not turn to bark, her hair does not thicken and split into leaves. Neither is she simply trapped, foetus-like, within the body of the tree. Instead, Daphne penetrates the body of the tree while the tree swallows her body in turn, and their individual bodies come together in a ‘grotesque togetherness’, an ‘engagement’ of tree-woman-body, ‘spiralbound / as nature/culture, / the great divide, broke down’.⁷ Rather than inhabiting any one point on Ardam’s spectrum of treeness to humanness, Fulton’s Daphne is simultaneously the entirety of this arboromorphic spectrum, existing in a constant state of becoming, at once something tree and something human, something neither and both.⁸

¹ Fulton, ‘Fractal Amplifications’, p. 63.

² Jeffrey Jerome Cohen, ‘Monster Culture (Seven Theses)’, in *Monster Theory*, ed. by Cohen (Minneapolis: University of Minnesota Press, 2006), pp. 3-25, p. 6.

³ Ovid, *Metamorphoses*, trans. by Rolfe Humphries (Bloomington: Indiana University Press, 1983), p. 20.

⁴ Louise Glück, ‘Mythic Fragment’, *The Triumph of Achilles* (New York: The Eco Press, 1985), p. 13.

⁵ Anne Sexton, ‘Where I Live in this Honourable House of the Laurel Tree’, in *Complete Poems 1981* (Boston: Houghton Mifflin, 1981), p. 17.

⁶ Jacquelyn Ardam, ‘Releasing Daphne: Alice Fulton, Ovid, Trees’, *Contemporary Women’s Writing*, 8.1 (2014), 89-107, p. 90.

⁷ Fulton, ‘Give’, in *Sensual Math*, (New York: W.W. Norton & Company, 1995), pp. 73-113, p. 101.

⁸ ‘Arboromorphic’ refers to my term ‘arboromorphism’, which I define as the literal, literary or psychological process of becoming a tree, or tree-like.

The idea of bodies merging, splicing, (be)coming together, transgressing boundaries and binaries, is significant in the context of the Anthropocene. For the editors of *Arts of Living on a Damaged Planet: Ghosts and Monsters of the Anthropocene*, the monstrous entangling of ‘bodies tumbled into bodies’ is emblematic of our multi-species entanglements with the more-than-human world that are brought to light by the scales of Anthropocene thinking.⁹ ‘Monsters ask us to consider the wonders and terrors of symbiotic entanglement in the Anthropocene’, they argue.¹⁰ Grotesque or monstrous bodies, therefore, are emblematic of the paradox of an Anthropocene identity – of being neither wholly human nor wholly non-human, but something in between. In this chapter I argue that these ideas of entanglement, monstrosity, and the ‘neither-nor’, can be found in both the field of fractal geometry, and the entangled bodies of Fulton’s contemporary free verse poetry. Through an ecocritical analysis of the formal aspects of Fulton’s 1995 poetry collection *Sensual Math*, alongside her various essays on ‘fractal poetics’, I seek to demonstrate that the complex connections and textures of Fulton’s work demand a reconsideration of scale within the text that speaks to the reconsiderations of scale demanded by Anthropocene discourses.

Bodies Tumbled into Bodies: Bodily Entanglement in the Anthropocene

In contemporary Anthropocene thinking we adjust the scale of our notice; in doing so, we become aware of a vast network of entangled relationships that were previously overlooked. Swanson, Tsing, Bubandt and Gan refer to the multi-species bodily entanglements of the agricultural, dairy, meat and fishing industries, and the spread of chemicals, toxins, and other pathogens that permeate our bodies on a cellular level.¹¹ Haraway has written extensively on what she refers to as ‘companion species’, a category into which ‘one must include such organic beings as rice, bees, tulips and intestinal flora, all of whom make life for humans what it is’.¹² Haraway argues that these companions species are ‘kin’, not merely ‘entities tied by ancestry or genealogy’, but part of the assemblage that is the human self.¹³ Human beings are, according to Haraway, ‘kinds-as-assemblages’, composed of a blend of human genomes, and the ‘genomes of bacteria, fungi, protists, and such, some of which play in a symphony

⁹ Swanson, Tsing, Bubandt and Gan, ‘Introduction: Bodies Tumbled Into Bodies’, in *Arts of Living on a Damaged Planet*, pp. 1-12, p. 10.

¹⁰ Swanson, Tsing, Bubandt and Gan, p. 2.

¹¹ Swanson, Tsing, Bubandt and Gan, p. 4.

¹² Haraway, *The Companion Species Manifesto: Dogs, People and Significant Otherness* (Chicago: Prickly Paradigm Press, 2003), p. 15.

¹³ Haraway, ‘Anthropocene, Capitalocene, Plantationocene, Chthulucene’, p. 161.

necessary to my being alive at all. [...] I am vastly outnumbered by my tiny companions'.¹⁴ In fact, as biologist Scott Gilbert points out, only half of our cells have human genomes – the rest are comprised of bacteria, viruses, mites and fungi.¹⁵ We can therefore (re)identify the self as a 'holobiont', a 'multispecies composite', a 'supra-organism – that is, a collection of organisms that function as an organic whole, such as an ant colony', a symbiotic 'assemblage' made up of the cells of the other.¹⁶ 'We are thus not what we thought', argues Margaret McFall-Ngai. 'Every "I" is also a "we"', and "'individuals" aren't particularly individual at all'.¹⁷ The human body in the Anthropocene is (like Fulton's Daphne) therefore neither wholly human, nor wholly non-human. By readjusting the scale of our perspective to the global reaches of agriculture and industry, and to the infinite scale of the bodily microcosm, we find that what we thought of as our exclusively human, individual bodies are in fact shared spaces – multi-species communities of life.

As Adams writes, the multi-species self is 'culturally unimaginable'.¹⁸ While symbiotic relationships and co-evolved identities have been studied in microbiology and botany for some time, it is relatively recently that studies have considered animals (and humans) in such a light, leaving us unfamiliar, if not uncomfortable with the concept.¹⁹ Ashley Kniss uses the image of the corpse to further explore this trans-corporeal entangling, describing the 'monstrous mingling of the human and the nonhuman' that takes place during the processes of decomposition, in which maggots and other corpse fauna become entangled with the human body.²⁰ In considering the nature of the corpse, we are reminded of Julia Kristeva's identification of the corpse as 'the utmost abjection', as it is 'death infecting life'.²¹ Kristeva's abject is defined as that which 'disturbs identity, system, order. What does not respect borders, positions, rules. The in between, the ambiguous, the composite'.²² It is

¹⁴ Haraway, *When Species Meet* (Minneapolis: University of Minnesota Press, 2008), p. 3.

¹⁵ Scott F. Gilbert, 'Holobiont by Birth: Multilineage Individuals as the Concretion of Cooperative Processes', in *Arts of Living on a Damaged Planet*, pp. 73-90, p. 75.

¹⁶ David Griffiths, 'Queer Theory for Lichens', *UnderCurrents*, 19 (2015), 36-45, pp. 37, 41.

¹⁷ Margaret McFall-Ngai, 'Noticing Microbial Worlds: The Postmodern Synthesis in Biology', in *Arts of Living on a Damaged Planet*, pp. 51-70, pp. 51-52.

¹⁸ Adams, p. 17.

¹⁹ Gilbert, pp. 73-74.

²⁰ Ashley Kniss, "'The Hand of Deadly Decay": The Rotting Corpse, America's Religious Tradition, and the Ethics of Green Burial in Poe's "The Colloquy of Monos and Una"', in *Fear and Nature: Ecohorror Studies in the Anthropocene*, ed. by Christy Tidwell and Carter Soles (Pennsylvania: Pennsylvania State University Press, 2021), pp. 68-88, p. 69; for the term 'trans-corporeal', see Stacey Alaimo, 'The naked word: The trans-corporeal ethics of the protesting body', *Women & Performance: A Journal of Feminist Theory*, 20.1 (2010), pp. 15-36, p. 18.

²¹ Julia Kristeva, *Powers of Horror: An Essay on Abjection*, trans. by Leon S. Roudiez (New York: Columbia University Press, 1982), p. 4.

²² Kristeva, *Powers of Horror*, p. 4.

this disregard for the borders of the body which causes our disturbance in the case of the corpse fauna, and it is this disregard for borders and order, this inhabitation of the in-between, the transgressive, and the nonbinary that I seek to explore through the lens of monstrosity and fractal geometry, in the forms and textures of Fulton’s poetics.²³

‘A Gallery of Monsters’: Introducing Fractals

Fulton is an American poet, critic, and fiction writer, known for her eclectic, experimental style; her poetry fluctuates between humorous, emotional, and intellectual registers, and explicitly challenges the ‘culturally constructed assumptions’ of gender and society.²⁴ In this chapter, I focus on Fulton’s self-titled ‘fractal poetics’, which she outlines in two essays, ‘Of Formal Free and Fractal Verse: Singing the Body Eclectic’, and ‘Fractal Amplifications: Writing in Three Dimensions’.²⁵ Fulton’s fractal poetics draws on the language of the fractal, as introduced by mathematician Mandelbrot in *The Fractal Geometry of Nature*.²⁶

Mandelbrot’s book was born from his investigations into ‘those forms that Euclid leaves aside as being “formless” – wispy clouds, for example, or jagged coastlines.’²⁷ In the introduction to the text, Mandelbrot introduces the term ‘fractal’, writing that he ‘conceived and developed a new geometry of nature [...]. It describes many of the irregular and fragmented patterns around us, and leads to full-fledged theories, by identifying a family of shapes I call *fractals*’.²⁸ Describing fractal shapes variously as ‘grainy, hydralike, in between, pimply, pocked, ramified, seaweed, strange, tangled, tortuous, wiggly, wispy, wrinkled, and the like’, Mandelbrot provided a vocabulary that could be used to cover a variety of shapes that displayed irregular or non-linear properties, especially at magnified scales.²⁹ He writes:

I coined *fractal* from the Latin adjective *fractus*. The corresponding Latin verb *frangere* means ‘to break’: to create irregular fragments. It is therefore sensible – and how appropriate for our needs! – that, in addition to ‘fragmented’ (as in *fraction* or

²³ It is interesting to consider this alongside Jamie Lorimer’s writing on helminth therapies – a process of deliberate infection with parasitic worms to cure allergies and autoimmune conditions. Used in this way, worms become ‘kin’; rather than transgressors, they become part of the assemblage that is the human body (Jamie Lorimer, ‘Gut Buddies: Multispecies Studies and the Microbiome’, *Environmental Humanities*, 8.1 (2016), 57-76).

²⁴ Ernest J. Smith, ‘Alice Fulton (1952-)', in *Contemporary American Women Poets: An A-Z Guide*, ed. by Catherine Cucinella (Westport: Greenwood Press, 2002), pp. 127-132, p. 129.

²⁵ Fulton, ‘Of Formal, Free, and Fractal Verse: Singing the Body Eclectic’, in *Feeling as a Foreign Language*, pp. 43-59; Fulton, ‘Fractal Amplifications’, pp. 61-82.

²⁶ Mandelbrot, *The Fractal Geometry of Nature*. Mandelbrot first explored fractal ideas in his seminal paper, ‘How Long is the Coast of Britain? Statistical Self-Similarity and Fractional Dimension’, published in 1967, but did not use the term ‘fractal’ until *The Fractal Geometry of Nature*.

²⁷ Mandelbrot, *The Fractal Geometry of Nature*, p. 1.

²⁸ Mandelbrot, *The Fractal Geometry of Nature*, p. 1.

²⁹ Mandelbrot, *The Fractal Geometry of Nature*, p. 5.

refraction), *fractus* should also mean irregular, both meanings being preserved in *fragment*.³⁰

The word fractal therefore holds multiple meanings simultaneously within itself – it is a word meaning both irregular, and fragmented. In naming the category of fractal shapes, Mandelbrot has therefore constructed a category of the uncategorizable.³¹

Mandelbrot writes that ‘Homely names make the monsters easier to tame!’; by naming the fractal, it becomes de-mystified, and somehow more acceptable.³² Fractals are couched in a context of monstrosity, with early fractal shapes such as the Koch Curve or Sierpinski Gasket being vilified in mathematical dialogue. In the introduction to *The Fractal Geometry of Nature*, Mandelbrot extensively quotes Dyson’s article, ‘Characterizing Irregularity’, noting his use of the term ‘monster’, to which Mandelbrot returns throughout the book.³³ Dyson writes:

These new structures were regarded [...] as ‘pathological’, [...] as a ‘gallery of monsters’, kin to the cubist painting and atonal music that were upsetting established standards of taste in the arts at about the same time.³⁴

Fractals are monsters, according to Dyson (and Mandelbrot), because, like cubism and jazz, they ‘did not fit the patterns’ – they were too irregular, too fragmented, to fit within existing standards of mathematics (or art, or music).³⁵ It is important to note that ‘monster’ does in fact have a mathematical definition, as well as a colloquial or literary one. Martin Gardner unpacks this label of mathematical monstrosity, writing that mathematical definitions are constructed through a continual process of revision:

The objects are given a name, x , and defined in a rough way that conforms to intuition and usage. Then someone discovers an exceptional object that meets the definition but clearly is not what everyone has in mind when he calls an object x . [...] If the exceptions are strongly counter to intuition, they are sometimes called monsters. The adjective pathological is often attached to them.³⁶

Mathematically, then, fractal shapes were deemed monstrous as they defied categorization, refusing to be assigned neatly to the first, second or third dimensions, denying the label of

³⁰ Mandelbrot, *The Fractal Geometry of Nature*, p. 4.

³¹ This is reminiscent of Bill Brown’s categorization of ‘things’ as ‘between the nameable and unnameable, the figurable and unfigurable, the identifiable and unidentifiable’ (Brown, ‘Thing Theory’, in *Things*, ed. by Brown (Chicago: University of Chicago Press, 2004), pp. 1-22, p. 5).

³² Mandelbrot, *The Fractal Geometry of Nature*, p. 5.

³³ *The Fractal Geometry of Nature* contains several references to monsters. Of particular vehemence is Charles Hermite’s exclamation that he was ‘turning away in fear and horror from this lamentable plague’ (Mandelbrot, p. 36).

³⁴ Dyson, p. 678.

³⁵ Consider, for example, the fragmentation and distortion present in cubist artwork, or jazz, which is characterised by its multiplicities of rhythm, and its blue notes that inhabit the space between standard pitches.

³⁶ Martin Gardner, ‘Mathematical Games: In which “monster” curves force redefinition of the word “curve”’, *Scientific American*, 235.6 (1976), 124-133, p. 124.

infinite and the label of finite alike, and instead occupying an incomprehensible middle space. Pathological, meaning ‘relating to or dealing with disease’, also has a mathematical definition: ‘Of a function or other mathematical object: grossly abnormal in properties or behaviour’.³⁷ Fractals were considered deviations from so-called ‘classical mathematics’, but labelling them as pathological monsters evokes something more than simply otherness – it also evokes horror, aversion, grotesquery, and disease. What is it about the fractal that invites this language of grotesque monstrosity? Is it their hybridity, their paradoxical forms? Or perhaps their refusal to fit into discrete, linear categories?

In order to understand the relationship between monstrosity and fractal geometry in Fulton’s work, it is necessary to first unpack two key terms: self-similarity, and roughness (or fractional dimensionality). Self-similarity is perhaps the property of fractals with which people are most familiar. Also described as ‘symmetry under magnification’, self-similarity refers to a shape that contains iterations of itself at various scales – it repeats the same shape at different scales of magnification.³⁸ Consider, for example, a broccoli. One floret looks much the same as the complete head. Or consider a tree – the same branching structure is found at the scale of the tree, the branch, the twig. Essentially, the shape of the overall structure is contained within smaller portions of that same object.³⁹ This iterative repetition of shape can be found throughout the natural world – in the tangle of underground root systems; in clusters of blossoms, like the frothing head of Queen Anne’s Lace; in the shape of water trickling through dirt; in the ragged bulk of a mountain; in the frayed ribbon of the coastline, splintered with river-mouths; in the electric forks of lightning that leave Lichtenburg figures of themselves scorched into wood. In a digitally generated fractal, this repetition of shape can go on infinitely, but the self-similarity of naturally existing phenomena is finite – there will always come a point where the self-similar patterning does not hold (the atoms of a tree are not tree-shaped, for example).⁴⁰ Mandelbrot refers to these chains of iteration as ‘cascades’.⁴¹

³⁷ ‘Pathological’, *Oxford English Dictionary* (2005)

<<http://www.oed.com/view/Entry/138800?redirectedFrom=pathological#eid>> [accessed 23 January 2019].

³⁸ Michael Frame and Amelia Urry, *Fractal Worlds: Grown, Built, and Imagined* (New Haven: Yale University Press, 2016), p. 5.

³⁹ Frame and Urry, pp. 3-4.

⁴⁰ Heinz-Otto Peitgen, Hartmut Jurgens and Dietmov Saupe, *Chaos and Fractals: New Frontiers of Science* (New York: Springer Verlag, 1992), p. 103. For an example of an infinite digitally generated fractal, see Eck’s *Mandelbrot Viewer* <<https://math.hws.edu/eck/js/mandelbrot/MB-info.html>> [accessed 14 October 2020].

⁴¹ Mandelbrot, *The Fractal Geometry of Nature*, p. 35.

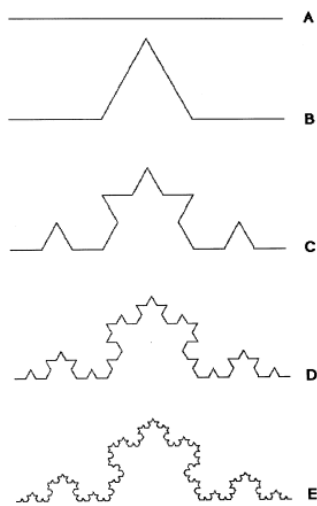


Figure 1. Five iterations of the Koch Curve. Herbert F. Jelinek and Eduardo Fernandez, 'Neurons and fractals: how reliable and useful are calculations of fractal dimensions?', *Journal of Neuroscience Methods*, 81 (1998), 9-18, p. 10.

The second property of fractals that is vital to an understanding of Fulton's fractal poetics is the property of inter-dimensionality, also referred to as fractal dimensionality, or roughness. When we talk about dimension, we are usually talking about integer dimensions. We say a point has zero dimensions, a line that connects two points has one dimension (1D), a flat shape on a plane (such as a square) that connects multiple lines has two dimensions (2D), and a shape that extends along three axes (such as a cube) has three dimensions (3D). Fractals are strange in that they exist between these integer dimensions. Lines (or curves) that should have one dimension become space-filling – they are too detailed to be considered simply one dimensional, without being perfectly two-dimensional. 'Our intuition', write Heinz-Otto Peitgen, Hartmut Jurgens and Dietmov Saupe, 'is that objects which fit on a piece of paper have finite length. But that is misleading'.⁴²

Consider the Koch Curve (Fig. 1). This is a bounded line of infinite length, as the process can generate an infinite number of 'heads' without the initial boundaries of the line ever increasing. The Koch Curve has a counterpart on the plane, the Koch Snowflake (Fig. 2). Although it is a closed shape, the Snowflake has an infinite area due to its increasingly complex cascading perimeter. This property of inter-dimensionality is also called 'roughness', which refers to the complexity of the fractal; a standard polygon has a smooth boundary edge of one dimension – its edges are all lines (see the initial triangle in Fig. 2). For a fractal, with its infinitely complex edges, this boundary edge is closer to two-dimensions. The closer the dimension is to two, the more complex the edges become, and the higher the 'roughness' of the fractal shape.

⁴² Peitgen et al, p. 184.

Inter-dimensionality seems like an abstract concept limited to the world of pure mathematics but that is not the case. In fact, the human body relies on this strange property. As Mandelbrot points out, ‘tissue is a fractal surface’; it is the fractal dimensionality of the arterial system and the structure of the bronchioles in the lungs that allows them to maximize surface area, and therefore function efficiently enough to support human life.⁴³

In *Fractal Worlds: Grown, Built and Imagined*, Michael Frame and Amelia Urry elaborate on this, explaining that in the average lung, ‘three-quarters the surface area of a tennis court [is] contained in a

volume of five or six litres’.⁴⁴ This occurs via a series of iterative branching processes, with the trachea splitting into airways, the airways splitting into bronchioles, which then split into alveoli, constructing an infinitely complex surface area that is essentially a ‘foam-like surface’.⁴⁵ Frame and Urry go on to note that even our DNA is arranged into ‘fractal globules’ through ‘an iterative process of folds on folds on folds, allowing for extensive folding without risk of knotting’.⁴⁶ Our blood, lungs, tissues, nerves – even our brains are full of fractal folding. As Mandelbrot exclaims, these ‘monsters are the very substance of our flesh!’.⁴⁷

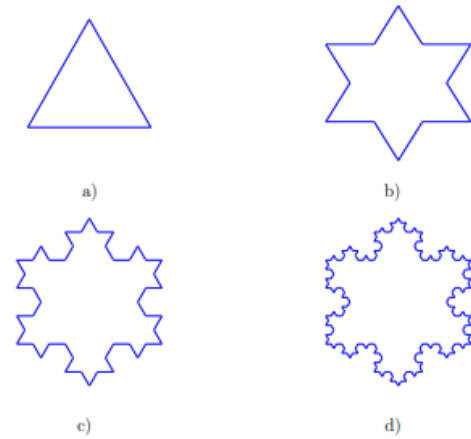


Figure 2. Four Iterations of the Koch Snowflake. Yaroslav Sergeyev, ‘Numerical infinities and infinitesimals: Methodology, applications, and repercussions on two Hilbert Problems’, *EMS Surveys in Mathematical Sciences*, 4 (2017), 219–320, p. 309.

The Dark Matter: Alice Fulton’s Fractal Poetics

Mandelbrot described his work as a response to the challenge of ‘those forms that Euclid leaves aside as being “formless”’ – forms that are ‘wiggly’, branching, folded, or otherwise foaming with irregularity.⁴⁸ In parallel, Fulton’s fractal poetics is a direct response to the ‘critical outburst against the “formlessness” of much contemporary poetry’ – the view taken by literary critics that free verse (in contrast to traditional poetic forms) lacked ‘form’.⁴⁹

Fulton first used the term ‘fractal’ to describe her poetics in 1986, in an essay, ‘Of Formal,

⁴³ Mandelbrot, *The Fractal Geometry of Nature*, pp. 149-150.

⁴⁴ Frame and Urry, p. 64.

⁴⁵ Frame and Urry, p. 64.

⁴⁶ Frame and Urry, p. 78.

⁴⁷ Mandelbrot, *The Fractal Geometry of Nature*, p. 150.

⁴⁸ Mandelbrot, *The Fractal Geometry of Nature*, p. 1.

⁴⁹ Fulton, ‘Of Formal, Free, and Fractal Verse’, p. 43.

Free and Fractal Verse: Singing the Body Eclectic’, where she argues that ‘all poems have a shape – whether it’s pleasing or perceptible to the reader is something else’.⁵⁰ For Fulton, ‘fractal verse’ is an alternative name for poetry that is irregular, yet, like a fractal, contains ‘a deep logic or pattern’ that is revealed upon close reading.⁵¹ This is a critical point: Fulton’s fractal poetics is a scalar poetics. The self-similarity of a fractal is revealed through the scalar transformation of magnification. Similarly, the fractal structure of this type of verse is revealed through the textual equivalent of magnification – a particular type of close reading, where the reader must learn to recognize the importance of details that would usually be overlooked. Fulton writes that ‘any line when examined closely (or magnified) will reveal itself to be as richly detailed as was the larger poem from which it was taken’.⁵² We must, Fulton argues, therefore consider ‘the whole panoply of design and pattern’ when analysing the form of a poem, including:

allusions, puns, apostrophes, and pronouns [...] rhetorical questions, conceits, virtuoso listings, registers of diction, and lineations [...] enjambment [...] use of resistant or resolved line breaks [...] use of white space [...] reiterative devices such as epanalepsis [...] refrain, chorus or repetend [...] such concepts as the microcosm moving toward the macrocosm; the linkage of opposites (oxymoron); stasis; dynamism; and equilibrium.⁵³

Essentially, every element of a poem’s formation (both structural and linguistic) contributes toward its ultimate form. For Fulton, this is what makes free verse fractal; unlike poetry in established, received forms, which Fulton likens to ‘standard mathematics’ or ‘linear analysis’, free verse poems are ‘chaotic structures’ – their ‘deep logic or pattern’ will only reveal itself under magnification (close study).⁵⁴

This magnification, or ‘scaling technique’ as Fulton refers to it, can be understood as a kind of grammar; it is ‘overlooked in our habitual attention to individual things, to the semantics, so to speak’.⁵⁵ In purposely refocusing our attention to these elements of a poem, as opposed to stanza, meter, and rhyme, we begin to notice the underlying order and structure of seemingly ‘chaotic’ free verse. We begin to see the connectedness of things – our preconceptions of part and whole become confused, the background rises and becomes the foreground. This noticing (and prioritising) of ‘background’ details is the method of fractal poetics – as Fulton elaborates, ‘fractal poetics is composed of the disenfranchised details, the

⁵⁰ Fulton, ‘Of Formal, Free, and Fractal Verse’, p. 45.

⁵¹ Fulton, ‘Of Formal, Free, and Fractal Verse’, p. 55.

⁵² Fulton, ‘Of Formal, Free, and Fractal Verse’, p. 58.

⁵³ Fulton, ‘Of Formal, Free, and Fractal Verse’, pp. 46-48.

⁵⁴ Fulton, ‘Fractal Amplifications’, p. 80; Fulton, ‘Of Formal, Free, and Fractal Verse’, p. 55.

⁵⁵ Fulton, ‘Fractal Amplifications’, p. 83.

dark matter of Tradition'.⁵⁶ Punctuation, for Fulton, is one of these details. Made strange, punctuation becomes overt, and 'rather than effacing itself, [it] can become a glyph of implication'.⁵⁷ Interestingly, Mandelbrot argues something similar. *The Fractal Geometry of Nature* makes use of unconventional punctuation, specifically two sets of triangular brackets, one just an outline, the other blocked black. This is a deliberate invention from Mandelbrot, who writes that 'the latter is very bold, so as to be readily found by anyone who becomes lost [...] But the "open bracket" symbol avoids attracting attention, so as to prevent digressions'.⁵⁸ Like Fulton, Mandelbrot manipulates punctuation to either command or deflect notice.

In *Sensual Math* Fulton introduces a new punctuation symbol designed to attract the reader's notice. Inspired by Emily Dickinson's prevalent and idiosyncratic use of the dash, Fulton's 'bride sign' appears throughout the text as two successive equals signs (= =). Fulton dedicates a poem, '= =' to explaining the connotations of the bride sign:

It might mean immersion, that sign
 I've used as title, the sign I call bride
 after the recessive threads in lace= =
 the stitches forming differential
 space around firm design.
 It's the unconsidered

mortar between the silo's bricks= =never admired⁵⁹

The bride sign is also described as 'seam made to show', as the thing 'hinging / one phrase to the next'.⁶⁰ Fulton explains that = = takes its name not from a bride in the matrimonial sense (although Fulton links brides to liminal states throughout *Sensual Math*), but from the terminology of lacemaking. In an interview, Fulton elaborates:

As I researched lace patterns, I learned that the figure or pattern of lace is held together by tiny joining threads called brides. [...] In one lacemaking book, a drawing of the background brides looked like this: = =. So = = is the stuff of ground rather than figure, the yin space that has been occupied, across time, by women. It's a net that holds the pattern together and allows the design to emerge.⁶¹

⁵⁶ Fulton, 'Fractal Amplifications', p. 69. Here, Fulton is referring to 'dark matter' in the astrophysical sense, meaning the matter of the universe that is unseen and undetected.

⁵⁷ Fulton, 'Fractal Amplifications', p. 69.

⁵⁸ Mandelbrot, *The Fractal Geometry of Nature*, p. 15.

⁵⁹ Fulton, '= =', in *Sensual Math*, pp. 56-57, p. 56.

⁶⁰ Fulton, '= =', pp. 56-57.

⁶¹ Fulton and Linden Ontjes, 'The Wick That Is the White Between The Ink: Interview of Alice Fulton by Linden Ontjes at the Josephine Miles House, Berkeley, CA 11/20/04', *The Seattle Review*, 27.2 (2005) <<http://alicefulton.com/interviews/sr.html>> [accessed 3 January 2019] (para. 15).

The bride sign is representative of a transformative moment where the background becomes the foreground – where the punctuation (or other disenfranchised detail) sits at the foreground of the poem and catches the eye, rather than receding and being skimmed over. Fulton uses the bride sign to ‘suggest the poem’s constructedness, suggest that it’s a thing built of words: it has joints, ribs, bones, struts, beams, trusses, pauses, stutters’.⁶² In exposing these joints, Fulton is drawing attention to the artifice of the poem; the bride sign therefore compels the reader to pay close attention to the previously overlooked features of the text.

The bride sign is an example of what happens when we read (or write) fractally. By changing the scale of our reading, the elements that are usually considered to be the background (the dark matter), become prominent. This type of scalar reading can be understood within an ecocritical framework. Drawing on Woods’ use of the term ‘scale critique’, Clark argues that although scale is something that shapes the way we see and interpret everything around us, it is not often something we think to consider critically and is therefore like ‘a kind of grammar’ – it is often overlooked.⁶³ If we change the scale of our attention, new understandings emerge:

at the counterintuitive scale of the whole earth, even once environmentally insignificant behaviours (emitting an amount of a pollutant, chopping down a tree, and even having a baby) now feed into nonlinear material processes that have become problematically decisive and incalculable.⁶⁴

This is the same scalar process that is occurring within Fulton’s fractal poetics. When we change the scale of our attention to focus on the background we previously overlooked, we become aware of relationships, patterns and significations existing beyond our usual, comfortable, anthropocentric perceptions.

What do we notice, then, when we read a poem simultaneously at the microscopic cellular scale of the word, the planetary scale of the collection, and the macroscopic, galactic, universal scale of the history of language and text? When we read like this, strange things start to happen. The text opens up, reveals itself to be made of gaping holes, like the pores in a magnified face. Constellations of meaning pick themselves out, stretching across pages, across poems, like a fungal web. Words become galactic clusters of meaning in themselves, and every word splinters into an infinite chain of words. Poem tumble into poems, like bodies tumbling into bodies, becoming monstrous, porous, rough.

⁶² Fulton and Ontjes, para. 7.

⁶³ Woods, pp. 133-42; Clark, p. 81, 83.

⁶⁴ Clark, p. 85.

Sensual Math: Roughness

To the naked eye, human skin appears as a single smooth sheet. Under a microscope, however, the top layer of the epidermis fractures into a rough assemblage of almost hexagonal scales, overlapping in thick, jagged piles. The same thing occurs when images of tongues or teeth are magnified – what we perceive as smooth is in fact rough, full of holes or barbs or ridges, violently textured in a way that goes unnoticed – unless you change the scale of your noticing. Roughness refers to ‘the quality of being rough in texture, esp. to the touch’, to harshness, abrasiveness, inelegance of diction, ungentleness, the inclemency of weather or sea.⁶⁵ In fractal terms, however, roughness refers to the inter-dimensionality of the fractal, and the increasing level of complexity revealed under magnification. Fractals are like teeth or skin; under magnification, any edge or surface falsely presumed to smooth or straight, becomes porous, or rough.⁶⁶

For Fulton, roughness can be equated to the texture of words: Words have an unimaginable materiality. It is not only the meaning of words that holds my attention, but their sensual, especially tactile, presence. Passages can have an ultrasuede nap, like the velour finish of a petal, or they can feel prickly as hairbrushes.⁶⁷

Here, we can hear resonances of Mandelbrot’s description of fractals as ‘*grainy, hydralike, in between, pimply, pocked, ramified, seaweed, strange, tangled, tortuous, wiggly, wispy, wrinkled, and the like*’.⁶⁸ For Fulton, this texture is determined by the ‘density’ of a word, with ‘transparent’ words or passages being those that ‘vanish into meaning when read rather than calling attention to their linguistic presence’, and ‘dense’ language being that which ‘refuses to yield its mass’, rebuffing the eye and assuming impenetrable solidity.⁶⁹ Fulton elaborates, noting that transparency does not just mean simplicity – it also refers to ‘exposition, reportage, platitudes, advertisements, or clichés. What they have in common is lucidity’.⁷⁰ Language that is mundane or familiar, is transparent – it does not require illumination, untangling, a second, third, look. Fulton also notes that ‘density need not be

⁶⁵ ‘Roughness’, *Oxford English Dictionary* (2011)

<<https://www.oed.com/view/Entry/167890?isAdvanced=false&result=1&rskey=CY0Gab>> [accessed 9 November 2020].

⁶⁶ In using terms such as ‘smoothness’, we are inevitably reminded of Deleuze and Félix Guattari’s essay, ‘1440: The Smooth and Striated’, in which ‘smooth’ space is linked to fractal shapes and the property of fractal dimension; this is in contrast to the linear, regular ‘striated’ space of Euclidean geometry (Deleuze and Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, trans. by Brian Massumi (London: Athlone Press, 1988), pp. 474-500).

⁶⁷ Fulton, ‘Fractal Amplifications’, p. 77.

⁶⁸ Mandelbrot, *The Fractal Geometry of Nature*, p. 5. (Emphasis in original).

⁶⁹ Fulton, ‘Fractal Amplifications’, p. 77.

⁷⁰ Fulton, ‘Fractal Amplifications’, p. 76.

leaden or dull. “Texture” can be built, for instance, from sequined, woolly, stippled, flannel, marbled, glittery or drippy linguistic registers. Resistance is key.⁷¹ Dense or textured language is, therefore, language that commands a closer reading.⁷²

In fractal poems, these distinct textures are shuffled together, with ‘comic, bawdy, banal, or vulgar lines [...] spliced to lyrical, elegiac, or gorgeous passages’, the effect of which is to ‘[construct] a linguistic screen that alternatively dissolves and clouds’.⁷³ This blending of textures is therefore what creates the roughness (or the increasing complexity) of fractal poetry. ‘Some Cool’ exemplifies this textural complexity, featuring lyrics from nursery rhymes (*‘This little piggie went to market. / This little piggie stayed at home’*), quoted speech (‘hey, what kind of poetry you write?’), as well as poeticisms (‘Each hog is rendered into darlingness, / rendered in the nerve-dense rose / of lips, tongue, palm, sole’), moments of confession (‘As I see it, // it’s culturally incorrect to think of this when stringing pig lights on the tree. / It’s chronic me’), scientific language (‘thoracic cavity’), and archaic language (‘At mealtime, come thou hither, / and eat of the bread, / and dip thy morsel in the vinegar’).⁷⁴ Refusing to hold to any one poetic voice or style, Fulton’s verse compels a heightened awareness of the constructed nature of the poem – of its artifice – and demands a slower reading. Jumping between registers of tone makes the poems difficult to decipher, and a heightened level of attention is required to begin to unpick the meaning(s) of the text. Fulton writes that ‘[a] fractal poem might contain [...] lines that would be throwaways if taken out of context. When juxtaposed with other inclusions, however, these debased lines establish a friction or frame greater than their discrete presence would predict’.⁷⁵ Lines of little consequence become critical to our understanding when read in conjunction with other lines, words, or poems. The result is what Fulton terms a ‘radical artifice’ (after Marjorie Perloff), where the formal construction of poetry – its ‘interruption, artifice, disjunction and raggedness’ – is made evident, brought to the foreground.⁷⁶

This radical artifice is disorienting. Victor Shklovsky writes that defamiliarization results in a ‘roughening’ of form; applying this to Fulton’s work, we see that by making poems jagged-edged, by situating them strangely on the page, by refusing conventions of

⁷¹ Fulton, ‘Fractal Amplifications’, p. 77.

⁷² For Mandelbrot, fractal texture is also related to porosity, and is defined by its ‘lacunarity’ (*lacuna* being Latin for gap), or its ‘succolarity’ – the extent to which the fractal allows ‘percolation’ (Mandelbrot, *The Fractal Geometry of Nature*, p. 310).

⁷³ Fulton, ‘Fractal Amplifications’, p. 62.

⁷⁴ Fulton, ‘Some Cool’, in *Sensual Math*, pp. 12-16, pp. 14-16.

⁷⁵ Fulton, ‘Fractal Amplifications’, p. 80.

⁷⁶ Fulton, ‘Fractal Amplifications’, p. 80; Marjorie Perloff, *Radical Artifice: Writing Poetry in the Age of Media* (Chicago: University of Chicago Press, 1991).

meter, stanza, and lineation, and by using varied textures and registers of language, she is defamiliarizing language – making it ‘rough’.⁷⁷ This defamiliarization pushes the reader to read slower, deeper – to read like they are ‘peeling’ or ‘exfoliating’, as Fulton demands.⁷⁸ When we read like this, the most mundane lines bristle with textures and tones. In ‘Wonder Stings More Than the Bee’, ‘Adorable / as hell’, which could be read as a simple colloquialism that means to be very adorable, could also come to mean as adorable as hell, meaning, not adorable at all, but hellish. Or, hell could be, converse to expectation, adorable. Ambiguity flourishes. The fractal reader is encouraged to parse words as individual units, and to consider the multiplicity of potential meanings that they entail, rather than as the transparent phrases we have become immune to. Kristeva, building on Bakhtin’s description of a ‘polyphonic novel’, writes that words, as the ‘minimal structural unit’ of a text, can be understood as ‘an intersection of textural surfaces’ as opposed to a ‘*point* (a fixed meaning)’.⁷⁹ By attempting to parse these various textures of words, to pick them apart, the text becomes complex – becomes rough – due to a proliferation in meaning.

For Renu Bora, fractals inhabit the border of texture and structure, where texture means both the surface quality of a material and the ‘texxture’, the quality or feeling of the inner level that has to be squeezed or groped or chewed to be properly felt, in the same way ‘squeezing someone’s, say, bicep, can register various resistances of skin, fat, muscle and bone’.⁸⁰ Fractals inhabit what Bora calls a ‘mossy third’ dimension, always ‘at risk’ of becoming structured, but never quite tipping across the boundary.⁸¹ We can helpfully borrow from Bora’s work to think about Fulton’s poetics; for one, fractal reading requires a reading of texxture – it requires the reader to squeeze, to dig in to the inner layers, to thoroughly chew the text in order to parse out the fatty lines, the ‘defects known as textures’.⁸² Furthermore, Fulton’s poems inhabit this mossy third space – they exist between styles, between textures, ‘between identities’.⁸³ In Fulton’s own words:

⁷⁷ Victor Shklovsky, ‘Art as Technique’, in *Russian Formalist Criticism: Four Essays, Second Edition*, trans. by Lee T. Lemon and Marion J. Reis (Nebraska: University of Nebraska Press, 1965), pp. 21-34, p. 25.

⁷⁸ Fulton, ‘Screens: An Alchemical Scrapbook’, in *Feeling as a Foreign Language*, pp. 11-39, p. 38.

⁷⁹ Kristeva, ‘Word, Dialogue and Novel’, in *The Kristeva Reader*, ed. by Toril Moi, trans. by Alice Jardine, Thomas Gora and Léon S. Roudiez (Oxford: Blackwell Publishers, 1986), pp. 34-61, p. 66. Kristeva is building on the work of Bakhtin, *Problems of Dostoevsky’s Poetics*, trans. by Caryl Emerson (Minneapolis: University of Minnesota Press, 1984).

⁸⁰ Renu Bora, ‘Outing Texture’, in *Novel Gazing: Queer readings in fiction* (Durham: Duke University Press, 1997), pp. 98-101.

⁸¹ Bora, p. 101.

⁸² Fulton, ‘Fuzzy Feelings’, in *Sensual Math*, pp. 58-62, p. 60.

⁸³ Fulton and Cristanne Miller, ‘An Interview With Alice Fulton’, *Contemporary Literature*, 38.4 (1997), 585-615, p. 588.

Just as fractal science analysed the ground between chaos and Euclidean order, fractal poetics could explore the field between gibberish and traditional forms. It could describe and make visible a third space: the nonbinary in between. [...] Fractal poetics is interested in that point of metamorphosis, when structure is incipient, all threshold, a neither-nor.⁸⁴

We can liken this to a fractal's multi-dimensionality – its roughness, the way it exists between dimensions, somewhere between finite and infinite. Fulton's fractal poems are poems on the 'threshold of structure', the 'edge of chaos'; they inhabit the nonbinary space of the intertextual, the neither-nor – the monster.⁸⁵ The multiple interacting textures and tones of Fulton's writing therefore echo the monstrous, entangled properties of the human body, and our inhabitation of a nonbinary space between the human and the more-than-human. Furthermore, it is scalar disruption that reveals the monstrous nature of both the text, and the human – via close reading in the case of the text, and the changing paradigms of our academic discourses in the case of the human.

Sensual Math: Self-Similarity and Intertextual Clusters

Ardam argues that Fulton's work exhibits a 'grotesque poetic form' that 'mimics Daphne's grotesque bodily form'.⁸⁶ Ardam is referring to Bakhtin's grotesque body – the multiple body, 'two bodies in one', 'not a closed complete unit', but something still in the process of growing, transgressing, and becoming.⁸⁷ Building on this, I argue that Fulton's fractal poetry further enacts the incoherent nature of the monster and the self-referential nature of the fractal through complex internal intertextual dynamics. Just as a fractal contains smaller versions of itself when magnified, Fulton's poetry includes inter-, intra- and extratextual repetitions, with certain words, ideas and themes recurring at various magnifications of the text – at the level of the poem, the line, and the word.⁸⁸ The word 'immersion', for example, appears scattered throughout the collection, including as the title for the poem, 'Immersion', in which the concept of immersion is defined:

the double equal that means more
than equal to= =within

⁸⁴ Fulton, 'Fractal Amplifications', p. 63.

⁸⁵ It is important to note that while Fulton refers to her poetics as 'fractal', she also draws on the larger field of complexity theory (the study of how order and pattern can arise from apparent chaos) for some of her terminology. 'Edge of chaos' is the term given to the transition space within a system that exists between order and chaos.

⁸⁶ Ardam, p. 105.

⁸⁷ Mikhail Bakhtin, *Rabelais and His World*, trans. by Helene Iswolsky (Bloomington: Indiana University Press, 1984), p. 26.

⁸⁸ Fulton, 'Fractal Amplifications', p. 81.

It's sensual math
and untied railroad tracks= =
the ladder of gaps and lace
unlatched. It's staples
in the page and the swimmer's liquid lane.
Those sutures that dissolve into the self

[...]

each sinks in each
as paper can fold back onto itself.
When you unpleat, the crease lingers
and each wing wants to press= =consensual= =into
the other once again.⁸⁹

Here, immersion is defined as something that folds or dissolves into itself. We see this repeated in references to immersion throughout the collection, with lines like 'immersion's also treason / to a naming', 'for immersion see / "passion between"', 'cuddled in the gray immersion', and 'metaphor is pure immersion'.⁹⁰ This intertextual linking creates a scalar effect whereby every instance of the word 'immersion' contains the entirety of the poem 'Immersion' within itself. Consequently, the collection *Sensual Math* is neither merely a sequence of discrete, individual poems, nor a single long poem, but instead an intertextual web that inhabits a between state where every poem is immersed in every other. This intertextual linking therefore exemplifies a monstrous poetics, a poetics that disregards binaries – a poetics of the 'neither-nor'.⁹¹

This expression, 'neither nor', which, as Spivak points out, 'is at once either or', expresses a non-binary logic.⁹² In the same way that Daphne refuses the binary of tree or human, and in the same way that the Koch curve refuses the binary of one or two dimensions, being simultaneously either and both, Fulton's poetry defies binary categorisation and instead embraces the type of non-binary logic that Kristeva refers to as 'poetic logic'.⁹³ Building on Bakhtin's work on the dialogic text and the word as an intertextual intersection, Kristeva posits that it is impossible for 'any logical system, based on a zero-one sequence (true-false, nothingness-notation) to account for the operation of poetic language'.⁹⁴ Kristeva argues that literary and poetic texts are intersections: 'each word (text) is an intersection of word (texts)

⁸⁹ Fulton, 'Immersion', in *Sensual Math*, pp. 66-68, p. 66.

⁹⁰ Fulton, 'Immersion', p. 68; Fulton, 'The Priming is a Negligee', in *Sensual Math*, pp. 3-4; Fulton, 'Drills', in *Sensual Math*, pp. 53-55, p.54.

⁹¹ Fulton, 'Give', p. 88.

⁹² Spivak, loc. 2142. Kindle Edition.

⁹³ Kristeva, 'Word, Dialogue and Novel', pp. 34-61.

⁹⁴ Kristeva, 'Word, Dialogue and Novel', p. 40.

where at least one other word (text) can be read'.⁹⁵ Consequently, the idea that one thing can equal just one other, that a word can signify a single referent, becomes absurd in a poetic text. For Kristeva, this is because there is 'an infinity of pairings and combinations' – every word, or text, means at least more than one thing. Every 'unit' is 'a multi-determined peak', meaning that 'the minimal unit of poetic language is at least *double*'.⁹⁶ This poetic double-logic rejects the binary of 0-1, and instead inhabits a fuzzy space, where logic is based on relationships and 'non-exclusive opposition'.⁹⁷ In a poetic text, therefore, one word (or unit) contains a monstrous proliferation of meanings.

Fulton writes that a key characteristic of fractal poetry is that it contains 'cluster words' – groups of words with common properties.⁹⁸ Fulton explains that:

I wanted to let the meanings of words accrue and change through their presence in the poems. I think of the repeating words as superclusters and clusters [...]. A supercluster word – charged, vibrating, mutable – creates itself anew within the poems: Its definition is available only by reading it within the context of the work. [...] The clusters are the smaller units of the supercluster. For instance, I consider the word *cascade* a supercluster. The cluster words or components of CASCADE include: the spill, waterfall, blitz, flood, accident, slip, pivot, fountain, anima.⁹⁹

The term 'cascade' is a mathematical one – it refers to the chains of iteration formed by a fractal function.¹⁰⁰ Here, it describes the waterfall of words that appear when we examine cluster words more closely. Fulton gives other examples of cluster words, including 'silk', whose cluster words include 'selvage, shift, fabrication, synthetic, skin, cellulite'.¹⁰¹ Cluster words are therefore words relating to another word through various means – association, etymology, polysemy, homophony, opposition, perversion, version, volta, metaphor, simile, likeness, and unlikeness.

⁹⁵ Kristeva, 'Word, Dialogue and Novel', p. 40.

⁹⁶ Kristeva, 'Word, Dialogue and Novel', p. 40.

⁹⁷ Kristeva based this on Georg Cantor's work on the transfinite (transfinite sequences allow for the discussion of infinities and 'next-larger infinities'). Cantor is also the founder of a famous fractal, the Cantor Set, or Cantor Dust. I refer to a 'fuzzy' space in the sense meant by 'fuzzy logic', or non-Boolean logic, in which something can have a value somewhere between true and false. It is interesting (and perhaps important) to note that *Sensual Math* includes a poem entitled 'Fuzzy Feelings', which can be read as a play on words relating to both the colloquialism, and fuzzy logic.

⁹⁸ Fulton, 'Give', pp. 80-81.

⁹⁹ Fulton, 'To Organize a Waterfall', in *Feeling as a Foreign Language*, pp. 173-207, pp. 200-201.

¹⁰⁰ Mandelbrot, *The Fractal Geometry of Nature*, p. 35. In a section on fractal 'curdling', which he defines as 'a cascade of instabilities', Mandelbrot notes the etymology of 'curd' (to press, to push hard, from the old English *crudan*), and provides a list of associations, linked by arrows: curds, cheese, milk, Milky Way, Galaxy (Mandelbrot, *The Fractal Geometry of Nature*, p. 77). For Mandelbrot these associations are linear, forming a chain – for Fulton, the cascade is non-linear, with every part of the cluster relating to every other.

¹⁰¹ Fulton, 'To Organize a Waterfall', p. 202. This has echoes of Christensen's list of words related to 'silk' (Christensen, 'Silk, the Universe, Language, the Heart', p. 29). See Chapter One, p. 43.

Words, according to Fulton’s fractal poetics (and Kristeva’s poetic logic) are therefore not singular referents, but clusters of meaning. The term ‘cluster’ is one with celestial and fractal connotations. Fulton notes that ‘in astronomy, a *cluster* is a group of galaxies; an association of such clusters is a super cluster’.¹⁰² Clustering is also a fractal behaviour and can be used to explain the physical processes of planetary formation. Diffusion-limited aggregation (DLA) describes the way particles begin to coalesce in the very early stages of planetary birth; in brief, particles randomly collide with other particles and stick, and, as Frame and Urry describe, begin ‘growing branches, and side branches, and side branches off side branches’.¹⁰³ Due to particles having a higher chance of sticking to the outer edges of the clump, ‘wispy fractal clusters’ form.¹⁰⁴ Once these clusters reach a certain size, they collide with other clusters and collapse into dense ‘planetesimals’.¹⁰⁵ Examining the work of Wallace Stevens, Lucy Pollard Gott has suggested that words can be described as ‘dust particles’, and that these dust particles can form patterns ‘repeated across several scales’ within a text, and that this can ‘add to the perception of infinite depth’.¹⁰⁶ I argue that in *Sensual Math*, various meanings can be read as dust particles, and words themselves as clusters of such particles, with thematic superclusters (such as betweenness, or difference and affinity) acting as ‘planetesimals’.

Fulton returns to this celestial metaphor to describe the way multiple meanings of cluster words interact, writing that they ‘oscillate under consideration’ like ‘binary stars [...] orbiting about a common centre of mass’.¹⁰⁷ Furthermore, the closer two binary stars are, the faster their orbit; the closer the relation, the quicker meanings oscillate, one rising to the forefront of the reader’s attention before being swung away, and replaced with the other. In *Sensual Math*, clusters occur both as close-proximity clusters within the same poem, and as scattered occurrences, which, when viewed from a more distant magnification (the level of the text in its entirety), can be seen to be part of a coherent pattern that can be picked out and analysed. ‘Industrial Lace’ exemplifies the close-proximity cluster, with the poem featuring numerous references to gemstones and minerals:

The city had such pretty clotheslines.
Women aired their intimate apparel

¹⁰² Fulton, ‘To Organize a Waterfall’, p. 201. A cluster in astronomy can also be a group of stars.

¹⁰³ Frame and Urry, p. 81.

¹⁰⁴ Frame and Urry, p. 81.

¹⁰⁵ Frame and Urry, p. 81.

¹⁰⁶ Lucy Pollard-Gott, ‘Fractal Repetition in the Poetry of Wallace Stevens’, *Language and Style*, 19 (1989), 233-249.

¹⁰⁷ Fulton, ‘Screens: An Alchemical Scrapbook’, p. 26.

in the emery haze:
 membranes of lingerie-
 pearl, ruby, copper slips-
 their somehow intestinal quivering
 [...]

Once we boarded, the girls from Behr-Manning
 put their veins up
 and sawed their nails to dust
 on files from the plant.
 All day they made abrasives. Garnet paper.
 Yes, and rags covered with crushed gems called
 garnet cloth.¹⁰⁸

Here, the reference to ‘emery’ (a crushed mixture of stones and minerals that is applied to paper and used as an abrasive), is quickly followed by ‘pearl, ruby, copper slips’ hanging on the clothesline. Several stanzas later, we have a reference to ‘amber envelopes’, which holds connotations of the stone as well as the colour, and a return to gemstones with the ‘garnet’ paper and cloth. By reading these words as a cluster, we excavate a new layer of meaning within the poem; the haze that envelops the city, the slips that contain bodies and the reference to amber (which is known for holding insects within itself), point toward a theme of containment that adds new resonance to poem about the women in industrial jobs.

Conversely, the cluster of stones also performs an abrasion; attached to papers and rags, they become emery boards, used for filing, sanding, wearing down. The closing lines of the poem refer to an opening of a packet of sanding discs – ‘The old cellophane was tough. / But I ripped until I touched / / their harsh done crust’.¹⁰⁹ Here, the ripping of a covering reveals a further layer of obstruction or containment – the ‘done crust’. We have returned to the language of texture; our scalar, clustering reading acts much like the emery boards, abrading at words until they shed a prolific dusting of meaning.

By contrast, we can read the concept of immersion as a ‘super-cluster’, scattered more widely across the entirety of *Sensual Math*. The meaning(s) of the word ‘immersion’ and the poem ‘Immersion’ can only be understood by reading them within the context of the entire work. Immersion means to be immersed – to be placed completely under a liquid – but it can also refer to being deeply engaged or absorbed, being baptised, or, in the case of astronomy, the entrance of a celestial body into an eclipse; immersion is therefore also an act of occluding, and a moment of transit. In *Sensual Math*, Fulton plays on all the connotations (or clusters) of immersion. In the poem ‘Immersion’, Fulton writes ‘By night she sank jewels in

¹⁰⁸ Fulton, ‘Industrial Lace’, in *Sensual Math*, pp. 7-9, p. 7.

¹⁰⁹ Fulton, ‘Industrial Lace’, p. 8, 9.

immersion cells / to understand them better’, referring to a geological process where gemstones are placed in liquids in order to see the inside more clearly and determine its imperfections.¹¹⁰ In the same poem, Fulton refers to celestial immersion – ‘So no one thought is occluded by another / no less celestial motion in your head == / each sinks in each’.¹¹¹ Elsewhere, we find ‘those summer immersion courses’.¹¹² The word ‘immersion’ therefore, contains not only ‘Immersion’ the poem (and all the words contained therein) but also ‘immersion’, the act of immersing in liquid; ‘immersion’, the moment of eclipse; and ‘immersion’, the act of concentrating intensively on one thing. Reading at the contrasting scales of the word, the poem and the wider text can therefore reveal complex entanglements and nuances of implication and association that alter the reading of other words, poems, and even texts.

Fulton also describes immersion as ‘treason / to a naming that’s a nailing down’.¹¹³ ‘Naming’ can be read as a logically proper naming: names that directly refer to or pick out an object.¹¹⁴ By arguing that immersion is treasonous to this concept, Fulton is rejecting the idea that a word or a name can be a direct referent. This speaks to Derrida’s *différance*, the concept that words and signs are not direct signifiers with intrinsic meanings but instead trigger the production of an infinite chain of signifiers.¹¹⁵ Consequently, meaning is infinitely deferred. Words that carry infinite multitudes of meaning within themselves are therefore demonstrative of Derrida’s *différance*; these words, be it ‘TWILL’ or ‘WING’ (to borrow from Fulton’s analysis of Dickinson) or ‘immersion’ (to borrow from Fulton herself), do not refer to specific signs – instead, they refer to infinite chains of signification.¹¹⁶ There is a distinction to be made; for Fulton, words expand, accumulating meaning – they grow, like fractal clusters, or galaxies, ‘[adding] so many tones to words that words / become a world all in themselves’.¹¹⁷ For Derrida, however, this expansion is also a regression – words acquire so many meanings that no one meaning holds, and ‘a sign [...] signifies nothing, shows the

¹¹⁰ Fulton, ‘Immersion’, p. 67.

¹¹¹ Fulton, ‘Immersion’, p. 67.

¹¹² Fulton, ‘Drills’, p. 53.

¹¹³ Fulton, ‘Immersion’, p. 68.

¹¹⁴ Harold Noonan, *Routledge Philosophy Guidebook to Kripke and Naming and Necessity* (Oxford: Routledge, 2013), p. 36.

¹¹⁵ Derrida, ‘Signature Event Context’, p. 317. For more on *différance* see Chapter 1, p. 38.

¹¹⁶ Fulton, ‘Her Moment of Brocade: The Reconstruction of Emily Dickinson’, in *Feeling as Foreign Language*, pp. 125-170.

¹¹⁷ Fulton, ‘Some Cool’, p. 15.

pas de sens, no-sense, and announces the loss of the tongue'.¹¹⁸ Like a fractal that cascades into dust, words collapse under the weight of their possibilities.

'This Grotesque Togetherness': Reimagining Human Bodies in the Anthropocene

In *What is Called Thinking*, Martin Heidegger includes a translation of Friedrich Hölderlin's poem 'Mnemosyne', the first line of which reads '*Ein Zeichen sind wir, deutungslos*', or 'We are a sign that is not read'.¹¹⁹ Derrida, in '*Geschlecht II: Heidegger's Hand*', considers a French translation of '*Zeichen*', reading it not as 'sign', but as '*monstre*' – 'We are a "monster" void of sense'.¹²⁰ For Derrida this translation reveals the monstrosity of the sign – the 'sign that shows and warns, but [...] is void of sense' – and 'stresses' the monstrous 'gap of the sign to itself'.¹²¹ This loss of sense, or 'loss of the tongue' produced by the infinite deferral of meaning, is, for Derrida, monstrous. For Cohen, the editor of *Monster Theory*, this loss of the tongue is exemplified literally by Ovid's account of Lycaon, the King who, on becoming a wolf, could 'no longer speak, *only signify*'.¹²² Returning to Fulton's 'grotesque togetherness' of woman and tree, we see a similar loss of the tongue; when Daphne is trapped with(in) the tree, she 'became / more babyish / as the centuries passed by [...] often babbled rather than talked: "Sis-boom-bah. Doobie-/doobie-doo"'.¹²³ With the collapse of Fulton's text into infinite chains (or clusters) of signification, words tumbling into worlds like bodies tumbling into bodies, we return to the territory of the monster.

To be monstrous, colloquially, is to be 'large, ugly, and frightening', to be 'malformed', to be 'something repulsively unnatural, an abomination; a thing which is outrageously or offensively wrong'.¹²⁴ This idea of monstrosity as deformation, deviation or aberration is Hegelian in nature – monsters, according to Hegel, are deviations from normative forms. In *Philosophy of Nature*, the second part of his *Encyclopaedia of the Philosophical Sciences*, first published in 1817, Hegel writes:

¹¹⁸ Derrida, '*Geschlecht II*', p. 167. Derrida is writing in response to Heidegger's argument that the thing that makes man distinct from animals is our ability to 'monstrate' – to signify – and that 'monstration' (or demonstration) is enacted through the gesturing hand (Martin Heidegger, *What is Called Thinking*, trans. by Fred D. Wieck and J. Glenn Gray (New York: Harper & Row, 1968), p. 16).

¹¹⁹ Heidegger, p. 11.

¹²⁰ Derrida, '*Geschlecht II*' p. 167.

¹²¹ Derrida, '*Geschlecht II*', p. 167.

¹²² Cohen, p. 13.

¹²³ Fulton, 'Give', pp. 103-104. Strangely, as Daphne loses the ability to speak, the Tree gains it – 'in a migraine pink epiphany', the Tree claims, 'I knew I was / a tree' (Fulton, 'Give', p. 101).

¹²⁴ 'Monster', *Oxford English Dictionary* (2002)

<<http://www.oed.com/view/Entry/121738?rskey=8TvO4z&result=1&isAdvanced=false#eid>> [accessed 21 January 2019].

Even within a specific genus such as mankind, monsters occur, which have to be included within the genus, although they lack some of the characteristic determinations which would have been regarded as essential to it. In order to classify such formations as defective, imperfect, or deformed, an invariable prototype has to be assumed, with the help of which we are able to recognize the so-called monsters' deformities and borderline cases.¹²⁵

Therefore, to have a monster, you must first have a non-monster, an 'invariable prototype' for the monster to deviate from. There must be an original form to become deformed in the body of the monster. This definition of monstrosity as simply 'defective' or 'deformed' fails to hold in the context of entangled Anthropocene monsters. The idea of a deformity necessitates the existence of discrete groups of bodies – those which are 'right' and those which are 'wrong' – those that are part of the accepted group, and those that are 'other'. Monstrosity in the Anthropocene complicates this seemingly simple binary; instead of being equatable to 'wrongness', monstrosity is 'two-faced' – the monster is that incoherent, impossible self that holds both the form *and* its deformity concurrently, defying simple classification.¹²⁶

Cohen argues that what makes Lycaon a monster, rather than an animal, is the inherent internal incoherence of his existence. He is both human and non-human and represents the horrific possibility of a human being reduced to an animal and, simultaneously, the possibility of an animal becoming human. We might think of the werewolf, as in the case of Lycaon, or the vampire, or even the devil, traditionally depicted as half-man, half-goat. However, Cohen argues that the hybrid monster is more than just a spliced pair; it is a 'refusal to participate in the classificatory "order of things"', a paradox:

They are disturbing hybrids whose externally incoherent bodies resist attempts to include them in any systematic structuration. And to the monster is dangerous, a form suspended between forms that threatens to smash distinctions. Because of its ontological liminality, the monster notoriously appears at times of crisis as a kind of third term that problematizes the clash of extremes.¹²⁷

Cohen's reference to 'crisis' is based on Marjorie Garber's definition of a 'category crisis' as a 'failure of definitional distinction, a borderline that becomes permeable, that permits of border crossings from one (apparently distinct) category from another'.¹²⁸ Consequently, the hybridity of monsters is much more than an external incoherence; their incoherence is conceptual, internal, and ontological. It is their very nature of being, and it is this repellent

¹²⁵ Georg Wilhelm Friedrich Hegel, *Philosophy of Nature: Volume I*, trans. by Michael John Petry (Oxfordshire: Routledge, 2002), p. 216.

¹²⁶ David Gunkel, 'Scary Monsters: Hegel and the Nature of the Monstrous', *International Studies in Philosophy* 29.2 (1997), 23-46, p. 24.

¹²⁷ Cohen, p. 6.

¹²⁸ Marjorie Garber, *Vested Interests: Cross-Dressing and Cultural Anxiety* (New York: Routledge, 1992), p. 11.

incoherence that attracts the label of ‘monster’. For Cohen, the monster is therefore ‘the living embodiment of the phenomenon Derrida has famously labelled the “supplement” (*ce dangereux supplément*): it breaks apart bifurcating “either/or” syllogistic logic’.¹²⁹ Monsters, as we have seen, defy boundaries and classifications – they inhabit a world of fuzzy, poetic logic, where everything is multiple, paradoxical, complex. They reject binary opposition and ontological classification, challenging – in the words of Derrida – ‘the relation between the 1 and the 2, and of divisibility in general’.¹³⁰ Monsters can therefore be both self *and* other, both human *and* more-than-human, both woman *and* tree.

Swanson, Tsing, Bubandt and Gan describe monsters as ‘bodies tumbled into bodies’, but for Derrida the monster is not just an entanglement, or a ‘chimerical figure [that] in some way [...] grafts one animal onto another, one living being onto another’.¹³¹ The monster is also the unknown – ‘it shows itself in something that is not yet shown [...] it frightens precisely because no anticipation had prepared one to identify this figure’.¹³² The monstrosity of the Anthropocene self therefore occurs not just because we are entangled, but because we have not (perhaps could not) have anticipated the scale of our geologic and temporal entanglements. We were not prepared to identify the geologic figure of the human self in the context of Anthropocene thinking. Similarly, reading Fulton’s *Sensual Math* through a scalar lens finds us unprepared for unanticipated textures (or texxtures), unforeseen linkings, splittings, bindings. The text therefore becomes a realm of monstrous possibility.

Margrit Shildrick argues that ‘Monsters signify, then, not the oppositional other safely fenced off within its own boundaries, but the otherness of possible worlds, or possible versions of ourselves, not yet realized’.¹³³ They reveal other ways of being, possibilities of form that are yet to come. Fulton describes the relationship between Daphne and the Tree as a ‘grotesque togetherness’.¹³⁴ A grotesque body (in the sense meant by Bakhtin) is one which exists as a threshold state, as ‘a body in the act of becoming [...] never finished, never completed’.¹³⁵ This is certainly the case for Daphne and the Tree: ‘There are holes’, Fulton writes, ‘have you noticed - / where the seams don’t quite close? Daphne peers through / those

¹²⁹ Cohen, p. 7.

¹³⁰ Derrida, ‘*Geschlecht II: Heidegger's Hand*’, p. 189.

¹³¹ Swanson, Tsing, Bubandt and Gan, p. 2; Derrida, ‘Passages - From Traumatism to Promise’, in *Points: Interviews, 1974-1994*, ed. by Elisabeth Weber, trans. by Peggy Kamuf (Stanford: Stanford University Press, 1992), pp. 372-398, p. 386.

¹³² Derrida, ‘Passages - From Traumatism to Promise’, p. 386.

¹³³ Margrit Shildrick, ‘Posthumanism and the Monstrous Body’, *Body & Society*, 2.1 (1996), 1-15, p. 8.

¹³⁴ Fulton, ‘Give’, p. 100.

¹³⁵ Bakhtin, *Rabelais and His World*, p. 317.

gaps'.¹³⁶ Daphne and the Tree exist indefinitely in a strange, liminal space of gaps and seams, suspended in an infinite moment of becoming. 'Give' therefore suggests the possibility of different, other ways of being – of humans becoming trees, and trees becoming human.

This moment of transformation is, for Fulton, the nature of a fractal poetics, which she describes as being 'interested in that point of metamorphosis, when structure is incipient, all threshold, a neither-nor'.¹³⁷ By writing a collection that exists on the threshold of genre, tone, and form, that exists at a point of metamorphosis between states or between dimensions, Fulton is opening up the potential of the fractal text. 'The space of between, where meaning is neither completely revealed nor completely concealed', she writes, 'is the space of possibility'.¹³⁸ I argue that the same is true of a monstrous text that reveals (and conceals) unanticipated connections and multiplicities of meaning, and in which every word is a threshold, poised to reveal another possible cluster of signification. A fractal, or monstrous poetics therefore suggests that other ways of being and thinking are possible if we adjust the scale of our noticing. By paying attention to the unspoken clusters, the dark matter, the fractal textures and repetitions of the text, the reader is confronted with the incoherent nature of the monster, and, consequently, the monstrous nature of the ecological self.

The Monstrous Text is Full of Holes

For Fulton, monstrosity is a transformation – a becoming, a turning into. 'Once otherness gets in', Fulton writes, 'a something else entirely begins. / Newness / isn't truth so much as motion'.¹³⁹ We see this in *Sensual Math* – littered with moments of ambiguity, and with the background perpetually flexing to the foreground before receding, the text is very much in motion, (be)coming to life through a close, scalar reading. The text blisters with holes – it has become a fractal carpet, a fractal foam of more hole than surface, holes within holes, a trypophobic nightmare. Mandelbrot calls the negative spaces within a fractal shape 'tremas', from the Greek for 'hole', which is related to the Latin *tremes*, meaning 'termite'.¹⁴⁰ In our fractal text, with all its clusters dissolving into their infinitely deferring chains, it is as though termites have been eating the body of the text, leaving monstrous tunnels in place of signification.

¹³⁶ Fulton, 'Give', p. 108.

¹³⁷ Fulton, 'Fractal Amplifications', p. 63.

¹³⁸ Fulton, 'Screens: An Alchemical Scrapbook', p. 15

¹³⁹ Fulton, 'Give', p. 106.

¹⁴⁰ Mandelbrot, *The Fractal Geometry of Nature*, p. 76.

How, then, can we read such a text? In a fractal world, dimensions are fractional; it is possible to think of these ‘tremas’, these ‘holes’ not as one-dimensional points, but as two-dimensional lines, three-dimensional tunnels – passages into, or through the text, passages that are ‘rare and narrow’, complex, convoluted pathways like those through ‘ice floes’ and archipelagos.¹⁴¹ Consequently, ‘to see on a large scale’ – to see more than just a single word or poem, to read the deep, fractal levels of the text – ‘thus means to attempt to travel through as much space [and time] as possible, as one does at sea, when one goes from island to island searching for “Northwest passages” between different spaces’.¹⁴² In the following chapter, I follow this line of questioning, asking what it means to pass through a text – to voyage, to conduct passage, which is at once ‘the action of passing’, passing over, passing on, passing through, but also ‘the extension of a line, string, etc. from one point to another’, and the migratory paths of fish and birds. I ask what it means to unravel a text, to unpick a ‘skein of shards of words’, where a skein is at once a thread or a woven string, but also a flock, or a V of geese.¹⁴³ Here, we begin to make sense of the fractal, haunted text, constructing meaning through acts of constellation, as we voyage through what Barthes terms a ‘galaxy of signifiers’, a “‘nebulae” of signifieds’.¹⁴⁴

¹⁴¹ This borrows from Michel Serres’ description of the ‘passages’ connecting the sciences and the humanities. See Serres, *Hermes V: Le Passage de Nord-Ouest* (Paris: Minuit, 1980), p. 18, translated in Josué V. Harari and David F. Bell, ‘Introduction’, in *Hermes: Literature, Science, Philosophy*, ed. by Harari and Bell (Baltimore: Johns Hopkins University Press, 1982), pp. ix-xi, p. xi.

¹⁴² Harari and Bell, ‘Introduction’, p. xiv.

¹⁴³ Derrida, ‘A Silkworm of One’s Own (Points of view stitched on the other veil)’, trans. by Geoffrey Bennington, *Oxford Literary Review* 18.1 (1996), 3-65, p. 13. The definitions of ‘passage’ are taken from ‘Passage’, *Oxford English Dictionary* (2005) <<https://www.oed.com/view/Entry/138437#eid31655684>> [accessed 11 November 2020].

¹⁴⁴ Barthes, *S/Z*, pp. 5-6, 8.

V IS FOR VEER IS FOR VOYAGE IS FOR VERSION Constellation as Meaning-Making in Stephanie Strickland's *V*

When you think of the sky, what is it you imagine? Perhaps it is something flat, blue, and 'up there', like the wide crayon stripe in a child's drawing, scribbled across the top of the page. Perhaps you think of the sky as a bowl, or a dome, 'a vault between the waters to separate water from water', like an upturned beaker cupping the surface of the earth.¹ Perhaps you think of the sky as an unfurling of rich fabric, 'the old-star-eaten blanket', 'the heaven's embroidered cloths', with stars as studs or 'intolerably bright / holes, punched in the sky'.² While inaccurate, these metaphors reveal certain celestial truths. Like a vault, the sky is a space of great depth – it is a deep well, cluttered with layers of clouds, rainbows, lightning, balloons, birds, pollutants, insects, chemicals, aeroplanes, smog, people, radiation, kites – and further, satellites, debris, moons, asteroids, planets, suns, stars, galaxies, dark matter, all moving in orbits, trajectories, arcs, woven into a humming background of cosmic microwave radiation. As well as a deep vault of space and matter, the sky is a vault of deep time. What we cannot intuitively see when we look to the sky is that stars (and other celestial objects) are millions of miles apart, not just from us but from each other, and that this vast spatial distance translates into a vast temporal distance. The light of the sun takes eight minutes to reach us, meaning that we see the sun as it was eight minutes ago. Some of the most distant celestial objects that we have detected are billions of light years away, meaning that we are 'seeing' them as they were billions of years ago.³ When we look at the night sky we are therefore looking back in time(s). What is strange, or perhaps fascinating, is that we take this deeply textured space, with all its various spatial and temporal distances, and flatten it – perceiving flat planes where there is nothing but depth.⁴ The sky, then, is a multi-dimensional patchwork, of lines and of time.

¹ Genesis 1. 6. (New International Version)

² T. E. Hulme, 'The Embankment', in *Selected Writings: T.E. Hulme*, ed. by Patrick McGuinness (Manchester: Carcanet Press, 2003), p. 2; W. B. Yeats, 'He Wishes for the Cloths of Heaven', in *W.B. Yeats*, ed. by Seamus Heaney (London: Faber & Faber, 2000), p. 23; Louis MacNeice, 'Star-Gazer', in *Selected Poems of Louis MacNeice*, ed. by Michael Longley (North Carolina: Wake Forest University Press, 1990), p. 158.

³ For objects this distant, we are not able to 'see' them visually – methods of detection include radio, and x-rays.

⁴ The Plough, for example, is a constellation of seven stars whose distances from the Sun vary from between 123 and just under 80 light years away – yet when we look at the Plough, we flatten this 43-year span, and make it singularly present.

When we adjust the scale of our thinking to that of the Anthropocene, we perform the same kind of flattening as we do in the act of constellation; vastly disparate times and places are compressed, made simultaneous. The word ‘Anthropocene’ is rooted in geology. First devised by Crutzen and Stoermer as the name for a hypothetical new geological epoch, ‘Anthropocene’ was intended to be used as a designation on the Geological Time Scale (GTS). Though the use of the word has evolved, coming to hold various meanings across academic and cultural discourses, its geological heritage is still apparent in its construction, with the suffix ‘-cene’ traditionally used for the names of geological periods of time, like the Holocene, or the Pleistocene. This thesis has so far considered the deep, geologic entanglements of the Anthropocene on both a nuclear, planetary scale, and across the infinite scale of the microcosm. This final chapter moves beyond geology, defined by the *Oxford English Dictionary* as ‘the branch of science concerned with the physical structure and substance of the earth’, its ‘rocks, structures and processes’, and instead turns its focus skyward.⁵ Instead of the lithosphere, or the hydrosphere, or even the atmosphere, the scope and scale of this chapter moves beyond spheres to the infinite planes of space, and inhabits the realm of the cosmological, the astrological, the celestial – the realm of constellation.

The sky is a topic of great debate in environmental discourse. In 2019, Elon Musk’s SpaceX launched 60 satellites into low orbit as part of its Starlink programme, resulting in an outcry from the astronomy community. Both the International Astronomical Union (IAU) and the International Dark-Sky Association (IDA) released statements expressing their concerns that the ever-increasing number of satellites in orbit has the potential to disrupt visibility, with the IAU stating that ‘dark and radio-quiet sky’ should be protected as a ‘resource for all humanity and for the protection of nocturnal wildlife’.⁶ There is a growing concern that our orbit is becoming littered with space junk and debris (the European Space Agency (ESA) estimates that the number of bits of space debris currently in orbit is in excess of 900,000), with dead satellites forming a layer of orbital pollution described by Leonard as ‘an auto-thanatocsmography that threatens both vision and life in orbit’.⁷ The technofossils of human

⁵ ‘Geology’, *Oxford English Dictionary* (2012)

<<https://www.oed.com/view/Entry/77768?redirectedFrom=geology#eid>> [accessed 16 January 2021].

⁶ ‘IAU Statement on Satellite Constellations’, *International Astronomical Union* (2019)

<<https://www.iau.org/news/announcements/detail/ann19035/>> [accessed 16 January 2021]; ‘Response to SpaceX Starlink Low Earth Orbit Satellite Constellation’, *International Dark-Sky Association* (2019)

<<https://www.darksky.org/starlink-response/>> [accessed 16 January 2021].

⁷ This figure increases to over 128 million if you include objects less than 1 cm. See ‘Space Debris by the Numbers’, *The European Space Agency* (2021)

<https://www.esa.int/Safety_Security/Space_Debris/Space_debris_by_the_numbers> [accessed 16 January 2021]; Leonard, p. 173.

activity are therefore haunting our skies just as much as our geological spheres. In fact, the physical entanglements of human life have reached as far as 14 billion miles from Earth (and counting), with the Voyager 1 satellite crossing the heliopause to enter interstellar space on 25th August 2012.⁸ This is both awe-inspiring and horrifying in its implications; our planet has been ecologically dominated (perhaps even devastated) by the consequences and the by-products of our lives and inventions, and now, even the void of interstellar space has the potential to become polluted with our satellites, and the noise and chatter of our radio communications.

In the introduction to this thesis, I refer to Morton's *Hyperobjects: Philosophy and Ecology After the End of the World*, and his description of the contrasting, fluctuating scales of the Anthropocene – the contemporary, mundane instances of starting a car, taking a breath, or turning on the television juxtaposed against their deep time contexts of 'liquefied dinosaur bones', the Oxygen Catastrophe, and even the Big Bang itself.⁹ This exemplifies the strangeness of scalar thinking in the Anthropocene: when we adjust our perspective, we see that disparate times and spaces are folded together into the present moment – in much the same way that our human gaze flattens the deep temporal and physical spaces of the sky into a singular plane space. Throughout this thesis I have argued that formal poetic structures that make use of intertextual repetition can reflect the temporal and physical connections of contemporary Anthropocene living. In this chapter, I build on these ideas to develop a poetics of constellation, in which myriad times, spaces and texts, come together in clusters (or clouds) on the supposedly flat surface of the page. By reading Strickland's *V* (a poem published in multiple print and digital formats, including a digital skyscape referred to as *Vniverse*) in constellation with Barthes' work on the text as a sky, Morton's ecological meshwork, and Royle's veering, I seek to interrogate the formal properties and textual effects of constellation as a poetic device including constellation as the making simultaneous of physically, temporally, and textually disparate elements, constellation as a migratory or active way of reading, and the unreadability of the constellated text. Furthermore, this poetics of constellation can expose or complicate ideas of formal interconnectedness in a way that resonates with Anthropocene thinking about the bringing together, or entangling, of disparate times, bodies, and texts.¹⁰

⁸ For Voyager 1's distance from Earth in real time, visit <https://voyager.jpl.nasa.gov/>.

⁹ Morton, *Hyperobjects*, p. 58.

¹⁰ Morton, *The Ecological Thought*, pp. 39-40; Tim Ingold, *Being Alive: Essays on Movement, Knowledge and Description* (Oxon: Routledge, 2011), p. 91.

Constellation as a Literary Device

In *S/Z*, Barthes writes that ‘the text, in its mass, is comparable to a sky’.¹¹ Barthes notes many similarities between the sky and the text, including its texture (‘at once flat and smooth, deep, without edges and without landmarks’).¹² This paradox of being simultaneously flat and deep speaks to the idea of the sky as a seemingly flat space that is, in reality, full of depth, texture, and unseen temporalities. This infinite expanse of both flatness and depth is also full of meaning: ‘The text is a galaxy of signifiers’, writes Barthes, an ‘agglomerative space’, where ‘certain areas of the text [are] correlating other meanings outside the material text and, with them, forming “nebulae” of signifieds’.¹³ These ideas of agglomeration and correlation are critical to the establishment of constellation as a literary device. The word ‘constellate’ is derived from ‘con’ and ‘stellare’, meaning ‘together with’ and ‘stars’, and is often used to refer to the clustering, or bringing together, of things and concepts other than stars.¹⁴ It is in this sense that we can read Barthes’ galaxies and nebulae as constellations of signification, as they serve as mechanisms of clustering and connection.

Barthes is not the only critic to use constellation to describe instances of connection and formation. Stan Smith uses constellation as a literary metaphor in *Poetry and Displacement*, writing that in poetry, our past and present come together to ‘make a “constellation”’.¹⁵ N. Katherine Hayles similarly uses the term ‘conceptual constellations’ to refer to an accumulation of associated ideas ‘possessing an internal coherence that defines it as an operational unit’.¹⁶ Fulton, as described in the previous chapter, uses celestial metaphors (‘clusters’ and ‘superclusters’) to describe intertextual elements of her fractal poetics.¹⁷ And Rebecca Solnit, in her essay ‘Excavating the Sky’, links constellation to

¹¹ Barthes, *S/Z*, p. 14. It is important to note that Barthes’ ‘starred text’ refers specifically to his text, *S/Z*, which is a dissection of and commentary on Balzac’s short story *Sarrasine*. Barthes splits the text of Balzac’s story into 561 fragments (or ‘lexias’) of varying lengths divided by literal star symbols, and interspersed with 93 ‘divulgations’, which are meditations on the practice of reading a literary text. ‘The Starred Text’ is the seventh of these divulgations, and while the stars might literally refer to the symbols used to divide Barthes’ lexias, this is by no means the full or final extent of Barthes’ comparison between text and sky, and we can helpfully extend his analogy to the literary text more generally.

¹² Barthes, *S/Z*, p. 14.

¹³ Barthes, *S/Z*, pp. 5-6, 8.

¹⁴ ‘Constellate’, *Oxford English Dictionary* (1989)

<<https://www.oed.com/view/Entry/39820?rskey=SjAg92&result=1&isAdvanced=false#eid>> [accessed 24 June 2020].

¹⁵ Stan Smith, *Poetry and Displacement* (Liverpool: Liverpool University Press, 2007), p. 62.

¹⁶ N. Katherine Hayles, *How We Became Posthuman: Cybernetics, Literature and Informatics* (Chicago: University of Chicago Press, 1999), pp. 13-15.

¹⁷ Fulton, *Feeling as a Foreign Language*, pp. 200-201. For more on Fulton’s cluster words and their celestial connotations, see Chapter Two, pp. 65-66.

metaphor, arguing that not only are constellations themselves ‘an essential metaphorical construct’, but also that when we connect two disparate textual elements through the mechanism of metaphor, we engage in the ‘art of making constellations, of constellating’.¹⁸ Solnit elaborates, comparing the ‘drawing [of] imaginary lines between stars’ to the way ‘a metaphor draws analogies between disparate things’.¹⁹ For Solnit, both celestial and metaphorical constellations are acts of creation; constructing a ‘common ground for them that makes each look different’.²⁰ As with Hayles’s constellation, to constellate therefore means to bring disparate things together and create something new, with its own coherent existence. To constellate, then, is to connect, to bring together, to make simultaneous a scattering of varied spaces and times.

Andrea Krauß, in the introduction to the ‘Constellations’ issue of *MLN*, writes that textual constellations are composed of ‘syntactic relations’ that ‘give rise [...] to networks of connections’ that can either ‘be rendered concrete [...] or remain indecidable’.²¹ Much like Fulton’s clusters, words can be connected through association, or meaning. These relations, or networks of connection, can be formed between words within a text, or between texts themselves; Krauß gives the example of the translated text which forms a constellation with the original. These ‘non-identical readings’, argues Krauß, ‘[establish] new relationships’.²² The constellation of the translation with the original, and the inevitable discrepancies between them, can lead to new understandings or interpretations of both texts; constellation, in this sense, generates a new perspective.

It is in this vein that I approach Strickland’s *V*. Repeated across four versions – two print books, *V: WaveSon.nets / Losing L’Una* and *V: WaveTercets / Losing L’Una* (henceforth referred to as *V: WaveSon.nets* and *V: WaveTercets*), the digital *Vniverse*, and the *Vniverse* app – *V* exists as a constellation of texts.²³ Much like a translation and its versions, reading these texts in constellation leads to revelations – new understandings or

¹⁸ Rebecca Solnit, ‘Excavating the Sky’, in *The Sky Book*, by Richard Misrach (New Mexico: Arena Editions, 2000), pp. 9-27, p. 11.

¹⁹ Solnit, ‘Excavating the Sky’, p. 11.

²⁰ Solnit, ‘Excavating the Sky’, p. 11.

²¹ Andrea Krauß, ‘Constellations: A Brief Introduction’, *MLN*, 126.3 (2011), 439-445, p. 443.

²² Krauß, pp. 442-443.

²³ Stephanie Strickland, *V: WaveSon.nets / V: Losing L’Una* (New York: Penguin, 2002); Strickland, *V: WaveTercets / V: Losing L’Una* (Colorado: SpringGun Press, 2014); Strickland and Cynthia Lawson Jaramillo, *Vniverse* (2002) <<http://www.cynthialawson.com/vniverse/original.html>> [accessed 24 June 2020]. Both *V: WaveSon.nets* and *V: WaveTercets* have multiple points of entry; the reader can either start from the *V: WaveSon.nets* or *V: WaveTercets* side (depending on which version they have) or they can flip the book over, and start from the other side, which contains the text for *Losing L’Una*, a series of poems that could be considered part of the extended constellation of *V*.

interpretations of its admittedly dense content. The scope of *V* is vast, featuring references to (amongst other things) mathematics, fractals, British, Greek, Roman and Haitian mythology and folklore, Neolithic symbolism, constellations, birds, fish, witches, the Tarot, lunar cycles, AI, the 70s American crime drama series *Kung Fu: The Legend Continues*, Sigmund Freud, glaciers, the colour red, and Simone Weil. This content remains the same across the multiple versions – what changes is its presentation. In *V: WaveSon.nets*, the sequence is divided into 47 ‘son.nets’, while *V: WaveTercets* displays the same text as 232 numbered tercets. At the centre of both print books, the reader will find a double page spread containing a hyperlink to <http://vniverse.com/>, and the phrase ‘There Is a Woman in a Conical Hat’ (an acrostic anagram of the word ‘WITCH’). If the reader enters the link into a web browser they will find the digital iteration of *V*, *Vniverse*, which takes on the identity of a poetic constellation more literally, appearing as ‘a dark space full of bright points, most easily read as stars, but perhaps neurons, or some other kind of bright node’ (see Fig. 1).²⁴ These nodes can be hovered over, bringing up strings of text that form into tercets (see Fig. 2), or clicked, causing the tercets to re-assemble into fifteen line ‘son.nets’ (see Fig. 3). When hovered over, lines also appear that connect each point, or star, to a selection of others, forming what Strickland refers to as ‘constellations’.²⁵

²⁴ Strickland and Jaramillo, *Making the Vniverse* (2003)

<<http://www.cynthialawson.com/vniverse/essay/index.html>> [accessed 24 June 2020], p. 1.

²⁵ Strickland and Jaramillo, *Making the Vniverse*, p. 2. *V: WaveTercets* contains another type of constellation; each page has the name of its constellation grouping (swimmer, conductor, broom, dipper, twins, bull, embryo, goose, infinity, or dragonfly) noted in the top outer corner of each page, not as a title but as a note or perhaps a key indicating how to read the poem. These groupings (mostly) correspond with the unnamed lines of constellation that appear between stars on the digital *Vniverse*.



Figure 1. *Vniverse* without any reader interaction (screenshot author's own).

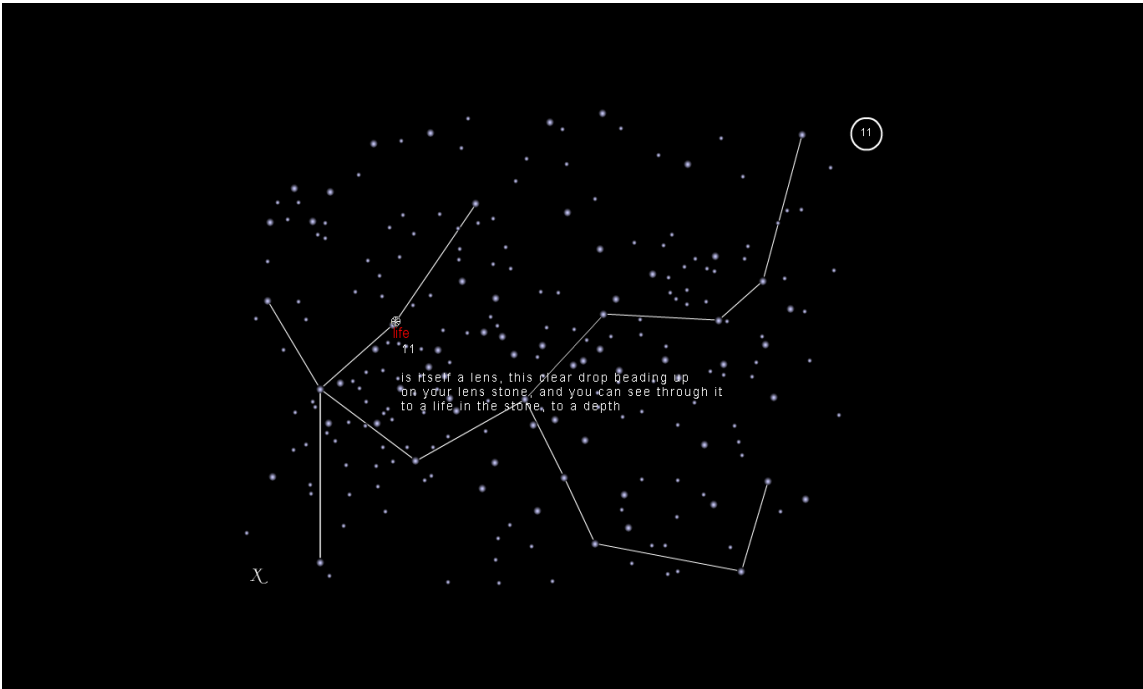


Figure 2. Reading *Vniverse* by hovering (screenshot author's own).

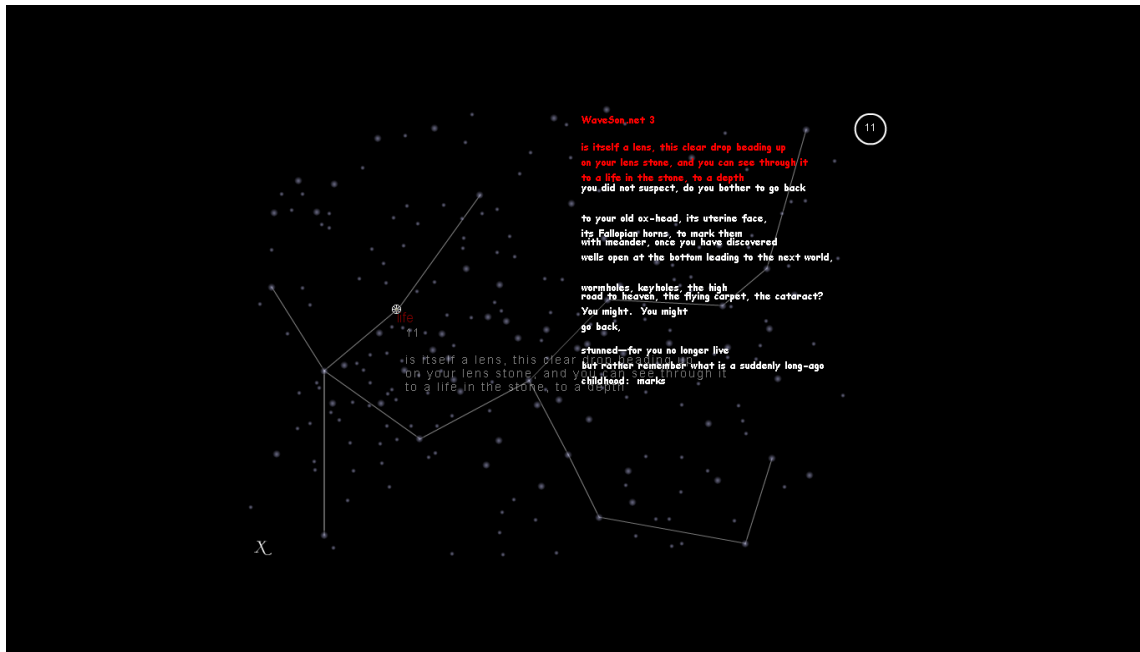


Figure 3. Reading *Vniverse* by clicking (screenshot author's own).

When we look to the sky, that deep, black vault, it is the stars, the ‘superdense [...] globular clusters [...] or open clusters / like the Pleiades’ that allow us to construct meaning, and transform the otherwise bewilderingly infinite sky into a space of navigation and migration, a space of myth and legend – a space of reading.²⁶ For Strickland, it is the same with *Vniverse*; interaction with the stars and their constellations is what makes the otherwise blank sky ‘readable’.²⁷ The digital form of *V* therefore confronts the reader with their role as constellator, bringing together disparate words, lines, and texts.²⁸ Barthes describes the reader of the writerly sky-text as a ‘soothsayer, drawing on [the sky] with the tip of his staff an imaginary rectangle wherein to consult, according to certain principles, the flight of birds’, and as a ‘commentator’ who ‘travels through the text [...] in order to observe therein the migration of meanings, the outcropping of codes, the passage of citations’.²⁹ The soothsayer, sketching out imaginary lines across a skyscape, has an uncanny resemblance to the reader of Strickland’s digital *Vniverse*; equipped with cursor-tip rather than staff-tip, the reader of *Vniverse* sketches shapes onto the deep, flat space of the screen, selecting zones and portions of the sky (or text) to read and observe. The reader’s resemblance to Barthes’ soothsayer is

²⁶ Strickland, ‘TITA: The Incandescent Thought About’, in *V: WaveSon.nets*, pp. 25-28, p. 25.

²⁷ Strickland and Jaramillo, *Making the Vniverse*, p. 1.

²⁸ In doing so, the reader also becomes part of the constellation of *V*; embodied in the text in the form of the cursor (which takes the shape of a degree symbol, but could also be interpreted as a zero, an o, an eye, or a hole), the reader is a star in the constellation of reader-computer-text.

²⁹ Barthes, *S/Z*, p. 14.

not limited to *Vniverse*, but the digital text serves to expose the interactive nature of the reader-text relationship and acts as a lens that brings the constellated qualities of the printed texts to light.³⁰

In *Vniverse*, *V: WaveSon.nets* and *V: WaveTercets* are made simultaneous, with the tercet and son.net forms appearing layered over one another. *Vniverse* therefore brings their constellated nature to the foreground, insisting that the reader widen their gaze to include the printed texts. This is further supported by the inclusion of a link to purchase the print books on *Vniverse.com*, and a hyperlink to the digital version confronting the reader from the central pages of the print books; each format points the reader toward the others. The various formats of *V* – and their explicit links to each other – therefore make the multiplicity of the text(s) overt, urging the reader to move between the texts, beyond the single version they are currently reading. In an interview, Strickland notes:

A thing can seem to stand alone, be readable on its own, but it's not; it is in a world of relations that is ongoing. [...] *V*, for instance, exists most truly in a new space *between* its 'versions'.³¹

To fully experience the constellation *V*, the reader must therefore read not just the various versions, but the way that they interact, and the differences between them. As the words of the text remain unchanged in each variation, what we are really reading is the variations in form, and the tensions produced by their differences. As Strickland writes, each tercet 'is the entryway to multiple other forms'.³² Strickland refers to the totality of *V* as 'a continuous present of varying forms, like the night sky, in which readers trace their own path'.³³ Reading between the versions, then, can be likened to an act of constellation, bringing different iterations together into one presently existing collated reading – into a single, woven, intertextual entity.

The constellation of texts that make up *V* can be described as a 'meshwork' – a term with considerable ecological connotations. In *The Ecological Thought*, Morton defines the 'meshwork' as the deep, environmental interconnectedness between 'all living and non-living

³⁰ For Elizabeth Swanstrom, the complication between reader and writer in a digital text 'can help us play with the boundary lines between our bodies and the world, and even make these boundaries suspect'; it is therefore a useful mechanism for thinking about environmental and bodily entanglements (Swanstrom, *Animal, Vegetable, Digital: Experiments in New Media Aesthetics and Environmental Poetics* (Tuscaloosa: The University of Alabama Press, 2016), p. 53).

³¹ Strickland and Jaishree K. Odin, 'Into the Space of Previously Undrawable Diagrams: Interview With Stephanie Strickland', *The Iowa Web Review* (2002) <<http://www.elo-repository.org/TIRweb/tirweb/feature/strickland/stricklandinterview.pdf>> [accessed 24 June 2020], p. 6.

³² Strickland and Jaramillo, *Making the Vniverse*, p. 8.

³³ Strickland and Jaramillo, *Making the Vniverse*, p. 8.

things'.³⁴ In the meshwork, everything is interdependent, and 'all beings are related to each other negatively and differentially, in an open system without center or edge'.³⁵ The meshwork, therefore, has no beginning and no end, no outside or inside. In a move away from anthropocentric modes of thought, things are defined by their relations to each other without any one thing being considered primary, original, or central, but also without collapsing into undifferentiated homogeneity. As Morton notes, 'each being in the mesh interacts with others. The mesh isn't static'.³⁶ The interconnectedness of the various versions of *V* enacts this ecological interconnectedness; each text is related to every other with none being considered central or original – the digital is not the derivative of the print, and vice versa. There is also no beginning. Extending the constellation of *V* to include *Losing L'Una* (the second half of both *V: WaveSon.nets* and *V: WaveTercets*) uncovers an instruction to 'begin anywhere / Skip anything', to take a 'soft ziggy sampling butterfly approach' to reading.³⁷ *Vniverse* demands this method of reading as there is no first page, no starting point – the reader arrives adrift in the text. As Krauß suggests of texts in constellation, the reader's interaction with *Vniverse* then influences their interaction with the remaining texts, encouraging them to notice the opportunities for non-linearity and exploration on the printed page. Thus, rather than a network, where individual points are prioritised, *V* is a 'meshwork' of entanglement, and multi-directional relation.

As well as a constellation consisting of its various versions, *V* exposes itself as an intertextual constellation within a wider literary context. *V* contains numerous in-text references to other books and writers (*The Search for Structure* by metallurgist Cyril Stanley Smith, the fifteenth century treatise on witchcraft, *Malleus Maleficarum*, and Plato's *Republic*, for instance), and the centres of both print versions of *V* hold a curious list, entitled 'To Go On / To Go Back'.³⁸ This list can be interpreted as recommended reading, or acknowledgements, or, perhaps, as a series of portals to (or nodes of) other textual universes for the reader to 'go on' and explore. The constellation of texts therefore expands to encompass not just the print books and the digital *Vniverse*, but also the entirety of the following texts: *Divine Horseman: The Living Gods of Haiti* by Maya Deren, *Fractals: Form Chance and Dimension* and *The Fractal Geometry of Nature* by Mandelbrot, *Hamlet's Mill: An Essay on Myth and the Frame of Time* by Hertha von Dechend and Giorgio de Santillana,

³⁴ Morton, *The Ecological Thought*, p. 28.

³⁵ Morton, *The Ecological Thought*, p. 39.

³⁶ Morton, *The Ecological Thought*, pp. 29-30.

³⁷ Strickland, 'Errand Upon Which We Came', in *V: WaveTercets*, pp. 34-36, p. 34.

³⁸ Strickland, 'To Go On / To Go Back', in *V: WaveTercets*, p. 48.

Arthur Corwin's 'Ice Age Numbers' from the *Numbers Exhibition Catalogue*, and his unrecorded lectures, *The Language of the Goddess* by Marija Gimbutas, Simon Weil's *Notebooks*, and *Notices of the American Mathematical Society* from August 1997. If the reader then follows Strickland from *V* to these other texts, they will find themselves falling into 'wormholes, keyholes' of citation, as each of these texts leads, via the citations or the indices, to another text in turn, and then another, and another, *ad infinitum*, the boundaries of *V* mutating and expanding exponentially every time, into a big bang of citation.³⁹

This image of the text as an entanglement of citation is intimately constellated with Barthes' work on the text as a 'tissue of citations, drawn from innumerable sources of culture'.⁴⁰ Barthes describes the 'multiplicity of writing' as something to be 'disentangled [...] "run" like the thread of a stocking'.⁴¹ These textile metaphors are repeated in *S/Z*, where Barthes describes the reader as 'working back along threads of meanings'.⁴² This is true of any writerly, or literary text; we can pick our way through the references, the associations, the citations to other texts and times. By placing the list of titles centrally, rather than at the end or the back of the books, Strickland is deliberately exposing *V* as a text woven from allusions to other cultures, stories, and other types of knowledge. Its function is not to be exhaustive, but to spark an awareness of the nature of the literary text as a tissue, or constellation, and to incite the reader to pluck at each line, each word, each star of citation, in the hope of disentangling the myriad relations of *V* (both to itself and to other texts), thereby (re)constructing new constellations of meaning. As Strickland writes in 'WaveSon.net 39', memory (and, we can argue, a text) is a 'swell of breakage, torn tissue / of threads // tangle, adrift, ends / to pull'.⁴³ By emphasizing the entangled nature of the text within its wider literary context, Strickland is engaging with ecocritical ideas of scale and relation. Just as humans exist in tangled environmental and ethical relationships with more-than-human times and bodies, so too do texts exist in tangled citational constellations with other textual bodies and times.

Morton is not the only scholar to turn to the image of the meshwork to describe this kind of ecological interconnection. Tim Ingold writes that 'When everything tangles with

³⁹ Strickland, 'WaveSon.net 3', in *V: WaveSon.nets*, p. 3. We can also interpret each layer of this chain of citation as moving back in time, as each text contains citations to an earlier text.

⁴⁰ Barthes, 'The Death of the Author', in *Image – Music – Text*, trans. by Stephen Heath (London: Fontana, 1977), pp. 142-148, p. 146.

⁴¹ Barthes, 'The Death of the Author', p. 147.

⁴² Barthes, *S/Z*, p. 12.

⁴³ Strickland, 'WaveSon.net 39', in *V: WaveSon.nets*, p. 39.

everything else, the result is what I call a *meshwork*'.⁴⁴ The world, for Ingold, is therefore made 'not of things but of lines [...] paths of growth and movement'.⁴⁵ Immediately, this recalls Deleuze and Guattari's rhizome – namely, the prioritisation of lines over points (or things), and the conception of the line as an active, growing, shooting motion.⁴⁶ Critically, Ingold makes a distinction between several types of lines: threads, traces, ruptures, ghostly lines, tubes and rods.⁴⁷ To follow the textual metaphor already suggested in Barthes's work, a thread, for Ingold, 'is a filament of some kind, which may be entangled with other threads or suspended between points in three-dimensional space'.⁴⁸ Threads are three-dimensional – they pass through, not over or across, as in the case of the trace. Ingold gives various examples, including a violin string, a suspension bridge, the roots of a plant.⁴⁹ He notes that bodies, too, can be considered 'complexly connected bundles of threads'.⁵⁰ These threads extend beyond the supposed boundary of the individual body, however: 'the organism is not limited by the skin [...] it leaks'.⁵¹ This leaking is the extending of bodily threads to environmental threads, the knitting or the knotting together of lines within the world.

We can apply this ecological thinking to the constellated text: each text is a bundle of citational threads that leaks through the boundary of its front and back covers, knitting or knotting together with a multitude of other texts.⁵² The word 'text', as Ingold points out, is derived from *texere*, meaning 'to weave', and text on the page is indeed woven from the intertextual threads of other texts and times, just as the ghostly threads of constellation weave together the spaces and times of distant stars.⁵³ In this sense, constellation acts as a formal mechanism that reflects the entangled nature of Anthropocene scales of thinking, in which no thing or action exists in isolation, but is instead situated in a vast meshwork of temporal, physical and ethical relation.

⁴⁴ Ingold, *The Life of Lines* (Oxon: Routledge, 2015), p. 3.

⁴⁵ Ingold, *Lines: A Brief History* (Oxon: Routledge, 2007), p. 5.

⁴⁶ Deleuze and Guattari, pp. 3-25.

⁴⁷ For Ingold, constellations can be categorised as 'ghostly lines' – lines which we perceive, but do not physically exist in the world. I suggest that constellations can be considered ghostly threads, as the connections between stars move through the body of space and through time, even though they are rendered as flat in depictions.

⁴⁸ Ingold, *Lines: A Brief History*, p. 41.

⁴⁹ Ingold, *Lines: A Brief History*, p. 41.

⁵⁰ Ingold, *Being Alive*, p. 86.

⁵¹ Ingold, *Lines: A Brief History*, p. 61.

⁵² This thesis can also be read as a constellation, or a weaving of intertextual threads. Passages of citation can be traced not just between the thesis and its bibliography, but also between the two halves of itself, poetry and critical writing knotted together, each leaving ghostly traces (or threads) woven in the body of the other.

⁵³ Technically Ingold is referring to the hand-written text, and its formation through the literal weaving of continuous weft lines (written words) over the warp lines of the page. He writes critically of typed text, arguing that the application of pre-programmed letters is more of an assembling than a weaving (Ingold, *Lines: A Brief History*, pp. 69-70).

V as an Unreadable Text

Morton describes the vast scales of hyperobjects (things that are entangled across deep space and time) as ‘almost unthinkable’, as the mind struggles to comprehend them.⁵⁴ In parallel to this, the constellated text can be described as ‘unreadable’. The unreadable text is a term used by Derrida to define a text that ‘spoils all [the] boundaries and forces us to extend the accredited concept, the dominant notion of a “text”’.⁵⁵ By boundaries, Derrida is referring to what we might consider the outside edges of a text – the title, the margins, the covers – the places where the text ends and the world (or another text) begins.⁵⁶ Once those boundaries have become blurred, or confused, the text is ‘no longer a finished corpus of writing [...] but a differential network, a fabric of traces referring endlessly to something other than itself, to other differential traces’.⁵⁷ Again, we find the text described as a fabric, something woven, and again, the network (or meshwork, or constellation) of the text reaches beyond its supposed boundaries. The outer edge of a text becomes indecisive; in a manner reminiscent of the infinitely folded perimeter of the fractal, Derrida describes this compromised edge as ‘an inner fold’ – a porous transition space that belongs to neither one text nor the other, but both.⁵⁸ Texts with these blurred boundaries and endless referrals become ‘unreadable’, in the same way an untranslatable word is unreadable – meaning cannot ever be accessed or established, as every reference, every translation, every trace of meaning, is dependent on another reference, or translation, or meaning, and so on, *ad infinitum*, in an infinite chain. An unreadable text, therefore, possesses what Derrida calls an ‘essential *unfinishedness* that cannot be reduced to incompleteness or inadequacy’.⁵⁹ The text is not unfinished in the sense that it is literally not complete, but in the sense that this chain of signification can never be completed or contained within the limits or boundaries of the single text.

We see this quality of unfinishedness, or unreadability performed not just by the constellated texts of *V* pointing infinitely back to themselves (from printed to digital via the hyperlink, and back, via the link to purchase the printed materials) or the listed additional texts, but also at the level of each word. Strickland makes considerable use of wordplay, including linguistic double-coding through homonyms and portmanteaus, and places

⁵⁴ Morton, *The Ecological Thought*, p. 19. For more on the hyperobject, see Introduction pp. 4-5.

⁵⁵ Derrida, ‘Living On’, p. 69.

⁵⁶ Derrida, ‘Living On’, p. 69.

⁵⁷ Derrida, ‘Living On’, p. 69.

⁵⁸ Derrida, ‘Living On’, p. 93. The idea of the infinitely wrinkled or folded boundary is reminiscent of the roughness of a fractal (see Chapter Two, pp. 54-55).

⁵⁹ Derrida, ‘Living On’, pp. 84-85.

noticeable emphasis on etymologies as a mechanism for interrogating the multiplicity of words. The reader of *V* must, Strickland argues, be open to reading inference, nuance, and implication – they must be open to ‘the archaeology of language’ if they want to ‘really feel [the] shifting relationships’ between the words, lines and texts.⁶⁰ One of the most explicit examples of this is in ‘WaveSon.net 43’ (or ‘WaveTercet 214’):

while” the arc lasts in the sky – a double
positive is
not

a negative. “Yeah,
yeah.”
😊 Deep
rule(s), par-t[ur]i-tion.⁶¹

Here, we have a brief interrogation of the ambiguity of language and the importance of tone. The statement that a double positive is not a negative is immediately contradicted by ‘Yeah, / yeah’, which is itself contradicted by the positivity of the smiley face emoticon (and the subsequent sense that a joke has been made). Furthermore, the positioning of the line breaks that separate the two instances of ‘yeah’ means that the phrase can be read both as an affirmative, and as a negation. This draws out the ‘Deep / rule(s)’ of language – the rules of grammar, and the unspoken, socially constructed rules of colloquial conversation that reveal the dependency of words on each other; their textual relations (or constellations) alter our perception of them.⁶²

In this context, the meanings of the word(s) ‘par-t[ur]i-tion’ are many and complex, and all exist in dialogue with each other. The most obvious two words are ‘partition’ (a noun and a verb, meaning the action or process of dividing something into shares or portions) and ‘parturition’ (literally meaning the act of giving birth, and figuratively meaning the act of creating something, especially something imaginary or literary). We also have ‘par’ (meaning an enclosure for farm animals, or the action of enclosing, confining, or penning, or to score equal to par in a game of golf, or to be equal to, or on a level with), ‘part’ (meaning both a portion of the whole, and the action of dividing the whole), ‘ur’ (meaning an inarticulate sound uttered in place of a word, a prefix denoting the primitive, original or earliest thing, a letter in the Ogham alphabet meaning earth, clay, or heather, a place in Iran, France, Switzerland or Iraq, a hypothetical supercontinent from 3.1 billion years ago, and an acronym

⁶⁰ Strickland and Odin, p. 5.

⁶¹ Strickland, ‘WaveSon.net 43’, in *V: WaveSon.nets*, p. 43.

⁶² Ferdinand de Saussure outlines the socially constructed nature of the sign in *Course in General Linguistics*, trans. by Roy Harris (London: Bloomsbury, 2013), pp. 82-91.

for Underlying Representation), and ‘I’ (meaning the self). The various meanings of ‘ur’ are particularly interesting here, spanning various continents, cultures, languages and times; the scale of ‘ur’ is planetary, perhaps even geologic. Furthermore, it seems to be speaking about itself, with the acronym UR pointing towards the underlying constellation of meanings packed into this single syllable. Through the use of dashes and parentheses, Strickland explodes the physical, semantic, and even temporal boundaries of the word(s), calling attention to nature of language as something assembled, something constellated, from other texts and times.

It is this type of reading that Strickland hints at in the opening pages of *V*, writing:

If you understand virginity,
you understand abstraction, you understand V –
V which is flight, and you understand VVV,
i.e. ric-rac, the earliest recorded

symbolic motif, Cassiopeian breasts pouring forth
a Milky Way, a.k.a. zigzag⁶³

Our understanding – or perhaps interpretation – of one word seemingly triggers our interpretations of a whole host of words that are connected by their various significations, associations and etymological roots. This is echoed a page later, in the lines ‘If you understand red, you understand ruby, / you understand light bubbling up’.⁶⁴ Both red and ruby share the same Proto-Indo-European etymological root, *reudh*, meaning simply ‘red’. For Matti Kangaskoski, a tension or ‘pull’ exists in *V* between the ‘the scientific means of making sense of the world and [the] mythical one’.⁶⁵ Kangaskoski uses ‘WaveSon.net 4’ as an example, and the line ‘If you understood red, but – you cannot; / for you understand web / glistening in sunlight as stronger than steel / per ounce’.⁶⁶ For Kangaskoski, the ‘scientific’ knowledge regarding the tensile properties of spider silk contrasts with the mythic knowledge that red means ruby and ruby means light, ‘bubbling up’, and these two types of knowledge ‘rule each other out’.⁶⁷ I argue, however, that the various types of knowledge and signification present in *V*, be they scientific, mathematical, (pre) historical, (pop) cultural, mythical, poetic, etymological or otherwise, work in constellation, each providing new ways of reading and understanding the other.

⁶³ Strickland, ‘WaveSon.net 1’, in *V: WaveSon.nets*, p. 1.

⁶⁴ Strickland, ‘WaveSon.net 2’, in *V: WaveSon.nets*, p. 2.

⁶⁵ Matti Kangaskoski, ‘New reading strategies in print and on digital platforms: Stephanie Strickland’s *V*’, in *Reading Today*, ed. by Heta Pyrhönen and Janna Kantola (London: UCL Press, 2018), pp. 87-102, p. 91.

⁶⁶ Kangaskoski, p. 91.

⁶⁷ Kangaskoski, p. 91.

These techniques demonstrate what Royle calls ‘veering’ – a theory of literature or type of reading that manipulates the ‘strange materiality’ of language, and its ability to ‘slip and slide and turn into something alien’.⁶⁸ A veering reading focuses on:

the play of the letter, the treatment of words as things, the veering and vanishing of one word or thing into another (homonyms, homophones, substitutions, displacements, omissions, allusions, non sequiturs, suppressed references, ‘repressed meanings’, metaphors becoming literal, literal language becoming metaphorical, etc.).⁶⁹

Royle’s description of veering could be a description of Strickland’s *V*; both use wordplay to ‘[think] afresh and otherwise about the borders [of words]’, in a way that speaks to unreadability, and the infinite folding of the edges of texts (and words).⁷⁰ Strickland’s reader is encouraged (if not compelled) to seek out these veering ways of reading – to read and reread, to dig into etymologies, to turn back and pick out alternative scientific or mythic or colloquial definitions, to follow the wormholes of citations to other texts. ‘A word’, writes Royle, ‘is never only itself, it is constantly veering off into something or somewhere else’.⁷¹ Every word refers to every other, across cultures, texts and times, creating a mesh of relations, a constellation of text that approaches unreadability as there is always another thread to follow, another interpretation to be found.

There are clear resonances here with Morton’s and Ingold’s ecological meshworks, in which everything is physically, temporally or ethically entangled together. Royle notes the ecological connotations of veering, through the shared etymological root of veering and environment, *virer*, which can be defined as the state of being environed (surrounded, encircled, encompassed).⁷² This etymological linking, for Royle, reveals that:

above all, the theory of veering is concerned to interrogate and displace all thinking of an environment in straightforwardly anthropocentric terms; if an environment *environs*, it does not merely environ the human. The human animal is not at the centre of the world.⁷³

In Anthropocene thinking, this displacement of the human results in a new understanding of the relationship between humans and ‘other’ forms of life – plants, animals, fungi, bacteria, viruses, and other ecological systems. Veering, with its acknowledgement of the porous borders of words, and the acknowledgement of words as things that exist in relation with each other, changes the scale of our reading; it challenges us to rethink the scale of a text in the

⁶⁸ Nicholas Royle, *Veering: A Theory of Literature* (Edinburgh: Edinburgh University Press, 2011), p. 35.

⁶⁹ Royle, p. 35.

⁷⁰ Royle, p. 7.

⁷¹ Royle, p. 210.

⁷² Royle, p. 2.

⁷³ Royle, pp. 2-3.

same way that the Anthropocene challenges us to rethink the physical and temporal scales of human life. *V* therefore challenges the reader to think about connection at a vast scale; uncanny and unexpected linguistic relationships that span thousands of years are brought to light, and this in turn leads to a (re)consideration of the relationship between the reader and the text, and the reader's own connection to other places, spaces, times and texts.

***V* as a Text in Perpetual Motion**

For Farrier, it is 'conditions of flux that distinguish Anthropocene temporalities'.⁷⁴ These entanglements with other times and places do not just exist – we constantly fluctuate between them, our scales of perception shifting from the present to the deep reaches of the past and future, and back, in a disorienting instant. Our view of the night sky is similarly in flux, continually shifting as the Earth moves around the sun, and as different seasons (and weather or light conditions) pass, each bringing different groupings into view. The stars themselves are also moving, albeit so slowly that any movement is imperceptible on human timescales. Furthermore, the perception of a constellation varies by eye; different people, with different cultures and different knowledge, will pick out different patterns, and assign them different names and meanings. As Krauß notes, textual constellations similarly fluctuate and 'remain indecidable', due to their subjective nature.⁷⁵ For Royle, the veering text reflects:

the veerings of the universe [...] seeing beyond seeing, moving back billions of years towards when or how the universe began, the elusive character of dark matter and dark energy, redshifts and blueshifts, elliptical and spiral galaxies, galactic rotation curves and deviations, the abruptly rising light curves of supernovae, neutron stars spinning round hundreds of times per second...⁷⁶

Everything in our universe is made by, or connected with, lines in perpetual motion – spirals and waves and strings – and the same is true of a veering text.

V is a text in perpetual motion – as Strickland notes, 'v' represents 'the hands of a clock, a volumetric wedge of sky [...] an opening, an interim, an interval, a space-between'.⁷⁷ It is the sign of water, of waves, of a zig-zag, ric-rac motion, and of birds, 'the space between the wings of a goose and [...] between geese as they fly'.⁷⁸ The letter 'v', Strickland emphasises, can transform 'moment' into 'movement'.⁷⁹ It stands for (amongst other things), 'veering, vestige, virginity, visual, and vulval. Other important v-sounded words would be

⁷⁴ Farrier, *Anthropocene Poetics*, p. 22.

⁷⁵ Krauß, p. 443.

⁷⁶ Royle, p. 9.

⁷⁷ Strickland and Jaramillo, *Making the Vniverse*, p. 7.

⁷⁸ Strickland and Jaramillo, *Making the Vniverse*, p. 7.

⁷⁹ Strickland and Jaramillo, *Making the Vniverse*, p. 7.

variant, vector, vernal, void, vortex, voyager, virtual, volt, volta'.⁸⁰ Volta is the term given to the turn in a sonnet – the point where the poem shifts, or veers in tone, subverting the reader's expectations. Strickland developed the form of the son.net after reading Phillis Levin's definition of the volta in her preface to *The Penguin Book of the Sonnet*, in which Levin writes that the volta is 'a "turn" or change in tone, mood, voice, tempo, or perspective – a shift in focus, a swerve in logic, a change of heart, a moment of grace'.⁸¹ For Strickland, this turning, this shifting, this swerving motion, 'shows the mind in action, the mind turning to talk to itself, the mind anticipating an irreversible turn'.⁸² It is a moment of 'possibility for transformation'.⁸³ It is the transforming, turning, mobile nature of the volta that is the foundation of the sonnet (and son.net) identity – but also the multiple forms of *V*, and the way they turn and speak to each other.

The form(s) of *V* were developed with this pursuit of flux and motion in mind, though they display none of the conventions of the traditional sonnet form. Each son.net is fifteen lines (with the exception of 'WaveSon.net 47' which is six), and is split into three quatrains and a triplet, rather than closing with the couplet of the Shakespearean sonnet. The son.nets are not written metrically, the length of the lines varies dramatically, and there is no rhyme scheme. All that remains of the traditional sonnet is the volta, though even this is not as you might expect. Rather than a single, central turning point, Strickland's verse is filled with continual moments of rupture; every line, every word turns to speak to itself – every line, every word is moment of veering, a volta.

For critic Robert Hass, a 'turning' moment occurs at the end of every line of verse, sonnet, son.net or otherwise. Hass writes that every line is either a whole sentence or not, and that the 'hidden paradigm of the single line is the completed sentence'.⁸⁴ We don't know until we reach the end of the line whether or not the unit will be concluded or continued – the line ending, therefore, is a space of possibility, and when a sentence is split (enjambé) over two lines, a tension is produced. As Hass notes, it is the second line that '[introduces] the idea of form as the energy of relation' as it demands a connection with the world outside of itself.⁸⁵

⁸⁰ Strickland and Jaramillo, *Making the Universe*, p. 7. It is interesting that 'veering' appears in this list; as Royle notes, the etymological origin of veer is 'the French verb *vire*, to turn or turn around', which speaks quite clearly to the volta (Royle, p. 1).

⁸¹ Phillis Levin, 'Preface', in *The Penguin Book of the Sonnet* (New York: Penguin Books, 2001), pp. xxv-xxvi, p. xxvi.

⁸² Strickland and Jaramillo, *Making the Universe*, p. 4.

⁸³ Strickland and Jaramillo, *Making the Universe*, p. 4.

⁸⁴ Robert Hass, *A Little Book on Form: An Exploration into the Formal Imagination of Poetry* (New York: HarperCollins, 2017), p. 11.

⁸⁵ Hass, p. 11.

Royle similarly refers to this tension between lines as a ‘dynamic oddity’, and notes that enjambment is, at its essence, a ‘veering’ – a turning place.⁸⁶ For Royle, there is an intrinsic relationship between poetry (or ‘verse’, a word etymologically related to ‘veer’) and veering (all ‘verse veers’), due to the poetic line.⁸⁷ Royle describes ‘the force of turning that is the very veering of a line, diataxia in and across line-endings’.⁸⁸ The line ending is, therefore, not an ending at all; it is a moment of rupture, a veering, a turning into another multiplicity. When we read multiple lines of poetry, we are always reading them in conjunction with each other; no line stands alone, it is always in constellation with the other lines of the poem – lines past, and lines yet to come – as we veer between them.

Strickland often plays with ambiguity around line endings in *V*. In ‘WaveSon.net1’, the first quatrain reads:

If you understand virginity,
 you understand abstraction, you understand V –
 V which is flight, and you understand VVV,
 i.e., ric-rac, the earliest recorded⁸⁹

The last line of this quatrain appears to refer to the earliest recorded ric-rac – until the next line, ‘symbolic motif, Cassiopeian breasts pouring forth’, reveals that it is the earliest motif, not the earliest ric-rac itself.⁹⁰ In ‘WaveSon.net 22’, ‘All gods kill each other and all collapse’, until the next line recants the statement with the amendment ‘except the horned’.⁹¹ In ‘WaveSon.net 24’ the reader is asked ‘Who but I, / sings?’ The next line opens with ‘the bird’, which recalibrates this set of lines to mean that the bird is singing the question ‘who but I’.⁹² This type of ambiguity is by no means unusual, and, as Royle and Hass determine, is an integral part of poetry. In *V*, however, the reader can veer between more than just the lines – they can also veer between the multiple versions of the text. This intertextual veering exposes the critical role of the line break in our perception of meaning, as the stanza breaks operate differently in the different versions of the text. The digital *Vniverse* makes this explicit, as the interface allows the reader to toggle between the son.net and the tercet forms instantaneously

⁸⁶ Royle, p. 1.

⁸⁷ Royle, p. 29. Royle identifies the related Latin verb *vertere*, meaning to turn; this is also related to subvert, pervert, advert, vertigo, and *vice versa*. *Vertere* itself derives from the Proto-Indo-European root **wer*, meaning to turn or revolve. Other words derived from **wer* include adverse, avert, converse, converge, convert, diverge, invert, obverse, reverberate, revert, verge, subvert, version, and vortex. These are also related to the Latin verb *volvere*, meaning to turn, twist or roll, with the PIE root **wel*. Words derived from **wel* include vulva, volta, and *volte-face*. This list is a forcible reminder of Strickland and Jaramillo’s ‘v-sounded words’.

⁸⁸ Royle, p. 39.

⁸⁹ Strickland, ‘WaveSon.net1’, p. 1.

⁹⁰ Strickland, ‘WaveSon.net1’, p. 1.

⁹¹ Strickland, ‘WaveSon.net 22’, in *V: WaveSon.nets*, p. 22.

⁹² Strickland, ‘WaveSon.net 24’, in *V: WaveSon.nets*, p. 24.

(see Fig. 4 and 5). Strickland notes that the digital format is ideal for this type of reading, as ‘to see the poem shift back and forth between tercet and sonnet form, to really play with that, to actively read that, you need an interactive poem system’.⁹³



Figure 4. *Vniverse* showing ‘WaveSon.net 44’ (screenshot author’s own).



Figure 5. *Vniverse* showing WaveTercets 216 to 220 (screenshot author’s own).

⁹³ Strickland and Odin, p. 8.

However, the son.net and tercet versions can also be ‘read between’ by comparing the two print texts. When we read between tercet and son.net forms, the tension that already existed between Strickland’s ambiguous line endings is multiplied, as the changes in the positioning of the line breaks and the white space of the text change how it is read.

‘WaveSon.net 44’, for example, begins with the following two quatrains:

tracery of frost on glass.
Any
section of such blown up – equally
exquisite, detailed, ever, over and over, a never

ending,
never decaying, never
exactly
the same pattern – recognizable at once.⁹⁴

By contrast, ‘WaveTercet 216’ to ‘WaveTercet 218’ read as follows:

216

tracery of frost on glass.
Any
section of such blown up – equally

217

exquisite, detailed, ever, over and over, a never
ending,
never decaying, never

218

exactly
the same pattern – recognizable at once.
Begin with a closed interval, include ends⁹⁵

The different forms of the son.net and the tercet enhance the ambiguity of Strickland’s verse at different points. In the son.net, the break between ‘never’ and ‘ending’ emphasises the multiplicity of things both ‘ending’ and being ‘never / ending’. In the tercet, the longest moments of pause occur after ‘equally’ and ‘never decaying, never’; here, the ambiguous reading of something being both equally blown up and equally exquisite is brought to the forefront, as are the simultaneous readings of both ‘never // exactly’ and ‘exactly / the same pattern’.

This same veering occurs in the constellation between ‘WaveSon.net 46’, and ‘WaveTercet 226’ and ‘WaveTercet 227’. ‘WaveSon.net 46’ opens with the lines:

⁹⁴ Strickland, ‘WaveSon.net 44’, in *V: WaveSon.nets*, p. 44.

⁹⁵ Strickland, *V: WaveTercets*, p. 44.

the time it takes
to recognize your mother.
From one hundred million
retinal dots

to one
word
– *is it really*
*you*⁹⁶

By contrast, the tercets read:

226
the time it takes
to recognize your mother.
From one hundred million

227
retinal dots
to one
word⁹⁷

As a son.net, the ‘one hundred million’ clearly refers to the retinal dots or pixels, but as a tercet, ‘from one hundred million’ is initially intuitively read as one hundred million *others*, perhaps other people, or other mothers, rather than retinal dots. By placing the tercets and son.nets in constellation, *Vniverse* exposes the nature of the line-ending as a space of possibility and anticipation, foregrounding the fact that we read with future lines in mind.

The reader of a poetic text, as the form(s) of *V* emphasise, is therefore constantly recalibrating, constantly re-evaluating their position between what they’ve read, and the lines to come, constantly re-triangulating like the ship’s navigator adjusting their instruments, re-measuring, re-calculating the distance between themselves, the stars, and the horizon, to try and map their place in the constantly moving seas. Strickland notes that ‘*V* is haunted by similarities between the nomadic Ice Age task of reading and 21st century reading’.⁹⁸ Here, Strickland is referring to the way that nomadic people ‘read’ patterns in their environments – the patterns of weather and seasonal plant life, but also ‘the migratory patterns of fish and mammals’, and the ‘travelling patterns’ of constellations.⁹⁹ In reading constellations, Strickland argues, these nomadic people were reading movements, ‘loops’, and ‘border-crossings, gestural, graphic, numerical, and cognitive’.¹⁰⁰ *V*, looping and veering between

⁹⁶ Strickland, ‘WaveSon.net 46’, in *V: WaveSon.nets*, p. 46.

⁹⁷ Strickland, *V: WaveTercets*, p. 46.

⁹⁸ Strickland and Jaramillo, *Making the Vniverse*, p. 1.

⁹⁹ Strickland and Jaramillo, *Making the Vniverse*, p. 1.

¹⁰⁰ Strickland and Jaramillo, *Making the Vniverse*, p. 1.

forms and times, challenges the reader ‘Not simply to notice / the stars’, ‘but to quiet / and open the mind to something / outside it’, to ‘pattern upon pattern giving way to deeper / grasp’.¹⁰¹ In reading *V*, the reader finds themselves adrift in a text in perpetual motion, constructing endless constellations of meaning as they attempt to navigate, or migrate, between those flexing, ghostly threads that veer between tercet and son.net, page and screen, line and word, word and etymology, past and future, reader and text.

In *Losing L’Una*, Strickland refers to the celestial navigation of sailors, including a substantial quotation from a review of J.E.D. Williams’ *From Sails to Satellites*, part of which reads: ‘Navigation [...] was a way of apprehending one’s place in the cosmos’.¹⁰² As Royle argues, to be in the environment, to be environed, displaces anthropocentric thinking; the place of the human is not as a single point at the centre, or the top, or the foreground of the world.¹⁰³ Rather, the human is another thread of relation – a line in the vast mesh that is the environment. This is the place that the reader of *V*, navigating the text via constellating mechanisms, finds for themselves in the cosmological text: as another line of relation, a thread in the vast meshwork of text and time. As Ingold writes, ‘*as soon as a person moves he becomes a line*’.¹⁰⁴ This is based on the philosophies of wayfaring Inuit people – the same arctic navigators that Strickland takes her inspiration from. For these people, the act of travelling is not a simple movement between an origin and a destination; the purpose of a journey is not to reach an end goal or terminal, but to ‘[move] through the world *along* paths of travel’.¹⁰⁵ Here, there is a veering away from teleological modes of living, and reading: there is no ultimate *telos*, no goal or aim or intended purpose. Instead, the reader simply journeys through the text for the sake of journeying, moving along the many constellating paths, the threads of relation between texts, times, and voices, veering through unexpected tangents – etymological dictionaries, perhaps, or the citations of old treatises, or mathematical tracts – for no other purpose than to move.

In *Hope and Grief in the Anthropocene: Re-Conceptualising Human-nature Relations*, Lesley Head argues that as the Anthropocene deals with such varied temporalities (the temporalities of human life contrasting with mineral, vegetal – even celestial temporalities), we should ‘be open to less linear ways of thinking and practising time’ and should therefore reject a teleological model that places the future as a goal directly ahead of

¹⁰¹ Strickland, ‘From Sails to Satellites’, in *V: WaveSon.nets*, pp. 1-7, p. 5, 7.

¹⁰² Strickland, ‘From Sails to Satellites’, p. 6.

¹⁰³ Royle, pp. 2-3.

¹⁰⁴ Ingold, *Lines: A Brief History*, p. 75.

¹⁰⁵ Ingold, *Lines: A Brief History*, p. 75.

us.¹⁰⁶ Kathryn Yusoff similarly argues that when we consider the human as a geologic entity, we must reject the idea that we are teleological beings. Geology, Yusoff argues, ‘is characterized by continuous temporal conservation and propagation of life forms, with no beginning, nor end’.¹⁰⁷ Thus, if humans are geologic entities, they too have ‘no telos or origins’; they are simply another layer in an endless folding and layering of ‘biological slime’, another element in the mineral and ‘temporal constellations between the burning of intensified 345 million-year-old solar matter-energy in the present, [and] the future-to-come’¹⁰⁸ *V*, with its non-linear, veering reading, therefore enacts this rejection of *telos*, and instead opens up the reader to the possibility of a text without end. This, in turn, opens up the reader to the possibility of rejecting a goal-oriented, or teleological mode of thinking about the Anthropocene and the environmental future of the planet, and instead embracing the future as something open, something multiple – something full of potential and possibility.

V as an Unfinished Text

Krauß writes that a constellation is something ‘suspended’ in time and space, ‘something open and still to come’.¹⁰⁹ There is always another relationship to found, or read – always another grouping, or cluster, to be drawn. Constellations, therefore, are a useful mechanism for interrogating Anthropocene scales of temporality that are so vast they challenge our notions of linear time, and introduce ideas of infinity, or being without end. In a text, infinity can be explored through the lens of unreadability (discussed above) and iteration. The notion of iterability is one Strickland raises herself, writing that reading *Vniverse* is an ‘iterative process of return’, as the reader is able to generate infinite iterations, or permutations, of the text.¹¹⁰ Iteration, for Derrida, is necessarily a property of every text; all words are repetitions, placed into various new and unique contexts. Derrida writes that ‘every sign, linguistic or nonlinguistic, spoken or written [...] can be *cited*, put between quotation marks; thereby it can break with every given context and engender infinitely new contexts’.¹¹¹ Any word can therefore be displaced, broken out of one context and grafted into another, and yet still retain the capacity to function; for Hayles, the consequence of this is that ‘infinite contexts invade

¹⁰⁶ Lesley Head, *Hope and Grief in the Anthropocene: Re-Conceptualising Human-nature Relations* (Oxon: Routledge, 2016), pp. 57-58.

¹⁰⁷ Kathryn Yusoff, ‘Anthropogenesis: Origins and Endings in the Anthropocene’, *Theory, Culture & Society*, 33.2 (2016), 3-28, p. 24.

¹⁰⁸ Yusoff, pp. 21-22.

¹⁰⁹ Krauß, pp. 442-443. For Derrida on the ‘future to come’, see Conclusion, pp. 107-108.

¹¹⁰ Strickland, ‘Quantum Poetics: Six Thoughts’, in *Media Poetry: An International Anthology*, ed. by Eduardo Kac (Bristol: Intellect, 2007), pp. 25-44, p. 35.

¹¹¹ Derrida, ‘Signature Event Context’, p. 320.

and permeate the text'.¹¹² This is manifestly evident in a text like *V*, which contains so many overt references to other texts, writers and influences, that any sense of contextual stability is shattered. For Hayles, the consequence of this instability is that 'the text is opened to an infinitude of readings and [...] meaning becomes indeterminate or disappears altogether, chaos apparently reigns supreme'.¹¹³ Strickland's construction of a digital version of *V* is an extreme version of an iterative text; an infinitude of readings is literal here, as a result of the infinite number of ways the text can be (re)constructed and read. If you were to calculate the number of possible permutations for reading *Vniverse* – considering, for example, the number of orders that the tercets can be read in, then factoring in the option to also read the son.nets as an additional layer, and the fact that any tercet or son.net can be repeated, either intentionally or by the slightest slip of the hand – you would come to a number so vast that it can't be expressed in words (or comprehensibly expressed in numbers), and can perhaps be more helpfully thought of as infinity.¹¹⁴

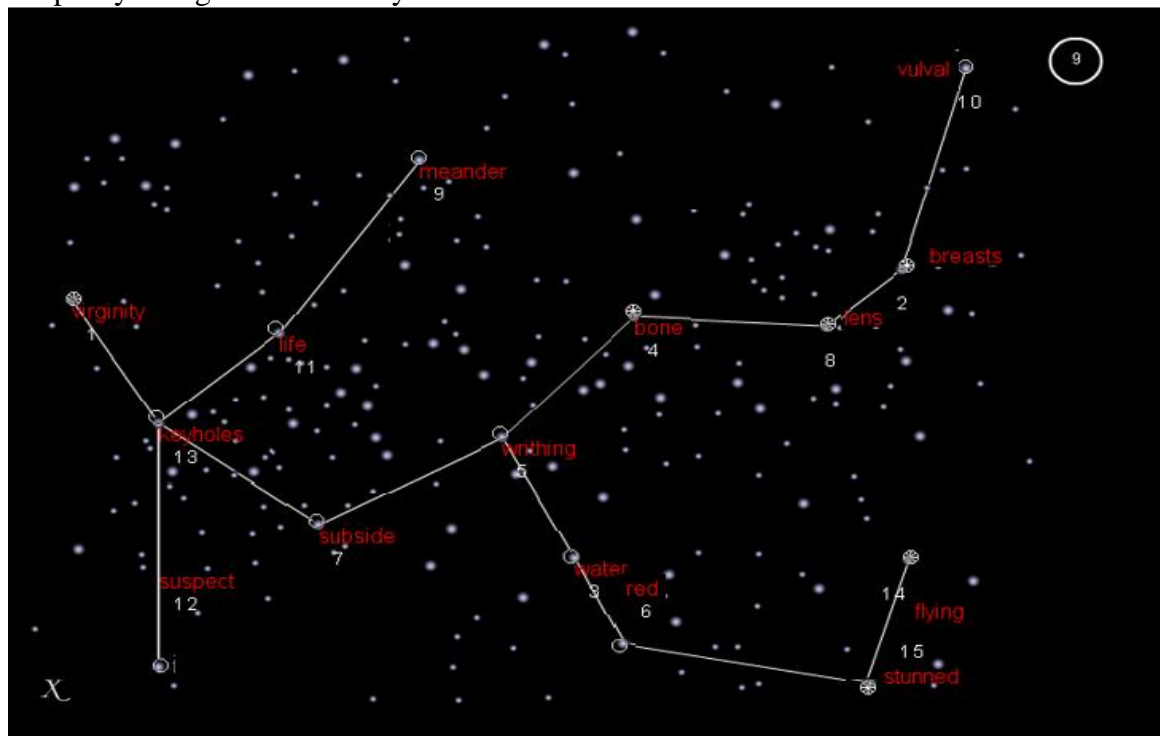


Figure 6. Edited image by author to show the tercet number and keyword for each star in the 'Swimmer' constellation.

¹¹² Hayles, *Chaos Bound: Orderly Disorder in Contemporary Literature and Science* (New York: Cornell University Press, 1990), p. 179.

¹¹³ Hayles, *Chaos Bound*, p. 175.

¹¹⁴ The number of ways you can read the 232 tercets, not including the son.nets, or repeating any of the tercets, is:

415798210832770977015571637026261943061848522604312624113370066788694260962277358924812122
 018540899189453160012306216996159585953169430580992217533416996218355769692228520181107693
 45298743334610610835457775908874765202729899189769837810867585550345084116012553381493679
 397220592936761668902813894894999677516082875409398242248834435266509874044408860014177472
 8083901305510650705226669477593088000

Consider the ‘Swimmer’, the first constellation in *V: WaveTercets*.¹¹⁵ The Swimmer, as it exists in the digital *Vniverse*, takes the shape of a person swimming, or perhaps floating in water. There is no clear starting point to this constellation, and it can be read in multiple permutations (assuming, of course, that the reader chooses to read this one constellation without swerving or veering away to interact with a star in another grouping). A logical approach to reading this constellation might be to start at the head and move down through the neck and the spine, finishing in one of the feet, perhaps. Interestingly, none of the versions that start at the head even come close to forming the tercets in numerical order – while ‘WaveTercet 1’ is found at the top of the head, the second star in the position of the neck, or perhaps chest, is ‘WaveTercet 13’, with ‘WaveTercet 2’ not appearing until near the end of one of the legs (see Fig. 6). In fact, to read the tercets in print order, the reader would have to travel from the head to the leg, before moving repeatedly up and down the various limbs in a chaotic fashion.

Consequently, instead of beginning with the first line of ‘WaveTercet 1’, ‘If you understand virginity’ and ending with the final line of ‘WaveTercet 15’, ‘childhood: marks’ (as *V: WaveTercets* would suggest), the reader of the digital text might find themselves reading from the top of the head to the top of the right toe, thereby beginning with ‘If you understand virginity’, but ending with ‘You might / go back’. The reader might choose to follow this instruction, and travel back up the leg, to read the curve of the spine, or the stretch of the left arm, reaching for ‘wormholes, keyholes, the high / you did not suspect’, instead of the book-bound ‘wormholes, keyholes, the high / road to heaven’.¹¹⁶ Or perhaps they might follow the right arm, gesturing down to the bottom of the page, where ‘wells open at the bottom leading to the next world, / wormholes, keyholes the high / is itself a lens’. In places, any sense of meaning in the text dissolves – ‘you do not / stunned – for you no longer live’, ‘the high / mock the real’, but in others, new connections strengthen existing associations, as with the combining of ‘WaveTercet 8’ and ‘WaveTercet 2’:

If you understand vulva, you understand lens,
 you understand an entrance
 to unsuspected, fertile, labyrinthine darkness,

i.e. ric-rac, earliest recorded
 symbolic motif, Cassiopeian breasts pouring forth
 a Milky Way, a.k.a zigzag

¹¹⁵ In *V: WaveTercets*, the top corner of each page contains a keyword (swimmer, broom, dipper, twins, bull, embryo, goose, infinity and dragonfly) that serve to group the various tercets into constellations.

¹¹⁶ Strickland, *V: WaveTercets*, p. 3.

Here, the reader can access a new series of associations, between lenses, entrances, fertile darkness, and the symbolic motifs of Cassiopeia and the Milky Way.

Though the constellations do not have to be read in any particular order, some of the shapes suggest logical patterns. The ‘Broom’, for example, might be read from handle to brush, then each bristle read first forward then back, with the end of the handle (‘WaveTercet 38’, ‘from his design and say / to myself, so, we must meet apart / in a time’) acting as a repeating pivot that recurs between each bristle. The ‘Twins’ might be read as first one twin, then the other, the reader crossing between them where they join hands at the pivot of ‘WaveTercet 106’. The ‘Infinity’ constellation, shaped like the infinity symbol, can be read as an endless loop, with no beginning and no end at all. None of these readings reconstruct the order of the text found in the books, with one notable exception. The final constellation in *V: WaveTercets* is the ‘Dragonfly’, and it ends with ‘WaveTercet 231’ and ‘WaveTercet 232’:

swaying – swaying in the air
above her,
an emerald darner

hovers;
that, I think, she hears, but
does not see.¹¹⁷

The final son.net in *V: WaveSon.nets* is also comprised of just these six lines (rather than the usual fifteen), with the stanza breaking after ‘hovers’. The constellation in the digital *Vuniverse* has ‘WaveTercet 231’, followed by ‘WaveTercet 232’ right at the tip of its tail – the presumed ‘end’ of the dragonfly, which is in the bottom right corner of the screen, and the digital equivalent, perhaps, to the end of the digital page (see Fig. 7). This, then, is perhaps the closest thing that *V* has to an ending.

¹¹⁷ Strickland, *V: WaveTercets*, p. 47.

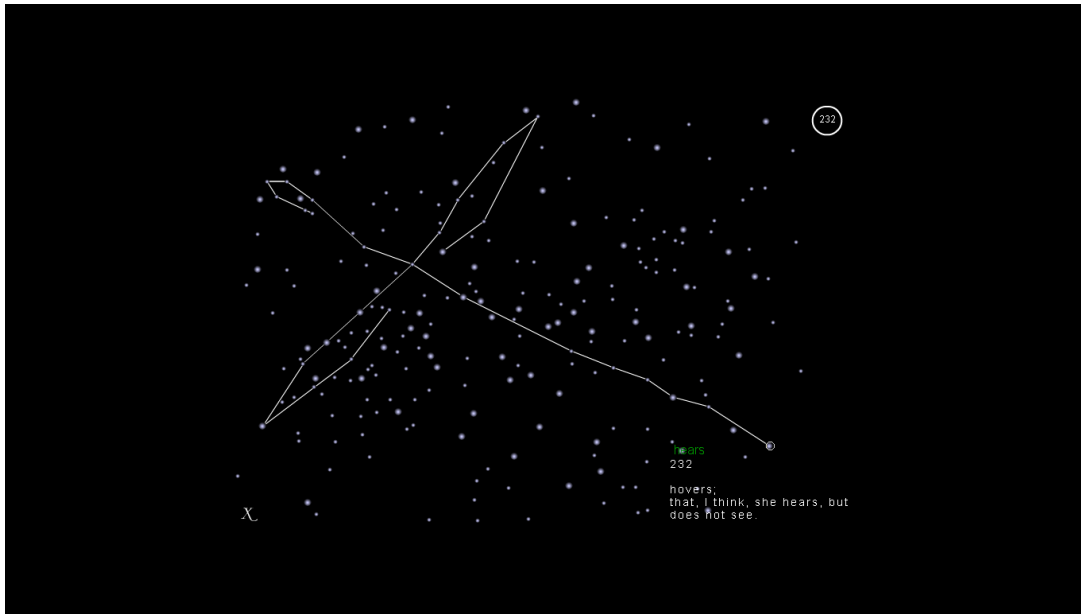


Figure 7. The ‘Dragonfly’ Constellation (screenshot author’s own).

V is a text that can be read and re-read forever; this is a text without borders or edges, a text where every word, every line, can be constellated with other words and lines, other times and texts, the bodies of other writers (and readers, perhaps), uncovering an infinite, unreadable textual realm of relation. Strickland’s experimental formal strategies (the multiplicity of texts, the innovations of the son.net form and the digital *Vniverse*, her chaotic, veering language and exaggerated use of etymology and citation) come together in constellation to expose the entangled nature of the poetic text. Experimental formal poetics that reveal the deep entanglements of language and text therefore challenge the reader to rethink their relationship with the environment on a cosmological scale. By widening the temporal and physical scales of our reading, these texts expose environmental entanglements that stretch billions of miles into the depths of interstellar space, and billions of years into the depths of the past and the future yet to come – into a space of endless, veering possibility.

A Poetics of Constellation as a Space of Revelation

Before it gives way to something that is both an ending and a beginning, this chapter takes a final, veering detour – to the constellation ‘Broom’. A broom, in *V*, is a thing that is likely to belong to a witch, to a woman in a conical hat. This seems to be confirmed in ‘WaveTercet 57’: ‘As she wove her seven-bristled, / quarter-circle broom’.¹¹⁸ However, broom is not just a

¹¹⁸ Strickland, *V: WaveTercets*, p. 12.

noun, meaning an implement for sweeping or flying or jumping over in a contract of marriage, or a small, yellow, summer flower; it is also, historically, a verb, meaning to sweep. It is related by etymological roots to the verb ‘to bream’, meaning ‘to clear (a ship’s bottom) of shells, seaweed, ooze, etc., by singeing it with burning reeds [...] softening the pitch so that the rubbish adhering may be swept off’.¹¹⁹ A broom is a method of transportation, then – but also an uncovering, and a sweeping motion. If we think of ‘broom’, and its constellation of various meanings and associations, as a pivot (or perhaps lens) for an analysis of *V*, we begin to understand that to read *V*, we need to let ourselves be transported, veering from one theme to the next; we begin to understand that when we read *V*, we are uncovering meaning, sweeping our mouse or our eye across the page to clear away the rubbish, the barnacles and weeds, to uncover the hull beneath.

And when we have uncovered the hull (or the helm, the hollow, the hall, the hill – the covering, the concealment, the ceiling – the sky), what then? Solnit writes that ‘if the earth is the record of what has happened, the sky is the realm of portents and prophecies, [...] the apparitions of deities and omens’.¹²⁰ There are many forms of divination that make use of the sky – nephelomancy, augury, astrology, selenomancy – all of which involve reading the motions and connections in the skies – the quick, transient movements of birds and clouds, and the endlessly slow turning of the stars, the planets, the moon. Astrology, in particular, is a paradoxical act, looking back in time to look forward. This is the nature of a poetics of constellation: it is a poetics that connects to the past to look ahead, to the future, opening up ‘a space of revelation’.¹²¹

And what is it that a poetics of constellation reveals? Constellation (meaning stellation, stellate and star, meaning aster, or asterisk), relates etymologically (via ‘star’), to disaster.¹²² Anthropocene discourses often speak of disaster – of environmental disaster, and ecological catastrophe. As Head writes, in times like these, it often ‘feels as though we are hurtling down a hill without any brakes, through an unfamiliar landscape’, toward ‘the possibility of catastrophe’.¹²³ Often defined as a ‘sudden disaster’, catastrophe is intimately

¹¹⁹ ‘Broom’, *Oxford English Dictionary* (1989) <<https://www.oed.com/view/Entry/23767?rskey=FZt7Tn&result=2&isAdvanced=false#eid>> [accessed 24 June 2020].

¹²⁰ Solnit, ‘Excavating the Sky’, p. 9.

¹²¹ Solnit, ‘Excavating the Sky’, p. 11.

¹²² Stellation, it is interesting to note, refers to a geometrical process by which a shape is extended into another dimension, creating something new. An asterisk, a little star, guides the reader out of the body of the text, to some annotation or omission. Furthermore, disaster, meaning ‘ill-starred’ is not simply a misfortune – it is a misfortune written in the stars.

¹²³ Head, p. 11.

entangled with ideas of ending, of The End. In the *Oxford English Dictionary*, catastrophe is defined as a ‘change or revolution which produces the conclusion or final event’; it is ‘a disastrous end’, a ‘finish-up’, a ‘ruin’, a ‘calamitous fate’. Geologically, a catastrophe is:

[a] sudden and violent change in the physical order of things, such as a sudden upheaval, depression, or convulsion affecting the earth's surface, and the living beings upon it, by which some have supposed that the successive geological periods were suddenly brought to an end.¹²⁴

A catastrophe is therefore something sudden, a single, decisive instant of conclusion. Even in mathematics, catastrophe theory refers to ‘systems which display abrupt discontinuous change’.¹²⁵ A poetics of constellation, in which everything is connected and nothing is discontinuous, reveals a future beyond this apocalyptic vision. Instead of being a catastrophic, sudden ending, the Anthropocene is revealed to be a shifting space of possibility and potential in which we catch a glimpse of a deep future – a future of minerals, stone and stars, that despite all human action, is (to return to the work of Christensen), ‘going on regardless’.¹²⁶ This is what the constellating form of *V* reveals to us; that everything that seems like an end is in fact the threshold to another beginning.

¹²⁴ ‘Catastrophe’, *Oxford English Dictionary* (1989)

<<https://www.oed.com/view/Entry/28794?redirectedFrom=catastrophe#eid>> [accessed 18 January 2021].

¹²⁵ ‘Catastrophe’, *Oxford English Dictionary*.

¹²⁶ Christensen, *Alphabet*, p. 28.

AND THE FUTURE EXISTS, THE FUTURE, THE FUTURE
Introduction to an Ending
or

A FEW SECONDS OF AMAZEMENT AT THE END OF THE WORLD

In an age of global warming, there is no background, and thus there is no foreground. It is the end of the world.¹

– Timothy Morton

The Angel of History must look just so. His face is turned towards the past. [...] The storm drives him irresistibly into the future, to which his back is turned, while the rubble-heap before him grows sky-high. That which we call progress, is this storm.²

– Walter Benjamin

we will exist, small as pollen bits in peat,
as virus bits in bones³

– Inger Christensen

In the summer of 2019, before the 2020 Covid-19 pandemic made such things impossible, I flew out to California to present at the ASLE 2019 International Conference, ‘Paradise on Fire’.⁴ This conference trip provided me with the opportunity to make a second journey – a 350-mile pilgrimage to the south-east, along the snow-laced Tioga Road through Yosemite National Park, to the White Mountains of Inyo County, and the Patriarch Grove. There is a species of tree, the Great Basin Bristlecone Pine, which is only found in California, Nevada, and Utah. The Patriarch Grove is one of the few places in California where you can find these trees, and it is home to the oldest of the species (in fact, the oldest confirmed living tree in the world), a tree called Methuselah, reported to be approximately 4,852 years old.⁵ Methuselah, named after the long-lived biblical figure, remains elusive, spectral; its exact location is kept secret to deter potential arsonists – any one of these twisted, sun-bleached, pale-limbed trees could be Methuselah.

¹ Morton, *Hyperobjects*, p. 99.

² Walter Benjamin, ‘Theses on the Philosophy of History’, in *Illuminations*, ed. by Hannah Arendt, trans. by Harry Zorn (London: Pimlico, 1990), pp. 245-255, p. 249.

³ Christensen, *Alphabet*, p. 21.

⁴ In hindsight, the conference name might seem a little literal, perhaps even distasteful, but at the time it was thought up, it was still just a metaphor; the 2018 Camp Fire that destroyed the California town of Paradise had not yet taken place.

⁵ Methuselah is specifically the oldest ‘non-clonal’ tree; in Utah there is a clonal colony of aspen known as ‘Pando’, which is anywhere between 16,000-80,000 years old.

The White Mountains are an otherworldly place. The ground is dusty and white, with only the scarcest hints of plant life, and the sky is an uninterrupted, vicious slice of blue. Here and there are great piles of red rocks, the remnants of an old seabed, broken into angular shards by the immense, unstoppable pressure of expanding ice. A fallen trunk lies uprooted by the path; a dusty placard informs me that when this tree fell, it was around 3,200 years old. This tree, then, sprouted in the twelfth century BC – an unimaginably long time ago. The twelfth century BC was a time when civilizations were still being born, a time long enough ago that it’s almost just a myth – the time of the Trojan War, the time of Odysseus and Achilles, the time of dynasties, and ancient lines of kings, the time of the development of the Phoenician alphabet, the time of the Biblical Books of Samuel, in which ‘Hannah prayed to the LORD, weeping bitterly’.⁶ I didn’t know this, at the time that I placed my hand on that impossibly warm, impossibly smooth, fallen trunk. At the time, all I knew was that this tree was old, older than I could ever fully comprehend, and, suddenly, that the world was older, larger, vaster than I could ever fully comprehend, and that in this exact moment, I was somehow connected to it, to the depths of the past, through the palm of my hand.

Drawing on the work of Jane Bennett, Christina Frendengren calls this moment of transcendent, cross-temporal inspiration ‘enchantment’.⁷ For Bennett, ‘enchantment’ is ‘a state of openness to the disturbing-captivating elements of everyday experience’, or ‘to be struck and shaken by the ordinary that lives amid the familiar’.⁸ It is a similar type of experience to an uncanny experience, but rather than resulting in a feeling of horror, or discomfort, enchantment results in an openness, ‘a mood of ethical potential’, a feeling of motivation toward ethical action.⁹ Frendengren argues that it is this sense of enchantment that we experience when we encounter archaeological finds. Frendengren gives the example of the discovery of a preserved leaf from the Mesolithic era (about 7,000 years ago), which was excavated in Derragh as part of an archaeological project and handed to a visitor. Frendengren writes, ‘both diggers and visitors were visibly moved as this ephemeral object withered in his hand: many of us felt a near “otherworldly presence” in its moment of decay’.¹⁰ This physical encounter with the deep past, much like my encounter with the fallen

⁶ 1 Samuel, 1. 10.

⁷ Christina Frendengren, ‘Unexpected Encounters with Deep Time Enchantment. Bog Bodies, Crannogs and “Otherworldly” sites. The materializing powers of disjunctions in time’, *World Archaeology*, 48.4 (2016), 482-499, p. 485.

⁸ Jane Bennett, *The Enchantment of Modern Life: Attachments, Crossings and Ethics* (Princeton: Princeton University Press, 2001), p. 131, 4.

⁹ Bennett, p. 131.

¹⁰ Frendengren, p. 490.

Bristlecone Pine, is a moment of enchantment, in which the enchanted party experiences the sudden, unexpected possibility of ‘seeing other ways of being in the world’.¹¹ A tree, a leaf, a well-preserved body, perhaps, all have a sense of familiarity – of the everyday – but there is something about these artefacts, the way they exist as tangible reminders of the deep past, of an impossibly old, and therefore impossibly different world, that renders this world, this moment – and all presently existing trees, leaves, and bodies – strange.

For Farrier, this experience of transcendence, this ‘irruption of clarity’, has as much to do with the future as the past.¹² In *Footprints: In Search of Future Fossils*, Farrier gives an account of finding a ‘plastiglomerate’, ‘a new kind of Anthropocene stone usually formed when beach fires melt together plastic debris with rocks and sediment grains’, on a Scottish beach.¹³ For Farrier, his encounter with this strange entanglement of plastic and stone was an experience of ‘*enargeia*’ – a moment where the ‘capacity to peer beyond the present moment’ and see the ‘bright, unbearable reality’ of the Anthropocene, ‘of the world we have made’, with its realities of ecocide, climate crisis, and species extinction, was realised.¹⁴ Farrier describes this experience (or encounter) as transformative, and argues that it is our ‘acute, intimate responsibility’ to ‘feel our closeness to those lives [of the future]’ that will be impacted by our current actions.¹⁵ This resonates with Bennett’s concept of enchantment as an experience that incites a mood of ethical potential, or ethical responsibility. Friendengren writes that it is through the direct experience of ‘the very vibrancy of the preserved leaf or the faces of long-dead bog bodies’, that we will begin to challenge ‘those apparently common-sense boundaries of “here:there”, “presence:absence” or “nature:culture”’, and ‘motivate a move from ethical thinking to ethical action [...] to make a move for better futures to come’.¹⁶ The experience of the past being brought into the tactile immediacy of the present therefore opens up the possibility of the same immediate encountering with the deep future; suddenly, the boundary between the past and the future erupts, and the future is revealed to be close, touchable – something that can be interacted with and maybe even changed.

¹¹ Friendengren, p. 483. I use encounter in the sense meant by Oswald, who uses it to describe a possible type of interaction within poetry. For Oswald, ‘encounter’ is a word that holds within itself the connotations of coming across something by chance, of surprise, spontaneous meetings, of unexpectedness. See Oswald, ‘The Universe in time of rain makes the world alive with noise’, in *A Green Thought in a Green Shade: Poetry in the Garden*, ed. by Sarah Maguire (London: The Poetry Society, 2000), pp. 38-39.

¹² Farrier, *Footprints*, loc. 199. Kindle edition.

¹³ Farrier, *Footprints*, loc. 3342-3352. Kindle edition.

¹⁴ Farrier, *Footprints*, loc. 192. Kindle edition. Farrier’s description of *enargeia* as ‘bright unbearable reality’ is borrowed from Oswald’s introduction to her collection *Memorial* (London: Faber and Faber, 2011). Farrier discusses Oswald’s *enargeia*, and its haunting effect in her poetry, in Farrier, ‘Like a Stone’, 1-18.

¹⁵ Farrier, *Footprints*, loc. 3362. Kindle edition.

¹⁶ Friendengren, p. 496.

My encounter with Methuselah was, therefore, an encounter with the *enargeia* of the world – an encounter with the bright, unbearable reality of the deep time scales of the Anthropocene. The sun-warmed, wind-scoured trunk that I pressed my palm to was dead – but the trees surrounding it were not. They, and 4,852-year-old Methuselah, were very much alive. To me, the fallen tree represented something more than a connection to history. For a moment, I was transported simultaneously backwards into the past and forwards into the far future. Then, with the themes of the ‘Paradise on Fire’ conference still fresh in my mind, and now, with the many catastrophic events of 2020, the Methuselah tree allowed me to glimpse, for a moment, the reality of the Anthropocene: that we are simultaneously insignificant and brief, and, paradoxically, that our daily lives are impacting a future more distant than we can imagine. As Farrier notes, ‘our present is saturated with things that will endure into the deep future’.¹⁷ Our coffee cups, our water bottles, our clothes, our cars, our aeroplanes, all the technologies of twenty-first century life (such as face masks, perhaps, or disposable gloves) are creating a planetary archive – our daily lives, our waste, are becoming fossils of the future.¹⁸ In Farrier’s words (which I recount with some measure of guilt, given that this chapter opens with an anecdote about a transatlantic flight), ‘our carbon could influence the climate for the next half a million years. The entire atmosphere now bears the mark of our passage, like a vast geochemical tracefossil of the journeys we have taken and the energy we have consumed’.¹⁹ In the Anthropocene, our lives are therefore revealed to be entanglements, or collisions, between the deep past, and the deep future.

In this thesis, *Entangled Times, Bodies, Texts: Mathematical Form in Contemporary Anthropocene Poetry*, I argue that poetic forms inspired by patterns found in the natural world can enact the challenging, tangling, paradoxical scalar realities and perspectives of the Anthropocene. There is a focus on the formal representation of fluctuating or incalculable scales, and the temporal, bodily, and textual connections between them. These ideas of scale and connection build towards the critical idea of futurity in an Anthropocene poetics. Anthropocene discourses and Anthropocene literature are haunted by questions of what the future means in the context of geologic timescales, or the unfolding climate catastrophe, and questions of how to live in a time when the future is so uncertain, or perhaps, so certainly catastrophic. Amir Eshel, writing on futurity in contemporary literature, argues that since the ‘unprecedented violence in the First World War’, the subsequent ‘genocide, the use of

¹⁷ Farrier, *Footprints*, loc. 312. Kindle Edition.

¹⁸ Farrier, *Footprints*, loc. 129. Kindle Edition.

¹⁹ Farrier, *Footprints*, loc. 123. Kindle Edition.

weapons of mass destruction in warfare, mass expulsions, irreparable damage to the environment, and seemingly endless regional conflicts’, and the detonation of the first nuclear bombs, we have been living in a ‘postcatastrophic world’, in which we ‘struggle with the sense of a world deprived of a future’.²⁰ In the introduction, I discussed the Anthropocene Working Group’s recognition of the Anthropocene as beginning in the mid-1900s, in part due to the indelible record of nuclear detonation suddenly visible in the geological record. We can, therefore, helpfully extend Eshel’s thinking from the unprecedented violence of war, to the unprecedented violence and destruction of the contemporary climate crisis. Eshel’s statement has echoes of Morton’s proclamation that the end of the world is not something in the distant future, but something that is happening here and now:

The spooky thing is, we discover global warming precisely when it’s already here. It is like realizing that for some time you had been conducting your business in the expanding sphere of a slow-motion nuclear bomb. You have a few seconds for amazement as the fantasy that you inhabited a neat, seamless little world melts away.²¹

For Morton, we are currently living in this ‘seamless little world’, these few seconds of pause, in which we are just beginning to realise that the bomb has already gone off.²² As we can see, ideas of the future become complicated in Anthropocene discourse; the future is perhaps the present – as is the past.

In ‘Archive Fever’, Derrida writes that ‘[*l’avenir*] the future to come [...] is the condition of all promises or of all hope, of all awaiting, of all performativity, of all opening toward the future’.²³ ‘*L’avenir*’, as Jean-Paul Martinon explains, is distinct from ‘*le futur*’, which is ‘something distant and remote’.²⁴ By comparison, ‘*l’avenir* [...] is imminently closer to us’.²⁵ ‘*L’avenir*’ is, therefore, the future-to-come (or the coming back) of the spectre, the return of the monstrous *arrivant*, whom we are awaiting, but whose arrival we do not expect.²⁶ When we talk about the futurity of the Anthropocene, we are talking about *l’avenir*, about the deep future that we thought was distant – which we awaited but did not expect – and which has now been brought close, within touching distance, returning to the

²⁰ Amir Eshel, *Futurity: Contemporary Literature and the Quest for the Past* (Chicago: University of Chicago Press, 2013), pp. 2-3.

²¹ Morton, *Hyperobjects*, p. 103.

²² In light of the ongoing Covid-19 pandemic and its effects on our global systems, we can perhaps see more clearly than ever that this bomb is already beginning to expand – that our comfortable illusions of stability are in fact inhabiting the precarious threshold of imminent destruction.

²³ Derrida, ‘Archive Fever’, p. 45.

²⁴ Jean-Paul Martinon, *On Futurity: Malabou, Nancy, Derrida* (New York: Palgrave Macmillan, 2007), p. 1.

²⁵ Martinon, p. 1.

²⁶ Derrida, *Specters of Marx*, p. 82.

immediate present.²⁷ We are living in the few seconds of pause, the moment before we realise that the *arrivant*, the catastrophe, or the end of the world, has in fact already arrived, and is slowly unfolding (or detonating) around us.

For Farrier, art and poetry, like the plastiglomerate (or the Methuselah tree, or Friendengren's preserved Mesolithic leaf), 'can help us imagine how close we are to the extraordinarily distant future'.²⁸ Eshel similarly writes that literature, specifically poetry, opens up questions of 'whom we may become', and 'the prospect of a better tomorrow'; here, Eshel is drawing on Aristotle's *Poetics*, in which he writes that the poet 'deals with the realm of the possible'.²⁹ Poetry, Eshel argues, can reveal that 'what is to come is not a mystery [...] but rather a shade we can move in and out of'.³⁰ In an Anthropocene poetics, the future is something touchable, tangible, and, crucially, something open. We return here to the future-to-come as the 'condition [...] of all hope', as a space of possibility, and ethical potential.³¹ An Anthropocene poetics can therefore function as a space of encounter (with the other, with spectres, with the possibility of the monster), that can help us to imagine the scale of our physical and temporal entanglements – with the past and the environment, but also with the future-to-come.

As I explore at the end of Chapter 3, futurity in the Anthropocene holds the potential to speak only of catastrophe, or a paralyzing uncertainty, but this is not a necessary condition of looking ahead.³² Solnit writes in the Forward to the third edition of *Hope in the Dark: Untold Histories, Wild Possibilities* that the open, uncharted space of the future is a place of hope. 'Hope', she writes, 'locates itself in the premises that we don't know what will happen and that in the spaciousness of uncertainty is room to act [...] Hope is an embrace of the unknown and the unknowable'.³³ Furthermore, hope exists in the collision of the past and future – hope is a feeling that relates to the future-to-come, but the basis of hope, argues

²⁷ We might also consider these ideas of environmental catastrophe in the context of Derrida's 'messianic without messianism' – the 'thinking of the other and of the event to come', the state of anticipation, or 'waiting without horizon of expectation', as there is no predeterminable messiah-figure or event that would allow us to know, definitively, that the future has arrived (Derrida, *Specters of Marx*, p. 74, p. 211). In the Anthropocene, we await the unforeseen, unknowable future of irrevocable climate disaster.

²⁸ Farrier, *Footprints*, loc. 302. Kindle Edition.

²⁹ Eshel, pp. 5-6; Aristotle, *Poetics*, ed. and trans. by Stephen Halliwell (Cambridge, MA: Harvard University Press, 1995), p. 59.

³⁰ Eshel, p. 6.

³¹ Derrida, *Archive Fever*, p. 45.

³² E. Ann Kaplan has written about what she calls Pretraumatic Stress Syndrome – 'an immobilizing anticipatory anxiety about the future'. See Kaplan, *Climate Trauma: Foreseeing the Future in Dystopian Film and Fiction* (London: Rutgers University Press, 2016). For more on looking to the future, see Chapter 3, pp. 101-102.

³³ Solnit, *Hope in the Dark: Untold Histories, Wild Possibilities*, 3rd edn (Edinburgh: Canongate Books, 2015), p. xii.

Solnit, '[lies] in the records and recollections of the past'.³⁴ An Anthropocene poetics, therefore, is that which establishes an entanglement of the past and future where 'each moment is thickly threaded through with all other moments', and each word is threaded through with all other words.³⁵ An Anthropocene poetics is that which inhabits this space of uncertainty, unknowability – even unreadability; it can be, and perhaps must be, a poetics of futurity, but also a poetics of hope.

Robert Macfarlane has spoken of our responsibility to use hope as an act of resistance, a 'remedy' for the malaise and apathy that occur when we are confronted with the overwhelming scale of the climate crisis.³⁶ In an interview with Rob Hopkins, Macfarlane argues that hope can be galvanized through language: 'Language is action. Language is a world-making, world-shaping force. [...] [It] shapes, of course, everything we encounter in the world and the ways we frame the world to ourselves. The metaphors we use deliver us hope'.³⁷ Rigby has also written about Anthropocene literature as a vehicle for 'prophetic witness', for '[awakening] us to the possibility of another way of thinking and being'.³⁸ This 'prophetic' mode or voice of writing, argues Rigby, 'insists on the ever-present possibility of a change in direction in the present'; it insists upon the chance to turn from one path, or future, toward another.³⁹ I argue that an Anthropocene poetics that engages with these ideas of futurity is therefore one that calls attention to the poetic text as a space of possibility, uncertainty and flux – that calls attention to the poetic text as a veering thing that opens up the reader to new ways of encountering, reading or thinking in a time of climate crisis.

This thesis examines the work of three contemporary poets, and the ways in which their formal innovations inspired by mathematical and scientific patterns enact the themes of connection, betweenness, and relation. Furthermore, I argue that they demonstrate the themes of openness and possibility that represent the fluctuating scales and temporalities of an Anthropocene present, and an Anthropocene future. In Chapter One, Christensen's Fibonacci-structured *Alphabet* concludes with the infinite deferral of an abecedary that cuts off at 'n', leaving the letters (or poems) 'o' to 'z' suspended in an anticipatory future, and the reader waiting for the unwritten poem-to-come. I argue that this demonstrates a formal

³⁴ Solnit, *Hope in the Dark*, p. xvii.

³⁵ Barad, p. 113.

³⁶ Robert Macfarlane, *Nottingham UNESCO City of Literature Lecture* (2019).

³⁷ Robert Macfarlane and Rob Hopkins, 'Robert Macfarlane: "the metaphors we use deliver us hope, or they foreclose possibility"' (2018) <<https://www.robhopkins.net/2018/06/04/the-metaphors-we-use-deliver-us-hope-or-they-foreclose-possibility/>> [accessed 18 July 2019].

³⁸ Kate Rigby, 'Writing in the Anthropocene: Idle Chatter or Ecoprophetic Witness?', *Australian Humanities Review*, 47 (2009), 173-187, pp. 173-174.

³⁹ Rigby, p. 178.

poetics of Anthropocene futurity, and the reality of our position in this state of suspense, as we wait, anxiously, for the end of the world, for the arrival of the spectre, for the future, which may, or may not, already be here.⁴⁰ In Chapter Two, I examine Fulton's fractal text *Sensual Math*, which demonstrates the monstrous effects of meaning being 'permanently forestalled', permanently deferred into an unobtainable future; the text loses all sense, loses its tongue, as every word collapses into infinite chains of signification – into wormholes, tunnels, passages.⁴¹ Here, too, the text becomes infinite, with word after word accumulating meaning on top of meaning, 'the poem [becoming] more myriad with each line', and in doing so, creating a 'space of possibility' that echoes the open 'spaciousness' of the future.⁴² In Chapter Three, Strickland's iterative, assembled, constellated text, *V*, demonstrates the unreadability of the infinite text. Here, texts become infinite – galaxies, universes – in possession of 'an essential *unfinishedness*' that speaks to the unknowability of the future.⁴³ The many versions and permutations of *V* also demonstrate that essential sense of possibility – of the future as something fluctuating, something mutable, something possible.

In an Anthropocene poetics, we are therefore compelled to look forward, onward, to what might be, to the yet-to-come, *l'avenir*. In an Anthropocene poetics, we inhabit a monstrous, tangled, ghostly space, poised on the unfolding edge of the present, and all its possibilities. In an Anthropocene poetics, we read with a fractal, multi-dimensional eye; the lens of our gaze is wide. Times, bodies, and texts are constellated together, and in their spectral patterning, we read shapes, portents, prophetic messages, signs. This is the purpose of *The Auspices & Other Futures* – to consider grief and hope in the Anthropocene, to look forward by looking back, to encounter the future in the signs of birds and roots (both etymological and arboreal), alphabets and stars, ghosts and stones, the sorrowful sound of the o – to encounter all the subtle connections, repetitions, and associations of sound and sense that reveal the 'bright, unbearable reality' of living in the time of the Anthropocene.⁴⁴

⁴⁰ 'State of suspense' refers to Cordle's term, outlined in Chapter 1, p. 31 (Cordle, *Late Cold War Literature and Culture*, p. 193).

⁴¹ Fulton, 'Her Moment of Brocade', pp. 152-153.

⁴² Fulton, 'Her Moment of Brocade', p. 153; Fulton, 'Screens: An Alchemical Scrapbook', p. 15.

⁴³ Derrida, 'Living On', pp. 84-85.

⁴⁴ Farrier, *Footprints*, loc. 192. Kindle edition.

**THE AUSPICES
& OTHER FUTURES**

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CAVE

hollow – cavern – cavity – swell – cumulate – cumulus – excavate – enceinte

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ROOT

rhizome – relation – dig – eradicate – irradicable – radicle – radical - ramify

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STAR

interstellar – constellate – start – aster – astrologer – soothsayer – star-crossed – disaster

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What an itching Curiosity there is in the best of Men, to know Futurities.¹

– William Burkitt

The Future speaks even now in a hundred signs; this destiny announces itself everywhere.²

– Friedrich Nietzsche

¹ William Burkitt, *Expository Notes With Practical Observations, The New Testament of Our Lord and Saviour Jesus Christ* (Philadelphia: Sorin & Ball, 1844), p. 390.

² Friedrich Nietzsche, *The Will to Power: in Science, Nature, Society and Art*, trans. by W. Kaufmann (New York: Random House, 1968), p. 3.

CAVE

a hollow place
a cumulation/cumulus
of stones and ghosts

Approaching Pin Hole

The path turns, a slow and steady muddying
past fat white mushrooms frothing in the moss,
past coots, skipping themselves over the dark
surface of the lake, past the pits and pocks

of the weathered stones that overspill their bulk
down into the gorge, rusted gates studded
into the base of their wind-lashed geometry,
while silhouetted trees peer from the brink.

Winter settles in the slow lapping sounds
of the cress, in the white, headless bodies
of the ducks tucked into the slipping bank,
frost huffing itself down over black water.

Palisades of ice glint on a swinging gate;
the scarlet flare of a dogwood interrupts –
is tempered by the bare, lopsided stretch of a pine,
by the skin of a shallow puddle, cracking.

At the crest of the river, a shock of sun –
bulrushes burst into sudden clouds
and Pin Hole, like a lodestar, shines
with leaves and lime and juvenile ivy,
every green and living thing unfurling –

An Aeromancer's Forecast

Between the hinging press of the crags, the sky
is a thick blue wedge, busy with rooks and clouds.
Two mallards glide across the gap, un-ducked
and graceful with their elongated necks

now that they are free from the suck of the green water.
A clod of low-heaped cumulus crumbles darkly
from one clifftop to the next, trailed by faint locks
of cirrus that un-form as you watch,

leaving a bright, blue pause –

before a great bank of cumulonimbus breaks
on the tree-feathered ridge and sends waves
of gathered water rolling down
into the gorge, where they settle, thicken

into a vault of fog shot through with the shadows
of birds passing, spectral, overhead.

Creswell

Before, there was a mill here, turning, endless –
now, the river, flat and clouded like spilled paint water,
flows unimpeded, dipping into three rills at the bend

due to some unknown defect of bank or bed.
At the crossing, a dense floe of cress bobs and frills,
obscuring the current as it hurries out and on

toward the Trent, the Humber, the North Sea.
A single aluminium can is wedged in the mudbank;
if left, it will sit there for eighty years, more.

Perhaps my children will remark upon it – perhaps
their children will delight at the way it glitters in the ivy.

On Devil's Chimney

Atop the rocks the watcher watches
over the walkers; their smallness
makes them purposeful, like milling ants

and they don't look up as they pass, their attention
fixed on the trail as they march through the valley,
the shadows, the lingering frost.

Up here, the sun is full level with the eye,
and freshly risen; it is already spring
in this sudden, yellow pocket. Up here,

the watcher hulks and waits,
and turns their face to the light.
Under the corvid bells, a quiet voice

is singing a soft, green prayer –
to be still, to be slow, to be held
in the calm of the old stones,

to be damp, and cold, and lit up golden
by the brief, benevolent touch
of far, alien suns.

The Auspices

Two mirthful birds fly overhead, join a third
funerary bird, which instantly lifts, turns,
splits away to the crag-tops to become
a solitary sorrow.

You await the auspicious fourth,
breath held, as the birds cast fluttering
shadows onto the rock face, squalling
their leisure from dark, feathered throats.

The overhanging trees have become a striated mass,
as the sun picks itself out of the leaves, flings
itself at the scrying chambers of the eye.
The river below blurs to a silver shivering

and the grey-bellied bodies of the birds bloom
and spread, the vicious green of the moss blooms
and spreads, and the yellowed ivy blinks, and spits
out a bird, a single instance of sun-glimpsed feathering –

foretelling nothing,
save the burn of your hands
when you come in from the cold.

A Catalogue of Bones

for A. L. Armstrong³

From the last cave, the contained remains
of bison, hippopotamus, *hyæna*,

ribs and shins engraved with toothmarks,
rootmarks, the destructive action of fire.

From the cave entrance, sun-cracked,
sun-bleached fragments, the quartzite

splinters of mice and fish, flatpack sets
of voles and snakes stacked in plastic crates.

From elsewhere, the partially sutured skulls
of pike and pilot whale, brushed, de-greased,

picked clean by beetles and polished
to a high lustre, the distinctive, creamy-white

patina of a lion's skull, its nasal turbinals
like layered sheets of lace, like the husk

of a physalis flower. From the basement bed,
white calciferous sand, an abundance

of burnt stones, a slow accumulation of teeth –
a single vole's jaw, incisors crawling back

toward the skull like fossilised rhododendrons,
the loose teeth of a common shrew, tipped

with red like the shavings of a scarlet pencil
rattling in a plastic sample jar.

On a high shelf veiled with white cloth –
a lone skull, *Homo sapiens*,

and below, a trowel, a bottle of sherry,
a pair of brown trousers wrapped in tissue paper.

³ Certain phrases in this poem are taken from A. Leslie Armstrong, 'Excavations at Mother Grundy's Parlour, Creswell Crags, Derbyshire, 1924', *The Journal of the Royal Anthropological Institute of Great Britain and Ireland*, 55 (1925), 146-175.

Winter

Deep in Church Hole, the bats are sleeping.

On the bank, pale roots spread
a map of skeletal fingers
pressed flat by time.

Cold wind rolls into the gorge like a tide.
Hollow umbels of hogweed quiver;
bleached reeds begin to hiss.

Between the rough honking of the coots
and the patter of passing dogs,
 little pockets of quiet.

Something shifts in the grass – some small, swift thing,
the sudden, rodent-leap of a leaf, momentarily airborne.

Deep in Pin Hole, the bats are sleeping.

The Fourth Bird

As they roost, the heartbeats of the bats slow
to the bare threshold of life. Calcite slopes
down the walls of the cave, tracing over
and over itself, forming the slowest of secrets.

At the lip of the lake, January hangs
like a rag on a nail. The reeds are motionless
and the lake is heavy with colourless clouds.
Inside Church Hole, the bats are sleeping.

Three black birds in arrowhead formation
chatter from branch to rock face,
settling noisily, caustically, wings fussing,
and there, there –

the shy peek of bright eyes,
blinking in the fissure.

Pheasant: A Haruspicy

Caught in the bank – an obscene, meatless balloon
of feathers and bones, red string trailing, beribboned
with shards of red and white, a yellow lump of fat,
the kind that you might smear, soft,
across a glass dish, heat until spitting,
then load with chunks of parboiled potato.

At the end of the string, one pendant talon,
scaled, grey and curling, reaches clear across
the path as though poised to keep running,
its plump little body bobbing over soft grass,
expecting only to keep running, running,

as the sun rises
and the trees bloom
and all the little eggs are hatching.

Comparative Brown Rat

On a square of black crafting felt:
the careful construction of a skull,

all hollows and runnels and sockets,
jawbones unpacked, detached

and set apart to the sides, studded
with grains that used to be teeth.

To the front, a recognisable leg bone,
bleached chalk-white and pristine.

Here, a little nodule of spine,
grooved and flared like a passing star

and there, on the cloth, all that's left
of the frantic, clinging thing it called life:

the fleeting white wing of the scapula,
scraping over the fibres –

so brief the light slips through it.

The Sorrow

Three blue eggshells lie smashed
on the path, the insides emptied, licked
fingernail-smooth by passing dogs.
Caught in the cup of one broken half,
snagged on the sharp edge of the shell,
is a sorrow.

It's a small and scuffling thing
with black eyes and hollow bones
that sag under its own unbearable weight.
It makes strange, ragged sounds
that shudder and stick in your throat
like a mouthful of hot, white, stones.

You think this is all there is,
that you and the sorrow are alone

but there, behind you, deep in the grass,
something wingless and soft is starting
to hatch from its own yellow egg –
the smallest and greenest of hopes.

The O in Hope

is the same o
as in open and in nova,
super-nova meaning new,
meaning *to bring forth* –
it's a solitary wishing
sound, an imploring,
an invocation, o
please, o
my darling, it's the second
o in sorrow –

the hoping o is the sound
of a choking –
star death is also
a birth, both
held simultaneous
in the snow
white heat, the counterglow
of the quiet
heart
as it opens,
o

Ghosts Go Where the Willow Grows

Where the willow grows, ghosts go, disguised as bats
or owls, or a *lekk* of moths glowing low
over the fields, wings flickering like papery keys.

Where the willow grows, ghosts grow, the illusions
of little flowers hidden in the hedgerow. An orchid
blooms the ghost of a bee on its lip, as lavender shakes

with the ghosts of bees, and rivers pucker with the ghosts
of wind, and a hollow tree stands only because that's all it knows.
Your body is as haunted as the land; the appendix,

that shrivelled vestigial ghost, the auricular muscles
of the ear that no longer remember to twitch,
the *plica semilunaris*, the ghost of the third eyelid.

Your ovaries are sacs of ghosts, and deep in the stones
of your teeth and bones, isotopes, plastics, endocrine disrupters
breeding their little ghosts, and somewhere

in the dark oceans of your insides, the tiny scintilla
of a ghost – the start of the thing
that will kill you.

There are ghosts on your tongue; the ghost of brown is bear,
and the ghost of cloud is clod, and even the h in ghost
is itself the ghost of a man called William Caxton,

and even your own name is the name of countless ghosts.
Hello? Your ears are full of ghosts, summoned by the wire
of a phone that vibrates the bones of your ears like applause.

Ghosts go where the willow grows, the treetops flocked
with the ghosts of the *archaeopteryx*, sparrows, crows, rose
finches, and we're all the ghosts of some bow-legged, bold-headed fish,

and the earth under your feet is glittering with ghosts
in stones and shells and bones, in roots and tubers and nodes,
and the slipping body of the ocean is alive with sunfish, ghostfish,

sharks without bones, and lower, the protozoa, the hydrozoans,
the isopods, down below the photic zone, the microbes
and motes and protists and plastics and still

the ghosts of plutonium, strontium, radiocesium,
the memory of whiteness –
poison drifting like snow.

Moss Chamber

In Memory of Neil Moss

Under the hill, the earth is riddled with holes,
twisting passages and caverns, like bubbles
of air in a loaf of well-leavened bread.

Time down here runs slow and heavy –
you might find that when you surface
into the starstruck Autumn night,

you've left your body behind, lodged in a fissure
surrounded by the remains of the old seas –
hard skeletons of coral, molluscs, brachiopods,

the bodies of urchins and brittle stars,
tiny, watery algae that are still in the process
of becoming opals.

This is what time will do to you – petrify
your warm body into a fossil of calcium and plastic,
your face becoming a frightened moon,

your eyes compressing into two blue pearls,
your heart and lungs disappearing, leaving no trace,
except for your bones and the soles of your shoes

and the shreds of your waterproof coat
to be excavated and strung up on wires,
displayed like a great whale, in the middle of a well-lit hall.

Hieroglyph Clam

Lioconcha hieroglyphicaalis

Wedged in the bed of the ocean, a clam
busies itself with inscription, etching
angular brown branches into the ridged face
of its trigonal shell – fractal trees that iterate, iterate,

iterate, all the way to dust. Its claims
are solely exterior – the inside is white and smooth,
an unmarked hollow holding the fat white tongue
that is also a foot. It speaks only to the sand,

a rhythmic, muscular oration that propels
the clam over sheets of mud and stone
into which it will, eventually, engrave itself.

Under Lake Isabella

The miners wait in their eternal bordello,
chipped faces tipped up to the green sun
that splinters down through the weight of Isabella.

Behind them, the mirror blushes with black mould;
a wooden counter houses crabs, the nodding skull
of a horned cow. Wooden chairs rock

under the miners' shifting bodies. Their blue jeans fray,
boots peeling away from their feet.

The room is a haze of water and fish, flakes

of wallpaper, particles of wax and skin,
motes floating thick. At their fingertips, bottles
of whiskey are wearing smooth, into pebbles

of brown glass, as they sit, rocking, and wait
for the tide to go out – for the water to go down,
for the town to rise

back up to the shore.

Pebble

Once, a vast black clifftop
hung over the bay, its great belly
pregnant with bones and bands
of sand, the spectres of old shells.

A buzzard mews, and time
and salt compact it down
into a scoured slip,

 brief pip
 of matter, little glint

brought in on the wash.

Salt Wife

The sky in the lake is clouded and holds no signs.
All vegetation is low; there is no defence
from the desert peach, the waxy bitterbrush,
the small, furred leaves of the Great Basin Sage.

Dregs of black larvae clump on the tideline,
scatter at your approach, writing lines in the scum,
in the strange alphabet of flies. The sun
is a pulse on the back of your bared neck

and you will never see this coming.
In the water, pillars of salt face the horizon;
they are looking for omens in the mud,
their crusted clam eyes prised open and empty.

Like them, you are compelled to search,
to look forward over your shoulder
for your daughters, for your sons –
will they, are they coming?

ROOT

a root or rhizome

a radical, or radicle relation

to dig with the nose (or the eye, or the ear)

And Still the Cypress Remains a Tree of Mourning

The trunk presses against your back, steady
as a second spine. You hear what the tree hears –
the sound of your mother's call,
frantic and fluttering, like garden birds,

and when they come for the tree, you bind yourself
to it with a skipping rope, make a sign of protest,
but you are small and easily uprooted,
and chalk can be washed away with a hose.

The chainsaw makes quick work of that steady trunk
and you feel the injustice of it in your bones,
the sheer injustice of it, like a spear to the heart
of a sleeping deer, and you think you might die

from the weight of knowing that grief
has all the power of smoke against stone.

Ghost Apples

In Grandmother's orchard, a blue-white shell
of ice hangs on a low branch on a low tree.
It holds everything you know about apples –

apple, or *aeppel*, *eple* and *apful*, *epli*, *aeple*, *aepael*, *apel*,
**ab(e)l*, the root meaning apple, but also a name, Hebhel,
meaning both 'breath' and 'vanity' and 'murderer' – an apple
is an any fruit – finger-apples, earth-apples, love-apples,
apples of paradise – an apple is a man and a woman crouching
naked in a garden – Eve ate an apple, but so did Adam – it
stuck in his throat and calcified – the pip of an apple-apple
contains cyanide – you would need to chew 200 seeds to die
by apple – in a fairy-tale an apple can kill with a bite – the
apple of the eye is the pit of the iris; it is also the one that you
love – the apple is both the fruit and the tree and the colour –
apple is just a shape – apples live in the cheeks of children and
virgin maids – mad-apple, mayapple, oak-apple, the gall of the
wasps – *Apple-time is the third Quarter of the Year* – an apple
is a pome, a *pomme*, a ball, a globe, an orb, a knob, a heart –
apple is a verb, to swell, become globular, apple-shaped – to
apple is to gather fir-cones, for the specified purpose of
burning – *children love apples more than gold* – to be
appleless is to be without apples –

the apple-knowledge leaks from a pinprick
in the glass apple-case, leaving only blue-white ice,
the suggestion of an apple-shape.

Chimera

It's the knot in the flesh of the tree, a drooping dark eye uncovered by swift planing –
and did you know that those dark eyes are the stubs of small branches
that tried to grow and failed, and died, and were encased, lidded,
by the slow, inevitable, growth of the bark?

It's the body of a mother, with its four lungs, eight limbs, two hearts –
and did you know that when the baby is gone, the body of the mother is still multiple
with foetal cells, little alien lymphocytes, hepatocytes, neurons, spinning in the blood
for as long as the mother can live?

It's the body of the pig, butchered and diced and minced and smoked –
and did you know the average American eats twenty-seven whole pigs in their lifetime,
twenty-seven sets of loins, bellies, and heads, and sixteen pigs can eat a whole human body,
uncooked, in under eight minutes?

It's the Earth, the rich soil and the crisp air, innocuous and fresh smelling –
and did you know that if you left your body out in a field to decompose,
the bacteria and the blowflies and the mites and the worms and the earth itself
would absorb your cells, and thrive?

It's the mosquito that pricks your arm or back with its needle-face –
and did you know that your blood will be carried off inside it as it whines away
into the night, so that a part of you lives beside the still water, drinking the blood
of the squirrels, the chickadees, the white footed mice?

The Garden at Tŷ Newydd

The lavender bed is flocked with bees, flowers bobbing
under the press and release of the bees' quick weight

as they launch themselves from one stem to the next,
black-furred, buff-tailed bumblebees thrusting

their faces into the cups to suck at bell after bell,
bright crumbs of pollen latched to their pelts.

We are standing in the garden talking about sex –
about angiosperms, naked seeds, questing proboscis,

about blooming, splitting, furling, inheritance.
A beech mast spins soundlessly down to the lawn,

its stubbled casing cracked open to reveal
the spread velvet flare of its three dun ears.

*Did you know, she says, that dragonflies mate
through the backs of their heads?*

The Sack-of-Potatoes Tree

Adenium obesum socotranum – the ‘ugliest tree in creation’

The sky is a hot blue stripe above a flat slate of sand.
Even the lizards lie still and bloated on the stones,
even the flies have fallen, stunned, against the heat.

The slender cinnabar trees are flocked with snails,
trunks laden like keels with shells the size of fists
that knock together like pebbles at high tide,

and from the surrounding sand, the earth blurts out
a body, birthing ring after ring of thick, rolling tissue
that spill over themselves into a fat burling sack

of water and sun, shadows pooling in its navel.
It might surprise you to know that inside this stout
and stunted form, there are flowers –

five petaled stars of incandescent pink and white
that will bloom and be admired by the starlings,
the doves, the polka-dotted moths.

Tea Trees at Lake Merritt

Leptospermum scoparium

A necklace of lights adorns the throat
of the lake – 3,400 pearled bulbs,
strung from sculpted iron posts.
There is a second collar, one of green

and brown, woven from coast live oak,
California buckeye and pickleweed,
saltgrass, marsh gumplant,
and, in the water, widgeon grass,
dead man's fingers, wireweed,

but the Tea Trees stand alone – strange,
imported contortionists, braided limbs
bent back on themselves in incoherent
loops. Their wicker necks stretch and flex,
as they survey the lake, eyes knotted.

Bay Laurel

A single bay leaf on the tongue
is enough to infuse the pulp of your mouth
with flavour.

A single bay seed on the tongue
dissolves, and takes root
in the lower intestine.

Epithelium tissue cracks into fissures of bark –
dry leaves blister and bud from the scalp,
come howling from the mouth, the tips
of the fingers, the hard fork
of the pubic junction.

If the body is found to exist, it will be stripped,
splintered, tapped. The skin will be burnt,
the flesh shaved into flat shapes,

the hair and nails added to tomatoes,
stock, fresh egg pasta.

Pipistrelle

A clutch of old leaves lies abandoned
on the sill. The shape is unmistakable –
those lobed wings, dark as wet wood,

one snapped tight to the body, the other
stretched wide, hooks at each apex,
glittering with the secretions of slugs.

Triangular ears sit like twists of thick paper
on a sweet, bleached skull. The eyes
are flat like apple pips, the pelt dense,

like pincushion moss. This crumpled shape
has been picked clean of all its urgent, mammalian
impulse – what's left is vegetable, arboreal,

an assemblage of leaf and twig, a little scrap
of night crawling with silver mites that spin
and arc like lapsing stars.

Photosynthesis

Inside my pine
I pray a soft prayer
and subside
into sticky bark, become
rough, and wooden, slow
my quick animal breathing,
let green shadows saturate
my quick animal body,
until even the quiet space
between the nerves
in my spine
and the meat
of my back
is green

and deep
inside I am

water
rushing
damp
sugar
swift lines
cambium
radiocesium
rings
phloem tissue
seed

44 Uses for A Common Ash

after Robert Penn

include planks and panels and pens and pegs,
porridge spoons, jam spoons, spoons for tea and eggs,
coat hooks and hat hooks and sanded slats,
toboggan staves, arrow shafts, a pot-bellied axe,
a felloe hoop, nesting bowls, paddles for canoes,
bike wheels, coffee-tables, mauls, and milking-stools,
catapults, spatulas, a spindle-backed chair,
a worktop, a yurt's roof, a heartwood writing desk,
a table set, a chopping board, the shelf over the cooker,
dominoes and bookmarks, a custom beer-shop counter,
frames for nets and liners for boards, the hull of a coracle boat,
a bench for boots, with tongues and grooves, bedding for domestic goats,
firewood and kindling, charcoal briquettes,
the smoked taste of bacon – the other kind of ash.

Five Stages of Citric Hybridity

I. Oranges

are not the only fruit — there's also tangerine, satsuma, mandarin, clementine, pomelo, Seville, navel, heirloom, bergamot, bitter, blood — oranges are also apples of gold and Cezanne painted oranges and apples together on a white cloth and you could never tell them apart — half an orange tastes just as sweet as the whole, and California is a fine place to live if you happen to be an orange — orange is a city and a county and a lake, it's a park and a river and a creek and a cap, and it's also a colour but the fruit came first — before we had oranges we only had yellow-red, *geoluread*, *geolucrog* — and the orange of an orange is actually a carotene, the colour of leaves in autumn, and the sun in *Impressionist Sunrise*, and the fur of the fox, and the wings of the oriole, and the glittering scales of the koi — and orange was an agent deployed in Vietnam, and orange killed the jungles and the forests, and orange irradiated all the babies and blossomed cancers in their bloods, and orange cleaved their palates and bifurcated their spines and their genes and neural tubes — and orange used to begin with an n but now all we have is o — and underneath the peel and the pith, you will find carpels, membranes, vesicles, pips —

II. Clementine

o my darling, o my darling, o my darling clementine — *Citrus x clementina* — the *tang* of the tangerine bred with the *or* of the orange — my darling clementine — is the name of a fruit and the name of a girl and the name of a plutonium reactor — clementine cake is glazed and sweet and made with almonds and wine — clementine is cooking up experimental plutonium sons in the darkness of the desert — o my darling o — clementines come from the garden of Brother Clement (his name means mercy) — my darling clementine — deep down in the Alamo sand-box clementine is *blowing bubbles soft and fine* — o — at its root a clementine is a leaning, a bending, perhaps to a will or a want or a god — making green glass pebbles and white mushrooms in the sky — and at its root clementine is tied to climate and clinic and cline and climax — o my darling — his name means mercy — o my darling the sand *grows roses and other posies* now and you are easy to peel — clementines have thinner skins than oranges — the skin just slips right off — this new breed of clementine is a clemenule, a merciful nil (there are no pips) — meaning thank god, thank god — *dreadful sorry, Clementine* —

III. Peels

are poles used for shovelling bread — are gallows, an executioner's stake — are a clamouring of bells and tongues — are a begging, a beseeching, a plea — to be cured like a salmon in a ceviche marinade — are trichloroacetic acid searing into the soft flesh of your face, melting away all visible consequence of age in the

skin — are pared off with a blade, stripped, sliced, diced, boiled in a vat of liquid sugar, and baked into a cake that is wrapped in linens and preserved for a hundred years, waiting for the right wedding, the right bride, the right birth —

IV. **Pith**

from *pipa*, meaning substance — it's the soft, interior tissue — it's *the innermost or central part of a thing* — it's the webbed lining of the rind — it's the keratin-core of a feather and also the core of a horn — it's the vascular stem of a plant that shrivels and dies and leaves only a hollow space — it's the porous sponge-cake layer between the strata of the skull — white and often bitter-tasting — it's the sprung white heart of bread that you tear out with your fist — from *pitte* meaning pit — it's a cavity, a hole, the smallest deepest dark — *some do twine out the pith of the backe with a long wire* — it's the literal and figurative backbone — *the core, the nub* — it's the mettle, the spine — it's to be of great import — it's a lace, a marrow, a pudding, a ball — it's *the spirit or essence*, the spark of courage that streaks from the belly to the throat — it's a cavity, a marrow, a pudding, a ball — it's a helmet worn in the jungles of war — it's *the innermost or central part of a thing* — it's an act of violence, an insensible severing, a terrible snipping of the spine — *the essential or vital part* —

V. **Pips**

a robin sees a cat and pip-pips the alarm — a creased envelope holds dried chips of taupe, cornsilk, seashell, eggshell, snow — six shrill pips from the telephone — peregrine or pilgrim — a pip is *pepin* is a *popin* is a *pipin* is a *pippe* — a domino clicks and sticks on the table and on each side, pips — if a chick has a pip then it might well die but if a human is pipped they are only behind — the PIP of a tiger is a pawprint on glass, a moment cast in plaster — a Predicted Impact Point, a strike, a detonation, a hit —

Alamogordo Glass

Slick bubble of stone
suspended in a twist
of silver wire; pale green
(like hellebore flowers,
like sage, like sea-glass)
it holds time
within itself –

sand melting crumbs of stone quartz
calcite feldspar become slack and liquid
frothing into irregularities of green
glass like spilled beads like water spasming
in a hot pan coming together in a sudden shrieking
brightness

(flies
bumping the panes
of amber windows)

tarmac melting the skin melting the fat
the bones shadows on the walls the smell
of the eyes melting the hands melting the sky
a sudden bright silence

leaking into the water,
into your children's teeth,
their soft, forming bones.

The Stomach Contents of a Northern Fulmar

On the brim of a cliff, a mother
nests in a scrape of moss and rocks,
pecks at a cigarette, a bottle cap,
scraps of net too large to digest.

Inside the mother, a slow forming
of yellow yolk, jelly albumen,
the calcium carbonate coat.

Inside the mother, toothpicks,
balloons, cigarettes,
a bottle cap, scraps of net,
a steady leaking of letters –

BZT-UV
Fe PVC
P Zn B₁ E161b
PS CaCO₃ B₆
PET XPS EPS PP H₂O
TCE ATP HDPE K
B₉ BPA CFC Ca HCFC
ICP PA Mg PC PES PE LDPE Se
HIPS PU PVDC ABS PMMA PTFE
MF B₁₂ PEEK PEI PDK PCB DEHP
DPB EFA DINP DIDP BTA HPBT
PTHPBT PF POP TCDD DDE PS
DDD DDT PCB EPPP PAH
EGG

Picnic

We crest the hill and there are flowers –
buttercups, daisies, buttercups,
dandelion clocks, clovers,
cowslips and buttercups.

Stitchwort, my mother says.
Stitch-wert, I say.

We sit on the remains of a stone wall,
prop plastic beakers of elderflower cordial
on the handy crags, eat cheese and pickle sandwiches,
packed tightly in tinfoil and Tupperware.

I toss the vine from my cherry tomatoes
into the long grass, into the cow parsley
and buttercups, bluebells, red campion,
ribwort plantain and bluebells, saxifrage,
buttercups.

Contamination, my father says.

I fish through bluebells, bluebells,
stitch-wert and buttercups,
until I reclaim my vine,
my string of strange spiders,
thick and green and stunted,
coated in vinclozolin, maybe,
or carbendazim, carbendazim and dicofol,
carbendazim, endosulfan and iprodione,
or vinclozolin, vinclozolin.

Snowfall in the Mariana Trench

At 10 feet down your eardrums burst,
and cold seawater floods the pockets
of your tympanic cavities.

The peach balloon of your face deflates,
your sinuses collapse. The delicate pulp
inside each of your teeth is squeezed.

plastic syringes pumps packets
blue plastic nets

At 100 feet down
the spongy tissue in your lungs
ruptures; alveoli pop
like corn.

pumps plastic pots

At 190 feet your retinas unlatch
from their jellied surface.

lids caps

You are compacted into a slick ball
of yellow fat and phlegm and grey matter –

caps tops lids

your bones fold like collapsible furniture.

microbeads straws

It begins to snow –
shreds of whiteness sinking
into blackness.

nets pumps
plastic pens coke bottle

At 3280 feet, the sun reaches the end
of its 93-million-mile journey,
dissolving against a black wall,
leaving only bioluminescence.

straws cups capsules tops
discs plastic pegs toothpicks
coat hangers pill packets lids
microbeads straws nets yoghurt pots
plastic sheet

At 26800 feet the last fish,
ghost-white and thick,
slugs through slick
big-eyed life,

tubes hooks straws
plastic pegs coke bottle packets
tags tops screws yellow plastic duck
cups pumps
nets reels hooks straws
nets

a soft snowbank of detritus

pumps packets syringes
bottles lids tops caps pots crates
blocks buckets pics nozzles
tubes tops straws pens bands lids
sheets hooks caps amoeba pegs sheets
cups wheels legs shreds pipes legs
tags screws links flanges hangers
buttons tubs straws tags
capsules nets reels cups arms
syringes amphipods cables pics balloons forks
pegs stoppers scraps lids foraminifera cups
microbeads links cups crates packets
pics pellets bottles tubes flecks
trays wheels arms bottlenecks xenophyophores
nets discs plastic turtles plastic ducks combs
bottles cups valves rivets plastic crabs
bottles cups rings tubes nets rubber bands
diatomaceous ooze flanges pics wheels white plastic bag

The Wave Organ

From a bed of recycled graveyard marble,
a series of rubber mouths fetch up the sounds
of the sea – the ugly slop of waves

slapping like feeding tongues,
bubbles burping in the organ's rusted throats.
Under this misophonic smack and slobber,

under the ambient humming of ocean liners
and petrol rigs, and the unreadable codes
of bubbles and spray, under the chorus line

of the whales, the percussive flapping of fins
and flukes, the pulsive calls of the snapping shrimp,
a second, low-frequency transmission

is sending itself to your ear. In the shallows
at the foot of a lighthouse an old storm bell
is ringing, and the ocean whispers to you

of the hush of plastic bottles slowly shredding
themselves to pieces, the agitations of molecules,
small particle sounds –

and from the depths, a distant humming, perhaps,
or a groan, then a whistle –

the silence of ice as it melts, finally.

Wind Turbine

A smearing of scrubby bushes,
dirty trees, collapsing

bricks, bags of wet
sand, winking

signal lights,
a lone horse,

pylon, pylon,
pheasant.

Terraced gardens, overgrown,
rusted trampolines,

graffiti, pink –
call your mother tonight,

fencepost, topsoil,
fox.

In the mist, a lone white giant,
upper blade dissolving,

reforming,
in and out

of sight.
Elsewhere, a switch – a light.

The Tyndall Effect

On a burn-scarred bench, a long glass cylinder sits in a wooden bracket.
Black rubber seals circle each end and are affixed with wax.
A white light burns in place of the sun.

The scientist fills the tube with smoke, and the light scatters,
like flour in water, hangs, suspended –
like chalk in milk –

and the tube fills up with melancholia, with minerals
and stones, and cornflowers, and baby boys,
and peacocks, and the Queen's navy, and the Aegean Sea,
and heaven, of course –

and once I heard a story that our ancestors didn't have a word for blue,
because there weren't any blue things, or at least if there were,
they never noticed them –

and if you think the sky is blue, think again (it's just empty),
and the sea isn't blue (it's just deep), and behind your eye
(it's exactly the same) sky-blue blossoms as the light turns,
is bent and bounced by the iris, scattering
like milk, like chalk, like flour –

and if you scoop up the blue of the world in your cupped palms,
you'll find no colour, only clarity –

and this blue marble isn't blue at all,
it's only wine-dark or blind-white,
and everything else is just a scattering

of milk, and chalk,
and small, perennial flowers.

Nellie's Tree

After Vic and Nellie Stead

Is actually three trees, allografted – scion
to rootstock – into the upward-downward-upward
strokes of an N.

N, say the trees, November, nutmeg, note.
That alveolar nasal press of tongue to roof,
that push of air – N. It stands for Nellie,

which could mean Ellen or Helen or Petronella.

N, say the trees, and to tree means to chase,
or to corner, to hunt. N, say the trees, and what they mean

is number, negative, nitrogen. Near-sighted,
they say, net and needle and nib. N is for noose.
N is for nuclear, nails and nest. N is for names,

like Nellie, who had a husband and a tree,
like Norma, who had long white hair and taught ballet,
like Naomi, who can see out the back of her head.

N is for Nanny and naval and navel, and did you know
that the navel can be removed, leaving a flat pane
of skin that is still riddled (at the cellular level)

with genetic traces of the maternal graft? N
is for naked, nude, new-born. N is for nipples
and night, for no-one, nobody, and nowhere. It's for naiant,

which means to swim horizontally, but you must be a fish
for this to apply. N, the trees say, and they mean nape,
the base of the neck (and if you dream of the neck

you are dreaming of the connection between the mind
and the body), they mean nadir, nausea, norepinephrine.
Nut, which is both a god and a seed,

Neptune, which is both a god and planet,
Narcissus, which is both a man and a flower.
N, which is the fourteenth letter, and is for nettles

and narrow-leaved arrowheads, N, which is for narrow-lipped
helleborine. N is for nasturtiums and navelwort
and Neapolitan garlic. N is for nectarines.

N is for needle grass and nettle-leaved goosefoot.
N is for nit grass, and nits. N is for Normandy sorrel
and Norway maple – N is for Nuttall’s waterweed.

N, say the trees, and though they are beeches,
they are saying *nuin*, meaning Ash. They are telling you
about nebulae, and networks, and nodes, and nacreous clouds,

unreal celestial sheets of mother-of-pearl,
which is really called nacre, from the Arabic *nakara*,
meaning ‘to hollow out’. The trees are speaking of nerves,

nervousness and nervous tissue, neurons. The trees
are neurotic. They are telling you about natterjack
toads and narwhals and nautilus

and needlefish and nightcrawlers and nightjars
and nighthawks and nightingales, neon and neptunium
and nickel. N is for negligee, which means screen,

and nightmare, which is the time we’re living in. The trees
are saying, never, no, not now. The trees are pointing North.
They are saying nab and *na luin* and nick, which is a cut

or a theft or a gap in the hills through which the weather comes,
or the devil if it is prefaced with old. N means to *nuddle*,
it means *nant*, it means *nubbim*, the stump of a tree

after it has been felled. N, say Nellie’s trees, and what they mean
to say is Nth, the Nth term, meaning, really, infinity –
meaning nearly, not quite, not now, next time, not yet –

STAR

a celestial body
a portent or revelation
a spark

*

Dust

They left the house empty, just walls
and doors, bare windows, and their ghosts
embedded in the light cream carpet –

greasy flakes of food, spiders of dark hair,
a crescent moon fingernail, her skin
all in pieces, hair pins in the gap
behind the door, his skin all in pieces,
four black beetles curled up dead,
endless mites, feeding and flourishing
in the fibres –

and in the void
between the edge of the carpet plane
and the sheer, vertical face
of the skirting board,

a clump of hair and lint and skin and spider webs
clings statically together, a tiny grey planet
of aggregated detritus, forming

the same way planets form in the void
of space, particles of interstellar dust
spinning together, tangling
into a ball of heat and light that becomes
a ball of stone and dirt and water,
and then somehow, incredibly,

life –

the grass and the trees, the yellow fields,
and then metal and concrete and brickwork,
and glass and houses with walls and doors
and windows and carpets

full of dust.

Gabriel's Trumpet

Brugmansia suaveolens

From the trellis, a flourish of trumpets stretch their wide, yellow throats,
and your head becomes a bucket mute, bright brass tidings burbling
in your ear, reminding you that the trumpet is, most bizarrely,
the reason you are alive –

your father played it, and your mother played the cornet from the seat beside,
and it's funny to think of yourself as a coincidence
of plants and metals and sounds, a composition
of times, places, and songs –

Tam o' Shanter's Ride, perhaps, or The Margam Stones,
O Little Town of Bethlehem, played out in the snow
by the steps of the Buttercross –

and you wonder if they could hear what glad tidings were heralded
in that playing – if they knew that the heart-thudding spaces of the cathedral
and the future, were ringing, resounding,
with three golden notes.

The Seasonal Weather of Migrating Birds

The window is a black square, lit with the twin moons
of my face and the pendant light. There's still weather

in this dark swatch; like the real moon, waxing away
to nothing behind the house, it cannot be seen, only felt.

With the window flung wide, the cold encroaches –
it's like lowering your arm into a still river and letting the line

of the water rise, clear, over your pebbling skin.
The air carries the taste of burning wood, wet wood, rain –

and the passing sounds of geese, a fricative aggregation
of migrating birds, a thundering of wings and hearts

held together by the linchpin call of the coxswain,
as they arrow southward into the past –

where you and your mother are waiting,
your faces twin moons in the landing

window, as you stand, and listen,
and wonder.

The Futures

In the garden, you stand and watch the martins
as they swerve and loop, little blue geometries
of feathers and sticks,

and as you stand and watch, a nest is knitting
itself together, and as you stand and watch,
a future is knitting itself together,

and for every second you stand and watch,
the futures are splitting, budding, proliferating
like roots, or worms, or intestinal bacteria,

and every step, and thought, and motion
sloughs another future from your back,
scalps another future from your bowed head,

and with every breath you inhale a future,
and every time you speak, each word splits
the world in two –

and as you move through the air, the weight
of all those possible futures pushes you back,
like a stone, rolled from the crown of a hill.

The Future, The Future

and in a cold, porcelain instant,
the future –

a moon fracturing
in water

an orb of painted glass
breaking over stone

a dandelion's clocked head
shattering over the field

a cloud of murmuring birds
dispersing

The Cubbington Pear

In the green thick of the hedgerow, a wild pear
turns suddenly to ghost –

the crown of simple leaves blisters white and unreal
with silk-slip flowers, the auspices of fruit,

and the old homestead trunk collapses into itself
in a singularity of blackbirds, leaves, buds, sap,

unravelling caterpillars, spiders ballooning away
on their silks, pips spitting nonchalant from mouth

to earth, a rush of light and heat and oncoming steel,
a sapling just breaking ground –

and the crease of the hedgerow is ironed
from the map with a fistful of crushed stones,

leaving the line of the hill unbroken,
perfectly smooth, for a swifter passing.

Birch, Meaning Birth, Meaning Weeping

birch, n. A genus of hardy northern forest trees, which grows from Mt. Etna to Iceland, distinguished by its slender white stem. Also called Lady Birch, Silver Birch, White Birch, the Weeping or Drooping Birch.

birch, n. The first letter in the Ogham alphabet, beith, meaning birth, meaning beginning, meaning bright, shining, dawn.

birch, v. A punishment, or striking blow.

In the early hours of a winter
morning when the light is a silver lustre
and the moon is a silver ladder over the water

On a white table in a quiet hall
the sun slants yellow over the walls
and the silent phone sits waiting.

night turns to dawn on the verge
of the atmosphere.
Far over the crown of the earth

On the desk, a parturition of careful
words on white paper, the only birth
the house will see this winter.

silence –
as the aurora emerges, a shivering
curtain of polar light.

In the white hall a quiet clock is ticking.
Dust stirs into a curl of starred light;
curtains drift.

The hills are burdened with furling feathers
of bladder-fern, leather-leaf fern,
slender-tailed moss, purple heather

A layer of silence hovers over every
surface and every hour is heavier,
like wading through dark water.

and on the branches by the gate
white buds stayed furled tight shut
inside their silver branches.

A light rain falls, a soft *smirr* of water.
The folding hills are beaded with lanterns,
little stars, little marsh lights.

The windhover shivers, suspended
as the earth turns and a white ship berths,
and burnished silver burrs let go their seeds.

A mother who is not a mother
pulls the grey cover up over
herself.

A mother who is not a mother
goes wading through ferns, purple
heather, dark water

and a mother who is not a mother
drifts and cries and tries
to remember –

in the other world behind the mirror
there is a mother who is
a mother, and a baby who is

a baby is sleeping in a bower
of white flowers, roses, juniper,
purple heather

and when the sky moves
with the lights of the mirrie dancers,
that baby who is a baby

will stir and cry with all the fervour
of a white-winged seabird
turning over the water.

Under Earth

Darkness spills up from the chimney
and the fissure contracts to a single eye.
You are reduced to crawling,
low, on your belly,
and on the close walls, white marks, scratched
into the stone, urge you to turn –

VIRGO VIRGINUM urges you to turn,
PACE MARIA urges you to turn,
IOTA urges you to turn, turn away, turn back
to the light –

but you persist, and the passage balloons
out into a gasping blackness,
and when you look up

the stone vault is scattered with pinpricks
of light –

the secret glitter

of water

under earth,

little subterranean stars

trembling

trembling

Pin Hole Cave: An Ending

I.

dark

red
cave
earth

wet
cave
stones

flint

a
faint
red

spark

II.

inside

cave-earth
the colour of iron and hawks

the hearth is the heart — a smouldering
nest of ashes antlers flint chips bones
split longitudinally for marrow

the fire is choking — hyenas
lose their teeth lions lose their bones
men smoke clay pipes and carve birds
and the shapes of women in the stone

they have no knowing of what's yet to come

outside

wind and wolves go howling
mammoths roam between larches and pine

teeth and tongues striped with grass
bellies filled with bright spring flowers

they have no knowing of what's yet to come

III.

What's yet to come is this:

A bristling of thatched roofs, smoke, beer,
rough cloth, loud songs, hammers and anvils,
cleavers and dogs, the sudden flood of a new lake,
and the slow, creaking turn of a watermill.

What's yet to come is this: cows herded
down under the earth to scratch at straw
and stones with restless hoofs, scraping the walls
with the blades of their bones, the first archaeologists.

In this place, to be a witch is to be a woman
and to be a woman is to be a witch, trapped
in a shoe like a pheasant in a stovepipe,
unable to see a future other than this –

unable to see what's yet to come.

IV.

What's yet to come is this:

On April 12, 1870, the cave proclaims
AND OF SUCH IS THE KINGDOM OF GOD
and the red floor shatters – the inside
is hauled outside, dumped into piles of spoil.

The cows are long gone, and the second archaeologists
have dynamite, hammers, chisels for striking
away the slow-born layers of earth, unburying
its valuable bones so they can be packed up in crates

and carried away by an engine powered with stones
and steam, to be stored, labelled, used as evidence
that time is older than we supposed, that all we are
is earth and bone, things that can and will be known.

(when the women come, they turn
their beribboned caps loose, cast
their hatpins into the dark, little seeking
spells of brass, glass, filigree, scattered
among the red cave-earth and stones
in the hope of receiving some small
auspices

of what's yet to come)

V.

What's yet to come is this: lights sparks waves information streaming fast faster 01100001 01101110 01110100 01101000 01110010 01101111 01110000 01101111 01100011 01100101 01101110 01100101 hot black tarmac everywhere roaring everywhere in the water and the air particles of ⁹⁰Sr surreptitious poisons lights white green amber red the CO² is rising no unsupervised admission the clock is 3 minutes to midnight plastic bag in the river <meta property="og:title" content="Creswell Craggs Museum and Prehistoric Gorge"/> <metaproperty="og:description" content=" Creswell Craggs is a spectacular magnesian limestone gorge on the border between Derbyshire & Nottinghamshire. Explore the caves, museum & visitor centre." /> children in white hats information streaming NOAH MR T headlamps the crows ARE AM the bats MIA SAVE BEES are sleeping the bats are sleeping JAKE says the tree on the bank <metaproperty="og:url"content="https://www.creswellcraggs.org.uk"/><meta property="og:site_name" content="Creswell Craggs Museum and Visitor Centre"/> £9.00 adults £8.00 concessions £7.00 children ticket price the clock is two minutes to midnight includes exhibition entry the bats are sleeping the ticket machine requires exact change 01100011 01101111 01110110 01101001 01100100 00101101 00110001 00111001 the future remains unprecedented under 100 seconds to midnight threat uncertain the bats the Clock continues to tick. Immediate action is required.

And then?

VI.

And then, when all the people are gone
(or not yet returned)

the bats begin to wake, heartbeats skipping
back from the threshold of unliving,
wings unfurling, sending them streaming out
into the night in a great, flapping, exhalation.

The grass is unlawful with a mad peppering
of small hills, and moles scurry unafraid,
and fox kits roll in the mud,
and a fat pheasant rattles itself skyward,

glides from one side of the crags to the other,
tail feathers streaming in unlikely banners
of black and brown, red and gold.

VII.

and then
when all the animals are gone
(or not yet returned)

all that's left are the crows
burdening the ivy
with their murdering

and the coots in their plague-masks
peddling miraculous
over the water

and the bones of the mammoth
rising up from the hill
grass still wet on its teeth

and the bats
 flickering

somewhere between
the moon and here

VIII.

and then

a time
like the time
before dawn

pale
and still

the river
bronzed by the sun
where it strikes clear
to the bottom

a far bell

and then

red cave-earth
and wet cave-stones

a gradual erosion

eyes pressed into pearls

hollows and holes

bones under rock

the slow eddying
of stones

and then

at some point

(we must suppose)

an ending

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