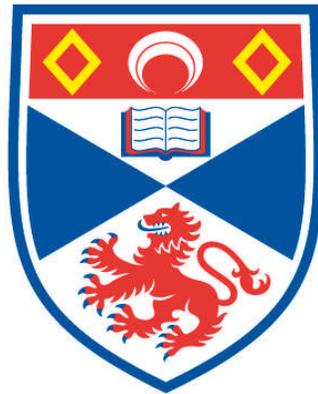


**TWENTIETH-CENTURY POETRY AND SCIENCE
SCIENCE IN THE POETRY OF HUGH MACDIARMID, JUDITH
WRIGHT, EDWIN MORGAN, AND MIROSLAV HOLUB**

Donald Gibson

**A Thesis Submitted for the Degree of PhD
at the
University of St Andrews**



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Twentieth-Century Poetry and Science

Science in the Poetry of Hugh MacDiarmid, Judith Wright, Edwin
Morgan, and Miroslav Holub

Donald Gibson



University of
St Andrews

This thesis is submitted in partial fulfilment for the degree of PhD
at the
University of St Andrews

December 2015

ABSTRACT

The aim of this thesis is to arrive at a characterisation of twentieth century poetry and science by means of a detailed study of the work of four poets who engaged extensively with science and whose writing lives spanned the greater part of the period. The study of science in the work of the four chosen poets, Hugh MacDiarmid (1892 – 1978), Judith Wright (1915 – 2000), Edwin Morgan (1920 – 2010), and Miroslav Holub (1923 – 1998), is preceded by a literature survey and an initial theoretical chapter. This initial part of the thesis outlines the interdisciplinary history of the academic subject of poetry and science, addressing, amongst other things, the challenges presented by the episodes known as the ‘two cultures’ and the ‘science wars’. Seeking to offer a perspective on poetry and science more aligned to scientific materialism than is typical in the interdiscipline, a systemic challenge to Thomas Kuhn’s *The Structure of Scientific Revolutions* (1962) is put forward in the first chapter. Additionally, the founding work of poetry and science, I. A. Richards’s *Science and Poetry* (1926), is assessed both in the context in which it was written, and from a contemporary viewpoint; and, as one way to understand science in poetry, a theory of the creative misreading of science is developed, loosely based on Harold Bloom’s *The Anxiety of Influence* (1973). The detailed study of science in poetry commences in Chapter II with Hugh MacDiarmid’s late work in English, dating from his period on the Shetland Island of Whalsay (1933 – 1941). The thesis in this chapter is that this work can be seen as a radical integration of poetry and science; this concept is considered in a variety of ways including through a computational model, originally suggested by Robert Crawford. The Australian poet Judith Wright, the subject of Chapter III, is less well known to poetry and science, but a detailed engagement with physics can be identified, including her use of four-dimensional imagery, which has considerable support from background evidence. Biology in her poetry is also studied in the light of recent work by John Holmes. In Chapter IV, science in the poetry of Edwin Morgan is discussed in terms of its origin and development, from the perspective of the mythologised science in his science fiction poetry, and from the ‘hard’ technological perspective of his computer poems. Morgan’s work is cast in relief by readings which are against the grain of some but not all of his published comments. The thesis rounds on its theme of materialism with the fifth and final chapter which studies the work of Miroslav Holub, a poet and practising scientist in communist-era Prague. Holub’s work, it is argued, represents a rare and important literary expression of scientific materialism. The focus on materialism in the thesis is not mechanistic, nor exclusive of the domain of the imagination; instead it frames the contrast between the original science and the transformed poetic version. The thesis is drawn together in a short conclusion.

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I would like to thank the librarians and staff at the National Library of Scotland and the University of Glasgow Special Collections who have been kind and helpful during my research into archives relating to Hugh MacDiarmid and Edwin Morgan respectively. Sarah Hepworth of Glasgow University, in discussion with the Edwin Morgan trust, has accepted my use of the MS Morgan material. For the NLS, Sally Harrower has accepted my use of the MacDiarmid archive. Thanks are also due to the librarians at the Mitchell Library in Glasgow for their help in researching Morgan's personal collection of books. I would like to thank as well the librarians and staff at the University of St Andrews library and the British Library in London.

Regarding the use of an image from Miroslav Holub's *Immunology of Nude Mice*, I am grateful to CRC Press for directing me to the U. S. Copyright Clearance Centre, where permission was granted. Regarding a second image, a Moscow postcard from 2012, I am grateful to the Embassy of the Russian Federation in London for suggesting that the probable copyright holder is the organisation responsible for the monument, the Federal Guard Service of the Russian Federation. I have written to the Federal Guard Service, in English, requesting permission, but for understandable reasons this permission may be difficult to progress. I hope and trust the Russian copyright holders will not object to the use of this image and the context in which it is placed.

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gratitude, I want to thank my wife Christine, who with love and support, has made all this possible. The thesis is dedicated to her.

ABBREVIATIONS

Abrams(2005)	<i>A Glossary of Literary Terms</i> (8 th edn.)
AI	Artificial Intelligence
Armitage(2006)	‘Poetry, Science, and the Art of the Metaphor’
Astley(2006)	<i>Bloodaxe Poetry Introductions</i>
Bamforth(2001)	<i>Applied Poetry</i>
Beckett(1953)	<i>Waiting for Godot</i>
Beer(1983)	<i>Darwin’s Plots</i>
Beer(2006)	‘Afterword’ in Crawford(2006)
Bergson(1911)	<i>Creative Evolution</i>
Berndt(1952)	<i>The First Australians</i>
Bloom(1973)	<i>The Anxiety of Influence</i>
Bloor(1976)	<i>Knowledge and Social Imagery</i> (2 nd edn. 1991)
Bold(1984)	<i>The Letters of Hugh MacDiarmid</i>
Bold(1988)	<i>MacDiarmid</i>
Bradbury(1951)	<i>The Martian Chronicles</i>
Brady(1998)	<i>South of My Days; A Biography of Judith Wright</i>
BSLS	British Society of Literature and Science
Buthlay(1964)	<i>Hugh MacDiarmid</i>
Buthlay(1987)	<i>A Drunk Man Looks at the Thistle; Annotated Edition</i>
Čapek(1933)	<i>Hordubal</i>
Čapek(1934)	<i>An Ordinary Life</i>
Čapek(1936)	<i>War with the Newts</i>
CERN	European Organization for Nuclear Research
Clarke(1968)	<i>JBS</i>
Clarke&McKinney(2004)	<i>The Equal Heart and Mind</i>
Clarke&McKinney(2006)	<i>With Love and Fury; Selected Letters of Judith Wright</i>
Clarke&Rossini(2011)	<i>The Routledge Companion to Literature and Science</i>
Constable(1990)	<i>Selected Letters of I. A. Richards</i>
Cornwall(1995)	<i>Nature’s Imagination</i>
<i>CPEM</i>	Edwin Morgan, <i>Collected Poems</i>
CPGB	The Communist Party of Great Britain
<i>CPHMD</i>	<i>Hugh MacDiarmid, Complete Poems</i>
<i>CPJW</i>	Judith Wright, <i>Collected Poems</i>
<i>CPMH</i>	Miroslav Holub, <i>Poems Before and After</i>
Crawford(1995)	‘The glow-worm’s 96 per cent efficiency’
Crawford(2006)	<i>Contemporary Poetry and Contemporary Science</i>
Crawford(2013)	private email to the author 8/12/13
Crawford&Whyte(1990)	<i>About Edwin Morgan</i>
Curd&Cover(1998)	<i>Philosophy of Science</i>
Davie(1961)	<i>The Democratic Intellect</i>
Davie(1986)	<i>The Crisis of the Democratic Intellect</i>
Dawkins(1976)	<i>The Selfish Gene</i>
Dawkins(1982)	<i>The Extended Phenotype</i>

- Demetz(1997) *Prague in Black and Gold*
- Dunn(1990) 'Morgan's Sonnets'
- Dupré(2002) *Humans and Other Animals*
- Dylan(1963) 'A Hard Rain's A-Gonna Fall'
- Dyson(1995) 'The Scientist as Rebel'
- Edgecombe(2003) *Aspects of Form and Genre*
- Einstein(1920) *Relativity*
- Einstein(1922) *The Meaning of Relativity*
- Eliot(1935) 'Burnt Norton'
- Evans(2014) *The Language Myth*
- Flood(1983) *Archaeology of the Dreamtime*
- Folger(2005) 'If an Electron can be in two places at once ...'
- Fuller&Waugh(1999) *The Arts and Sciences of Criticism*
- Ginsberg(1956) *Howl!*
- Gish(1984) *Hugh MacDiarmid, The Man and his Work*
- Graham(1987) 'The Frightened Fawn of Sense'
- Graham&Smith(1992) *MacDiarmid in Shetland*
- Graves(2001) *The Emperor's New Clothes*
- Green(2011) *The Hidden Reality*
- Gross&Levitt(1994) *Higher Superstition*
- Haldane(1923) *Daedalus*
- Haldane(1925) *Callinicus*
- Hašek(1923) *The Good Soldier Švejk*
- Hawke(2001) 'The Moving Image'
- Heaney(1989) *The Government of the Tongue*
- Herbert(1992) *To Circumjack MacDiarmid*
- Holmes(2009) *Darwin's Bards*
- Holmes(2012) *Science in Modern Poetry*
- Holub(1989) *Immunology of Nude Mice*
- Holub(1990) *The Dimension of the Present Moment*
- Holub(1990b) 'Prague Diary' (*LRB*, 14 June 1990)
- Holub(1996) 'Chemical Common Sense' (*LRB*, 4 July 1996)
- Holub(1997) *Shedding Life*
- Holý&Culík(2001) 'Miroslav Holub'
- Holý(2008) *Writers Under Siege, Czech Literature Since 1945*
- Hope(1975) *Judith Wright*
- Hughes(1986) *The Fatal Shore*
- Jones(2006) *Strange Likenesses*
- Jones.r(2012) *Where Rockets Burn Through*
- Jones.r(2014) *Broken Wor(l)ds (PhD thesis)*
- Jung(1933) *Modern Man in Search of a Soul*
- Jungk(1958) *Brighter than a Thousand Suns*
- Kafka(1922) 'Investigations of a Dog' in *The Complete Short Stories*
- Kafka(1925) *The Trial*
- Kafka(1926) *The Castle*
- Kinloch(2012) 'The Case of the Missing War'

Koertge(1998)	<i>A House Built on Sand</i>
Kuhn(1962)	<i>The Structure of Scientific Revolutions</i>
Labinger&Collins(2001)	<i>The One Culture?</i>
Ladyman(2002)	<i>Understanding the Philosophy of Science</i>
Ladyman(2014)	'Structural Realism'
Latour&Woolgar(1979)	<i>Laboratory Life</i>
Latour(2004)	'Why has Critique Run Out of Steam?'
Leavis(1962)	<i>Two Cultures, The Significance of CP Snow</i>
Levine(1987)	<i>One Culture</i>
LHC	Large Hadron Collider
Lightman(2007)	<i>Victorian Popularisers of Science</i>
London(1906)	<i>Before Adam</i>
London(1914)	<i>The Star Rover</i>
Lord(1960)	<i>The Singer of Tales</i>
LP	<i>Lucky Poet</i>
LRB	<i>London Review of Books</i>
Lucas&McCredden(1996)	<i>Bridgings</i>
Lyall&McCulloch(2011)	<i>The Edinburgh Companion to Hugh MacDiarmid</i>
MacKenzie(2013)	<i>Contemporary Poets' Responses to Science</i>
MacNeice(1979)	<i>Collected Poems</i>
McCarey(1987)	<i>Hugh MacDiarmid and the Russians</i>
McCarey(1992)	'Lev Shestov and Hugh MacDiarmid'
McKinney(1950)	<i>The Challenge of Reason</i>
McKinney(1971)	<i>The Structure of Modern Thought</i>
Manson(2011)	<i>Dear Grieve</i>
Middleton(2012)	'Language Writing and Molecular Biology'
Midgley(2001)	<i>Science and Poetry</i>
MIT	Massachusetts Institute of Technology
Morgan(1974)	<i>Essays</i>
Morgan(1996)	<i>Collected Translations</i>
Morgan(2007)	<i>A Book of Lives</i>
Morris(1890)	<i>News from Nowhere</i>
MRI	Magnetic Resonance Imaging
Murray(1986)	<i>The New Oxford Book of Australian Verse</i>
Nadeau(1964)	<i>The History of Surrealism</i>
Nezval(1936)	<i>Prague with Fingers of Rain</i>
Nicholson(2000)	'Remembering the Future'
Nicholson(2002)	<i>Edwin Morgan, Inventions of Modernity</i>
NLS	National Library of Scotland
NYRB	<i>New York Review of Books</i>
O'Driscoll(1984)	1984 interview with Miroslav Holub in Astley(2006)
O'Driscoll(1990)	1990 interview with Miroslav Holub in Astley(2006)
O'Driscoll(2008)	<i>Interviews with Seamus Heaney</i>
O'Shea(1990)	Interview with Miroslav Holub
OED	The Oxford English Dictionary
Ort(2013)	<i>Art and Life in Modernist Prague</i>

- Ortolano(2009) *The Two Cultures Controversy*
- Orwell(1949) *1984*
- Owen&Smyser(1974) *The Prose Works of William Wordsworth*
- Patai&Corrall(2005) *Theory's Empire*
- Paterson(2015) 'The Lyric Principle'
- Penrose(1989) *The Emperor's New Mind*
- Penrose(1994) *Shadows of the Mind*
- Penrose(2004) *The Road to Reality*
- Pinker(2007) *The Stuff of Thought*
- Riach(1991) *Hugh MacDiarmid's Epic Poetry*
- Richards(1924) *The Principles of Literary Criticism*
- Richards(1926) *Science and Poetry*, 1st edn.
- Richards(1970) *Poetries and Sciences*, 3rd edn.
- Ripellino(1973) *Magic Prague*
- Roth(1990) 'A Conversation in Prague'
- Prynne(2005) *Poems*
- Russell&Norvig(1995) *Artificial Intelligence*
- Russo(1970) *I. A. Richards, Complementarities, Uncollected Essays*,
- Russo(1989) *I. A. Richards, His Life and Work*
- Samuel(1985) *The Lost World of British Communism*
- Schrodinger(1951) *Science and Humanism*
- Secord(2000) *Victorian Sensation*
- Shapin(2010) *Never Pure*
- Sharrock(1962) 'The Chemist and the Poet
- Shestov(1932) *In Job's Balances*
- Sokal(1996) 'Transgressing the Boundaries'
- Sokal(2008) *Beyond the Hoax*
- Sokal&Bricmont(1997) *Intellectual Impostures*
- Small(2012) 'The Function of Antagonism'
- Small(2013) *The Value of the Humanities*
- Smolin(2006) *The Trouble with Physics*
- Smolin(2013) *Time Reborn*
- Snow(1959) *The Two Cultures*
- SSK *The Sociology of Scientific Knowledge*
- Stapledon(1930) *Last and First Men*
- Stapledon(1937) *Star Maker*
- Stockwell(2002) *Cognitive Poetics*
- Strauss(1995) *Judith Wright*
- Tallis(2000) *The Raymond Tallis Reader*
- TLS* *Times Literary Supplement*
- Tsur(2008) *Towards a Theory of Cognitive Poetics* (2nd edn)
- Voznesensky(1933) 'I am Goya'
- Walker(1981) *Judith Wright* (bibliography)
- Walker(1991) *Flame and Shadow*
- Walter(1953) *The Living Brain*
- Waugh(1999) 'Revising the Two Cultures Debate'

Weinberg(2013)	'Physics: What We Do and Don't Know'
Wells(1895)	<i>The Time Machine</i>
Whitworth(2001)	<i>Einstein's Wake</i>
Whitworth(2011)	'Science in MacDiarmid's Later Poetry'
Whitworth(2012)	'Strange Synthetic Perfumes'
Whyte(1990)	<i>Nothing Not Giving Messages</i>
Wikipedia(2014)	Entry on Immanuel Kant
Wilhelm(1942)	<i>The Secret of the Golden Flower</i>
Williams(2002)	<i>Truth and Truthfulness</i>
Wilson&Barsky(2001)	'From Social Construction to Questions for Research'
Woit(2006)	<i>Not Even Wrong</i>
Wright(1959)	<i>The Generations of Men</i>
Wright(1965)	<i>Preoccupations in Australian Poetry</i>
Wright(1975)	<i>Because I Was Invited</i>
Wright(1981)	<i>The Cry for the Dead</i>
Wright(1992)	<i>Going on Talking</i>
Wright(1999)	<i>Half a Lifetime</i>
Zilhay(1953)	<i>The Angry Angel</i>

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INTRODUCTION

The study of science in literature in Britain is flourishing. There is a dedicated society, the British Society for Literature and Science (BSLS), which has affiliations in North America and Europe. The BSLS holds annual conferences which attract an international gathering of literary scholars; the tenth such conference was held in Liverpool in 2015. This thesis aims to make a contribution to the study of poetry and science, a sub-discipline of literature and science, from the perspective of a scientist – I am a mature student who was educated in physics, and who subsequently followed a career in software engineering. The BSLS is reporting considerable and rising interest in its subject. A 2014 ‘call for papers’ posting on the BSLS website notes: ‘Literature and Science is currently gaining popularity amongst undergraduates, but opportunities for discussing how – and why – to teach it remain thin on the ground’.¹ Poetry (or literature) and science is intuitively attractive: it seems to offer a bridge or even a bond between two widely different and usually separate aspects of learning. But there is a pedagogical challenge. While the interface between the two subjects holds the promise of productive interdisciplinary thinking, unfortunately it also has a long and not altogether harmonious history. No thesis of this type can ignore the controversy which is tempered by the notorious ‘two cultures’ dispute between C. P. Snow and F. R. Leavis in the 1950s and 60s. Cultural division and ‘two cultures’ modes of argument are of course now widely deprecated; however, there remains an imbalance in the study of science in literature: as Helen Small notes, literature and science is ‘interdisciplinary principally from the vantage

¹ <http://www.bsls.ac.uk/2014/10/bsls-teaching-symposium-reminder/>, 28/10/2014.

point of the humanities'.² An important reason for this is simply institutional – science departments have no facility for the study of literature. The perceived imbalance therefore presents an opportunity, and Chapter I of the thesis engages with the theoretical implications of shifting the study of science in poetry towards scientific materialism.

The core subject matter of this study is science in the writing of four poets: Hugh MacDiarmid (1892 – 1978), Judith Wright (1915 – 2000), Edwin Morgan (1920 – 2010), and Miroslav Holub (1923 – 1998), discussed in Chapters II to V respectively. This choice allows a considerable diversity of poetry and poetic approaches to science to be studied, while maintaining a consistent timeframe of research. In addition to the temporal link between the poets, there are two main themes which draw together the four individual studies. The first of these is a consistent analytical method, the assumption that, whatever the end result of science in poetry, the starting point is scientific materialism. The intention is not to impose scientific materialism on the poetry, but rather to highlight the nature of the transition from the original science to its realisation as art. A corollary to this approach is the idea of the creative misreading of science, discussed at the end of the first chapter. The second linking theme is politics. A political outlook, and a radical response to the societies in which they lived, may be, as with MacDiarmid and Wright, overt and explicit, or as with Morgan and Holub, more quietly expressed; but for all four chosen poets it is an important factor in their writing. The temporal overlap of the writing lives of the chosen poets is considerable: the earliest poems studied are by MacDiarmid, and date from his period on the Shetland Island of Whalsay (1933 – 1941). Wright began publishing poetry in the mid-1940s, followed by Morgan in the late 1940s

² Helen Small, 'The Function of Antagonism: Miroslav Holub and Roald Hoffmann', in John Holmes, (ed.), *Science in Modern Poetry, New Directions*, (Liverpool: Liverpool University Press, 2012), 19-37, 19; Small(2012); Holmes(2012).

and Holub in the 1950s. All four poets, in different ways, brought a historical perspective to their work, and the poetry of all of them is conditioned by the catastrophes of the twentieth century. In the period when all four poets were writing science was advancing rapidly, both in the East and in the West. The excitement of this, and also the trepidation it induced, is reflected variously in the work of the chosen poets. Diversity is introduced into the study with three national and cultural backgrounds being represented: Scotland, over two generations, Australia, at a time when the country was starting to define its independent identity, and Czechoslovakia during the Cold War and through the fall of communism.

A necessary condition of the choice of writers is the richness and the amount of science in their poetry. Three of the poets, MacDiarmid, Morgan, and Holub, meet this condition easily and are well known to the study of poetry and science. The literary innovator MacDiarmid, in the corpus known as his late work, developed a broad ‘Whitmanesque’ vision in which the inclusion of science in verse was a key part. MacDiarmid famously characterised this idea in his call for ‘a poetry of fact’, a phrase which can be read as simply ‘poetry and science’. The scale of MacDiarmid’s use of science, coupled with the disciplined creative freedom with which he pressed it to the service of his wider concerns, has not been considered in detail before. Preeminent among MacDiarmid’s wider concerns is socialism, and a striking example of science being pressed to service is his association of the heady excitement of the then-new quantum physics with progress in revolutionary politics; examples such as this, and the radical nature of his late text with (as I argue) its compelling abstract structure, defines the centrality of MacDiarmid’s work to twentieth-century poetry and science. The

influence of science in Wright's work is less immediately obvious than in the writing of the other three poets, but careful reading of her poetry in conjunction with the rich and diverse intellectual synthesis behind it shows the presence of physics, particularly in relation to her treatment of time and her use of four-dimensional imagery. The chapter opens with an introduction to Wright's work which highlights her political activism in regard to Aboriginal rights and conservation via a number of her well known poems. These considerations provide important contexts later in the chapter in relation to her use of time and physics, and in a discussion of John Holmes's essay 'From Bergson to Darwin: Evolutionary Biology in the Poetry of Judith Wright'.³ In her essays, Wright said a considerable amount about science: she argued against science's value-free terms of enquiry, and, in general, her attitude to science was closer to the traditional literary point of view than that of the other poets. This counterpoint is helpful in widening the range of poetic approaches to science, especially because, as I argue, science was central to Wright's thinking.

A generation after MacDiarmid, Morgan responded with enthusiasm to the rapid growth in science and technology after the Second World War; in numerous statements and in the direction of some of his work, he allowed himself to be symbolic of positivity and optimism in regard to science. Although of course Morgan's optimism is often real, the picture which emerges from his poetry is much more rounded: his ludic wit and talent for misdirection hide a conflict between his promotion of the scientific tropes of adventure and exploration and his life-long opposition to imperialism and war. It is notable how bleak the futurist visions of Morgan's science-fiction poems are. Morgan

³ John Holmes, 'From Bergson to Darwin: Evolutionary Biology in the Poetry of Judith Wright' in Holmes(2012), 194-209.

also incorporated technological modes of articulation into his craft and wrote a number of ‘simulated computer’ poems. Against the grain of some of Morgan’s own remarks, these poems are read more as parodies of computers, rather than as prophecies of artificial intelligence. Holub was a practising experimental biologist in communist-era Prague; his work is a first-hand encounter of science and poetry, and something of a benchmark in the field. Even so, Holub’s work has not yet been fully explored in the West: his laboratory poems, for example, are both shocking and complex in their nuanced but resolute focus on materialism, and as far as I know, are without peer. ‘The root of the matter’ is a subtle poetic representation of quantum mechanics within an intricate theatrical and literary framework, and might come to be seen as a major work of literature and science.⁴ The political background to Holub’s work is of a different character to the other three poets; in the chapter, his political situation and his sometimes allegorised response to it in his poetry is examined. More generally, even if Holub was not free to develop an independent political analysis, the materialist outlook he puts forward in his writing can be seen as a secure grounding for political thought.

The aim of this study is to justify, through a series of detailed, extended, and fresh readings, the claim that the four chosen poets together, by virtue of their depth of engagement with the subject, are representative of twentieth-century poetry and science. There are of course limitations. The fact that no American poets are included restricts the scope to European and primarily European-influenced work; North American writing, however, is widely represented in the theoretical literature. A study complementary to this can be found in Vicky MacKenzie’s PhD thesis, *Contemporary Poets’ Responses to*

⁴ Miroslav Holub, *Poems Before and After*, 2nd edn., (Tarnset, Northumberland: Bloodaxe, 2006); first pub. 1990, 113-118; *CPMH*.

Science.⁵ MacKenzie offers a differing theoretical approach, and, with the exception of Holub, a selection of still-working poets who engage with science. These include Jorie Graham (physics), Michael Symmons Roberts (the human genome), and John Burnside (ecology).

The remainder of this Introduction is devoted to a survey of selected critical literature from both the general field of literature and science, and the specific field of poetry and science. Theoretical works from both parts of the interdiscipline interrelate and form the critical framework within which this thesis is written. The survey starts with a very brief outline of the key formative developments in the study of literature and science. The rest of the survey is divided into thematic groups which introduce relevant or typical works.

The rise of science was accompanied by considerable unease amongst poets. A well-known early reaction is John Keats's remark that Isaac Newton destroyed the poetry of the rainbow by 'reducing it to the prismatic colours'.⁶ However, the modern transition from expressions of concern about science to the academic field of Poetry and Science, started, arguably, with the publication of I. A. Richards's *Science and Poetry* in 1926; this work is in part a popularisation of his earlier *Principles of Literary Criticism* (1924) which explored the notion of psychological poetic affect.⁷ Richards's popular work was commissioned by C. K. Ogden, who had earlier also commissioned J. B. S. Haldane's

⁵ MacKenzie, Victoria, PhD Thesis, *Contemporary Poets' Responses to Science*, (St Andrews: University of St Andrews, 2013); MacKenzie(2013).

⁶ http://en.wikipedia.org/wiki/Unweaving_the_Rainbow, 23/03/2015.

⁷ I. A. Richards, *Science and Poetry*, 1st edn., (London: Kegan Paul, Trench, Trubner & Co. Ltd., 1926); Richards(1926); I. A. Richards, *The Principles of Literary Criticism*, (London: Cox and Wyman Ltd, 1976); Richards(1924).

Daedalus.⁸ Richards is probably reacting to *Daedalus*; but in addition to expressing concerns about science, his work also treats poetry and science as an object of study in its own right. After the Second World War interest in literature and science began to develop. The background to Douglas Bush's 1950 *Science and English Poetry* is a broadside against the rapidly growing presence of science in Western culture.⁹ David Daiches's 1956 *Critical Approaches to Literature* includes a chapter on science and poetry which centres on Richards's aforementioned works.¹⁰ In academic terms, however, it can probably be argued that the interdisciplinary field started to assume its modern shape as a result, not of Richards's free and open discussion, but because of a darker turn of events: F. R. Leavis's furious response in 1962 to C. P. Snow's 1959 lecture 'The Two Cultures'.¹¹ Many writers were stimulated to comment. Aldous Huxley's *Literature and Science* (1963), for example, searches for a middle ground.¹² The literary legacy of the two cultures dispute persists, if only due to the necessity of including it in any retrospective, as for example in Helen Small's 2013, *The Value of the Humanities*.¹³ Guy Ortolano's 2009 *The Two Cultures Controversy* is a useful historical account.¹⁴

Up to the early 1960s, the response to science from literary scholars was predominantly expressed as a fear that the supposed advance of mechanistic thinking would set the imaginative world into retreat. The response solidified, however, into an

⁸ J. B. S. Haldane, *Daedalus*, 8th impression, (London: Kegan Paul, Trench, Trubner, 1928); Haldane(1923).

⁹ Douglas Bush, *Science and English Poetry*, (New York: Oxford University Press, 1967).

¹⁰ David Daiches, *Critical Approaches to Literature*, (London: Longmans, 1967).

¹¹ C. P. Snow, *The Two Cultures*, (Cambridge: Canto, 2010); Snow(1959); Introduction by Stephan Collini.

¹² Aldous Huxley, *Literature and Science*, (London: Chatto and Windus, 1963).

¹³ Helen Small, *The Value of the Humanities*, (Oxford: Oxford University Press, 2013); Small(2013).

¹⁴ Guy Ortolano, *The Two Cultures Controversy*, (Cambridge: Cambridge University Press, 2009); Ortolano(2009).

attack on the foundations of science, beginning, arguably, with the publication of Thomas Kuhn's *The Structure of Scientific Revolutions* in 1962.¹⁵ Kuhn's work appeared to licence a more widespread philosophical attack on scientific materialism, and a growing number of literary and cultural theories associated with continental philosophy emerged. Bruno Latour and Steve Woolgar's *Laboratory Life* (1979) is one of the founding works of constructionism.¹⁶ *Laboratory Life* describes an anthropological study of scientific practice and claims that the observed process leads to the construction (as opposed to the discovery) of scientific facts. It is significant, however, that in an article in 2004, 'Why has Critique Run out of Steam?', Latour recants the indiscriminating nature of his earlier position.¹⁷

A related attack on scientific materialism is made by David Bloor in *Knowledge and Social Imagery* (1976).¹⁸ Bloor introduces the so-called 'Strong Programme of Sociology of Knowledge', claiming that even the hard sciences are dependent on social factors, and in addition that social construction applies to mathematics. Bloor acknowledges the apparent unassailability of mathematics: 'Truly, some Reality must be responsible for this remarkable state of affairs in which a body of self-subsistent truth appears to be apprehended in ever greater detail and ever wider scope'.¹⁹ His argument opens with a re-assessment of the 'psychologism' of mathematics offered by J. S. Mill, again acknowledging the difficulty by noting that Gottlob Frege's response to Mill is

¹⁵ Thomas Kuhn, *The Structure of Scientific Revolutions*, 4rd edn., (Chicago: Chicago University Press, 2012); Kuhn(1962).

¹⁶ Bruno Latour, and Steve Woolgar, *Laboratory Life*, (Princeton: Princeton University Press, 1986) Latour&Woolgar(1979).

¹⁷ Bruno Latour, 'Why has Critique Run Out of Steam?', *Critical Inquiry*, Vol. 30, No. 2. (Winter 2004), 225-485; Latour(2004).

¹⁸ Bloor, David, *Knowledge and Social Imagery*, 2nd edn., (Chicago: Chicago University Press, 1991); Bloor(1976).

¹⁹ Bloor(1976), 86.

‘widely accepted as being fatal’.²⁰ Bloor’s argument is complex, but as I understand, it depends on the idea that because a precise (non-mathematical) definition of mathematical theory is elusive, then there must exist a psychological dimension, in other words, a psychology of maths. Other elements of Bloor’s argument dwell on nuanced variations of interpretation of mathematical entities; these seem peripheral to mathematical content, and the remainder of his argument is equally unconvincing.²¹ Bloor, however, is to be commended for accepting that if the social construction of science is to be established, then a sociology of mathematics must similarly be established. The historian of science Steven Shapin, however, in his 2010 collection of his own essays, *Never Pure*, fails to address the role of mathematics convincingly.²² Shapin laments that ‘in the most extreme versions of what the mathematical discourse consisted in, it was unclear what role could or should be played by philosophers’; it is unclear if this is really true, or why it matters.²³ Shapin’s thesis is a systemic attack on science, in that it is supposed to be never pure because it is done by real people; but such a proposition cannot be made simply by reportage of discourse which lacks a detailed treatment of the structural components of science, including mathematics. All this seems to resonate with Latour’s quite anguished lament in the 2004 article mentioned above. Latour writes: ‘fortunately (yes, fortunately!), one after the other, we witnessed that the black boxes of science remained closed and that it was rather the tools that lay in the dust of our workshop,

²⁰ Bloor(1976), 87.

²¹ E.g. Bloor(1976), 110.

²² Stephen Shapin, *Never Pure*, (Baltimore: John Hopkins University Press, 2010), 132-5, 389; Shapin(2010).

²³ Shapin(2010), 133.

disjointed and broken. Put simply, critique was useless against objects of some solidity'.²⁴

The putative origin of the attempts to undermine science's foundations, Kuhn's relativizing attack on science, presents something of a roadblock if one is going to establish a position of scientific materialism. A view of the philosophy of science more closely aligned to my own is put by the physicist Freeman Dyson in his essay 'The Scientist as Rebel'.²⁵ Dyson writes that: 'Science is an art form and not a philosophical method', that 'squeezing science in to a single philosophical viewpoint' is Procrustean, and that 'Science flourishes best when it uses freely all the tools to hand, unconstrained by preconceived notions of what science ought to be'.²⁶ This is by no means to say that the search for a philosophy of science is unimportant. James Ladyman notes in the Introduction to his 2002 university primer *Understanding the Philosophy of Science*: 'We may not yet know how to define science or how to tell whether contentious activities or beliefs count as science or not'; however, the remainder of his primer represents a persuasive argument for the importance of the philosophical endeavour.²⁷ The field is too specialised to explore thoroughly in this thesis; it is worth noting however that there are, I believe, at least two major obstacles to arriving at a comprehensive statement of the philosophy of science: quantum mechanics, and mathematics. To characterise the former issue very briefly, Jeffery Bub, in his essay 'Indeterminacy and Entanglement' in Peter Clark and Katherine Hawley's *Philosophy of Science Today* (2000), raises questions

²⁴ Latour(2004), 242.

²⁵ Freeman Dyson, 'The Scientist as Rebel', John Cornwell, (ed.), *Nature's Imagination*, (Oxford: Oxford University Press, 1995), 1-11; Cornwall(1995); Dyson(1995).

²⁶ Dyson(1995), 10.

²⁷ James Ladyman, *Understanding the Philosophy of Science*, (London: Routledge, 2002), 4; Ladyman(2002);

concerning quantum entanglement and the many worlds interpretation of physics, and ends with the remark: ‘The investigation into such questions has just begun. The core conceptual questions remain to be answered’.²⁸ Regarding the philosophy of mathematics, Stewart Shapiro’s *Thinking About Mathematics* (2000) presents the contemporary state of the subject in its full diversity.²⁹ The range of thought may be seen, for example, in two successive chapter titles: Shapiro’s Chapter 8 is entitled, ‘Numbers Exist’; Chapter 9 is headed ‘No They Don’t’.³⁰

The approach taken in this thesis arises from the foregoing considerations. At the beginning of Chapter I, a systemic challenge to Kuhn is put forward, though note that an evidence-based rather than a philosophical argument is presented. It is hoped that this is sufficient to establish, unambiguously, this author’s stance on scientific materialism. Subsequent to this, rather than explore the philosophy of science further, a task which could not be conclusive, nor lead to further refinement of my own position, the thesis, in the first chapter, seeks a number of ways to characterise the interdisciplinary subject of poetry and science. Moreover, it is hoped that this approach – presentation of a challenge to (what is seen as) an idealist interpretation of science, and then (for the most part), backing off – is conducive to finding a working consensus within the interdiscipline, and thus providing a basis for the central thrust of the thesis – a qualified appreciation of what the humanities and the poetry and science interdiscipline have to offer. An overly combative thesis would risk replaying the two cultures dispute in modern guise.

²⁸ Jeffery Bub, ‘Indeterminacy and Entanglement’ in Peter Clarke and Katherine Hawley, *The Philosophy of Science Today*, (Oxford: Clarendon Press, 2000), 236-54, 252.

²⁹ Stewart Shapiro, *Thinking about Mathematics*, (Oxford: Oxford University Press, 2000); Shapiro(2000).

³⁰ Shapiro(2000), 201-25, 226-56.

Returning to the literature survey, the heady atmosphere of relativism which developed, I would argue as a result of the apparent substance behind the work of Kuhn, Latour, and Bloor, and also Richard Rorty, Paul Feyerabend, and others, seemed to grant literary and cultural critics a licence to speculate freely about science. Wendy Wheeler's *The Whole Creature* (2006), for example, demands that science must be non-positivist and non-reductionist; she valorises complexity and non-linearity, and proposes a theory of 'biosemiotics'.³¹ A particular difficulty for scientists reading some works of literature and science is the imposition of belief – being told what one thinks – sometimes with a barely disguised sneer. Charlotte Sleight, for example, in her 2011 *Literature and Science*, says: 'Sokal's fellow travellers are believers in a single scientific method and a single thing called "science". This is their totem'.³² A related difficulty is imposition of theory. The philosopher John Dupré in his collection *Humans and Other Animals* (2002) writes as if Kuhn's paradigmatic structure of scientific knowledge is essentially fact.³³ For instance, evolutionary psychology is said to be pre-paradigm; it is suggested that its status as Kuhnian normal science is 'faked'.³⁴ One doesn't feel patronised or boxed in, however, by Patricia Waugh's opening essay 'Revising the Two Cultures Debate' in her 1999 collection (with David Fuller), *The Arts and Sciences of Criticism* – just somewhat breathless.³⁵ Waugh assumes, without comment, the validity of interpreting physical theory in non-physical terms: classical physics is described emotionally as 'a universe of

³¹ Wendy Wheeler, *The Whole Creature*, (London: Lawrence & Wishart, 2006), e.g. 15, 17, 21, 22, 18-19.

³² Charlotte Sleight, *Literature and Science*, (Basingstoke: Palgrave MacMillan, 2011), 199.

³³ John Dupré, *Humans and Other Animals*, (Oxford: Clarendon, 2006); Dupré(2002).

³⁴ Dupré(2002), 153.

³⁵ Patricia Waugh, 'Revising the Two Cultures Debate' in David Fuller and Patricia Waugh, (eds.), *The Arts and Sciences of Criticism*, (Oxford: Oxford University Press, 2004), 33-59; Fuller&Waugh(1999); Waugh(1999).

physical determinism, laws of causality, and blind mechanical motion'.³⁶ This delivered, she suggests, in Schiller's opposition, its antithesis, a sort of inverse twin or 'redemptive aesthetic' into the 'alienated and mechanistic Laplacean blankness of interstellar cold'.³⁷ Waugh argues that 'If the quantum world is fundamentally indeterminate', then this might allow the 'free space of the aesthetic' to become integral with physical science because 'if this quantum world seems to be at odds with the laws of Newtonian mechanics', then 'what is "true" in one world is not necessarily "true" in the other'.³⁸ Science is relativized and culturalised; I have puzzled at length over the strange claims and formulations in this essay, and concluded that due to the value of its retrospective account of the field, one should not over-react.

Free-ranging criticism of science attains a focus in Mary Midgley's 2001 *Science and Poetry*.³⁹ In her Introduction she writes of her 'revulsion against the way of thinking which deliberately extends the impersonal, reductive, atomistic methods that are appropriate to physical science into social and psychological enquiries'.⁴⁰ She rounds on two scientific writers, Richard Dawkins, and the chemist Peter Atkins, and regarding their extra-scientific writing, I agree she has a point. Unfortunately this early clarity gets lost as the book develops, and the apparent condescending attitude towards science, implicit in the passage just quoted, tends to dominate. I am left profoundly disengaged by the way she seems to sweep judgementally over the surface of science, with claims such as this: 'Einstein, when he objected to the reasonings of quantum mechanics by insisting that God does not play dice, was talking metaphysics, not physics'; one is taken

³⁶ Waugh(1999), 35-6.

³⁷ Waugh(1999), 35-6.

³⁸ Waugh(1999), 42.

³⁹ Mary Midgley, *Science and Poetry*, (Abingdon: Routledge, 2006); Midgley(2001).

⁴⁰ Midgley(2001), 1-2.

nowhere.⁴¹ Midgley had been developing the ideas in *Science and Poetry* for some time, and her apparent suggestion that science has nothing to do with imagination, and her persistent charge of reductionism led to a gathering of scientists, and Midgley herself, at Jesus College, Cambridge, in 1994; the outcome is a series of vigorous essays in the volume *Nature's Imagination*, introduced by the scientist who chaired the gathering, Freeman Dyson (and whose essay is quoted above).⁴² Roger Penrose argues in 'Must Mathematical Physics be Reductionist?' that the mathematics of the Möbius band and other mathematical topologies is inherently holistic.⁴³ *Nature's Imagination*, however, seems to fade into the greater pattern of collections making claim and counter claim which was developing at the time. I will say more about this pattern shortly, but first it is worth probing a little into science.

The medical neuroscientist Raymond Tallis is well known as a passionate critic of postmodernism, and his essays are widely anthologised, for example in Fuller and Waugh's collection.⁴⁴ Tallis sometimes also turns his fire on science. He discusses the limits of science in his essay 'The Poverty of Neurophilosophy'.⁴⁵ Tallis is trying to resolve the difficulty that, while he himself is a 'believing clinician' in the field of neuroscience, what he sees as 'neuromythology', 'actually impoverish[s] our idea of human consciousness'.⁴⁶ The main target of his attack is the computational model of the mind as put forward by Daniel Dennett and Stephen Pinker which has 'cast no light on

⁴¹ Midgley(2001), 35.

⁴² Dyson(1995).

⁴³ Roger Penrose, 'Must Mathematical Physics be Reductionist?' in Cornwall(1995), 12-26, 13-16.

⁴⁴ Fuller&Waugh(1999).

⁴⁵ Raymond Tallis, 'The Poverty of Neurophilosophy' in Michael Grant (ed.), *The Raymond Tallis Reader*, (Basingstoke: Palgrave, 2000), 3-28; Tallis(2000).

⁴⁶ Tallis(2000), 6, 5.

how there is such a thing as the mind', or 'how in a fundamental sense it "works"'.⁴⁷

Tallis's argument is perhaps a little over-played. While Pinker discusses a computational model of the mind in various books, there is a growing scepticism that it should be taken literally; rather, the computational model is more appropriately used as a tool or a probe, perhaps like a microscope though more limited, and as a much-needed source of metaphors. Tallis's 2011 *Aping Mankind* develops his earlier argument against naïve computational models of the mind, into the excesses of what he calls neuromania and Darwinitis in contemporary science, and directly challenges well-publicised neuroscientific results.⁴⁸ This work, while a little wild and undisciplined at times, is given substantial credence by an editorial in *New Scientist* in 2013. The editorial (and later article) describes what happened when a researcher at the University of California, in a test run, put a frozen salmon through an MRI scanner – the researcher found that 'The fish's brain and spinal column were showing signs of neural activity'.⁴⁹ Provocatively, the *New Scientist* contends, 'It is now clear that the majority – perhaps the vast majority – of neuroscience findings are as spurious as brain waves in a dead fish'.⁵⁰

Physics too is encountering difficulties. Brian Green's (admittedly fascinating) *The Hidden Reality* (2011), describes no fewer than seven types of parallel universe, or multiverse, most of them associated with the framework of theories known as string theory.⁵¹ Green is aware that string theory has become 'a battle ground for the very soul of science'.⁵² This is because many physicists believe – and there appear to be no strong

⁴⁷ Tallis(2000), 4.

⁴⁸ Raymond Tallis, *Aping Mankind*, (Durham: Acumen, 2011), e.g. 191-99.

⁴⁹ *New Scientist* 19/10/2013, editorial, 3, article, 33-7.

⁵⁰ *New Scientist* 19/10/2013, see also *New Scientist* 16/05/2015, 56.

⁵¹ Brian Green, *The Hidden Reality*, (London: Allen Lane, 2011); Green(2011).

⁵² Green(2011), 164.

counter-arguments – that the existence of parallel universes is untestable in principle. Notable works which regard string theory as having failed, and argue that theoretical physics must return to making testable predictions, are Peter Woit’s *Not Even Wrong* and Lee Smolin’s *The Trouble with Physics*, both from 2006.⁵³ A later book by Smolin, *Time Reborn* (2013), makes the post-string theory hypothesis that time, on a universal scale, is in fact absolute.⁵⁴ Lisa Randall’s *Knocking on Heaven’s Door* (2011), occupies something of the middle ground, and extends the hope that perhaps if a violation of the conservation of energy was observed at CERN, this might be indirect evidence for hidden spatial dimensions (another requirement of string theory) or even the multiverse.⁵⁵ The mathematical physicist Roger Penrose has written two books which combine a detailed exposition of physical theory with a passionate argument against the possibility of artificial intelligence (AI), the latter centring on Gödel’s theorem of undecidability.⁵⁶ Due to their argument, Penrose’s *The Emperor’s New Mind* (1989) and *Shadows of the Mind* (1994) have been branded controversial and have been the subject of much criticism – a fatal blow against AI would threaten the existence of whole university departments.⁵⁷ However, these and a third book, *The Road to Reality* (2004), are chosen here as reference points due to their extensive detail which includes mathematics, and also their historical development of the theories of physics.⁵⁸

⁵³ Peter Woit, *Not Even Wrong*, (London: Vintage, 2007); Woit(2006); Lee Smolin, *The Trouble with Physics*, (London: Penguin, 2008).

⁵⁴ Lee Smolin, *Time Reborn*, (London: Allen Lane, 2013) ; Smolin(2013).

⁵⁵ Lisa Randall, *Knocking on Heaven’s Door*, (London: The Bodley Head, 2011), 320-1.

⁵⁶ Roger Penrose, *The Emperor’s New Mind*, (Oxford: Oxford University Press, 1999); Penrose(1989); Roger Penrose, *Shadows of the Mind*, (London: Vintage, 2005); Penrose(1994).

⁵⁷ Penrose(1989); Penrose(1994); for a counter argument to that presented in Penrose(1989) and Penrose(1994), in a paper where one of the authors (Bringsjord) is an opponent of strong AI, see Selmer Bringsjord and Hong Xiao, ‘A Refutation of Penrose’s Godelian case against Artificial Intelligence’, *Journal of Experimental and Theoretical Artificial Intelligence*, 12, (2000), 307-329.

⁵⁸ Roger Penrose, *The Road to Reality*, (London: Vintage, 2004); Penrose(2004).

Science, then, (excepting Penrose) is every bit as susceptible as the humanities to overwrought theory, and is even, as with Green, making arguments for downgrading testability as a central requirement.⁵⁹ Sometimes though, scientific scepticism cannot be suppressed. The most pyrotechnic event in literature and science of recent years was undoubtedly the publication of the physicist Alan Sokal's 'Transgressing the Boundaries: Towards a Transformative Hermeneutics of Quantum Gravity' in the journal *Social Text* in 1996.⁶⁰ Sokal's parody, and his follow up with Jean Bricmont, *Intellectual Impostures* (1997), is unquestionably provocative, but it has a quite different character to the only comparable event in the history of literature and science, the two cultures dispute. While passionate, Sokal and Bricmont's attack is based on reason, and is strictly within the domain of legitimate academic discourse; and science, it's worth noting, got similar treatment in a 'reverse-Sokal' hoax known as the Bogdanov Affair.⁶¹ Sokal's 2008 *Beyond the Hoax*, perhaps unavoidably, strays outside the domain of academic discourse into worldview, but this acts to the detriment of the work.⁶² The aftermath of the parody, known as the 'science wars', fanned the flames of an already extant conflagration, and the pattern of claim and counter-claim in literature and science developed. George Levine's collection, *One Culture* from 1987, is in the tradition Sokal was attacking.⁶³ Levine writes in his Introduction that 'This volume', 'assumes that science is embedded in culture'; he goes on to claim that 'Science is socially constituted; knowledge is culturally constituted', and even that 'this is very old news', without explaining how, say,

⁵⁹ Green(2011), 165-6.

⁶⁰ Alan Sokal, 'Transgressing the Boundaries: Towards a Transformative Hermeneutics of Quantum Gravity' in Alan Sokal and Jean Bricmont, *Intellectual Impostures*, (Bury St Edmunds: Profile, 1999), 199-240; Sokal&Bricmont(1997).

⁶¹ Woit(2006), 217-23.

⁶² Alan Sokal, *Beyond the Hoax*, (Oxford: Oxford University Press, 2010) ; Sokal(2008).

⁶³ George Levine, (ed.), *One Culture*, (Wisconsin: University of Wisconsin Press, 1987); Levine(1987).

the physics of moving bodies can be socially constructed.⁶⁴ Paul Gross and Norman Levitt's *Higher Superstition* from 1994 is an early volume-sized response to postmodernism from scientists.⁶⁵ Gross and Levitt quote, for example, Katherine Hayles's claim that "The special theory of relativity lost its epistemological clarity when it was combined with quantum mechanics to form quantum field theory. By midcentury all three had been played out or had undergone substantial modification".⁶⁶ As Gross and Levitt remark, 'This will come as a terrible shock to physicists!'.⁶⁷ Noretta Koertge's *A House Built on Sand* (1998) is a questioning of postmodernism from within the humanities.⁶⁸ *The One Culture?* (2001), edited by Jay Labinger and Harry Collins, is notable for its fairness, with contributions from both sides.⁶⁹ It is divided into three parts, with an initial part setting out authorial positions, a second section with responses from the book's community of authors, and a third with responses to responses. *Theory's Empire* from 2005, edited by Daphne Patai and Will Corral, is perhaps science's most open and rounded attack on postmodernism, with essays by notable writers such as Noam Chomsky, Frank Kermode, Raymond Tallis, and Paisley Livingstone.⁷⁰

The primary sense developed on reading the 2011 *Routledge Companion to Literature and Science*, edited by Bruce Clarke and Manuela Roussini, is that many of the contributors were oblivious to the arguments made by scientists in defence of their

⁶⁴ Levine(1987), 25-6.

⁶⁵ Paul Gross and Norman Levitt, *Higher Superstition*, (Baltimore: John Hopkins University Press, 1998); Gross&Levitt(1994).

⁶⁶ Gross&Levitt(1994), 101.

⁶⁷ Gross&Levitt(1994), 101.

⁶⁸ Noretta Koertge, (ed.), *A House Built on Sand*, (New York: Oxford University Press, 1998).

⁶⁹ Jay Labinger and Harry Collins, (eds.), *The One Culture?*, (Chicago: University of Chicago Press, 2001); Labinger&Collins(2001).

⁷⁰ Daphne Patai and Will Corral, (eds.), *Theory's Empire*, (New York: Columbia University Press, 2005) ; Patai&Corral(2005).

subject.⁷¹ The editors of this woefully missed opportunity to establish an introductory reader for the interdiscipline, in their summary, cite the essayist Neil Badmington's contention (in turn quoting from Donna Haraway's 'A manifesto for cyborgs' (1985)) that: 'one of the recognitions of posthumanist culture has been that "the boundary between science fiction and social reality is an optical illusion"'.⁷² There are, however, notable exceptions such as the essay by the German scholar Dirk Vanderbeke, who writes in 'Physics', that Sokal's famous hoax, 'to some extent cleansed the atmosphere with a heavy dose of well-administered ridicule'.⁷³ It's worth emphasising that while an explicit challenge to Kuhn's *The Structure of Scientific Revolutions* is put forward at the beginning of the first chapter, a similar challenge to postmodernist writing on science is not developed in the interest of diversity in the wider study; such a challenge should be regarded as implicit. In her retrospective, *The Value of the Humanities* (2013), Small acknowledges that science won a partial victory in the science war: she notes that 'the language of cultural studies has shifted'.⁷⁴ Whether due to Sokal or not, the atmosphere in literature and science is clearing.

One book in particular, I think, broke the mould which was casting out too many similar positions: *Contemporary Poetry and Contemporary Science* (2006), edited by Robert Crawford.⁷⁵ This innovative work is structured around a series of encounters where poets enter the laboratory with their scientist colleagues. The latter explain, and the former create poetry based on their newly acquired knowledge. Poetic science is thus the

⁷¹ Bruce Clarke and Manuela Rossini, (eds.), *The Routledge Companion to Literature and Science*, (London: Routledge, 2011); Clarke&Rossini(2011).

⁷² Clarke&Rossini(2011), 240; Neil Badmington, 'Posthumanism', in Clarke&Rossini(2011), 374-84, 376.

⁷³ Dirk Vanderbeke, 'Physics', in Clarke&Rossini(2011), 192-202, 200.

⁷⁴ Small(2013), 37.

⁷⁵ Robert Crawford, (ed.), *Contemporary Poetry and Contemporary Science*, (Oxford: Oxford University Press, 2006); Crawford(2006).

centrepiece and the collection develops a fraternal, though still open and candid, discussion in some of the associated essays. Such is its success that Gillian Beer opens her 'Afterword' by asking, 'How do we avoid collapsing the differences between science and poetry in our eagerness to explore their interactions?'.⁷⁶ An earlier attempt to find common ground between the arts and science is E. O. Wilson's *Consilience* (1998).⁷⁷ Unlike Crawford's volume, with its carefully measured scope, Wilson's monumental ambition is to outline a unity of knowledge. Wilson comes perilously close to asserting a scientific theory of art, but his search for a putative unity tends to extreme oversimplification.⁷⁸ Wilson was involved in the interdisciplinary experiment of using evolutionary theory as a basis to understand literature. He contributed a Forward to *The Literary Animal* (2005), edited by Jonathan Gottschall and David Wilson.⁷⁹ Perhaps the founding work in this field was Joseph Carroll's *Evolution and Literary Theory* (1995), and the ideas were still being developed in 2009 by Brian Boyd in *On the Origin of Stories*.⁸⁰ As Terry Eagleton says in his review of the latter work, 'The truth is that none of the functions of art just listed' (Eagleton has been discussing quite general features of art), 'is illuminated by being redescribed in evolutionary terms'.⁸¹ Cognitive poetics is another crossover between literature and science, this time with a heritage which can be traced to I. A. Richards. It is still, I believe, in the research phase, but the idea that poetry has psychological affect is intuitive, and might hold promise. There was evidence of

⁷⁶ Gillian Beer, 'Afterword' in Crawford(2006), 204-10, 204; Beer(2006).

⁷⁷ E. O. Wilson, *Consilience*, (London: Abacus, 2009); Wilson(1998).

⁷⁸ Wilson(1998), 233-64.

⁷⁹ Jonathan Gottschall and David Wilson, *The Literary Animal*, (Evanston: Northwest University Press, 2005), vii-xi.

⁸⁰ Joseph Carroll, *Evolution and Literary Theory*, (Columbia: University of Missouri Press, 1995); Brian Boyd, *On the Origin of Stories*, (Cambridge: Harvard University Press, 2009).

⁸¹ Terry Eagleton, 'Darwin Won't Help', *LRB*, 24/9/2009.

active research into the affect of metre at the 2014 BSLS conference.⁸² A measured guide to the subject can be found in Reuven Tsur's *Towards a Theory of Cognitive Poetics* (2008).⁸³

While Tsur looks into cognitive poetics from the perspective of a theoretician, Don Paterson, in an insightful essay, 'The Lyric Principle', looks outward at linguistic science from the perspective of a poet.⁸⁴ This advantageous viewpoint allows Paterson to challenge the Saussurian orthodoxy that the signifier is arbitrary. As a basis for his analysis of sound patterning in poetry, Paterson argues that while the 'acoustic and semantic aspects [of language] may be separately described, they are not actually separable'.⁸⁵ Further, drawing a number of threads of argument together, Paterson proposes as an important aspect of poetry a 'phonosemantic' system: 'Poets can trust their ears to think and their minds to listen; no compromise between sound and sense need be negotiated, as they are understood to be aspects of the same thing'.⁸⁶ Paterson is then in a position to offer a definition of the compositional process as a negotiation between 'the sound and sense we intended to make, and the sound and sense we end up making'.⁸⁷

The concluding part of this literature survey looks at a number of scholarly works which demonstrate success of literature and science, and serve to illustrate why the field is flourishing. A work generally regarded as a classic study is Gillian Beer's *Darwin's*

⁸² Catherine Charwood, University of Warwick, 'Culture and Cognition: Expectancy Patterns within Verse'; BSLS conference, Surrey, 11/4/2014.

⁸³ Reuven Tsur, *Towards a Theory of Cognitive Poetics*, 2nd edn., (Brighton: Sussex Academic Press, 2008).

⁸⁴ Don Paterson, 'The Lyric Principle', <http://www.donpaterson.com/arspoetica.htm>, 08/06/2015; Paterson(2015).

⁸⁵ Paterson(2015), opening of part 2, point 2.

⁸⁶ Paterson(2015), opening of part 2, point 5.

⁸⁷ Paterson(2015), opening of part 2, point 5.

Plots (1983).⁸⁸ As Darwin struggled to articulate his theory of natural selection in *On the Origin of Species*, he was engaged, Beer convincingly shows, in an equal struggle with language itself; Darwin, she notes, ‘was telling a new story, against the grain of the language available to tell it in’.⁸⁹ She argues that Darwin’s ‘language practice and scientific theory coincide’, saying that ‘In his use of words he is more preoccupied with relations and transformations than with limits’.⁹⁰ Beer’s literary terminology both parallels Darwin’s theory and describes his form of argument. She shows how the latter, on the one hand, conditional, speculative, and situated in complexity and ignorance, is, on the other hand, compellingly transformed into Darwin’s confident vision of the interrelatedness of all life. Darwin, Beer shows, echoed the language available to him, from Ecclesiastes to his ‘new creation myth’, that ‘makes the tree of life and the tree of knowledge one’.⁹¹ Beer’s focus on language seems to enrich the science; she says Darwin ‘did not *invent* laws. He *described* them’ – one could add: he *discovered* them.⁹² With an attitude towards science which is as rigorous as that towards literature, Beer develops the outward thrust of her work: a fine grained analysis of the reception and subsequent dissemination of Darwin’s ideas by writers such as George Eliot and Thomas Hardy.⁹³

Two works by Bernard Lightman (2007) and James Secord (2000) take a retrospective look at the fecundity of nineteenth-century science, and are fine literary re-creations of science and its cultural context in this period.⁹⁴ Lightman’s study of

⁸⁸ Gillian Beer, *Darwin’s Plots*, 3rd edn., (Cambridge: Cambridge University Press, 2009); Beer(1983).

⁸⁹ Beer(1983), 3.

⁹⁰ Beer(1983), 33.

⁹¹ Beer(1983), 16, 107.

⁹² Beer(1983), 46; emphasis original.

⁹³ Beer(1983), 106; emphasis original.

⁹⁴ Bernard Lightman, *Victorian Popularisers of Science*, (Chicago: University of Chicago Press, 2007); Lightman(2007); James Secord, *Victorian Sensation*, (Chicago: University of Chicago Press, 2003); Secord(2000).

Victorian popularisers of science shows the bewildering array of interpretations of the new scientific knowledge which confronted readers. From improving parables about the worker bee to justification of the imperial project, whether science revealed God or denied Him, Lightman captures the sheer vigour of the Victorian re-contextualisation of knowledge.⁹⁵ But there are dark notes – certain popularisers of science ‘may have contributed to the perception in the closing decades of the century that mass culture had become “feminized” and the cause of the decline of civilization’; defence of ‘masculine high culture’ is evident, Lightman notes, in the work of Nietzsche and others.⁹⁶ The lost perspective of accessible science as feminine also occurs in James Secord’s study of the reception of the anonymously published, *Vestiges of the Natural History of Creation* (1844).⁹⁷ Secord focuses on the maelstrom which developed around this persuasively written theory-of-everything. It represents, he argues, a critical juncture in the mass dissemination of knowledge – so much so there was concern about its effect on ‘men from the lower middle class and women’ as (Secord reports) ‘both lacked the masculine strength of mind to detect its fallacious reasoning’.⁹⁸ Secord recreates what can be accurately termed the raging controversy around *Vestiges* in such extraordinary detail that at times one almost feels present, for example in the ‘unusually intense’ exchanges in the meeting halls of Liverpool.⁹⁹ His narrative, he claims, successfully avoids becoming ‘engulfed in a cacophony of conflicting voices’ and reveals ‘wider patterns and structures of response’.¹⁰⁰ Secord concludes that it is now ‘possible to escape the old image of

⁹⁵ Lightman(2007), e.g. 142-54.

⁹⁶ Lightman(2007), 165.

⁹⁷ Secord(2000).

⁹⁸ Secord(2000), 274.

⁹⁹ Secord(2000), Chapter 6, 191-221, 199.

¹⁰⁰ Secord(2000), 519.

science as dominated by a handful of great theorists and simultaneously to understand theory making as a form of practice’, and that ‘Intellectual history, which used to be written as a story of dramatic changes of worldview (the “Darwinian Revolution”), can now be recast’.¹⁰¹

Michael Whitworth in *Einstein’s Wake* (2001), and John Holmes in *Darwin’s Bards* (2009), both develop their own critical theories with which to study aspects of literature and science.¹⁰² In the Introduction to *Einstein’s Wake*, Whitworth considers the ‘ontological problem’ raised by the study of literature and science.¹⁰³ When ‘faced with two terms which are commonly understood as antithetical’, Whitworth writes, ‘we must explain in what sense is it possible to compare like with like’.¹⁰⁴ Unlike Beer or Holmes, Whitworth is discussing a fully inanimate field of science, mechanics: Whitworth asks ‘How can a history centred on language take into account forces which are irreducibly material?’.¹⁰⁵ The popular intellectual excitement attending the study of moving objects is initially surprising to the scientific reader, as is the means by which the language of mechanics was transmitted into the modernist literary imagination. Whitworth develops a theory of transmission by metaphor carefully shaped against other theories of metaphor such as that of Lakoff and Johnson.¹⁰⁶ The key to this intellectual transmission, Whitworth argues, is periodicals, where popularisations of science were juxtaposed with literary reviews. Whitworth’s careful picking apart of complex ideas and his refusal to accept uncritically received opinion underlies his study. For example, he notes that ‘the

¹⁰¹ Secord(2000), 520.

¹⁰² Michael Whitworth, *Einstein’s Wake*, (Oxford: Oxford University Press, 2004); Whitworth(2001); John Holmes, *Darwin’s Bards*, (Edinburgh: Edinburgh University Press, 2009); Holmes(2009).

¹⁰³ Whitworth(2001), 1.

¹⁰⁴ Whitworth(2001), 1.

¹⁰⁵ Whitworth(2001), 1.

¹⁰⁶ Whitworth(2001), 10-15.

critical tradition has tended to emphasise [the modernists'] hostility to mechanistic and materialist science'; he counters that 'Not only was the modernist relation to technology less hostile than has often been argued, but a hostile relation to it need not imply hostility to pure science'.¹⁰⁷ In framing his study, Whitworth emphasises that he 'cannot address the theories as the scientists would have understood them', and in 'analysing theories into their component metaphors', 'one may produce results that would have seemed quite alien to a scientist'.¹⁰⁸ This health warning is a signifier of free and open discourse and challenges the scientist to learn from this finely controlled study.

In the opening theoretical chapter of *Darwin's Bards*, Holmes challenges some of the claims of historians of science, and makes a forthright defence of scientific realism and the scientific method. Holmes writes: 'My argument implies that two claims routinely dismissed by cultural historians and historians of science are in fact partially correct'.¹⁰⁹ Holmes argues that there was a Darwinian revolution, 'an epiphany in the history of ideas' (note Secord's comment reported above), and that 'Darwinism has remained largely consistent' since the publication of *Origin*.¹¹⁰ Regarding the latter, Holmes says: 'as in any living science, there are healthy disagreements over how data should be interpreted'.¹¹¹ Holmes's acceptance of scientific diversity is refreshing in the face of ongoing attempts by cultural critics and the media to portray every disagreement in science as a fundamental rupture which undermines the legitimacy of the discipline. In an impressive summary which is nothing less than a defence of scientific realism, Holmes sets out ten key tenets of Darwinism which have 'formed an influential strand in

¹⁰⁷ Whitworth(2001), 130.

¹⁰⁸ Whitworth(2001), 5.

¹⁰⁹ Holmes(2009), 5.

¹¹⁰ Holmes(2009), 5.

¹¹¹ Holmes(2009), 14.

scientific thinking since 1859 and [have] been accepted as correct across the scientific community since the 1940s'.¹¹² The particular clarity and precision regarding science in *Darwin's Bards* harmonises with Holmes's penetrating style of close reading – Holmes's shows the immense complexity of literary responses to Darwinism in the poetry of writers as diverse as George Meredith, Robert Frost, and Thom Gunn.

Of later interest to this study is Holmes's reading of Edwin Morgan's parody of human vanity, 'The Archaeopteryx's Song'.¹¹³ Holmes has also recently edited a valuable collection, *Science in Modern Poetry, New Directions* (2012).¹¹⁴ In addition to Helen Small's essay on Miroslav Holub and Roald Hoffman (an introductory remark from which was quoted above), and Holmes's own essay 'From Bergson to Darwin: Biology in the Poetry of Judith Wright', both discussed later in the thesis, the collection includes work by Peter Middleton, Robert Crawford, and Michael Whitworth.¹¹⁵

The four poets at the heart of this thesis were exposed, to varying extents, to the intense firmament of conflicting positions which literature and science has sometimes become. MacDiarmid was criticised by G. E. Davie, for example, for his 'conversion to the point of view of modern science'.¹¹⁶ Wright adopted a more conventionally literary position, but regarding postmodernism, her biographer, Veronica Brady, noted that 'Literary theory seemed to Judith "radio-active territory"'.¹¹⁷ James McGonigal, Morgan's biographer and formerly his student, recalls that when the 'study of English

¹¹² Holmes(2009), 15-18, 19.

¹¹³ Holmes(2009), 31-4; Edwin Morgan, *Collected Poems*, (Manchester: Carcanet, 1990), 403; *CPEM*.

¹¹⁴ Holmes(2012).

¹¹⁵ Small(2012); Holmes(2012), 194-209; Peter Middleton, 'Cutting and Pasting: Language Writing and Molecular Biology' in Holmes(2012), 38-54; Middleton(2012); Robert Crawford, 'Poetry, Science and the Contemporary University', in Holmes(2012), 67-83; Michael Whitworth, "'Strange Synthetic Perfumes": Investigating Scientific Diction in Twentieth-Century Poetry' in Holmes(2012), 87-100; Whitworth(2012).

¹¹⁶ G. E. Davie, *The Crisis of the Democratic Intellect*, (Edinburgh: Polygon, 1986), 135; Davie(1986).

¹¹⁷ Veronica Brady, *South of My Days*, (Sydney: Angus and Robertson, 1998), 438; Brady(1998).

was becoming heavily influenced by continental literary theory', Morgan taught the theory in the Masters course McGonigal followed, but 'did not feel that he had the time or real inclination for wide or deep reading around it'.¹¹⁸ Holub, in his final essay, engaged with the abstract topic of poetry and science, perhaps a little shakily.¹¹⁹ He does, however, say at the end of the essay that 'Science in poetry should shed some relatively new light', in contrast to the 'postmodern poetic way of wearing dark glasses on a moonless night'.¹²⁰ Perhaps now, in view of the probable wane of postmodernism, it is possible as an interdisciplinary contributor from a scientific background, to re-assert the materialism of science, and to develop this thinking in a study of science in poetry, without unnecessary controversy.

¹¹⁸ James McGonigal, *Beyond the Last Dragon*, (Dingwall: Sandstone Press, 2010), 253; McGonigal(2010).

¹¹⁹ Miroslav Holub, 'Rampage, or Science and Poetry', in Crawford(2006), 11-24.

¹²⁰ Crawford(2006), 24.

I: CRITICAL BACKGROUND TO POETRY AND SCIENCE

Introduction

Alan Sokal, opening his famous parody, writes: ‘There are many natural scientists, and especially physicists, who continue to reject the notion that the disciplines concerned with social and cultural criticism can have anything to contribute, except perhaps peripherally, to their research’.¹ The sentence is heavy with irony due to the context of its publication, but I believe that the sentiment expressed represents Sokal’s literal view. It is a conservative and established position which has been under substantial attack in recent years. Historically speaking, perhaps there is justice in this, and science is due a taste of its own iconoclastic medicine. For the first time since the Enlightenment science has not only been placed on the defensive as the widespread influence of the humanities has coloured the overall discourse on the subject, but science itself has been influenced, to some extent, by the wider developments in culture. The response in this thesis to the pressure which science is under is to retreat to a well-defined and defensible position. That position, put briefly, is that just as there is no comprehensive or fully convincing scientific theory of literature, there is similarly no comprehensive or fully convincing literary theory of science. At the same time, the interdisciplinary study of science in literature must function, and operate from the perspectives of both the humanities and science. A further point could be made: there is no fully convincing literary theory of science, but that does not mean there can be no literary or cultural *descriptions* of science. There is a tension between bringing poetry and science together either in a poem or as a methodology of study, and maintenance of their distinct domains of knowledge.

¹ Sokal&Bricmont(1997), 199.

As noted in the Introduction, Gillian Beer, in her 'Afterword' to *Contemporary Poetry and Contemporary Science*, asks 'How do we avoid collapsing the differences between science and poetry in our eagerness to explore their interactions?'.² I would want to respond: it is literary relativism that collapses the differences; relativism's homogenising influence operates in practice to make poetry and science like a comparison of texts, or a discourse on two related narratives. Beer's elaboration of her question makes it clear that she holds a different view. She characterises the differences between poetry and science as the diversity of 'forms of experience', and sees the distance between them in terms of 'approach, scope, and truth-telling'.³ This is a cultural view of science which at a certain level is undeniable, but it is not entirely neutral: the term 'truth-telling' is suggestively critical of science. Later Beer, differentiating between 'science' and 'science writing', collectively describes the science in Crawford's volume as 'ecology, physics, astronomy, psychiatry, and other forms of gathered and shifting knowledge'.⁴ In the humanities, this is a mainstream way of characterising science, and few, I think, would object to it. If this same phrase was considered from the perspective of a scientist, however, one would object that there is no sense of the heuristic or the scientific method in the idea of 'gathered' knowledge, and add that it is very hard to see how knowledge such as the periodic table or classical physics can be described as shifting.

The problem is not one of casual over-generalisation; Beer's understanding of science is highly sophisticated. Whether or not the different views, Beer's and that of a putative scientist, are simply two, potentially equally valid, perspectives on science, or

² Beer(2006), 204.

³ Beer(2006), 204.

⁴ Beer(2006), 205.

whether one view is right and the other is wrong has been seen, unfortunately, as the heart of the matter. The question is this: can science be both culturally situated and relative, and at the same time material and culturally independent, or are these definitions of science mutually exclusive? Put this way, I think the answer is clear. Literature and science scholarship has shown conclusively that the exclusivist view is not tenable – science can be described in cultural terms, and there is value in doing so. But equally, if exclusivism is not tenable, then science must *also* be material and culturally independent. Accepting that a description of science is not the same thing as a theory of science, and the former does not totalise, then the situation is simply that both views can co-exist. The issue then becomes one of balance, because if both perspectives are true, then both should be equally represented.

An important change in literary attitudes to science has taken place as a result of the era of relativism. Science has lost its power to shock. The fear engendered by science, as expressed by Matthew Arnold, I. A. Richards, Douglas Bush, and others, no longer exists, because science, along with everything else, is regarded as just part of the cultural miasma. The achievement of relativism, if such it is, is that science has been tamed. Its theories have lost importance because it is asserted that they will become obsolete at some point anyway, and its claims can be considered as ephemeral as any other aspect of culture. While the intention is not to make science shocking again, if the difference between poetry and science is not to collapse (to borrow Beer's terminology), and the interdiscipline is to achieve a natural balance, then a firm argument against exclusivist

relativism needs to be put forward: therefore, this chapter opens with a systemic challenge to the fine detail of Thomas Kuhn's *The Structure of Scientific Revolutions*.⁵

Rather than further explore the philosophy of science further, for reasons outlined in the Introduction, the remainder of the chapter seeks a sense of the identity of the *subject* of poetry and science. There are many ways in which this could be achieved; here I suggest three. The first is concerned with discourse. Quite different discourses related to poetry and science are identified in the intricate exchanges between William Wordsworth, Samuel Coleridge, and Humphry Davy; the debates in Scotland as described by G. E. Davie in *The Democratic Intellect*; and the two cultures dispute.⁶ The debates in the Romantic era and in Scotland are marked by the fact that the participants were bound by a common fabric of belief, a liberal consensus in the first case, and a philosophical consensus in the second. It is as if at the time when the two cultures dispute erupted mutual belief had been fatally eroded, and any that remained was destroyed.

This consideration of discourse is followed by a section of the chapter which sets out a baseline for poetry and science with a study of I. A. Richards's *Science and Poetry* and the context in which it was written.⁷ Lasting value is sought in Richards's work by comparing it to contemporary research in cognitive poetics. The chapter ends with a brief theoretical discussion useful to the understanding of science in poetry. Science is understood here to be a materialist discipline. When science is in poetry, that is, when something formerly descriptive of material reality has *become* poetry, a transformation

⁵ Kuhn(1962).

⁶ W. J. B. Owen, and Jane Worthington Smyser, (eds.), 2 vols., vol. 1, *The Prose Works of William Wordsworth*, (Oxford: Clarendon, 1974); Owen&Smyser(1974); Roger Sharrock, 'The Chemist and the Poet', *Notes and Records of the Royal Society of London*, Vol. 17, No. 1, (May, 1962), 57-76; Sharrock(1962); G. E. Davie, *The Democratic Intellect*, (Edinburgh: Edinburgh University Press, 1961); Davie(1961).

⁷ Richards(1926).

must have taken place. There is no single way to understand this transformation, but as a lead-in to the detailed study, the idea of the creative misreading of science is developed by cherry picking from the work of Harold Bloom. The result is a useful position, which seeks to shed this author's materialist biases: poets are free to make science their own, to mutate the meaning in any way they like, and they should mainly be judged on aesthetic grounds.

A Systemic Challenge to Thomas Kuhn

The philosopher Ian Hacking enthuses in his 2012 introductory essay to the 50th anniversary edition of Thomas Kuhn's *The Structure of Scientific Revolutions*, 'Thomas Kuhn was out to change our understanding of the sciences [...] He succeeded'.⁸ Hacking's inclusive 'our' is certainly not wholly correct – few scientists or general readers have in fact changed their understanding of the sciences as a result of Kuhn's work (or have even heard of it); however, for those in non-scientific disciplines who comment on science, *The Structure of Scientific Revolutions* is undoubtedly seminal. The back cover of the 1996 third edition declares that Kuhn's work is 'Considered one of "The Hundred Most Influential Books Since the Second World War" by *The Times Literary Supplement*'.⁹ The state of general acceptance of Kuhn's proposition is illustrated by Steven Shapin, a relativizing historian of science, who writes with confidence in 2010 the phrase: 'Thomas Kuhn has shown us ...'.¹⁰ *Structure* is a pillar of humanities pedagogy on science. At a postgraduate seminar entitled 'The Sociology of Scientific Understanding' in 2011, Kuhn's ideas were presented as if it was established

⁸ Kuhn(1962), viii; 4th edn. unless otherwise noted.

⁹ Kuhn(1962), 3rd edn., 1996.

¹⁰ Shapin(2010), 342; '...how deeply entrenched in expert communal life are the paradigms of a scientific practice'.

fact that *Structure* overthrew the ‘Grand narrative’ that scientific knowledge is cumulative; then, as if relativized once, science could be relativized again by ‘The sociological turn’.¹¹ This latter idea is a reference to the sociology of scientific knowledge or SSK associated with David Bloor of Edinburgh University, which claims that even mathematics is socially constructed.¹² SSK has a family resemblance to Bruno Latour’s constructionism, which asserts that scientists construct facts in the laboratory.¹³ Kuhn can be seen as the originator of this idealism, as the founder of the vast industry in the history, sociology, and philosophy of science which exists today.¹⁴ This industry, it is clear from the literature, is populated in large part by those Bernard Williams calls ‘the deniers’.¹⁵ Williams writes in *Truth and Truthfulness* (2002) that ‘the presence and relevance of [...] everyday truths give the sciences a claim to seriousness that the humanities can easily lose’.¹⁶

Kuhn’s theory has generated a vast amount of response and speculation. Although loose paradigm terminology is used by some scientists, the physicist David Deutsch argues that ‘stereotype has been elevated into a philosophy by Thomas Kuhn’, and he himself has ‘never come across anything like a Kuhnian situation’, and, regarding quantum mechanics, ‘it would be hard to find a more spectacular counter-example to Kuhn’s theory of paradigm succession’.¹⁷ By contrast, Garry Gutting’s 1980 collection of

¹¹ ‘Theories and Methods’ at the University of Salford, 13-14 Jan 2011; ‘The Sociology of Scientific Understanding’ presented by James Sumner; quotes are headings on printed handout.

¹² Bloor(1976); maths: chapters 5-7, 84-156.

¹³ Latour&Woolgar(1979).

¹⁴ C.f. Middleton(2012), 41.

¹⁵ Bernard Williams, *Truth and Truthfulness*, (Princeton: Princeton University Press, 2004), 5, 11; Williams(2002).

¹⁶ Williams(2002), 11.

¹⁷ David Deutsch, *The Fabric of Reality*, (London: Penguin, 1998), 312, 325, 327; Deutsch(1997).

essays, *Paradigms and Revolutions* is largely an unquestioning eulogy.¹⁸ A summary of more critical positions than in Gutting's collection, though from the point of view of continental philosophy, can be found in an editors' commentary in the 1998 Norton anthology *Philosophy of Science*.¹⁹ A comprehensive and balanced account of Kuhn's work is given in James Ladyman's *Understanding the Philosophy of Science*; also, there is a more detailed perspective in his article 'Structural Realism'.²⁰ Paradigm theory has been put under considerable pressure. Structural realism aside, however, little of the criticism of Kuhn is systemic, but rather is intended to make way for another form of denial.²¹ By contrast, the stance of this thesis is outright rejection of paradigm theory.

Kuhn's explicit purpose is to challenge the idea that science accumulates knowledge.²² Although it is admitted that knowledge will accumulate in certain circumstances, *The Structure of Scientific Revolutions* offers a proposal, paradigm theory, which is a mechanism designed to stop the net gain of scientific knowledge resulting from the practice of science.²³ Kuhn's proposal can be concisely defined. There exists an abstract superstructure in science, which Kuhn calls paradigms.²⁴ Immature science may be pre-paradigm, but once robust theories are established the scientific practice in that particular field enters a 'paradigm' within which day-to-day research is classed as

¹⁸ Garry Gutting, (ed.), *Paradigms and Revolutions*, (Notre Dame: University of Notre Dame Press, 1980).

¹⁹ Martin Curd and J. A. Cover, (eds.), *Philosophy of Science*, (New York: Norton, 1998); Curd&Cover(1998), 215-35; Curd&Cover(1998).

²⁰ Ladyman(2002), 93-123; James Ladyman, 'Structural Realism' in the online *Stanford Encyclopaedia of Philosophy*, <http://plato.stanford.edu/entries/structural-realism/>, (published 2007, revised Jan. 2014), printed 02/06/2014; Ladyman(2014).

²¹ See e.g. Curd&Cover(1998), 239, Hacking in Kuhn(1962), xxxv-xxxvi.

²² Kuhn(1962): against accumulation, 2, 3, 169; appearance of accumulation, 137, 138; ambiguous about progress, 155, discussion 160-1; 'problem of progress' psychologised, 162-3, 166.

²³ Kuhn(1962): accumulation during 'normal science', 96; progress during 'normal science' psychologised, 162; re-admission of progress in 'normal science', 165; apparent admission of advance, xlv; see also 'non-cumulative', 92; rejection of accumulation, 96, 108; 'evolutionary' claim, 172.

²⁴ Kuhn(1962): genesis of paradigms, xlii; introduction to paradigms, 11; on paradigms, 18; specialised meaning of paradigm, 23.

‘normal science’. However, as no theory is perfect, increasing pressure of anomalous results will eventually cause a crisis in the field of research; a period of ‘extraordinary science’ will follow resulting in a scientific revolution, and a subsequent paradigm shift. Kuhn claims that the process of moving from one paradigm to another necessarily invalidates old scientific knowledge, and replaces it with ‘incompatible’ or ‘incommensurate’ new scientific knowledge.²⁵ Of course it does not necessarily follow that the breakdown of one theory will mean that its successor will be incompatible rather than merely more general, nor that the imposition of an abstract superstructure on the entirety of scientific procedure should provide anything other than a vague descriptive framework.²⁶ However implausible it might seem, *The Structure of Scientific Revolutions* claims otherwise. Scientific knowledge, it is asserted, cannot accumulate because it is periodically destroyed by revolutions. Thus science is rendered relative, unstable, and uncertain: scientists are living in an illusory world of their own invention, their actions governed by deterministic epistemological forces of which they are completely unaware.²⁷

Towards the end of the Introduction to *Structure*, after outlining his theory, Kuhn reflects: ‘Undoubtedly, some readers will already have wondered if historical study can possibly effect the sort of conceptual transformation aimed at here’.²⁸ He admits that he may already have violated the ‘very influential contemporary distinction between “the context of discovery” and “the context of justification”’.²⁹ Rather than make an argument

²⁵ Kuhn(1962): incompatible, e.g. 6, 92; incommensurate, e.g. 4; psychological, 112; related assertions, 95-9; deterministic statement, ‘Let us...’, 103; invisible revolutions, 135; confusion, 148; ‘These examples ...’, 149; outright relativism, ‘have to relinquish’, 169.

²⁶ Kuhn(1962): denial of incremental knowledge, 7; more generally, 95-9.

²⁷ Kuhn(1962): illusory world, e.g. ‘These examples ...’, 149.

²⁸ Kuhn(1962), 8.

²⁹ Kuhn(1962), 8; see also Ladyman(2002), 74-7.

on this point, he ends a brief discussion with an appeal to the reader: ‘How could history of science fail to be a source of phenomena to which theories about knowledge may be legitimately asked to apply?’.³⁰ The reader is being asked to accept that the history of science is epistemologically equivalent to science itself. To put it another way, Kuhn is claiming that the historical evidence he presents is equivalent to scientific data, and that the conclusions drawn from these data have the robustness of scientific theory.³¹ This approach seems to privilege a specific reading of history, so at the very least one would expect a discussion, for instance, of the reliability of the evidence presented, the uncertainties involved, the potential bias of written sources, the completeness of the record, or the implications of the total loss of the oral discourse.³² Kuhn does not evaluate his own evidence in these terms, though scientists’ history of their own subject is criticised.³³ Throughout *Structure* what passes for evidence is simply presented as fact.³⁴ The treatment of evidence is actually much worse than this: it is re-contextualised – Kuhn’s history of science arrives pre-packaged in Kuhn-shaped boxes.³⁵ Paradigm theory is blatantly circular.³⁶ The taxonomy is back projected onto history: *Structure*’s narrative is constructed in terms of this putative taxonomy to the point of absurdity; for example, even Aristotle is equipped with a paradigm (in order that Galileo can later overthrow

³⁰ Kuhn(1962), 9.

³¹ Kuhn(1962): evidence as data, xliii, 9; analytical treatment of history, 43; ‘great precision’, 52; rigid formulation of evidence, 56-7; see also ‘characteristic of all discoveries’, 62; ‘entirely typical’, 75; argument as universal, ‘A similar...’, 100.

³² Kuhn(1962): treatment of evidence, e.g., awkward detail (rules) discarded, 43-6; ‘Philosophers...’, 76, if true should apply to paradigm theory; event described as ‘extremely rare’, when it could be the evidence which is rare, 84; overriding of missing data, 124. For a rounded criticism of Kuhn’s evidence which, however, backs away from systemic challenge, see Kenneth Williams and Constance Barsky ‘From Social Construction to Questions for Research’, in Labinger&Collins(2001), 142-155.

³³ E.g. Kuhn(1962), 20-1, 136.

³⁴ Kuhn(1962): evidence as fact, e.g., ‘paradigm rejection has been a historical fact’, 95.

³⁵ Kuhn(1962): pre-packaging: ‘The study of paradigms...’, 11; ‘fundamental unit’, 11; maturity and paradigms, 12; ‘Franklinian paradigm’, 18; theory imposed on evidence, 43-5, 52-3.

³⁶ Kuhn(1962): defence of circularity, 9; admission of circularity, 90; circular argument, ‘without commitment’, 100; further defence of circularity, 175.

it).³⁷ Kuhn's epistemologically privileged historiography strongly couples the evidence and the conclusions drawn – the theory must fit the evidence precisely. A woolly paradigm is no use because a woolly paradigm shift or a woolly revolution could not be an agent of epistemological transformation – in a woolly world it could never be clear what had actually changed. If a paradigm is woolly it becomes descriptive and not analytical as the theory requires. The direct and necessary consequence of Kuhn's historiography is that paradigms must be precise and uniquely definable. This need for precision pervades the book and explains the prescriptive and mechanical style of the narrative.³⁸ It is as if the history of science is not like other history, full of uncertainty and degrees of freedom, but is instead a series of analytical facts.³⁹ Kuhn has identified the underlying fallacy himself in his Introduction – *Structure* confuses descriptive and theoretical knowledge.

For the theory to work then, it is essential that paradigms can be defined simply and elegantly. Kuhn says confidently that 'Despite occasional ambiguities, the paradigms of a mature scientific community can be determined with relative ease'.⁴⁰ In fact they never do emerge in *Structure*, nor have they in any work since. An immediate problem is granularity – paradigms are assumed to apply at a sub-field level, for example electrical theory and mechanics in physics. This raises the issue of common principles, and Kuhn

³⁷ Kuhn(1962): back projection: 'usual development pattern', 12; also, 15; 'triumph', 17, 18-19; hindsight applied, 22, 23, 27, 61; see also 'paradigm rejection has been a historical fact', 95; Aristotle's paradigm: 11; attempt to justify, 16-17.

³⁸ Kuhn(1962): mechanical, 5-6; near deterministic: 7, 15, 93; see also 'paradigm forces scientists', 25; prescriptive, 47; mechanisation of evidence, 57-9; 'As a result of...', 127; mechanisation of scientists' activities, 143-4.

³⁹ Kuhn(1962): evidence as fact: 'ever since', 21; theory imposed on evidence, 43-5; see also 'entirely unequivocal', 67; historical determinism, 77, 78; 'This genetic aspect...', 93, 94; 'paradigm rejection has been a historical fact', 95; universalist claim: 'Other examples...', 106.

⁴⁰ Kuhn(1962), 43.

acknowledges that ‘global paradigms’ might exist.⁴¹ The conservation of energy could, for example, be identified as such a global paradigm across the physical sciences. By this reasoning there must a hierarchy of paradigms, and at the same time it must be possible for low-order paradigms to shift independently of the higher ones, although this seems to impose constraints on the permissible linkages between scientific theories. At one point Kuhn grants Newton’s laws a paradigm in their own right; at another he appears multiply to assign the laws as part of separate paradigms, implicitly acknowledging linkage between theories.⁴² Perhaps paradigms must shift in groups or parts of groups, but to say this means introducing another abstract entity, the group.⁴³ The problems compound: if a paradigm which depends on the conservation of energy has a revolution, then it must do so without losing the parts of the paradigm, which could be extensive, which depend on a global paradigm which needs to stay in place; but the revolution could not then produce an incommensurate result.⁴⁴

If mathematics is brought into the picture, any hope of defining the paradigms of science seems to be lost. Roger Penrose notes that the Irish mathematician William Hamilton (1805 – 1865) had developed a theory of classical mechanics, with a ‘hint of a relation between waves and particles’.⁴⁵ This hint, Penrose says, ‘and the form of the Hamilton equations themselves’, ‘was highly important in the later development of *quantum mechanics*’.⁴⁶ In fact, an operator known as the Hamiltonian function appears (in generalised form) in Schrodinger’s equation of quantum mechanics; moreover, similar

⁴¹ Kuhn(1962), 43-4.

⁴² Kuhn(1962): Newton is paradigm, 31; multiple assignment of theories to paradigms, 50; multiple assignment of Newton ‘stylistic’, 181; granularity, 49.

⁴³ Kuhn(1962): possibly overlapping paradigms, 50.

⁴⁴ The conservation of mass was generalised post-Einstein to the conservation of energy, an example of theory expansion; ‘historically implausibility’ of ‘logical inclusiveness’: Kuhn(1962), 98; denial, 7.

⁴⁵ Penrose(1989), 226.

⁴⁶ Penrose(1989), 226; italics original.

considerations apply to Maxwell's equations.⁴⁷ Ladyman reinforces this point: 'There are numerous examples of continuity in the mathematical structure of successive scientific theories'.⁴⁸ The presence of common mathematics throughout physical theory not only makes paradigm definition impossibly messy because it would need to model sub-theory level dependencies, it also seems to eliminate the possibility of an incommensurate paradigm shift altogether.⁴⁹ Kuhn admits in his 1969 Postscript to *Structure* that the actual paradigms are not clear in his original text; one sympathetic reader, he reports, noted that paradigm was used in at least twenty-two different ways.⁵⁰ In response, Kuhn introduces further complications, such as communities and disciplinary matrices, without apparently noticing that these seem more like descriptive terms, not the quasi-factual entity which a paradigm must be.⁵¹ A disciplinary-matrix shift hardly has the same ring as the original proposal, and in any case a change of historical description could not cause a scientific theory to be invalidated. Notwithstanding the declarations in *The Structure of Scientific Revolutions* that this or that is a paradigm, there is absolutely no case for a clean and universal taxonomy, but for paradigm theory to be successful it must be both those things. The taxonomy must be clean because theories of the type under discussion are precise and thus can only be invalidated precisely. The taxonomy must be universal because otherwise science would start accumulating knowledge again.

The problems multiply relentlessly as one works through *The Structure of Scientific Revolutions*. Scientists' reading and their publications during the so-called 'normal science' period are mechanically prescribed: they are 'usually either texts or

⁴⁷ Penrose(1989), 372-3.

⁴⁸ Ladyman(2014), 6.

⁴⁹ This is not an 'occasional ambiguity', see Kuhn(1962), 43.

⁵⁰ Kuhn(1962), 181.

⁵¹ Kuhn(1962), 176, 181.

retrospective reflections on one aspect or another of the scientific life'.⁵² Widespread evidence, however, of scientists' publications including, for example, Arthur Eddington and Max Born in Kuhn's time, or Richard Dawkins and Stephen Pinker more recently, show at the very least that the requirement for firm boundaries to 'normal science' cannot be met.⁵³ Moreover, the treatment of 'normal' scientists as uniquely conditioned by their pedagogy is ethically unsound.⁵⁴ The images of scientists behaving like brainwashed automata as if controlled by aliens or communists in the manner of 1950s science fiction would reward further study; so would the suggestions of behaviourist psychology in *Structure*.⁵⁵ The results of crude psychological experiments are pulled out of the hat to support Kuhn's assertions regarding scientists' 'normal' behaviour. One example is an experimental result on the perception of anomalies in a pack of cards, which purports to show that subjects have trouble detecting irregularities such as a black four of hearts; this is cut from the laboratory and pasted into scientists' real working lives.⁵⁶ Not only that, but results from experimental psychology are granted the same status as descriptive historical evidence, that is, absolute certainty. There is a vague admission that there might be paradigms in psychological science, but no discussion of the effect this might have on the status of the evidence.⁵⁷

⁵² Kuhn(1962), 20; narrowness of reading: 20; prescriptive, 50.

⁵³ Kuhn(1962): writing only addressed to professional colleagues, 20.

⁵⁴ Kuhn(1962): the scientific mind, 4-5; assignment of motives, 36-7; 'proper sort of addict', 38; psychologisation of scientists, 62, 64, 112; 'scientists' vision', 64; ducks/rabbits, 111-12; isolation of scientific communities, 163-4.

⁵⁵ Kuhn(1962): scientists' deterministic behaviour, 78-9, 80, 81, 85; 'largely unconscious', 86; 'most prevalent image', 87; scientists like 'typical character in Orwell's *1984*', 166.

⁵⁶ Kuhn(1962), 62-5, esp. 'wonderfully simple...', 64.

⁵⁷ Kuhn(1962), 121.

Structure includes a chapter on ‘invisible’ revolutions which stretches credulity.⁵⁸ Kuhn’s argument relies on the idea that scientists are more or less deliberately re-writing their own history; he says: ‘The depreciation of historical fact is deeply, and probably functionally, ingrained in the ideology of the scientific profession’.⁵⁹ Scientists, according to Kuhn, misconstrue history in their textbooks, and these ‘misconstructions render revolutions invisible’.⁶⁰ Kuhn’s excessive language with its suggestion of conspiracy obscures the fact that he has encountered a truism: theory building is a process of refinement based on hindsight. In Kuhn’s interpretation the developing meaning of, for example, the concept ‘element’, must imply there is a revolution each time the meaning develops.⁶¹ It seems necessary to believe that the science’s conceptual heuristic is composed of a series of static ideas which behave like mini-paradigms; these are duly destroyed by invisible revolutions, and replaced with a fresh mini-paradigm. It is as if, at the micro-structure level, science is locked in some sort of knowledge-neutral stasis. The idea of invisible revolutions reduces to absurdity. A much simpler explanation for the data Kuhn presents is that scientific ideas undergo a process of development based on accumulating experience and knowledge.

If it is necessary to abandon the search for scientific paradigms, except in loose and descriptive terms, then the theoretical claims of *The Structure of Scientific Revolutions* are lost. All that remains is induction – the possibility that if there has been a scientific revolution with catastrophic knowledge loss at least once, this might indicate that it could happen again. Ladyman refers to this theoretical remnant as ‘pessimistic

⁵⁸ Kuhn(1962), 135-42.

⁵⁹ Kuhn(1962), 138.

⁶⁰ Kuhn(1962), 139.

⁶¹ This is what his text implies: see Kuhn(1962), 141, see text starting ‘Boyle’s definition...’, and c.f. the wider context of the chapter, 141-2.

meta-induction', and discusses the difficulties of this position in the face of any reasonable stance on scientific realism.⁶² Kuhn presents three primary strands of evidence: the heuristics of eighteenth- and nineteenth-century physical science, the Copernican revolution, and Einstein's special relativity.⁶³ Possibly Kuhn's most important evidence is the rivalry in the 1770s between Priestley's theory of phlogiston and Lavoisier's theory of oxygen. Within *Structure*'s own terms it is necessary to accept that phlogiston was an accepted paradigm, not a school of thought in the pre-paradigm period.⁶⁴ Although the distinction seems simply to be a matter of convention, almost arbitrary, it serves a good illustration of the outlandishness of paradigm theory's claims. If phlogiston was pre-paradigm, then it can be abandoned without trouble, but if it was a paradigm then knowledge must be destroyed. However, even if a Kuhnian revolution is granted when the theory of phlogiston was overthrown, it is clear that there was a large net creation of knowledge, because Lavoisier paved the way for modern chemistry.

This highlights another problem with *Structure* – if knowledge is to be prevented from accumulating, then the amount of knowledge destroyed must be greater than or equal to the new knowledge gained. But Lavoisier's superior theory had the capacity for expansion and generalisation, so even if a Kuhnian scientific revolution occurred it still looks like scientific knowledge went on accumulating.⁶⁵ Priestly was one of the many dedicated researchers who helped bring into being science's great canon of discovery – Newton's laws, Carnot's thermodynamics, Maxwell's equations, the theory of Oxygen,

⁶² Ladyman(2014), 4; also Ladyman(2002), 230-1, 236-43.

⁶³ Kuhn(1962): emphasis on these strands, 6; assertion of Copernican paradigm change, 68.

⁶⁴ Kuhn(1962): admission of uncertainty, xliii; evidence of rival schools ignored, see 'hints from Priestly', 54; mechanistic discussion of period, 53-6; deterministic assignment of paradigms, 56.

⁶⁵ Kuhn(1962): denial of this, 'non-cumulative', 92; comment on Priestley's lost knowledge, 147-8; both acceptance and rejection of accumulation, 96.

and others – as often as not by being wrong. The heuristic approach, guided trial and error, is part of the scientific method, so abandoned theories are a necessary part of the development of correct ones. If induction is any guide, then the scientific heuristic, including the need to eliminate unproductive areas of research, tends towards the development of robust theories of great longevity. Theory change did clearly take place, especially during science's formative era, but any 'Kuhn-losses', if they exist at all when mathematical structure is taken into account, are dwarfed by knowledge gains.⁶⁶ In this light, science is restored as a conscious process, not one guided by unseen historical forces and unknown epistemological laws.

The Copernican revolution is surely a matter of knowledge foundation. Kuhn himself says that 'factors external to science played a particularly large role' in preserving the geocentric model of the universe.⁶⁷ It's worth noting that, in any case, structure is preserved to a first approximation across even the Copernican revolution.⁶⁸ Copernicus's discovery and also Darwin's were highly significant of course in ontological terms, but in both cases their impact was due to the challenge to non-scientific knowledge; the new theories were not, to anything like the same extent, revolutionary within science, even if science can be said to have existed within astronomy prior to Copernicus or in theoretical biology prior to Darwin.

Finally, there is the case of Einstein's special relativity. Consider the following two quotations. The first is from Kuhn:

⁶⁶ 'Kuhn-losses', see Ladyman(2014), 19.

⁶⁷ Kuhn(1962), 75.

⁶⁸ Kuhn(1962), 68; Ladyman(2014), 6.

The need to change the meaning of established and familiar concepts is central to the revolutionary impact of Einstein's theory ⁶⁹

The second is from Einstein's *Relativity*, a work which was in its fifteenth edition at the time Kuhn was writing.⁷⁰ Einstein's first mention of relativity in the following quotation refers specifically to the longstanding classical principle of relativity, which states, put loosely, that the laws of physics are the same irrespective of the speed and direction of travel.

in reality there is not the least incompatibility between the principle of relativity and the law of the propagation of light, and that by systematically holding fast to both these laws a logically rigid theory could be arrived at. This theory has been called the special theory of relativity ⁷¹

Kuhn is caught red handed in the act of imposing his theory's incommensurability requirement onto the evidence: in the first of the two quotes, the word 'generalise' would be more accurate than 'change', but would not imply knowledge loss. Einstein by contrast, with a striking voyage of discovery metaphor, is 'holding fast' to established principles of physics.⁷² This is no quibble over wording – Kuhn is unambiguous that Newton's and Einstein's theories are incompatible.⁷³ He says in a related passage: 'Einstein's theory can accepted only with the recognition that Newton's was wrong'.⁷⁴ No-one doubts that some things changed with special relativity, but it is an edge correction (of course an important one), and Einstein was right about continuity. The earth didn't have to change its orbit around the sun. What actually happened was theory

⁶⁹ Kuhn(1962), 102.

⁷⁰ Albert Einstein, *Relativity*, following 15th edn., (London: Folio, 2004), 25; Einstein(1920).

⁷¹ Einstein(1920), 25, italics original; precise statement of the principle, 17-20.

⁷² Metaphor, as translated.

⁷³ Kuhn(1962): Kuhn's defence of incompatibility, 94-9; dismissal of scientists' view, 'But, the objection continues...', 99.

⁷⁴ Kuhn(1962), 98-9; discussion of objections to this, 98-102.

expansion, not a Kuhnian paradigm shift.⁷⁵ Both old and new theories are mathematically united and Einstein's relativity is a securely established part of *classical* mechanics.⁷⁶ Any attempt to rescue paradigm theory would need to demonstrate that Newtonian knowledge had been irrevocably destroyed, and not simply built on, with the advent of special relativity. Even when the strange abstract forces are removed from *The Structure of Scientific Revolutions*, the argument for the pure relativism of scientific knowledge remains difficult to make by pessimistic meta-induction. It is more likely that once a scientific theory is established, we are stuck with it. Science does not process, as if on one of M. C. Escher's endless staircases, through a series of abstract structures which force it to destroy what it creates.

This argument is put forward to show that the case for the cultural relativism, or the social construction, of scientific knowledge is far from closed. There is no philosophical consensus on the arguments for and against scientific realism: Ladyman provides a concise summary in *Understanding the Philosophy of Science*.⁷⁷ Ironically, Kuhn's theory seems vulnerable to many of the arguments put forward by anti-realist philosophers. The theory seems underdetermined in that there is an alternative, and much simpler, explanation of the same evidence: the operation of the scientific method.⁷⁸ It is possible to argue that Kuhn's observations are theory-laden, and also that there is a need to believe in invisible entities.⁷⁹ The aim here, however, has been to make an evidence-based, rather than a philosophical argument to establish the materialist outlook of the thesis; the fact that there is no philosophical agreement on these matters means that in

⁷⁵ Kuhn(1962): denial of theory expansion, 7; more generally, 96-9.

⁷⁶ See e.g. Leonard Susskind and George Hrabovsky, *Classical Mechanics*, (London: Penguin, 2014), 1.

⁷⁷ Ladyman(2002).

⁷⁸ General discussion, e.g. Ladyman(2002), 162-95, esp. 162.

⁷⁹ General discussion, e.g. Ladyman(2002), 110-2, 185, 231.

interdisciplinary studies the texture of the arguments should be accepted, and the possibility of alternatives acknowledged. Ladyman comments: 'In later work, Kuhn sought to distance himself from extreme views which give no role to rationality in the progress of science'.⁸⁰ Retreat from philosophical disagreement is a sufficient basis for an interdisciplinary consensus within literature and science; individual positions can be taken without re-igniting the controversy which has done so much damage to the subject.

Wordsworth, the Democratic Intellect, and the Two Cultures

The foregoing discussion on *The Structure of Scientific Revolutions* has established, as noted, a basis on which this thesis can assert the materialism of science. Moving in this section to the discursive aspect of poetry and science, it is worthwhile, in order to develop a long view of the two cultures dispute, to start with a brief consideration of one of earliest and most open statements on poetry and science, that of William Wordsworth in the second version of the Preface to *Lyrical Ballads*, probably written between 1801 and 1802.⁸¹ Wordsworth's reflection on poetry and science seeks harmony while maintaining the distinction between the subjects, although the distinction is cast in terms which could be seen as unequal. The passage opens with the statement that poetry and science are both pleasurable forms of knowledge.⁸² Elaborating, Wordsworth writes that the knowledge of poetry, 'cleaves to us as a necessary part of our existence', while the knowledge of science is 'personal and individual', and lacks the 'habitual and direct sympathy', which connects us with our 'fellow-beings'.⁸³ Wordsworth seems to be

⁸⁰ Ladyman(2002), 121.

⁸¹ Owen&Smyser(1974), 112.

⁸² Owen&Smyser(1974), 140-1.

⁸³ Owen&Smyser(1974), 141.

saying that science is not, at least yet, a suitable subject for poetry; but he also accepts that this might change.⁸⁴ Shifting to a conditional future tense, Wordsworth writes: 'If the labours of Men of science should ever create any material revolution, direct or indirect, in our condition', then the poet 'will be at his side, carrying sensation into the midst of the objects of science itself'.⁸⁵ Then, he continues: 'The remotest discoveries of the Chemist, the Botanist, or Mineralogist, will be as proper objects of the Poet's art as any on which it can be employed'.⁸⁶ Wordsworth rounds to his subject with heady emotion: if science 'shall be ready to put on, as it were, a form of flesh and blood, the Poet will lend his divine spirit to aid the transfiguration', and 'the Being thus produced', will be welcome, 'as a dear and genuine inmate of the household of man'.⁸⁷ Wordsworth's unambiguous, yet also somewhat inconclusive, passage is the outcome of a productive discourse on poetry and science. As Owen and Smyser say, Wordsworth 'seems to be aware of the arguments of Humphry Davey in his *Introductory Discourse*', which was initially delivered as a lecture to the Royal Institution in January 1802.⁸⁸ The intellectual dynamics of Davey's *Discourse* and the way in which it impacted Wordsworth's thinking are discussed in a 1962 article by Roger Sharrock, 'The Chemist and the Poet'.⁸⁹

Wordsworth, and more especially his friend and collaborator Samuel Taylor Coleridge, had become acquainted with Humphrey Davey in Bristol in the early years of the nineteenth century. According to Sharrock, 'the young chemist seemed to his new poet-friends a fascinating figure who could talk their language, but who, because of his

⁸⁴ See also Owen&Smyser(1974), 181.

⁸⁵ Owen&Smyser(1974), 141.

⁸⁶ Owen&Smyser(1974), 141.

⁸⁷ Owen&Smyser(1974), 141.

⁸⁸ Owen&Smyser(1974), 112.

⁸⁹ Sharrock(1962).

chosen career, seemed to them in a certain fashion on the wrong side'.⁹⁰ Davey became a collaborator on the *Lyrical Ballads* project, for example, 'correcting Wordsworth's punctuation and proofs', prior to publication.⁹¹ Coleridge was present at Davey's presentation of the *Introductory Discourse* in 1802, reportedly commenting that the talk was 'full of poetry'.⁹² In his lecture, according to Sharrock, Davey both echoes the phraseology of the first edition of the Preface to the *Lyrical Ballads*, and, from within this framework, challenges his poet-friends' views on his own subject.⁹³ He argues that the study of chemistry is 'in no way divorced from the possibility of aesthetic satisfaction', and that chemistry may also 'solace the spirit and stimulate the imagination'.⁹⁴ Sharrock writes that 'Davey is prepared to defend chemistry on its own terms, not those laid down by Coleridge'.⁹⁵ By careful comparison of texts, Sharrock shows that the inclusion of the passage on science in Wordsworth's revised Preface was a response to the *Introductory Discourse*; Sharrock says, with the publication of the Preface, 'The debate continues, with the difference that now Wordsworth is replying to Davey'.⁹⁶

The Wordsworth-Davey debate on poetry and science, not only remained fraternal, but established positions were modified; this would have been impossible without political consensus between the participants. Wordsworth, Sharrock writes, 'could have felt nothing but whole-hearted agreement with the social attitude of the *Discourse*'.⁹⁷ Davey convinced Wordsworth that science could, 'knit together the classes

⁹⁰ Sharrock(1962), 63.

⁹¹ Sharrock(1962), 64.

⁹² Sharrock(1962), 65.

⁹³ Sharrock(1962), 67.

⁹⁴ Sharrock(1962), 66.

⁹⁵ Sharrock(1962), 67.

⁹⁶ Sharrock(1962), 69.

⁹⁷ Sharrock(1962), 72.

that compose society’, and could facilitate ‘social usefulness for all’.⁹⁸ Additional colour and support for this argument can be found in Mike Jay’s review of James Secord’s *Visions of Science* in the *LRB*, 20 November 2014.⁹⁹ It was a notable but brief moment of harmony. Richard Holmes, in his book *The Age of Wonder* (2008), charts the rise of ‘Romantic science’ through the nineteenth century, and the increasing sense that ‘discovery and invention brought new dread as well as new hope’.¹⁰⁰ In the 1880s, Matthew Arnold and T. H. Huxley, formally debated their quite opposed positions, though in ‘genteel’ terms which signify a still extant common fabric of belief.¹⁰¹ Attitudes hardened in the twentieth century, as seen, for example, in the early writing of the belief-bashing J. B. S. Haldane.¹⁰² I. A. Richards’s temperate response to Haldane’s *Daedalus*, with his acceptance that science could be a force for good, was an attempt to establish harmony in the hope of a liberal consensus.¹⁰³ That hope was subsequently smashed to pieces, famously, by F. R. Leavis. But a liberal consensus is not the only fabric of belief which can hold together a potentially divisive debate – a commitment to a philosophical outlook can do the same and is perhaps more secure.

In the Scottish academic tradition, as described in two works by the Scottish philosopher G. E. Davie, *The Democratic Intellect* (1961), and *The Crisis of the Democratic Intellect* (1986), the debate between the arts and sciences was more concerned with unity than division.¹⁰⁴ During the nineteenth and twentieth centuries,

⁹⁸ Sharrock(1962), 72.

⁹⁹ Mike Jay, ‘Like Cooking a Dumpling’, *LRB*, 20/11/2014; James Secord, *Visions of Science*, (Oxford: Oxford University Press, 2014).

¹⁰⁰ Richard Holmes, *The Age of Wonder*, (London: Harper Press, 2009), xv, xix.

¹⁰¹ Ortolano(2009), 6.

¹⁰² E.g. J. B. S. Haldane, *Callinicus, A Defence of Chemical Warfare*, (London: Kegan Paul, Trench, Trubner, 1925).

¹⁰³ Haldane(1923).

¹⁰⁴ Davie(1961); Davie(1986);

Davie argues, there was a ‘prolonged spiritual resistance’ in Scotland to the assimilation of its cherished generalist education system into the more specialist system dominant in England.¹⁰⁵ The generalist system meant that in Scotland there was a ‘tripartite alliance between philosophy, language and science’, where ‘philosophy was given the role of *primus inter pares*’.¹⁰⁶ The strength of this system is thrown into relief by those who criticised it. The Scottish critic John Campbell Shairp (1819 – 1885), according to Davie, feared that philosophy encouraged ‘a dangerous freedom of thought’, and advocated that ‘philosophy, if it was not to be excluded from the curriculum altogether, was to be converted into a mechanical, bookish drill’.¹⁰⁷ Central to the Scottish tradition was the Common Sense school of philosophy. Its leader Thomas Reid (1710 – 1796) thought, Davie comments, the great mistake of his contemporary Hume, ‘was a doctrinaire atomism which failed to see that knowledge from the start involves comparison, or, as he called it, judgment’.¹⁰⁸ A French admirer of Scottish philosophy, Theodore Jouffroy, said common sense is ‘obscurely implicit in all human beings’, and may be ‘presupposed as a point of agreement behind their philosophical and political differences’, which is ‘capable of being appealed to as a check on extremism’.¹⁰⁹

The freedom of the democratic intellect encouraged interdisciplinary thinking. John Burnet, Professor of Greek at St Andrews from 1892 to 1926, said that ‘if you are to locate disinterested general knowledge anywhere, you are to locate it in poetry’, and poetry ‘provides a kind of starting point for science’.¹¹⁰ This is far sighted. In 2002

¹⁰⁵ Davie(1961), xiii.

¹⁰⁶ Davie(1961), 17, 14; first among equals.

¹⁰⁷ Davie(1961), 62, 63.

¹⁰⁸ Davie(1961), 146.

¹⁰⁹ Davie(1961), 255.

¹¹⁰ Davie(1986), 20.

Ladyman wrote: 'If there is one thing which has been learned from the twentieth-century debates about scientific method it is that the generation of scientific theories is not, in general, a mechanical procedure, but a creative act'.¹¹¹ The Scottish tradition also encouraged self-awareness among scientists. The St Andrews's geo-scientist J. D. Forbes (1809-1868), according to the mid-twentieth-century philosopher Davie, argued that 'Bacon's account of the relation of experience to science was seriously misleading', and represented a 'superficial sort of empiricism'.¹¹² Forbes warned against 'Bacon and his projects for foolproof methods', and held that 'increasing scientific progress is inseparable from an increasing danger to science'.¹¹³ On similar ground, the physicist James Clerk Maxwell (1831-1879), argued for 'an abstractionist principle of knowledge involving comparison', which meant the 'union of the mathematical and the experimental', as opposed to 'single minded empiricism'.¹¹⁴

While interdisciplinary arguments were embedded in a common philosophical fabric which prevented breakdown, Davie charts the much more bitter disputes between the defenders of the tradition and those who wanted to assimilate the Scottish education system within the specialist system prevalent in England. James Hannay, editor of the *Edinburgh Courant* from 1860 to 1864, according to Davie, 'set himself to oppose the Northern ideal of democratic intellectualism'; Hannay advocated the principle of 'Blood and Culture', 'according to which a system of racial exclusiveness was presented as preferable to the anarchism of Scottish democracy', and held that 'the scheme of detailed classical scholarship', was 'incomparably superior to generalities of premature

¹¹¹ Ladyman(2002), 74.

¹¹² Davie(1961), 184.

¹¹³ Davie(1961), 184.

¹¹⁴ Davie(1961), 193, 195, 196.

intellectualism'.¹¹⁵ The roots of the catastrophic breakdown in intellectual fraternity known as the two cultures dispute can be found in Davie's characterisation of the English education system, where the common intellectual fabric was steadily eroded by specialisation.

The productive, although edgy, discourse on poetry and science in the Romantic era and nineteenth-century Scotland contrasts with the spectacular collapse of interdisciplinary discourse in the second half of the twentieth century. In his famous 'two cultures' lecture in 1959, C. P. Snow was calling for a new and science-led industrial revolution, for the benefit of Britain and the world.¹¹⁶ He claimed that science could overcome poverty and hunger.¹¹⁷ This is a play for a liberal consensus, but Snow felt it necessary to open his polemic by insulting literary academics. When he delivered his Rede Lecture, he was piqued by the fact that, for all their prowess and esteem, scientists were not seen as 'intellectual'; this word, Snow claimed, 'doesn't include Rutherford or Eddington or Dirac'.¹¹⁸ Speaking of Rutherford's comparison of himself to Shakespeare, Snow says: 'What is hard for the literary intellectuals to understand, imaginatively or intellectually, is that he was absolutely right'.¹¹⁹ Snow then becomes incendiary: naming 'Yeats, Pound, Wyndham Lewis', he asks 'Didn't the influence of all they represent bring Auschwitz that much closer?'.¹²⁰ He qualifies a little, saying 'literary persons were culpably slow to see' the connection between their views and what was to happen.¹²¹

Whatever one thinks of the politics of the named individuals, this is unconscionably

¹¹⁵ Davie(1961), 244.

¹¹⁶ Snow(1959), esp. section 3, 29-40.

¹¹⁷ Snow(1959), esp. section 4, 41-51.

¹¹⁸ Snow(1959), 4.

¹¹⁹ Snow(1959), 5.

¹²⁰ Snow(1959), 7.

¹²¹ Snow(1959), 8.

selective; as if there were no Nazi scientists, or no Manhattan Project.¹²² Nearly three years later, Leavis responded furiously in a Richmond Lecture entitled: *Two Cultures? The Significance of C. P. Snow*.¹²³ In vitriolic tones, Leavis made sure the division would be a lasting one. Snow 'is as intellectually undistinguished as it is possible to be', and he is 'in himself negligible'.¹²⁴ Snow, in turn, reconsidered the meaning of 'two cultures', in a 1963 article *The Two Cultures, A Second Look*.¹²⁵ He says 'in plain truth, either of our cultures, whether literary or scientific, only deserves the name of sub-culture'.¹²⁶ But the damage was done.

The centrality of politics to the terms of the debate is demonstrated in detail in a comprehensive 2009 study: *The Two Cultures Controversy*, by the historian Guy Ortolano.¹²⁷ Ortolano's study brings fresh perspective to an old issue: he analyses over-interpretations of the 'two cultures' saying that the 'arts-versus-science dichotomy does not begin to bear the explanatory burden that has been placed on it'.¹²⁸ He notes, for example, that the invective in Leavis's Richmond Lecture 'was not against Snow's proposals for science but his stature as a novelist'.¹²⁹ The 'two cultures' controversy has been an argument to which commentators have brought their pre-existing concerns, often taking licence from the strength of the original invective. Ortolano's analysis, and his portrayal of the cultural complexity of postwar Britain, is based on a 'revisionist

¹²² See, e.g., Robert Jungk, *Brighter than a Thousand Suns*, (San Diego: Harvest, 1986); Jungk(1958).

¹²³ F. R. Leavis, *Two Cultures, The Significance of CP Snow*, (London, Chatto & Windus, 1962), Leavis(1962).

¹²⁴ Leavis(1962), 10.

¹²⁵ Snow(1959), 53-100, originally published in the *TLS*, 25/10/1963.

¹²⁶ Snow(1959), 62.

¹²⁷ Ortolano(2009).

¹²⁸ Ortolano(2009), 4.

¹²⁹ Ortolano(2009), 4.

historiography'.¹³⁰ He rejects the idea that Britain was in economic decline in the 1950s and 1960s, though, of course, it was in imperial retreat.¹³¹ While many commentators 'believed Britain to be enduring a painful economic decline' Ortolano shifts attention to 'the indisputable phenomenon of cultural *declinism* – that is, to the emergence, workings, and manipulation of anxieties about decline'.¹³² This analytical strategy removes potential confusion about the protagonists' imprecise, changing, and sometimes contradictory positions, and shows instead the influences and pressures to which they responded. In the final section of the book Ortolano considers the respective fates and legacies of Snow and Leavis. He notes the fact that the two men had much belief in common. As regards their literary tastes, both reviled the Bloomsbury Group and Kingsley Amis.¹³³ In the Cold War politics of the day, 'they viewed the United States and the Soviet Union as essentially similar'; in other words, both were still attached to an older view of England. Both disliked the main political parties and the British New Left.¹³⁴ Both were against the 'permissive society', egalitarianism, and comprehensive education; and both defended elites – it was simply that their definition of the elite differed.¹³⁵ For all its symbolism in literature and science, the two cultures dispute presents a wholly inadequate view of British society. This was a bitter dispute between constituencies of the ruling class, a right-wing argument about whether traditional elites or forward-looking elites were preferred. The two cultures could be represented today by bitterness between the Tory back bench and the party's whigish leadership. It is most

¹³⁰ Ortolano(2009), 15.

¹³¹ Ortolano(2009), 12.

¹³² Ortolano(2009), 15; Ortolano's emphasis.

¹³³ Ortolano(2009), 249.

¹³⁴ Ortolano(2009), 249-50.

¹³⁵ Ortolano(2009), 250.

unfortunate that so much energy has been wasted on a petty argument over two equally unattractive political visions.

From I. A. Richards to Cognitive Poetics

An open interdisciplinary tradition, if short lived, can be identified in a work that stands, arguably, as the modern foundation of the subject of this thesis: I. A. Richards's *Science and Poetry* (1926).¹³⁶ Richards's eighty-three page essay provides many views of science, and also has the nature of a psychological investigation. *Science and Poetry's* most significant achievement was to popularise Richards earlier ground-breaking introduction of psychology into literary study in *Principles of Literary Criticism* (1924). *Science and Poetry* is also known for its classification of science into 'statements' which were verifiable, and poetry into 'pseudo-statements' which were not.¹³⁷ The idea, however, is fatally broken by Miroslav Holub in his poem 'Žito the magician', which contains a mathematical thus verifiable truth.¹³⁸ Nor do pseudo-statements withstand Louis MacNeice's mathematical precision in his poem 'Reflections'.¹³⁹ Another aspect of *Science and Poetry* is the fear of the advance of science, expressed in terms of 'Ages' and historical forces. In the opening remarks, Richards sees a watershed occurring in human affairs: much will be lost and the 'loss may be great without our knowing anything about it'.¹⁴⁰ Richards says humanity's place in the universe is precarious, our chances problematical, but science 'can enormously increase our chances if we make wise use of

¹³⁶ Richards(1926).

¹³⁷ Richards(1926), 55-61.

¹³⁸ Richards(1926), 57, 58; *CPMH*, 69.

¹³⁹ Louis MacNeice, *Collected Poems*, (London: Faber and Faber, 1979), 503; MacNeice(1979).

¹⁴⁰ Richards(1924), 2.

it'.¹⁴¹ It is distressing that similarly ambiguous and vaguely hopeful sentiments, without any analysis of power, are still being voiced. The astronomer Martin Rees, in his 2010 Reith Lecture, said: 'science, optimally applied, could offer immense benefits ... but it will present new threats'.¹⁴²

If Richards's hope was wishful, his fear was real. A crucial influence on *Science and Poetry* was Richards's fellow Cambridge Heretic, the pioneering biological scientist J. B. S. Haldane. Richards had noted earlier in *Principles of Literary Criticism*, in words which seem to underlie the introductory remarks in *Science and Poetry*, that 'as Mr Haldane supposes' an 'Age of Biology' will be introduced 'by a recognition on the part of many minds of their own nature' and this 'is certain to change their behaviour and outlook considerably'.¹⁴³ *Science and Poetry* was published in the wake of Haldane's successful *Daedalus* which expands on what an Age of Biology might look like.¹⁴⁴ Haldane's original lecture on the subject to the Heretics on 4th February 1923 was attended by C. K. Ogden, Richards's long-term friend and collaborator.¹⁴⁵ It was Ogden who urged the publication of *Daedalus*; it sold 15,000 copies in its first year and was in its seventh impression by 1926.¹⁴⁶ Most likely prefiguring Aldous Huxley's *Brave New World* (1932), *Daedalus* is a book of prophecies, and Richards's fear of an impending biological crisis is explained as eugenics via 'ectogenesis', or test-tube birth, becomes established. In one prophecy, Haldane, in a tone of mock promotion, describes some of

¹⁴¹ Richards(1926), 53.

¹⁴² Martin Rees, the Reith Lectures, 1/6/2010 to 22/6/2010; downloaded from BBC website 29/6/2010; Rees(2010), lecture 2, transcript, 13.

¹⁴³ Richards(1924), 62.

¹⁴⁴ Haldane(1923).

¹⁴⁵ Ronald Clarke, *JBS*, (London: Hodder and Stoughton, 1968), 70; Clarke(1968).

¹⁴⁶ Clarke(1968), 70.

the unexpected benefits of eugenics: the ‘increase in first-class music’ will be startling.¹⁴⁷

Haldane sums up: ‘no beliefs, no values, no institutions are safe’ from the advance of science.¹⁴⁸

Science and Poetry is probably a response to *Daedalus*. Richards’s quip about scientists ‘caught young and brought up in the laboratory’, and his comment that ‘men who might in other times have been poets are today in bio-chemical laboratories’, are likely to refer to Haldane.¹⁴⁹ Parts of the text of *Science and Poetry* are steeped in barely specified fears which can be traced to Haldane’s view of biology, such as the statement, when discussing the ‘neutralisation of nature’, that the result will be ‘a biological crisis’.¹⁵⁰ Again, Richards’s introductory remarks, for example: ‘the fairly near future is likely to see an almost complete reorganisation of our lives’, ‘Man is changing’, with a ‘suddenness that threatens us’, seem to refer to Haldane’s Age of Biology.¹⁵¹ Richards wanted to be saved from Haldane’s biological nightmare, but he had painted himself into a corner. He rejected the ‘Magical View’, ‘the belief in a world of Spirits and Powers which control events’, and, although he fears Haldane’s vision, he is compromised by accepting it; only poetry is left.¹⁵² To be fair, *Daedalus* is nuanced and the title is ironic in the context of the text, and no doubt Richards was aware of the boyish playful element, the shock tactics, and not least Haldane’s competitive brilliance. The significant issue for poetry and science is that Richards reacted but did not over-react, and he could put biology aside to explore psychology.

¹⁴⁷ Aldous Huxley, *Brave New World* (London: Vantage, 2007); Haldane(1923), 66.

¹⁴⁸ Haldane(1923), 87.

¹⁴⁹ Richards(1926), 63; Richards(1926), 50; see also Clarke(1968), 26.

¹⁵⁰ Richards(1926), Chapter V, 43-54; 54.

¹⁵¹ Richards(1926), 1.

¹⁵² Richards(1926), 49.

Principles of Literary Criticism is an ambitious and complex book which seeks to present a theory of poetry in thirty-five short chapters. Its purpose is to re-found aesthetics on the basis of psychology. Richards seeks to answer the questions: 'What gives the reading of a poem its value?' and 'How is this experience better than another?'¹⁵³ He is trying to find a basis in the mind for aesthetic values such as Truth, Beauty, Good, and morality. He says 'What is good or valuable' is the 'exercise of impulses and the satisfaction of their appetencies'; a good experience is when the impulses are 'fulfilled and successful'; he talks of 'organisation' and 'adjustment', without which 'value vanishes' since 'in a state of chaos important and trivial impulses alike are frustrated'.¹⁵⁴ A model is developed for impulses in terms of the psychological experience of reading a poem. Impulses are the 'weft of experience', interacting with the warp or 'the pre-existing systematic structure of the mind' which is itself an 'organised system of possible impulses'.¹⁵⁵ The impulses 'modify one another', and the ways in which this happens 'are the essential and fundamental things in any experience'.¹⁵⁶ *Principles of Literary Criticism*, however, really only contains the germs of ideas, as well as interesting though unrefined and undeveloped speculations.

In *Science and Poetry* Richards re-rendered his psychological model in the memorable 'compass needles' thought experiment. Suppose, Richards says, we carry a magnetic compass in the neighbourhood of a powerful magnet.¹⁵⁷ The needle waggles and comes to rest in a new direction depending on where we stand. Then suppose we carry an arrangement of many magnetic needles, and they can influence each other. Some

¹⁵³ Richards(1924), 1.

¹⁵⁴ Richards(1924), 44.

¹⁵⁵ Richards(1924), 95.

¹⁵⁶ Richards(1924), 95.

¹⁵⁷ Richards(1926), 15-16; paraphrase of Richards up to 'This new balanced position...'

may swing horizontally, some vertically, and some freely. As we move the perturbations will be very complicated due to action of the needles upon each other, and even more so under the influence of the powerful external magnet. For every position in which we rest, however, there will be a final position in which the needles also come to rest, although even the slightest movement will set the needles wagging again. This is the mind under the influence of a complex disturbance – the mind re-arranges itself, and finally, perhaps much later, regains equilibrium. This new balanced position of the needles, this response to stimulus, I take to represent a mental imprint, the final experience resulting from a poem entering one's mind. The stronger the engagement with the poem, the greater the disturbance, the more our internal machinery is altered, the more one learns. The return to equilibrium is crucial to Richards's thinking and represents satisfaction. The compass needle metaphor is an analogue model of poetic affect: the disturbance and the quality of the resulting experience are proportional to the perceived complexity or intensity, and how fully one absorbs the material being read. Richards's mental model is both simple and intricate, and also surprisingly free of abstractions; it is a rare example of successful theoretical poetry and science, and serves to hold open for further development Richards's idea of psychological poetic affect.

Richards, however, did not develop his ideas; he seemed unsure how to respond to criticism, or even to his own innovations. In the Introduction to the 1970 third edition of his popular work, now re-titled *Poetries and Sciences*, Richards says of his first edition: 'Soon after its appearance I took a dislike to it without being very sure why'.¹⁵⁸ He continues: 'What seemed to me its best and most clearly stated points were, I found,

¹⁵⁸ Richards(1970), 7.

understood in ways which turned them into indefensible nonsense'.¹⁵⁹ But as John Paul Russo, Richards's biographer, comments in his earlier Introduction to Richards's essays, Richards's psychology is 'something like a heuristic model rather than a belief rigidly adhered to' – and as is evident in the notes to *Poetries and Sciences*, Richards was frustrated at being boxed into dogmatic positions.¹⁶⁰ The critical domain was not comfortable with the open style of argument which Richards had found: he paid the price for the audacity of introducing scientific ideas into literary criticism. His friend T. S. Eliot said of *Principles of Literary Criticism* that it was a 'milestone, though not altogether a satisfactory one'.¹⁶¹ Eliot mocked Richards's idea of Good as 'Efficiency – a perfectly working mental Roneo Steel Cabinet System'.¹⁶² And of the Arnoldian idea in *Science and Poetry* that poetry can save us, Eliot said it was like saying 'the wall-paper will save us when the walls have crumbled'.¹⁶³ In 1935 Richards was castigated by F. R. Leavis for his 'pseudo scientific pseudo-psychological ambiance and Benthamite approach to Coleridge'.¹⁶⁴ Later the New Critics W. K. Wimsatt and Monroe Beardsley introduced the 'iron law' of the 'affective fallacy' in direct reaction to Richards's view that a poem can be judged by the intensity of its psychological effect.¹⁶⁵ M. H. Abrams describes the affective fallacy: the result is that the poem, as an object of critical judgement, tends to disappear, and this ends in impressionism and relativism.¹⁶⁶ Abrams adds that Beardsley later modified his claim because critical evaluation cannot be done at

¹⁵⁹ Richards(1970), 7.

¹⁶⁰ John Paul Russo (ed.), *I. A. Richards, Complementarities, Uncollected Essays*, (Manchester: Carcanet, 1977), xix; Russo(1970); Richards(1970), 85-92.

¹⁶¹ Eliot cited in John Paul Russo, *I. A. Richards*, (London: Routledge, 1989), 194; Russo(1989).

¹⁶² Eliot cited in Russo(1989), 194.

¹⁶³ Richards(1926), 82; Eliot cited in Russo(1989), 194.

¹⁶⁴ Leavis cited in Russo(1989), 200.

¹⁶⁵ Russo(1989), 545; M. H. Abrams, *A Glossary of Literary Terms*, 8th edn., (Boston: Thomson Wadsworth, 2005), 5; Abrams(2005).

¹⁶⁶ Abrams(2005), 5.

all if perceived effects are ruled out.¹⁶⁷ Richards's ideas were hardly given a chance.

Russo says 'After the 1930s Richards came to bear two reputations: one for scientism and another for its repudiation'.¹⁶⁸

I believe it is now possible to see Richards's work as foundational, even though it was both over-ambitious and unfinished. His legacy is surely cognitive poetics. The theorist Ruven Tsur draws a careful line between what is doable and what is not in his 2008 *Towards a Theory of Cognitive Poetics*. His approach is measured: he says 'the theories and models of Cognitive Poetics are related to specific texts *via* extensive analyses in terms of more traditional approaches'.¹⁶⁹ In a strikingly Richards-like formulation he says 'poetic processes' need to be described in three respects: 'the normal cognitive process; some kind of modification or disturbance of these processes; and their reorganisation'.¹⁷⁰ He characterises poetry as attempting to overcome the limitations of human cognition, such as the difficulty of thinking of things we don't have names for.¹⁷¹ He develops a mental model of high and low categorisation of information, arguing that 'intuition relies on information that escapes categorisation', and in this way 'poetry capitalises on disturbance or delay' in our cognitive processes.¹⁷² One of Tsur's frameworks is a multi-level view of speechmaking, credited to Michael Polanyi, with voice production at the lowest level, moving through levels which 'manage' vocabulary and grammar.¹⁷³ This type of layers-of-abstraction model allows consideration of different kinds of delay within the cognitive process, as in the familiar tip-of-the-tongue

¹⁶⁷ Abrams(2005), 5.

¹⁶⁸ Russo(1989), 210.

¹⁶⁹ Tsur(2008), 547; Tsur's emphasis.

¹⁷⁰ Tsur(2008), 4-5.

¹⁷¹ Tsur(2008), 20.

¹⁷² Tsur(2008), 20, 25.

¹⁷³ Tsur(2008), 3.

phenomenon, when our brain refuses to provide the word we know we want to say. As long as cognitive processes work they remain unnoticed, but when they fail, ‘the failure itself may have a unique conscious quality’, ‘which may be exploited for aesthetic purposes’.¹⁷⁴ He characterises the tip-of-the-tongue effect as an ‘intensely active gap’ in our consciousness, which is vague and formless but definite – a state of ‘unfulfilled perceptual readiness’ the inner aspect of which is an affect.¹⁷⁵ Thus reading a text which manipulates a ‘fluid mass’ of low or uncategorised information renders, due to delay, into our consciousness a specific cognitive process, or retrieval device, which can be interpreted as a feeling.¹⁷⁶ Interpreting Tsur: when we read a poetic text, in addition to perception of meaning, certain literary devices can introduce cognitive delay. This in effect foregrounds a cognitive process, placing the process, as well as the perceived meaning in our consciousness, thus adding dimensions to our cognition. Tsur continues, with Richards-like terms, to discuss manipulation of ‘attitudes’, ‘feelings’, and ‘affects’; these he relates, via cognitive process or devices, to ‘values’.¹⁷⁷ Tsur justifies the link to ‘values’ by saying that ‘Values have been defined as devices that direct human activities, in the form of attitudes and affects’, (supporting this with an anthropological study): ‘values are a complex association of symbol and affect – that is, of representation of states of affairs associated with feelings and emotions’.¹⁷⁸ Thus Tsur claims for cognitive poetics ‘that it can bridge the apparently hopeless gap between human values and the

¹⁷⁴ Tsur(2008), 8.

¹⁷⁵ Tsur(2008), 18-19.

¹⁷⁶ Tsur(2008), 19.

¹⁷⁷ Tsur(2008), 18-19.

¹⁷⁸ Tsur(2008), 19.

stylistic and poetic devices that otherwise would be considered trivial from the human point of view'.¹⁷⁹

The fingerprint of Richards is evident, and a significant advance is made by the addition of cognitive process to the older theory. However, it should be asked if Tsur's theory suffers from the same objection – that these 'attitudes' and 'processes' remain notional, and are somehow without roots in a more concrete view of the mind. It feels like something is missing. The inclusion of a theory such as conceptual semantics, popularised by Stephen Pinker, might provide foundation.¹⁸⁰ Pinker argues that the concepts behind language seem to be organised into 'basic conceptual distinctions which assemble themselves into a scaffolding of meaning, which has hooks here and there on which to hang images, sounds, emotions, mental movies, and the other contents of consciousness'.¹⁸¹ Pinker's model is more static, at first sight, than Richards's compass needles, but there is a suggestive resemblance. Pinker enriches the theory by inclusion of Lakoff and Johnson's theory of conceptual metaphors.¹⁸² (Note that Michael Whitworth discusses certain limitations of Lakoff and Johnson's theory in *Einstein's Wake*).¹⁸³ Conceptual metaphors seem to loosen any rigidity in conceptual semantics, allowing a sort of slippage of meaning between what might otherwise be seen as fixed semantic entities, and offer an explanation of the immense variety of ways in which we construe the world. Cognitive poetics research is divided, however, according to Peter Stockwell, over how to address Chomsky's theory of innate syntax, which underwrites the work of

¹⁷⁹ Tsur(2008), 19.

¹⁸⁰ Stephen Pinker, *The Stuff of Thought*, (London: Penguin, 2008); Pinker(2007).

¹⁸¹ Pinker(2007), 82.

¹⁸² George Lakoff and Mark Johnson, *Metaphors we Live By*, (Chicago: University of Chicago Press, 2003).

¹⁸³ Whitworth(2001), 10-15.

Pinker and others in his field.¹⁸⁴ It's worth noting briefly that Chomsky's and Pinker's work is being challenged by a mounting body of linguistic evidence, according to Vyvyan Evans's 2014, *The Language Myth*.¹⁸⁵ Evan's alternative hypothesis though, which also seems to include conceptual metaphors, is not yet articulated fully enough for it to be a replacement for Chomsky's universal grammar and Pinker's psycholinguistics.¹⁸⁶

Richards was speculating in *Principles of Literary Criticism*, and left his work unfinished: but there are reasonable intuitive grounds for believing that our emotional response to poetry, the 'truth effect', may arise in some way from innate responses. And cognitive poetics, perhaps with the addition of semantic structure, might help to develop an understanding of poetic knowledge, a concept which Robert Crawford has suggested as a means to discuss science in the work of Hugh MacDiarmid and other poets.¹⁸⁷ It can be reasonably claimed that Richards's ideas have lasting value, and given *Science and Poetry*'s pioneering interdisciplinary approach, his work should also be seen as pedagogically relevant for literature and science.

The Creative Misreading of Science

A position with respect to the interdisciplinary study of poetry and science has now been put forward. The firm challenge to *The Structure of Scientific Revolutions* has established the scientific materialist outlook in this thesis; this is complemented by the desire to

¹⁸⁴ Peter Stockwell, *Cognitive Poetics*, (Abingdon: Routledge, 2009), 9; Stockwell(2002).

¹⁸⁵ Vyvyan Evans, *The Language Myth*, (Cambridge: Cambridge University Press, 2014); Evans(2014); see also Paterson(2015).

¹⁸⁶ Evans(2014), 180-3.

¹⁸⁷ See Robert Crawford, 'The glow-worm's 96 per cent efficiency: Hugh MacDiarmid's Poetry of Knowledge', *Proceedings of the British Academy*, 87; Crawford(1995).

proceed within the confines of a balanced position where idealist views of science are seen to have been challenged. The interdiscipline has also been characterised in terms of three well-known discourses, and there has been a focus on still-active efforts to discover a common theoretical approach to poetry and science. The thesis now turns to the detailed study of science in poetry, in particular four case studies; as a prelude to this, the chapter ends with a brief overview of aspects of the mysterious process whereby materialist science is transformed into poetry. It should be said at the outset that the appropriation of science is risky for a poet – success is by no means guaranteed. Perhaps if science in poetry achieves the same level of conceptualisation as the other elements of a poem, the result is likely to be on the successful side of the scale; if the science seems dis-harmonious in the poem or appears to be misunderstood, failure might be more likely, though there is a fine line between putative failure and a potential poetic exploration of disharmony or misunderstanding. Such is the diversity of the means by which successful science in poetry may be achieved that there can be no universal theory. One might expect at first sight, for example, the transformation from science to poetry to be a one-way process: it should not be possible to regain the original science by reverse-engineering a poem – but this wouldn't necessarily hold for Hugh MacDiarmid's poetry of fact.

If a range of ways of thinking about science in poetry is necessary, one approach is quite helpful, especially for Judith Wright's poetic science, but also at times for that of MacDiarmid and Morgan: the creative misreading of science. To arrive at this I have cherry-picked, and changed, a central idea behind Harold Bloom's *The Anxiety of*

Influence (1973).¹⁸⁸ It is understood that within literary criticism, Bloom's theory is far from widely accepted, even strongly rejected; however, surely within the highly restricted domain of poetry and science (which Bloom did not address), a bare-bones extraction from his work can be justified. The idea, in brief, is that the successful poet of science must overthrow the materialist discipline in a similar manner to a poet overthrowing their influential precursor. The creative misreading of science thus insists on the distinction between poetry and science, and at the same time suggests that one successful approach for the poet of science is to abolish the distinction. In this situation there can be no reverse-engineering: the science has been stripped of its theoretical power, it has become the poet's idea, a mythological presence in a poem, vying for attention with other poetic tropes.

Briefly looking into *The Anxiety of Influence*, to give a sense of the tone of this work, Bloom identifies poetic influence as a branch of pataphysics, a term invented by the French absurdist Alfred Jarry, to mean the science of imaginary solutions.¹⁸⁹ The poet's creative revisionism necessarily involves the 'hapless re-creation of errors' as the original's 'stationing context ... is reseen, and shaped into the visionary'.¹⁹⁰ This is 'an act of vision [which] determines a particular law'; apparent absurdity must be accepted – poetic influence is 'absurdity of the highest mode, the apocalyptic absurdity of Jarry, or of Blake's entire enterprise'.¹⁹¹ Bloom's 'splendidly horrible paradox' of influence is secured on this basis: 'the new poet *himself* determines the precursor's *particular law*'.¹⁹²

¹⁸⁸ Harold Bloom, *The Anxiety of Influence*, 2nd edn., (New York: Oxford University Press, 1997); Bloom(1973).

¹⁸⁹ Bloom(1973), 42.

¹⁹⁰ Bloom(1973), 42.

¹⁹¹ Bloom(1973), 42-3.

¹⁹² Bloom(1973), 42-3; Bloom's emphasis.

This remarkable transition of ideas is about the struggle for power and the attendant risk. In terms relevant to this thesis, the poet of science must shift from real to imaginary solutions; the poet risks absurdity – the price of ownership – but absurdity can equate to high poetic vision. The poet re-visions science and makes it subservient to poet’s own laws, and in doing so *the poet declares the laws of science in the poem*.

It’s worth a short discussion of a poem where the poet appears to declare a law of science, J. H. Prynne’s ‘The *Plant Time Manifold* Transcripts’ (*PTM*).¹⁹³ This poem, with its notable opening line: ‘1st April 1972’, creates imaginary science and risks outright absurdity.¹⁹⁴ *PTM* is the putative transcript of a scientific conference where the protagonists engage at cross purposes: the reader is teased by swings between apparently cogent science, and what looks like a barrage of meaningless jargon. The phrase: ‘Sleep movements in the common bean seedling (leaf folding) are in phase with diurnal light-dark rhythms...’, for example, is meaningful; whereas: ‘The genetic epoch $G(t) = 0$ initiates a determined cytochronology, because almost at once the swarm of positive velocities branch by means of differential acceleration’, is not.¹⁹⁵ At times the *PTM* appears to be discussing a genuine scientific hypothesis, a sort of fusion between relativity and botany. This reading is given by Justin Katko (supported by research in the Ed Dorn archive); Katko says: ‘The basic proposition of the *plant time* hypothesis is that there exists a form of temporality specific to all plants, wherein the plant’s upper half

¹⁹³ J. H. Prynne, *Poems*, (Tarsset: Bloodaxe, 2005), 233-42; Prynne(2005).

¹⁹⁴ Prynne(2005); 234.

¹⁹⁵ Prynne(2005), 234.

(the stem) moves *forward* in time, and the plant's lower half (the root) moves *backward* in time'.¹⁹⁶

The *PTM* can be classed as creative misreading because of what seems like a semi-serious attempt to fold two scientific theories together for an entirely poetic purpose. But regarding its success as a poem, a number of objections could be made. The poem is clearly playful, and scientific obfuscation is a fair target for parody; but regarding obfuscation, there is no sense in the poem of reflexive irony in the context of Prynne's wider work. The likely presence of in-jokes, obscure to the reader, indicated by phrases such as 'vernal interbeen', and the general impenetrability of the discourse presented, discourages the reader from attempting to distinguish any serious science from the gibberish.¹⁹⁷ And because the majority of the scientific material in the poem reads like gibberish (at least in the poem's context), the poem does not sit on the tantalising interface between the serious and the ridiculous, fatally undermining (for me) any claim to parody the poem might have. Indeed, the parody backfires: one is left with the uncomfortable feeling that the *PTM* is simply frivolous, an un-self-aware and failed attempt to poke fun at science.

The creative misreading of science works best when the appropriated material is stripped of its original theoretical power, then re-imagined so that the original remains recognisable; theoretical power remains, but is transformed to poetic power. A good example, discussed in detail later, is Edwin Morgan's careful folding together of two interpretations of Heisenberg's Uncertainty Principle (Schrödinger's and Heisenberg's

¹⁹⁶ Justin Katko, 'Relativistic Phytosophy: Towards a Commentary on "The Plant Time Manifold Transcripts"', <http://solutioperfecta.files.wordpress.com/2011/10/g2-katko.pdf>, printed, 02/02/2011, checked 22/06/2014; italics original.

¹⁹⁷ Prynne(2005), 241.

own) to poetic effect in ‘Memories of Earth’.¹⁹⁸ Creative misreading is not like cherry picking, or transposition into imagery, or metaphor (not that any of these techniques are necessarily wrong or inferior, they are simply different) in that creative misreading must involve a struggle for power which in turn requires a detailed level of comprehension of the original. Creative misreading thus focusses attention firmly on the strength of the artistic creation – if successful, the poet using appropriated science is only subject to aesthetic judgement – and to a reasonable extent this renders the poet’s art immune to the changing relevance or even minor errors in the alien material they have appropriated.

¹⁹⁸ *CPEM*, 330-40.

II: HUGH MACDIARMID'S RADICAL INTEGRATION OF POETRY AND SCIENCE

Now that a shape to the subject of poetry and science has been outlined, the remainder of the thesis focuses on science in the oeuvres of four twentieth-century poets. Hugh MacDiarmid (1892 – 1978), the first of the four chosen poets, was one of the founders of the National Party of Scotland, a forerunner of the Scottish National Party, as well as a member of the Communist Party.¹ MacDiarmid was also an important figure in the Scottish literary revival. His enormous poetic canon falls broadly into two parts: the early lyrical verse in Scots, and the later epic poetry in English. For a non-Scot, a good introduction to his Scots verse is to listen to one of the extant recordings of MacDiarmid's poetry readings.² There is a cassette in the National Library of Scotland (NLS) of an electrifying performance in Greenwich Village, New York, in 1969, where Norman MacCaig introduced an evening of poetry and Scottish nationalism. It is MacDiarmid's late work in English, which has its roots in the time he lived on the Shetland island of Whalsay (1933 – 1941), which is the subject of this chapter.

MacDiarmid's late work must be considered as a single, potentially endless, text. Robert Crawford notes that reading 'MacDiarmid's late poetry of knowledge' is like 'surfing on the Internet or moving on impulse through a vast database or hypertext system'.³ MacDiarmid writes in his autobiography *Lucky Poet*: 'The kind of poetry I want / Is poems *de longue haleine* – far too long / To be practicable for any existing

¹ Alan Bold, *MacDiarmid, A Critical Biography*, (London: John Murray, 1988), 231; Bold(1988).

² NLS item number 4166145, shelfmark Tur.1139; cassette recording: *The Scotland of Hugh MacDiarmid*, live recordings from Apr. 1967 and Feb. 1968. NLS item number 3445067, shelfmark Cas.75(30); cassette recording labelled: *MacDiarmid Poetry Scots English*, live recordings of two performances at the YMCA New York on 4 May 1969, introduced by Norman MacCaig.

³ Crawford(1995), 182.

medium'.⁴ Individual poems do sometimes emerge from the vast assembly of fragmented, overlapping, and apparently unstructured text. The appearance of strongly defined poems, such as 'On a Raised Beach', can be visualised as a sculpted mountain range rising from a surrounding plane on which are scattered the abandoned and surplus boulders of thought.⁵ More generally, the text sometimes feels like uncoalesced pre-poetry, and MacDiarmid's late work can quite genuinely be read with pleasure by selecting one's favourite passages and gathering them into a reader-defined poem, a property which resonates with Crawford's observation. If MacDiarmid had had a trusted editor, as Eliot had Pound, a more conventionally structured late corpus might have emerged; this giant text stands, however, as a never-ending work in progress, a record of thoughts as they happened, held in place and given literary substance by the force of MacDiarmid's very considerable personality.

Before engaging with MacDiarmid's poetic science in detail, it is useful to outline the arguments which are to be made, and then to look briefly at a number of early, pre-mature, references to science in the poet's work. MacDiarmid's late work, it is argued, is radically integrated in the sense that the apparently discrete poems which comprise it are, with some exceptions, almost arbitrary physical constructions, or to a fair approximation, labels which mark divisions in the greater text. It is possible, however, to find structure at more abstract levels – *The Kind of Poetry I Want* is one such abstract structure, a sort of formula for bringing together sections of text. Within MacDiarmid's text assembly there is also a radical integration of poetry and science. The amount of science in

⁴ Hugh MacDiarmid, *Lucky Poet*, (Manchester: Carcanet, 1994), 130; *LP; de longue haleine*, of long breath; see also W. N. Herbert, *To Circumjack MacDiarmid*, (Oxford: Clarendon, 1992), 158; Herbert(1992).

⁵ *CPHMD*, 422-33.

MacDiarmid's late poetry is considerable, and varies from reportage of scientific theories or facts through allegorised science to creative misreading. It is also possible to associate certain modes of thought, such as the collection and classification of literature in *In Memoriam James Joyce*, with science. However, science retains its individuality in MacDiarmid's integration, and poetry and science do not become indistinct or collapse into one another. As Michael Whitworth says in his essay 'Science in MacDiarmid's Later Poetry', 'MacDiarmid's achievement is to create striking poems from scientific materials while allowing the scientific text a degree of autonomy'.⁶ The science in MacDiarmid's late poetry is constantly probed, worked through, and sometimes turned on its head, and the actual degree of autonomy of any instance of science varies. The individuality of science, as Whitworth suggests, remains; but the science is under MacDiarmid's poetic control as it is pressed to service in so many different ways that the entire late work is unthinkable without it.

MacDiarmid famously called, in *Lucky Poet*, for 'a poetry of fact'.⁷ It is best to start by abandoning any association of 'facts' with Gradgrindian crassness. Miroslav Holub's scrutiny of material statements, and their interaction with language, power, and ideology, discussed in Chapter V, is a far richer perspective. It is useful to consider *Lucky Poet*, MacDiarmid's poetry-filled, optimistic, frustrating, self-aggrandising though passionately honest autobiography, as an integral part of the late corpus. MacDiarmid writes in *Lucky Poet*: 'The programme for poetry I advocate is, in Walt Whitman's words: "To conform with and build on the concrete realities of the universe furnished by

⁶ Michael Whitworth, 'Science in MacDiarmid's Later Poetry' in Scott Lyall and Margery Palmer McCulloch, (eds.), *The Edinburgh Companion to Hugh MacDiarmid*, (Edinburgh, Edinburgh University Press, 2011), 97-110, 106; Whitworth(2011).

⁷ *LP*, xxxiii.

science, and henceforth the only irrefragable basis for anything, verse included”⁸. Grand sentiments aside, it is not difficult to find more nuanced thinking. The late work contains a repeated contra-Keatsian theme that science enhances the appreciation of nature, but MacDiarmid’s response to Keats is always open. MacDiarmid additionally, creatively engaging with the work of the idealist philosopher Lev Shestov, subjected facts to poetic scrutiny. MacDiarmid writes of ‘Shestov, my master’.⁹ Shestov says: ‘The “facts” themselves are no use to us. If we have remarked that a stone is warmed by the sun, that a piece of wood floats on water, that a mouthful of water quenches thirst, what can we do with such observations?’¹⁰ This is a great distance from MacDiarmid’s ‘anti-God, anti-all supernaturalism’ materialist stance.¹¹ The way in which this apparent gap is transformed into a poetic unity of thought is discussed in the first sub-section of this chapter, ‘Materialism and Idealism in “On a Raised Beach”’. The second sub-section of the chapter examines the role of science, the role of socialism, and their mutual embedding in a *Finnegans Wake*-like marshalling of language and literature in one of the monuments of the late corpus, *In Memoriam James Joyce*. The third and final sub-section brings the argument for radical integration of poetry and science together with a structural analysis of MacDiarmid’s late work.

MacDiarmid’s use of science in ‘On a Raised Beach’ and *In Memoriam James Joyce* is confident and mature. But several earlier poems, predominantly in Scots, show MacDiarmid introducing science in a much more tentative manner. The development of

⁸ *LP*, 187; from Preface to *November Boughs*, 1888, see Walt Whitman, *The Leaves of Grass, Deathbed Edition*, (New York: Quality Paperback Book Club, 1992), 413.

⁹ *LP*, 163.

¹⁰ Lev Shestov, *In Job’s Balances*, (Athens: Ohio University Press, 1975); Shestov(1932), 24.

¹¹ Alan Bold, (ed.), *The Letters of Hugh MacDiarmid*, (London: Hamish Hamilton, 1984), 487; letter to the composer F. G. Scott (1880 – 1958) dated 15/10/41; Bold(1984).

MacDiarmid's use of science begins (roughly) in the collection *Scots Unbound*, published in 1932.¹² 'Depth and the Chthonian Image' uses scientific imagery in lines such as, 'the lang / Process o' metamorphosis in rock', and 'Brownian movements swarmin' to his een'; MacDiarmid seems to shift between awe and critical commentary on science: 'The curve of sae-ca'd knowledge science has made [...]', is tempered a little with the phrase 'heidstrang science'; and there is also what seems to be a warning against the rise of science: 'Portentous prison-hooses o' fause thocht we see / "Science" big heicher daily'.¹³ 'The Oon Olympian' simply comments: 'The quantum theory's dung to blauds / The classic picture o' the world'.¹⁴ In 'Tam o' the Wilds and the Many-Faced Mystery' MacDiarmid, edging towards later themes, says ironically 'Tho' botany, ichthyology, and a' the rest / Are no' for the workin' man ye ken'.¹⁵ In 'One Thing Sure' the poet, who might have been talking too much about science, is able to set it aside :

No matter how science develops, my dear,
 One thing is perfectly sure
 Most joy will still come from forgetting it all,
 Sweet nothings will always endure.¹⁶

The potential liberating power of science is a theme in 'The Belly-Grip', but in general the use of science is peripheral until 'Thalamus', published in 1934.¹⁷ 'Thalamus' is a quintessentially science poem which doesn't celebrate science but incorporates the fact of science in dialectic tension with the poet's other concerns. One aspect of that tension is between old and new. The poem opens:

¹² *CPHMD*, 331-62.

¹³ *CPHMD*, 346-53, 348, 349, 352.

¹⁴ *CPHMD*, 354-61, 360.

¹⁵ *CPHMD*, 368-79, 372.

¹⁶ *CPHMD*, 379.

¹⁷ *CPHMD*, 394-6, 411-13.

Busy as any man in those centres of the brain
 Where consciousness flourishes I yet cherish more
 The older, darker, less studied regions
 Of cranial anatomy [...] ¹⁸

There is a declarative part of the poem: ‘Let fools think science has supplanted poetry’.¹⁹

The final three stanzas effect a remarkable transition of ideas. Almost appearing to celebrate the scientific knowledge of the thalamus, this is quickly diminished: ‘As the corpora geniculata [knotty bodies] before any star’.²⁰ The transition continues: ‘O misguided science pursuing / All tasks but the greatest of all’; there is an image of poetry, ‘a glorious unseen waterfall’, but water drives the ‘mills of Satan’, the ‘treadmills of rationalising’; and the poem ends with an image of internal thought, all too easily dismissed ‘As naught but vain dreams’.²¹ ‘Thalamus’ seems to move part way towards Shestov’s ideal, expressed in *In Job’s Balances*: ‘We have our science, and science has given us a great deal; we should rest content with what we have’ and ‘lull to sleep the restless inquirer within us’.²² From ‘Thalamus’ onwards, very roughly, a more sure-footed approach to science assumes its central position in MacDiarmid’s late work.

The 1993 and 1994 two-volume edition of MacDiarmid’s *Complete Poems*, and the 1994 edition of *Lucky Poet*, are used here as the definitive reference to the text under study. A new scholarly edition, the annotated and systematically glossed four-volume *Complete Collected Poems of Hugh MacDiarmid*, is being prepared. In an email of 30 March 2015, Patrick Crotty of Aberdeen University informed me that work on the first volume is nearing completion.²³

¹⁸ *CPHMD*, 411.

¹⁹ *CPHMD*, 412.

²⁰ *CPHMD*, 413.

²¹ *CPHMD*, 413.

²² Shestov(1932), xxxiv-xxxv.

²³ Private email, 30/03/2015.

Materialism and Idealism in ‘On a Raised Beach’

‘On a Raised Beach’ is a complex poem built with numerous unfamiliar words and a wide range of allusions, and set within a framework of direct and declarative statements. The parameters of the poem are defined in the opening line: ‘All is lithogenesis – or lochia’.²⁴ The scope of ‘On a Raised Beach’ encompasses everything between the formation of stone and afterbirth; this develops into a multi-faceted mediation on life and non-life, with literal and metaphorical shifts between the material and the ideal. The poem’s apparently antithetical themes have frustrated attempts to find a philosophical reading consistent with the clear Shestovian background in ‘On a Raised Beach’. Also, rapidly switching directions of thought make ‘On a Raised Beach’ highly resistant to summing up; remarkably, however, the dominant sense is not of fragmentation but of gathering coherence. In this section of the chapter I will engage with the detail of the poem and try to characterise the way its thoughts and emotions contrast and cohere; towards the end of the chapter, once the computational model has been developed, I will suggest, in the context of the late text as a whole, that there exists a simple abstract structure for ‘On a Raised Beach’ which overcomes the difficulty of finding an effective concrete description of the poem.

In ‘On a Raised Beach’ MacDiarmid is imagining isolation on the Shetland Island of Linga.²⁵ The poem opens with a crescendo of poetry and science, building power with descriptive and obscure technical words, some from science: ‘Celadon and corbeau,

²⁴ *CPHMD*, 422.

²⁵ Laurence Graham and Brian Smith, (eds.), *MacDiarmid in Shetland*, (Lerwick: Shetland Library, 1992), 13-15; Graham&Smith(1992).

bistre and beige, / Glaucous hoar, enfoulered, cyathiform'.²⁶ The sense of mystery leaves the mind free to focus on the building aural affect; then MacDiarmid begins to question the stones: 'What bricole piled you here, stupendous cairn?'; 'What eburnation augments you with men's bones'; 'But where is the Christophanic rock that moved?'.²⁷ The passage communicates before it is understood, as Nancy Gish observes.²⁸ Gish writes evocatively about the crescendo, noting: 'The combination of rare and technical words with a strong cadence and musical effects creates an unusual fusion of uncertainty and ease'.²⁹ In part I would agree with Gish, but would prefer to describe the opening of 'On a Raised Beach' in terms of certainty and *unease*: the solidity of the descriptions of the stones contrasts with the repeated questioning. The scientific terms denote certainty – it is certain that cyathiform is a botanical term for a shape which is narrow at the bottom and wider at the top (*OED*). There's a secondary effect of poetic science here too (whatever accident of dictionary searching was involved) – the image of a flower-shaped stone.

The tension between poles of thought is maintained as the poem progresses: the poem develops from the opening into a series of reflections most of which seem to include a dualism of some kind. The couplet 'So these stones have dismissed / All but all of evolution, unmoved by it', contrasts, through the word 'unmoved', science with the Christophanic rock.³⁰ 'We are so easily baffled by appearances', MacDiarmid writes, it makes no difference to the stones 'whether they are high or low', whether they inhabit 'palace or pigsty'; the stones endure: 'There are plenty of ruined buildings in the world

²⁶ *CPHMD*, 422.

²⁷ *CPHMD*, 423.

²⁸ Nancy Gish, *Hugh MacDiarmid, The Man and his Work*, (London: MacMillan, 1984), 161; Gish(1984).

²⁹ Gish(1984), 168.

³⁰ *CPHMD*, 424.

but no ruined stones'.³¹ The poet is perhaps recovering from depression, when there was no dualism, only uncertainty: 'an emotion chilled is an emotion controlled; / This is road leading to certainty'.³² He seems to be re-building his political commitment, re-finding the 'battle between opposing ideas'; and activism: 'Reasoned planning for the time when reason can no longer avail'.³³

Here and in *In Memoriam James Joyce*, MacDiarmid's model for the socialist end state (where 'reason can no longer avail') seems to be William Morris's Nowhere.³⁴ In *News from Nowhere*, an inhabitant of the *Epoch of Rest* (as the book is sub-titled) makes the Shestov-like comment: 'this is not an age of inventions', 'The last epoch did that for us'.³⁵ Returning to 'On a Raised Beach', the expression of doubt reinforces the idea of rebuilding, and the necessity of struggle for socialism: 'But, not indifferent to the struggle yet / nor to the ataraxia I might get / By fatalism'.³⁶ The battleground is defined: it is 'reality that is at stake', and 'Being and non-being with equal weapons here / Confront each other', and while non-being is invisible, it is said to be 'on the point of showing clear'.³⁷ The doubt works both ways: 'These stones go through Man, straight to God, if there is one'.³⁸ Yet both parts of the argument are left open: 'My disposition is towards spiritual issues / Made inhumanly clear'.³⁹ The various senses developed, from confrontational struggle though to idealist socialism, from a disposition towards spiritual issues to doubt, seem to mix freely and cohere, rather than conflict.

³¹ *CPHMD*, 425.

³² *CPHMD*, 426.

³³ *CPHMD*, 426.

³⁴ William Morris, *News from Nowhere*, (London: Penguin, 2004); Morris(1890).

³⁵ Morris(1890), 192.

³⁶ *CPHMD*, 428.

³⁷ *CPHMD*, 428.

³⁸ *CPHMD*, 427.

³⁹ *CPHMD*, 431.

The last major section of the poem opens with an address, compellingly to an imagined Shestov:

“Ah!”, you say, “if only the stones would move
– Were it only by an inch – of its own accord.
This is the resurrection we await ⁴⁰

A little later MacDiarmid writes that for ‘Detached intellectuals, not one stone will move’.⁴¹ Opposites remain, but the poet starts to accept this with equanimity: ‘I am enamoured of the desert at last’; ‘It is not / the reality of life which is hard to know’, ‘But you must participate in it to proclaim it’; ‘I lift a stone; it is the meaning of life I clasp’; ‘Though slow as the stones the powers develop / To rise from the grave’.⁴² The final line of the poem draws a circle both with the poem, and the world: ‘Earth’s vast epanadiplosis’.⁴³ The sense is not of fatalism, but of completion, and though the reference is literary, referring to the repetition of a word at the beginning and end of a sentence, it suggests the roundness and repetition of the stones.

Gish sees the opening passage as an endorsement of MacDiarmid’s ‘poetry of fact’; surprisingly she regards Kenneth Buthlay as dismissing the passage, but Buthlay remarks, ‘He may begin with limbering-up exercises for the brain’, ‘but then he will settle down to his line of thought, and it is well worth following him’.⁴⁴ MacDiarmid’s use of geological science is initially descriptive and generates both sound and imagery, before developing rapidly into a proxy for the materialist stance. The science in the poem is reinforced by injections of facts, such as ‘The mole has a rich sexual colouring in due

⁴⁰ *CPHMD*, 432.

⁴¹ *CPHMD*, 432.

⁴² *CPHMD*, 431, 432, 433.

⁴³ *CPHMD*, 433.

⁴⁴ Gish(1984), 169; Kenneth Buthlay, *Hugh MacDiarmid*, (Edinburgh: Oliver and Boyd, 1964), 87; Buthlay(1964).

season'.⁴⁵ It is difficult not to see such interjections, which appear throughout the late work, as a tongue-in-cheek lightening of the mood; here the poetic justification unfolds in emotional terms: 'every beast keeps / Brighter colours inside it than outside'.⁴⁶ Gish sees the opening passage as setting up 'the central theme of the hidden meaning of stone countering religious tradition'.⁴⁷ She seems to agree that the poem is framed by contrasts, but concludes: 'On a Raised Beach', 'is a grave and sombre indictment of human stoniness and cultural failure, and the death these represent'.⁴⁸ But the poem seems more to be about leaving 'grave and sombre' (or worse) feelings behind, and 'human stoniness' doesn't begin to catch the way the stones represent solidity, firmness, and other qualities with a positive sense in the poem. 'On a Raised Beach' is best explained as a process of recovery: strong emotions find analogous expression in the outer world, the solidity of which seems to heal. It is difficult, however, to see how the poem stretches beyond the representation of mental states into culture, or where Gish's 'cultural failure' is to be found. Nor does the poem move towards death (although it is present), it is more like the poet seems to emerge from the threat of 'suicide, here confronting me', 'to get a life worth having'.⁴⁹

Briefly, on the subject of scientific accuracy, Edwin Morgan noted in a footnote to his essay, 'Poetry and Knowledge in MacDiarmid's Later Work' (1962), two minor geological inaccuracies in the poems of *Stony Limits*.⁵⁰ Drew Milne references this in his entry in *Contemporary Poetry and Contemporary Science*, 'Wit and the Cambridge

⁴⁵ *CPHMD*, 424; source identified in Whitworth(2011), 100.

⁴⁶ *CPHMD*, 425.

⁴⁷ Gish(1984), 169.

⁴⁸ Gish(1984), 172.

⁴⁹ *CPHMD*, 428, 433.

⁵⁰ Edwin Morgan, *Essays*, (Cheadle: Carcanet, 1974), 201-13, 207(n); Morgan(1974); *CPHMD*, 385-512.

Science Park’; citing Veronica Forrest-Thompson’s scepticism regarding MacDiarmid’s use of science, he writes: ‘Poems such as “On a Raised Beach”, with its scientific inaccuracies, exemplify the failure to develop metaphorical transformation within poetic form’.⁵¹ The idea of the creative misreading of science overcomes this type of pedantic thinking: the mistakes are minor and do not diminish the poetry. In any case Morgan wrote of MacDiarmid’s technical errors, ‘Such inadequacies seem, however, fewer or less damaging than one might suppose’; earlier in his essay Morgan also said, ‘we are apt to forget how unhelpfully and unhealthily anti-scientific the dominant literary atmosphere has been’.⁵²

Peter McCarey discusses the extent of Shestov’s influence on MacDiarmid in his book *Hugh MacDiarmid and the Russians*.⁵³ The English translation of Shestov’s *In Job’s Balances* was published in 1932 – MacDiarmid was reading it when he first arrived in Whalsay.⁵⁴ It is, McCarey says, ‘central to *Stony Limits and Other Poems*’, the collection which includes ‘On a Raised Beach’, and also ‘Ode to All Rebels’, a poem which it’s worth including in this discussion.⁵⁵ *In Job’s Balances* is an engaging, lively, and polemical read. Shestov’s Christian mysticism seeks to restore the ‘*impossible* which our forefathers plucked from the tree in Paradise’, be open again to ‘universally valid judgements’, and forget our ‘self-sufficient piety’ – only then ‘will *free* inquiry begin’.⁵⁶ Shestov mocks science: if scientists prove ‘that you are descended from monkeys’, ‘you have to accept it’ – ‘What an absurdity of absurdities!’, ‘I shall not become reconciled to

⁵¹ Drew Milne, ‘Wit and the Cambridge Science Park’, in Crawford(2006), 170-87, 181; Veronica Forrest-Thomson, unpublished PhD thesis, 1971, University of Cambridge; see also Whitworth(2011), 105-6.

⁵² Morgan(1974), 207, 204.

⁵³ Peter McCarey, *Hugh MacDiarmid and the Russians*, (Edinburgh: Scottish University Press, 1987); McCarey(1987).

⁵⁴ Shestov(1932); Graham&Smith(1992), 15-16.

⁵⁵ McCarey(1987), 162; *CPHMD*, 487-512.

⁵⁶ Shestov(1932), 1; italics original.

it simply because it is built on twice two is four!'.⁵⁷ Shestov says materialism has been 'utterly defeated', and 'ranks as the philosophy of the stupid and the commonplace'.⁵⁸

Hugh MacDiarmid's commitment to socialism was visceral. He believed in the moral rightness of socialism in the manner of the protagonist in Robert Tressell's *The Ragged Trousered Philanthropists* or in the way presented in one of communism's founding documents, Friedrich Engels's *The Condition of the Working Class in England*.⁵⁹ All belief involves trial: the Grievances faced in Whalsay conditions of isolation and poverty which would test anyone. In 'Ode to All Rebels' MacDiarmid writes: 'I've bent nae knee to Reason / – except in mockery'.⁶⁰ McCarey notes Shestov's remark: 'do not forget that it is impossible to argue with reason', and 'There is only one weapon: mockery'.⁶¹ It is tempting to read the mockery of reason as only referring to science, but in MacDiarmid's work reason is also associated with capitalism, as in the 'treadmills of rationalising' from 'Thalamus'.⁶² The 'Ode' is a poem of despair; its ethic is more nihilistic than Shestovian, though Shestov's philosophy seems to provide solace. Wherever the mockery of reason is directed, science is scrutinised through negation: 'A' the men o' science, the enemies o' truth'.⁶³

In 'On a Raised Beach', by contrast, MacDiarmid depicts his own vision, not Shestov's. McCarey notes the 'atheist ontology' in 'On a Raised Beach', and asks: 'what has Shestov's "Eternal God"' to do with atheism, and what has the poem's "'the road

⁵⁷ Shestov(1932), 27.

⁵⁸ Shestov(1932), 146.

⁵⁹ Robert Tressell, *The Ragged Trousered Philanthropists*, (London: Lawrence and Wishart, 1955); written between 1902 and 1911; Friedrich Engels, *The Condition of the Working Class in England*, (London: Penguin, 2005); written 1844.

⁶⁰ *CPHMD*, 497.

⁶¹ McCarey(1987), 177.

⁶² *CPHMD*, 413.

⁶³ *CPHMD*, 507.

leading to certainty, / Reasoned planning for a time when reason can no longer avail”, ‘to do with the Shestovian defiance of reason in “An Ode to All Rebels”?’⁶⁴ McCarey regards this departure from Shestov as poetic failure: ‘MacDiarmid’s use of philosophical concepts in “On a Raised Beach” presents greater, if less obvious, difficulties than his use of technical terms’.⁶⁵ He concludes: ‘There *is* an ontological difference between Shestov and MacDiarmid’.⁶⁶ McCarey asks how MacDiarmid faced up to ‘the inconsistency of his politics’, and ‘the irrationality of his philosophy’.⁶⁷ However, in a later article with a slightly different focus, ‘Lev Shestov and Hugh MacDiarmid’, McCarey’s position seems to shift.⁶⁸ Considering some of MacDiarmid’s Glasgow poems such as the Hymns to Lenin and ‘The Glass of Pure Water’, McCarey writes: ‘Here we are faced not with a hopeless inconsistency but with a daunting integration of the metaphysical abyss with the economic depths of poverty’, and in view of this, ‘This alignment of [MacDiarmid’s] metaphysics with his politics might persuade some readers that there is, after all, a seriousness and consistency to MacDiarmid’s thought’.⁶⁹

Rather than poetic and philosophical failure, W. N. Herbert sees a measured response to Shestov in ‘On a Raised Beach’. He quotes Shestov: “‘Everything in nature is quite indifferent towards its fate’”, a stone does not know or care whether it “‘lies on the floor of the sea or on a high mountain’”, it is invariant to such contrasts.⁷⁰ Herbert identifies the following passage (paraphrased above) as MacDiarmid’s response.

⁶⁴ McCarey(1987), 187.

⁶⁵ McCarey(1987), 189.

⁶⁶ McCarey(1987), 187, emphasis original.

⁶⁷ McCarey(1987), 192.

⁶⁸ Peter McCarey, ‘Lev Shestov and Hugh MacDiarmid’ in Nancy Gish, (ed.), *Hugh MacDiarmid: Man and Poet*, (Edinburgh: Edinburgh University Press, 1992), 109-121; McCarey(1992).

⁶⁹ McCarey(1992), 121.

⁷⁰ Herbert(1992), 155; Shestov(1932), 189.

We must be humble. We are so easily baffled by appearances
 And do not realise that these stones are one with the stars.
 It makes no difference to them if they are high or low,
 Mountain peak or ocean floor, palace, or pigsty.
 There are plenty of ruined buildings in the world but no ruined
 stones.⁷¹

MacDiarmid uses many of Shestov's words, but changes the sentiment: indifference becomes transcendence – 'these stones are one with the stars'.⁷² MacDiarmid is absorbed in Shestov, but he is not prepared to be intellectually imprisoned by the Christian mystic he has called his 'master'.⁷³ This sense of self-release – establishing his own creative freedom – is almost explicit at the end of 'Ode to all Rebels'. This is the final stanza.

*Your song, O God, that none dare hear
 Save the insane and such as I
 Apostates from humanity
 Sings out in me with no more fear
 Than one who thinks he has the world's ear
 From his padded cell
 – Insane enough, with you so near,
 To want, like you, the world as well!*⁷⁴

The closeness to God, the song of God within, as described in these lines, is what Shestov seeks. But in the final line this sense is broken. Rebels, who can be taken to include the poet, are insane enough to want '*the world as well!*' – this is lifted with the closing exclamation mark and is perhaps the only moment in the poem where the poet's spirit rises.⁷⁵ Shestov is not negated, but MacDiarmid wants more. Shestov's sense remains, but the intent becomes MacDiarmid's. Shestov is overthrown, as MacDiarmid takes ownership of Shestov's philosophy, to put it to his own use. Given the background of despair in the poem, the words 'like you' in the final line probably do not represent an

⁷¹ Herbert(1992), 155; *CPHMD*, 425.

⁷² *CPHMD*, 425.

⁷³ E.g., *LP*, 163.

⁷⁴ *CPHMD*, 512.

⁷⁵ *CPHMD*, 512.

arrogant assertion of God-like status; rather ‘To want, like you, the world as well’ is a firm statement of the rebels’ cause founded on the underlying moral claim of Marxism: equality.

Shestov’s defiance of reason found deep emotional resonance in MacDiarmid. Here is a refuge from academic Marxism, and from capitalism with its iron laws of ‘no alternative’. Shestov’s somehow gentle and teasing deconstruction of what is often taken for granted gave MacDiarmid the strength to defy the logic of generally accepted truths, in other words the strength to be a Marxist. The situation for Marxists is the same or worse today, as market forces and even perpetual war are generally accepted truths; counter-arguments, if they are admitted at all, are ridiculed and their proponents, if they attain any prominence, are demonised. Terry Eagleton’s *Why Marx Was Right* illustrates the situation by directly challenging commonplace beliefs about Marxism, such as: Marxism is deterministic, Marxism advocates violence, it is authoritarian, and so on.⁷⁶ MacDiarmid was demonised for his Marxism, and undermined in almost unbelievable terms. Alan Riach sums up the majority position: ‘It is a commonplace of MacDiarmid criticism that contradiction and paradox are at the heart of his vision’.⁷⁷ Herbert is honest about his distaste for MacDiarmid’s politics: he says MacDiarmid’s communism ‘is adhered to with the fanaticism of a psychological dependency’, and that his ‘pronouncements have a fanatic naivety’ which is ‘socially unacceptable to a middle-class audience’.⁷⁸ Critical opprobrium persists in the 2011 *Edinburgh Companion to*

⁷⁶ Terry Eagleton, *Why Marx Was Right*, (Yale: Yale University Press, 2011), ch. 3, 30, ch. 8, 179, ch. 9, 196.

⁷⁷ Alan Riach, *Hugh MacDiarmid’s Epic Poetry*, (Edinburgh: Edinburgh University Press, 1991), 12; Riach(1991).

⁷⁸ Herbert(1992), 101, 100.

Hugh MacDiarmid in the essay ‘The Impossible Persona’.⁷⁹ MacDiarmid was supposed to be a terrible Marxist, and also, strangely, not a Marxist at all. Alan Riach says for example: ‘He was a party member, but he did not *subscribe*’; and from the supposed left, the critic David Craig trivialises MacDiarmid’s politics accusing him of having ‘only the *attitude* of seriousness and militancy’.⁸⁰

The critical opprobrium must represent only a fraction of what MacDiarmid faced. The attractive ideas of Shestov both compounded his struggle with conventional belief, and showed the way out of it. ‘On a Raised Beach’ represents this struggle in mercilessly honest terms. I do not want to suggest that MacDiarmid thought in terms of ‘scientific socialism’ – I know of no evidence that he did, and ‘On a Raised Beach’ is strong evidence that he did not confuse or conflate science and socialism. This does not mean, however, that science and socialism do not sometimes act as proxies for one another in MacDiarmid’s poetry. In ‘On a Raised Beach’ science and socialism seem to be analogues – the certainty of science lends heft to the re-building of his political commitment. The stones themselves are metaphors for both science and socialism:

These bare stones bring me back to reality.
I grasp one of them and I have in my grip
The beginning and end of the world⁸¹

Science and socialism confer the power to act, the power to describe, and the power to hold a totalising view of the world. As ‘On a Raised Beach’ shows so clearly, this power does not reside in a materialist vacuum. Science and socialism, like individual

⁷⁹ David Goldie, ‘Hugh MacDiarmid: The Impossible Persona’, in Scott Lyall and Margery Palmer McCulloch, (eds.), *The Edinburgh Companion to Hugh MacDiarmid*, (Edinburgh, Edinburgh University Press, 2011), 125-35; Lyall&McCulloch(2011).

⁸⁰ Riach(1991), 30, emphasis original; David Craig, ‘MacDiarmid the Marxist Poet’, from Duncan Glen, (ed.), *Hugh MacDiarmid, A Critical Survey*, (Edinburgh: Scottish Academic Press, 1972), 167; emphasis original.

⁸¹ *CPHMD*, 432.

stones – only one is grasped – may be isolatable, but like the stones in general, they are not isolated. In different ways, both science and socialism derive their power from the vivifying energy of ideology and belief; material forces seem to be constantly locked in struggle with life-giving abstractions, as they try to moderate and control idealism's endless flexibility. In 'On a Raised Beach' the poet's struggle resolves into a working, if restless, compromise of stability.

Science and Socialism in In Memoriam James Joyce

MacDiarmid's 151 page poem *In Memoriam James Joyce*, whose sub-title *From A Vision of World Language* suggests it is only an extract, opens with an address, probably to the poet's wife Valda:

I remember how you laughed like Hell
 When I read you from Pape's 'Politics of the Aryan Road':
 'English is destined to become the Universal Language!
 The vibratory effect of English correctly spoken
 (Which has somewhat of a nasal intonation)
 On the Pineal Gland is unique
 And a necessary factor in the evolution of humanity[']⁸²

In a much later passage, which could be called 'Fishing with Norman MacCaig', MacDiarmid mocks his own pomposity as well, but most of *In Memoriam James Joyce* is a serious effort to establish the polar opposite point of view to Pape's.⁸³ Like Pape, though in a much more sophisticated manner involving allegory and creative misreading, MacDiarmid uses science to support his argument. MacDiarmid identifies his explicit purpose: he is amongst those who are concerned with "the living whole / of all the

⁸² *CPHMD*, 735-889, 738.

⁸³ *CPHMD*, 851.

poetry that has ever been written”⁸⁴. This intent translates in *In Memoriam James Joyce* into a vast marshalling of poetry, prose, and language, sometimes discussed at length, sometimes recorded in lists. The relationship between ‘language and literature’ and ‘socialism’ in *In Memoriam James Joyce* is close. MacDiarmid confirms this in an Author’s Note: he says that he believes the unification of language he seeks ‘will be achieved ultimately “in a society in which the participant aspect of action attains its maximum expression” – a society which I naturally visualise as Marxist’.⁸⁵ Alan Riach, whose *Hugh MacDiarmid’s Epic Poetry* includes a lengthy discussion of *In Memoriam James Joyce*, is clear on this point: ‘MacDiarmid understood the idea of world literature to be in alignment with the development of communism’, and that his ‘vision of world language is a communist one’.⁸⁶ More generally, MacDiarmid makes the connection between socialism and learning explicit when he quotes, in *Lucky Poet*, apparently from Lenin’s final speech in November 1922 the injunction that communists must work over ‘the whole inheritance of human knowledge’ – though I have not been able to trace the provenience of this citation.⁸⁷

In Memoriam James Joyce is thus an allegorical vision of socialism, though it often appears in explicit passages in its own right. The science in *In Memoriam James Joyce* also exhibits an explicit and allegorical dual role. At times science is part and parcel of the language gathering, for example an early passage reminiscent of the

⁸⁴ *CPHMD*, 738; citing T. S. Eliot, see *LP*, xxxii.

⁸⁵ Hugh MacDiarmid, *In Memoriam James Joyce*, (Glasgow: William MacLellan, 1956), 17.

⁸⁶ Riach(1991), 78, 91.

⁸⁷ Lenin’s final address, as published in V. I. Lenin, *Problems of building Socialism and Communism in the U. S. S. R.*, (Moscow: Progress Publishers, 1964), does not contain any part of the extended quotation from *LP*, 152-3, nor have various searches (allowing for differences of translation) through the relevant volumes of Lenin’s *Collected Works*, downloadable from <https://www.marxists.org/archive/lenin/works/cw/index.htm>, (18/11/2015), identified MacDiarmid’s source.

crescendo in 'On a Raised Beach', has lines such as 'Argute, deurate, investite, lucktifick, excandescence'.⁸⁸ The physical structure of *In Memoriam James Joyce* is open. There are many well-defined passages, especially at the beginning and end, but also many passages which seem separable from or overlap substantially with the larger late text. There is at least one passage, for example, which seems to have escaped from *The Kind of Poetry I Want*.⁸⁹ The poem's section divisions, while not entirely arbitrary, do not provide an intuitively accessible structure. Alan Riach discusses what is known about the origin of the work, and its overlap with other large conceptual pieces, mostly abandoned; Riach says: 'the problem we have as textual critics is not only the instability of the content of the work but the changeability of the work's title'.⁹⁰ *In Memoriam James Joyce* is a monument of MacDiarmid's late work, but it is extremely difficult to find a useful description in physical structure terms. Nevertheless, as Riach cautiously says, there is a 'complex, provisional but pragmatic notion of the unitary' in *In Memoriam James Joyce*, which is 'sustained by the possibility of the purposive development of all the discrete parts'.⁹¹ To put it another way (and less cautiously), the purposive development of the parts of *In Memoriam James Joyce* can be interpreted as a simple and elegant *abstract structure* which provides coherence, and even tension. The abstract description 'impending breakthrough' seems to condition the work from end to end, as well as providing metaphors for the socialist revolution and scientific advance. Under this description the poem's porous borders and its position as part of a wider text become virtues. The abstract description provides a sense of universality essential to the vision,

⁸⁸ *CPHMD*, 739.

⁸⁹ E.g. *CPHMD*, 750.

⁹⁰ Riach(1991), 61.

⁹¹ Riach(1991), 148.

and it is almost as if the tension of the impending breakthrough is a vacuum-agent for drawing together the work. It is an exaggeration, but also an important way to consider *In Memoriam James Joyce*, to say that, under the idea of abstract structure, the actual text becomes a representative text. The same poem could have been written in a different way. If these ideas are right, then a *virtual theme* of ‘science and socialism’, while obviously not complete, should provide a reasonable insight into *In Memoriam James Joyce* as a whole.

The science in *In Memoriam James Joyce* is diverse in terms of scientific field, but a common factor is that, the more it is examined, the more it appears an essential part of the poem’s infrastructure. An early reference to science capitalises the subject and casts it as a non-mystical seer: MacDiarmid writes, ‘things not yet discovered are foreknown to Science / – As Meldelyev predicted scandium, germanium and polonium’; the theme repeats with astronomers who ‘have foretold where a planet should be’.⁹² MacDiarmid uses a scientific metaphor to set the limits to his marshalling of language: ‘We know that total speech is impossible of course / Like a too big star that therefore could transmit no light’.⁹³ The laws of classical physics seem to bound the poem, providing a secure future outlook, as well as a physical limit. MacDiarmid, however, draws a veil over the explicit poem, suggesting that any physical limit will be breached: ‘And all this here, everything I write, of course / Is an extended metaphor for something I never mention’.⁹⁴ A few pages on MacDiarmid uses science as a metaphor for something he does mention. Quoting from an unnamed source, he writes how ‘probably through the

⁹² *CPHMD*, 741.

⁹³ *CPHMD*, 742.

⁹⁴ *CPHMD*, 745.

comparatively small group of optic fibres', 'The eyes can pull the whole body about'.⁹⁵ He is unable to resist the comparison that Scotland 'is hypnotically controlled from London'.⁹⁶ One finds science entering the substrate of the poem: MacDiarmid admires 'mathematical exactitude', and 'Calculating stresses and strains / In the manner of an engineer'.⁹⁷ Scientific vocabulary and ways of thinking may arise in almost any passage. Considering the natural world, MacDiarmid is 'by no means weary yet of my concentration / On phyllotaxis'.⁹⁸ In a comment which extends scientific thinking across domains, the poet wants 'Grammar regarded as we should regard the natural sciences'.⁹⁹

Michael Whitworth, in 'Science in MacDiarmid's Later Poetry', says MacDiarmid drew his science from 'scientific papers, and non-technical scientific books', and also from 'more specialist works such as Erwin Schrodinger's *Statistical Thermodynamics*'.¹⁰⁰ Whitworth weighs the issue of poetic and scientific authority, and how the poet's understanding of science might differ from the scientist's.¹⁰¹ From close reading of the original scientific texts he suggests, 'MacDiarmid's art is, at least in part, an art of elimination, of knowing what to remove in order to allow the source materials to achieve their full potential'.¹⁰² The editing of science sources is accompanied by engagement with the scientific content. MacDiarmid writes, for example: 'My concern is not to be more Darwinian than Darwin'.¹⁰³ A little later MacDiarmid is developing his own theory: 'As speech flows / As it *is* time'; he includes the ideas of Cassirer, that

⁹⁵ *CPHMD*, 747.

⁹⁶ *CPHMD*, 748.

⁹⁷ *CPHMD*, 750.

⁹⁸ *CPHMD*, 758.

⁹⁹ *CPHMD*, 759.

¹⁰⁰ Whitworth(2011), 97, 100.

¹⁰¹ Whitworth(2011), 98.

¹⁰² Whitworth(2011), 102.

¹⁰³ *CPHMD*, 778.

‘speech actually develops and extends our experience’; and ends the passage by suggesting that language is “‘The supreme organ of the mind’s self-governing growth’”.¹⁰⁴ The quote, a footnote relates, is from I. A. Richards’s essay ‘Notes Towards an Agreement Between Literary Criticism and Some of the Sciences’.¹⁰⁵ Science is integral to the poem’s form of enquiry which is entirely on MacDiarmid’s terms, not science’s. The passage just quoted is a full-blooded creative misreading of science. The status of the theories employed, such as Cassirer’s and Richards’s, hardly matters: MacDiarmid presses them to poetic purpose, and only on that basis is any judgement secure. The use of science as the mode of enquiry seems to be made explicit at one point. MacDiarmid is thinking about how, if Schopenhauer is right, ‘all previous philosophy / Revolves around certain ideas which will always return’.¹⁰⁶ Regarding ‘*how* they return’, MacDiarmid writes, involving the reader: ‘To determine this requires an ever more precise / Scientific instrument – the object of *our* quest, my friend’.¹⁰⁷

There are two passages which include quantum mechanics, and have slightly different poetic purposes. The first of these passages opens with MacDiarmid adopting the meta-poetic tone of *The Kind of Poetry I Want*: he calls for ‘A language, a poetry, in keeping with the new quantum mechanics’.¹⁰⁸ This follows directly:

The non-intuitive handling of data introduced by Heisenberg;
The translation of the matrix calculus
Into operational and ‘Poisson brackets’ methods;
And, finally, the new ‘wave mechanics’ of de Broglie, Schrodinger,
and others
Giving a perfect translation into intuitive methods¹⁰⁹

¹⁰⁴ *CPHMD*, 794.

¹⁰⁵ *CPHMD*, 794.

¹⁰⁶ *CPHMD*, 781.

¹⁰⁷ *CPHMD*, 781; italics original.

¹⁰⁸ *CPHMD*, 782.

¹⁰⁹ *CPHMD*, 782.

‘Non-intuitive handling of data’ refers to Heisenberg’s struggle with non-commutative algebra, that is, algebra where the order of multiplication cannot be reversed.¹¹⁰ The resulting formalism is known as matrix mechanics or matrix calculus. ‘Poisson brackets’ describe an operation in classical mechanics, which, in the words of Roger Penrose provides ‘a fundamental general procedure that encompasses the dynamics of classical physics and supplies the link to quantum mechanics’.¹¹¹ The next breakthrough in quantum theory was the wave mechanics of de Broglie and Schrodinger. The advantage of their approach was that it allowed some degree of conceptualisation of the quantum world in terms of the wave function, hence the ‘translation into intuitive methods’ at the end of the passage. MacDiarmid follows the above passage with an un-referenced quote which reflects on quantum mechanics: ‘With the newer quantum mechanics / the old “discontinuity” resolves itself / Into an essential *individuality*’.¹¹² A discontinuity or singularity in mathematics represents an infinity, or a division by zero. The science here is obsolete: quantum mechanics has nothing to do with ‘essential individuality’, or ‘absolute individuals’.¹¹³ Ladyman comments that the ‘relations implied by quantum entanglement undermine the ontological priority conferred on individuals in most traditional metaphysics’.¹¹⁴ MacDiarmid has picked a quote which suits his purpose, and is presumably thinking that ‘quantum’ implies individuality; though this might have seemed reasonable in the wake of the discovery of the particulate nature of black body radiation.

¹¹⁰ See e.g., Manjit Kumar, *Quantum*, (London: Icon, 2009), 192-7.

¹¹¹ Penrose(2005), 322; see also Ladyman(2014), e.g. 6.

¹¹² *CPHMD*, 782.

¹¹³ *CPHMD*, 782.

¹¹⁴ Ladyman(2014), 13.

There is a clear parallel, on the theme of science and socialism, between the charting of scientific progress in this quantum mechanics passage, and the hoped-for progress towards socialism in *In Memoriam James Joyce*; perhaps too there is a resonance of heady excitement between the domains, both of which seemed to be moving towards their goals at the time MacDiarmid was writing. A deeper parallel emerges, I think, by considering the nature of quantum mechanics. Whatever lies ‘inside’ quantum mechanics is tangled up in well-known paradoxes which seem to denote the limit of physical reality. It is not difficult to see why quantum mechanics has so troubled physicists, notably Einstein, and on the same basis has inspired religious thinkers.¹¹⁵ Quantum mechanics seems to indicate the existence of an unknown world, a different place, which is related to, but fundamentally different from, our own – one which can be associated, in the context of *In Memoriam James Joyce*, with the socialist heaven. MacDiarmid seems to be well aware of this possibility; he writes in *The Kind of Poetry I Want*: ‘So here, in this poetry of one who knows / An ontological system behind physics’.¹¹⁶ Riach notes that ‘in a late but revealing interview with Walter Perrie’, MacDiarmid expressed a ‘view of matter’ which owed ‘much to modern physics’ and asserted ‘the simultaneity of spirit and matter’.¹¹⁷ Also, Davie notes that the paradoxes of quantum mechanics ‘are what first attracted Grieve to it’.¹¹⁸ And as Morgan noted, in MacDiarmid’s “‘poems of knowledge’”, ‘the method of analogy is widely used’.¹¹⁹

¹¹⁵ See e.g., John Pulkinghorn, *Reason and Reality*, (London: SPCK, 1991), esp. 85-98; also, generally, John Pulkinghorn, *Quantum Physics and Theology*, (London: SPCK, 2007).

¹¹⁶ *LP*, 121.

¹¹⁷ Riach(1991), 131; reel-to-reel tape of interview: NLS shelfmark Acc.12629; now available digitally.

¹¹⁸ Davey(1986), 144; the poet’s real name was Christopher Murray Grieve.

¹¹⁹ Morgan(1974), 206.

If quantum mechanics is understood in this way, then the passage under discussion can be seen to appeal, in a similar manner, to the quasi-spiritual socialist hope expressed in the ‘Ballad of the Crucified Rose’ (or ‘The Ballad of the General Strike’) section of *A Drunk Man Looks at the Thistle*.¹²⁰ In the following stanza, prior to bitter stanzas of betrayal, the fulfilment of socialist hope is allegorised as the earth resuming its original place in the mind of God.

The waeful’ clay was fire aince mair
 As Earth had been resumes
 Into God’s mind, fae which sae lang
 To grugous state ’twas doomed.¹²¹

In *In Memoriam James Joyce*, the place of unreality, the socialist utopia which is the object of the struggle in the poem, is compellingly represented by William Morris’s *Nowhere*. MacDiarmid says in *The Kind of Poetry I Want*:

A poetry, therefore, that like William Morris
 in his *News From Nowhere* will constantly show
 “How the Change Came”¹²²

There are numerous lines in *In Memoriam James Joyce* which seem to echo the serene conditions in *Nowhere*, and there is other evidence that MacDiarmid admired Morris’s vision of what all socialists are ultimately fighting for: heaven on Earth.¹²³ MacDiarmid talks of socialism in *In Memoriam James Joyce* in two distinct ways. There is the familiar and explicit *necessity* for socialism, typically expressed in terms of moral rightness or struggle. For example, the following couplet recalls the traditional cry ‘Socialism or Barbarism!’ – ‘Either we take hold of our destiny or, failing that, / We are driven towards

¹²⁰ Kenneth Buthlay, *A Drunk Man Looks at the Thistle*, (Edinburgh: Scottish Academic Press, 1987), 91-7; Buthlay(1987); in his note on p91 Buthlay highlights a political reading, and then challenges it; his challenge, I think, underestimates the way socialists associate ‘beauty’ with their hoped-for world.

¹²¹ Buthlay(1987), 92.

¹²² *CPHMD*, 1028.

¹²³ E.g., *LP*, 410-11; MS.27073, folio 37, MS of speech [?1954], quotes Morris’s poetry.

our fate'; if the struggle is lost, the fate will be barbaric.¹²⁴ The second way MacDiarmid speaks about socialism is in terms of utopia. MacDiarmid says: 'I know that in the final artistic / – The highest human – vision / There is neither good nor evil', and follows this Morrisian sentiment with a passage reminiscent of the *Epoch of Rest*:

There is neither good nor evil,
Better nor worse,
But only the harmony
Of that which is,
The pure phenomenon
Abiding in the eternal radiance.¹²⁵

Like MacDiarmid, Morris was not an academic Marxist; he was an activist who believed in the moral superiority of socialism. An archetypal story is that socialist families in hard times, even though they had pawned or sold or burnt for warmth all their possessions, would never be separated from their copy of *News from Nowhere*.¹²⁶ The feel of *Nowhere* is strongly recalled in the following selection of lines: 'clear-headedness of an illuminated race'; 'we can override and fuse / all our individual divergences'; 'Vanish all the complications of human life / Before the exultant note of universal joy'; dispense with 'the elaborate / Apparatus our Western tradition provides'; 'the simple constitutes the very climax'; the 'inexhaustible riches in the life of everyday'; 'Variation must be encouraged'; 'Tranquillity that seems no product of inertia'; and 'Infinite activities, infinite repose'.¹²⁷ Another passage which recalls *News from Nowhere* envisions the individual 'In proper balance with a society / Itself in proper ecological balance'.¹²⁸ The environment, as we would say today, is at the heart of Morris's paradise.

¹²⁴ *CPHMD*, 784.

¹²⁵ *CPHMD*, 835.

¹²⁶ Archetypal, no known source.

¹²⁷ *CPHMD*, 785, 785, 786, 787, 793, 832, 838, 879, 879.

¹²⁸ *CPHMD*, 837.

An inhabitant of Nowhere says: ‘The spirit of the new days, of our days, was to delight in the life of the world; intense and overweening love of the very skin and surface of the earth on which man dwells’.¹²⁹ *In Memoriam James Joyce* in several places reflects a mood of despair and doubt. One passage suggests that, if the masses were given ample incomes and freed for ‘higher things’, ‘They could no more live than fish out of water’.¹³⁰ A little later he says: ‘Culture is slowly declining / Mankind is returning to barbarism / And will finally become extinct’.¹³¹ This goes on: ‘Do not talk to me about likemindedness, / Brotherhood of man, democracy, or any such rot’.¹³² However, suggesting another parallel to Morris’s thinking, MacDiarmid finds a bucolic redemption. MacDiarmid writes: ‘An ecological change is recreative’; ‘We must look at the harebell as if / We had never seen it before’, and ‘Come. Climb with me. Even the sheep are different’.¹³³

The first passage on quantum mechanics suggests an analogy to the other-worldness of the Morrisian passages; it is as if quantum mechanics offers physical proof of the existence of another place. There is structural continuity (‘Poisson brackets’) between here and there, and there is also the possibility of transition, through resolving a singularity (perhaps standing for the socialist revolution or in Morris’s terms, ‘the Change’), into a future, and presumably better, individuality. The second passage on quantum mechanics also signifies both progress and mathematical continuity, and ends by making another metaphorical appeal to a socialist future, though in a slightly different way. The stanza starts by ‘delighting in “hohlraum” oscillators’, ‘Veiled allelomorphic

¹²⁹ Morris(1890), 158.

¹³⁰ *CPHMD*, 842.

¹³¹ *CPHMD*, 842.

¹³² *CPHMD*, 844.

¹³³ *CPHMD*, 844.

transitions such as liquid helium’, and the ‘Reimannian ζ [zeta] function’, the latter being part of the mathematical underpinning of relativity and quantum mechanics.¹³⁴ The list continues through major parts of physical theory – MacDiarmid’s point as the passage closes is explicit: there should be ‘one unified standard method / Capable of dealing, without changing the fundamental attitude, / With all cases’, ‘And with every new problem that may arise’.¹³⁵ This is a slightly edited version of the first sentence of Schrodinger’s *Statistical Thermodynamics*, but the purpose is MacDiarmid’s as he recruits physics to his cause and focusses its analogous senses on the interior of the poem.¹³⁶

In the next stanza MacDiarmid takes the reader into the world of mathematics: ‘On towards the calculus of ideas then’.¹³⁷ The maths passage, concerning which Michael Whitworth reported at a postgraduate seminar as-yet unpublished discoveries, seems to prefigure the couplet which opens the final set of passages of *In Memoriam James Joyce*: ‘Come follow me into the realm of music. Here is the gate / Which separates the earthly from the eternal’.¹³⁸ MacDiarmid asks, at least half seriously: ‘how can one write or think of writing even / Without a set of all the known 49 hypothetical curves’?¹³⁹ He knew about the structural relationship between mathematics and nature:

Recalling that when young ferns unfold in springtime
They are seen as logarithmic spirals,
When light is reflected under a teacup
A catacaustic curve is spotted,
And so on
Through all creation’s forms forever.¹⁴⁰

¹³⁴ *CPHMD*, 802; see Penrose(1994), 274-5, Penrose(2004), 48-9.

¹³⁵ *CPHMD*, 802.

¹³⁶ Reference explicit in the poem; see http://www-history.mcs.st-andrews.ac.uk/Extras/Schrodinger_Thermodynamics.html, 16/04/2015.

¹³⁷ *CPHMD*, 802.

¹³⁸ *CPHMD*, 871; seminar by Michael Whitworth, Salford University, 14/01/2011.

¹³⁹ *CPHMD*, 803.

¹⁴⁰ *CPHMD*, 803.

A teacup is lifted and a reflected curve is spotted, revealing a secret opening to the world of mathematics. The curve will change form as the teacup is moved, like a spontaneous geometry summoned to life, elemental and accidental, playfully creating variations on the fixed shapes of cup and saucer, deconstructing these shapes without limit. The surface on which a reflected curve falls is warmed, catching a shade of the main sense of caustic.¹⁴¹ This may become intense heat if the curve is able to collapse to a focal point, as in the reflection from parabolic mirror – a catacaustic curve in the extreme case creates fire, destroying its host surface.¹⁴² Mathematical structure is found under a teacup, it is alive in the logarithmic growth of the fern, it may self-destruct. Mathematics is God's bricks and mortar, and His power, 'Through all creation's forms forever'.¹⁴³ The passage reads like an incantation, a structural realist's prayer, and seems to require a closing 'Amen'.

In Memoriam James Joyce includes a disturbing though ambiguous passage from the field of human biology. MacDiarmid is writing about human evolution: 'Through some overcoming of inertia, / A loosening of connections in the nervous centre / There was a gradual development / Of the power of conscious reflection'.¹⁴⁴ The new species created (us) was marked 'by the loss or degeneration / Of many important instincts / Such as nutrition and reproduction. / These now require intelligent guidance'.¹⁴⁵ The idea of intelligent guidance becomes suggestive of eugenics several lines on: 'We must aim at producing / The most intensely organised individual'.¹⁴⁶ A few lines earlier, a couplet suggesting there is 'ample room' for further development has a footnote crediting H. J.

¹⁴¹ *OED*.

¹⁴² *OED*.

¹⁴³ *CPHMD*, 803.

¹⁴⁴ *CPHMD*, 837.

¹⁴⁵ *CPHMD*, 837.

¹⁴⁶ *CPHMD*, 837.

Muller's *Out of the Night* (1935).¹⁴⁷ The footnote quotes Muller (1890 – 1967), (who influenced J. B. S. Haldane), as saying that we now have the scientific means to create a society where 'the great philosophers, poets, and scientists' will no longer be 'very rare exceptions, but the rule'.¹⁴⁸ Also in the footnote, MacDiarmid undermines this a little: 'Of course there are things the biologists don't know yet'. Joseph Graves's *The Emperor's New Clothes* (2001), is a detailed analysis of, and fierce attack on, scientific racism.¹⁴⁹ Graves writes that Muller, as a Marxist, 'originally felt that eugenics could produce the type of human being suitable for the dictatorship of the proletariat'; but then, also quoting from *Out of the Night*, Graves says that later, 'Muller would describe eugenics as "lending a false appearance of scientific basis to advocates of race and class prejudice"'.¹⁵⁰ (Graves also notes Haldane's rejection of eugenics in 1938).¹⁵¹

It is possible that MacDiarmid's forthright expression of the improbability of 'man' is a response to G. E. Davie. *The Crisis of the Democratic Intellect* wasn't published until 1986, but Davie had visited MacDiarmid in Shetland, and forms of Davie's ideas were probably aired at the time.¹⁵² Davie casts MacDiarmid's change from a lyrical poet in Scots to an epic poet in English as 'the poet's tortuous journey from metaphysics to positivism'.¹⁵³ He contrasts 'the poetic expression in the *Drunk Man*, and also in *Cencrastus*, of the necessary truths which deny the possibility of progress', with

¹⁴⁷ MacDiarmid gives date as 1936.

¹⁴⁸ *CPHMD*, 837.

¹⁴⁹ Joseph Graves, *The Emperor's New Clothes*, (New Brunswick: Rutgers University Press, 2001); Graves(2001).

¹⁵⁰ Graves(2001), 126-7.

¹⁵¹ Graves(2001), 126-7.

¹⁵² See *LP*, <9>, 24, 285; Bold(1984), 572-4; John Manson, *Dear Grieve*, (Glasgow: Kennedy and Boyd, 2011), 180-2; Manson(2011).

¹⁵³ Davie(1986), 100.

‘the progressivist idea in *Lucky Poet*’.¹⁵⁴ Davie had earlier framed his work in terms of the contradistinction between ‘Pelagianism on the one hand and the doctrine of original sin on the other’; in other words, the human nature argument against socialism.¹⁵⁵ MacDiarmid seems to approach, but not unambiguously support, eugenics as a means of addressing the human nature argument; were it not for the footnote, MacDiarmid could simply be suggesting that improvement can take place through education. This latter sense is clear in the lines: ‘We must put all our reliance in the intellect / And develop it in everybody’.¹⁵⁶ The difficulty in reading this passage may reflect Muller’s changing attitude towards eugenics, or MacDiarmid’s genuine uncertainty over how to position his argument; it seems more like work in progress than a completed thought. Other lines quoted earlier in the context of *News from Nowhere*, concern the individual in balance with society, in turn, in balance with the environment. MacDiarmid seems to resist Stalinism in the closing couplet of the passage: ‘Variation must be encouraged / Rather than suppressed’.¹⁵⁷

In the final phase of *In Memoriam James Joyce*, the poet enters utopia:

Come, follow me into the realm of music. Here is the gate
Which separates the earthly from the eternal.
It is not like stepping into a strange country
As we once did. We soon learn to know everything there
And nothing surprises us any more. Here
Our wonderment will have no end, and yet
From the very beginning we feel at home.

At first you hear nothing, because everything sounds.
But now you begin to distinguish between them. Listen.
Each star has its rhythm and each world its beat.
And each separate living thing
Beats differently, according to its needs,
and all the beats are in harmony.¹⁵⁸

¹⁵⁴ Davie(1986), 154.

¹⁵⁵ Davie(1986), vi.

¹⁵⁶ *CPHMD*, 838.

¹⁵⁷ *CPHMD*, 838.

¹⁵⁸ *CPHMD*, 871.

Alan Riach has identified that this passage is re-written from an article by the Italian-Austrian composer Ferruccio Busoni (1866-1924).¹⁵⁹ Referring to Busoni's original, a letter to his wife dated 3 March 1910, it can be seen that MacDiarmid has tuned Busoni, stamping his poetic intent on the appropriated text: he has added the socialist maxim 'according to its needs'.¹⁶⁰ The theme of evolutionary destiny is woven into this transition into utopia, this time without human intervention, in an ecstatic passage as the poem moves towards its conclusion.

Even as nerves before they function
 Grow where they *will* be wanted; levers laid down in gristle
 Become bone when wanted for the heavier pull
 Of muscles which will clothe them; lungs, solid glands,
 Yet arranged to hollow out at a few minutes' notice
 When the necessary air shall enter; limb-buds
 Futile at their appearing, yet deliberately appearing
 In order to become limbs in readiness
 For an existence where they *will* be all important;
 A pseudo-aquatic paradise, voiceless as a fish,
 Yet containing within itself an instrument of voice
 Against the time when it *will* talk;¹⁶¹

This passage, from Charles Sherrington's *Man on His Nature* (1938), is compelling in its detail and commanding in tone.¹⁶² MacDiarmid has appropriated Sherrington's flourish on ontogeny in what amounts to a creative misreading of science which concretises his theme: the passage, de-contextualised, is no longer science, though it's the words and even the theory of science; it is science orchestrated to serve a poetic purpose, which in this case is also a political purpose. MacDiarmid is knee deep in a deterministic form of the Pelagian heresy – progress towards perfection is programmed into life itself.

¹⁵⁹ Riach(1991), 133.

¹⁶⁰ See <http://www.rodoni.ch/busoni/bibliotechina/lettereagerdaEN/gerdaEN2.html>; also Riach(1991), 133-4.

¹⁶¹ *CPHMD*, 886; italics original.

¹⁶² Charles Sherrington, *Man on His Nature* (Cambridge: Cambridge University Press, 1938), 98.

On the next page of the poem, MacDiarmid again seems to flirt with biological improvement. A chilling footnote to what might be regarded as descriptive verse, quotes from Lajos Zilahy's, *The Angry Angel*.¹⁶³ The footnote opens: 'Mankind's improved lot will be conceived in the laboratories of research scientists'.¹⁶⁴ In Zilahy's 1953 novel this passage is the scientist-protagonist's imagined Nobel address; it is analogous to the novel's theme of the hoped-for rebirth of Hungary in the pre-war period.¹⁶⁵ Zilahy, in the context of his novel, does not appear to assign sinister intent to this passage, although if the wider sense of the novel is brought into the poem it would introduce the idea of the failure of idealism followed by tragedy. It could be read that MacDiarmid is deliberately introducing, on the third last page of the poem, a note of realism as a counterpoint to the optimistic ending of *In Memoriam James Joyce*; in addition, at another level, he again seems to be approaching, but not endorsing, scientifically-controlled improvement of human biology. Also in MacDiarmid's defence, it can be argued that the fatalism of original sin, the idea of the immutability of human nature, bears some responsibility for his need to find a resolution. MacDiarmid's vision is simply of hope for a better world in the face of all conventional wisdom to the contrary, raised by Davie to the level of philosophical principle. Can MacDiarmid be the only one to blame if he reached out for whatever argument was at hand? The poem ends in equanimity with the line: 'Everything's O.K.' (although not in English), and another footnote commending 'the rightness of the world', 'despite all that may seem to enforce the opposite conclusion'.¹⁶⁶

¹⁶³ Lajos Zilahy, *The Angry Angel*, (New York: Prentice Hall, 1953), 56; Zilahy(1953).

¹⁶⁴ *CPHMD*, 887; Zilahy(1953), 56.

¹⁶⁵ Zilahy(1953), 56.

¹⁶⁶ *CPHMD*, 889.

Alan Riach observes the millennialism in *In Memoriam James Joyce*, though unfortunately he sees complexities and contradictions which undermine it.¹⁶⁷ Summing up Riach says: ‘MacDiarmid’s problem’, was to ‘bring the serenity he had achieved’ onto the page ‘*while maintaining a Marxist ethic*’.¹⁶⁸ In this reading socialism *is* serenity, as the sense of the *Epoch of Rest* merges with the place where ‘From the very beginning we feel at home’.¹⁶⁹

Science is deeply embedded in the fabric of *In Memoriam James Joyce*, and many of the poem’s devices and conceits would not work in its absence. Science is essential to the universality of the vision at one end of the scale, and at the other, it is often the formal mode of enquiry. So whether science is employed in a simple sense to provide texture and completeness, or whether it relates allegorically to truth, or transition, or stability of underlying structure, without it the poem would be one dimensional. Science is clearly made free with on occasion by misreading techniques which shift it to the domain of the poet’s concerns. In the final expression of the inevitability of utopia, evolutionary science is not just misread, but apparently turned completely on its head, which also signifies a transition to unreality.

Radical Integration

MacDiarmid’s late text is unsettling in terms of its scale, its overlap, and also its content. It challenges traditional views of poetic texts, not least the New Critical idea of the poem as a coherent stand-alone object. MacDiarmid’s late text is highly innovative in the way science is incorporated into its fabric. The critical reaction to MacDiarmid’s late text is

¹⁶⁷ Riach(1991), 90-93.

¹⁶⁸ Riach(1991), 148; Riach’s context is ‘the last major section’ of the poem; emphasis original.

¹⁶⁹ *CPHMD*, 871.

almost as complex as the text itself. One of the reasons for this is the fine line between MacDiarmid's life and his work. The difficulty of maintaining a clear distinction between biography and poetry is acute in MacDiarmid's quasi-autobiography *Lucky Poet*, where he completely blurs the distinction himself. Poetry and prose in *Lucky Poet*, although they stand out as different in appearance on the page, run together almost seamlessly, as MacDiarmid links passages of poetry with short prose statements to illustrate the particular argument he is making. The chapter 'The Kind of Poetry I Want' contains prose which relates to the poetry, and a version of the poem *The Kind of Poetry I Want* which is different from that in *Complete Poems*.¹⁷⁰ *The Kind of Poetry I Want* is simultaneously meta-poetry, in that it's poetry about poetry, and declarative prose-like statements of intent. There is a sort of multi-level radicalism in MacDiarmid's late text which is expressed in the poetry's form and content and in a tight bond between poet and poetry. From my first reading of MacDiarmid's late poetry, I was aware of the widespread critical position, as Alan Riach puts it, that 'contradiction and paradox are at the heart of his vision'; the implication is that contradiction runs on an axis through both his life and his work.¹⁷¹ To be frank, this was confusing – the poetry I was reading seemed to me entirely cogent. A still graver charge is put by G. E. Davie in his second book, *The Crisis of the Democratic Intellect*: philosophical confusion. Riach, in his introduction to *Lucky Poet*, writes that Peter McCarey, 'Picking up from Davie's argument', 'describes the essential problem with MacDiarmid's later work: attempts to read coherent philosophical positions from it run into insurmountable contradictions'.¹⁷² I have become convinced, however, that if one adopts the radical perspective that

¹⁷⁰ Excepting that the *LP* version is collected in *CPHMD*.

¹⁷¹ Riach(1991), 12.

¹⁷² *LP*, <10>.

MacDiarmid's late poetry seems to demand, then the contradictions disappear, and what emerges is a consistent body of work of great integrity. It is possible to define two opposing views of MacDiarmid's late poetry: that it is contradictory, or that it is integrated.

Some of MacDiarmid's 'contradictions' seem to drop away easily, such as the persistent charge that being both a communist and a nationalist is paradoxical.¹⁷³ It's well known that there was tension on the left over this issue; MacDiarmid, adopting a theoretical path already set out by John Maclean, engaged with the argument and was expelled from the Scottish Nationalists for communism, and subsequently from the Communist Party for nationalism.¹⁷⁴ This, however, is political struggle, not paradox: MacDiarmid re-joined the CPGB in 1957 and was on the winning side of the argument.¹⁷⁵ In 1954 the CPGB leader Harry Pollitt said 'the imperialists cannot subdue the mighty movement for ... national liberation'.¹⁷⁶ Kenneth Buthlay's understanding of the matter in 1964, when he wrote that 'MacDiarmid's nationalism is not at all narrow but is rather conceived as the necessary condition of internationalism', seems to have been ignored.¹⁷⁷ Another charge against MacDiarmid, that his commitment to Marxism was weak, does not stand up to the evidence. Scot Lyall, for example, claims that 'the extent of Marx's influence on MacDiarmid is debatable'.¹⁷⁸ There is nothing debatable about MacDiarmid's commitment to political activism in his letters to Barbara Niven, the

¹⁷³ E.g. Lyall&McCulloch(2011), 1.

¹⁷⁴ Maclean, see e.g. *LP*, 145-7; Riach(1991), 83; Bold(1988), 343-4, 377.

¹⁷⁵ There is no criticism of the CPGB in *LP*, which was written post-expulsion in 1939-40; only one letter has been found which criticises the CPGB directly: letter to the independent communist Guy Aldred addressed 'Dear Comrade' dated 28/8/39, Grieve, Dorian, O.D. Edwards, and Alan Riach, (eds.), *Hugh MacDiarmid: New Selected Letters*, (Manchester: Carcanet, 2001), 166.

¹⁷⁶ Quoted from Raphael Samuel, *The Lost World of British Communism*, (London: Verso, 2006), 49 (ellipsis in Samuel); Samuel(1985).

¹⁷⁷ Buthlay(1964), 10; see also *LP*, 143-5.

¹⁷⁸ Lyall(2007), 8.

widely admired financial organiser for the *Daily Worker* who is credited as almost the life force behind this remarkably professional but shoestring operation.¹⁷⁹

There is a folder in the NLS of 119 letters from MacDiarmid to Niven covering the period 1955 to 1972, and Niven's extant letters to MacDiarmid, of which seven are published in John Manson's volume *Dear Grieve*, extend to circa 500 folios, beginning in 1938.¹⁸⁰ The MacDiarmid persona which appears in this set of letters is emotionally seamless between the personal reports of illnesses and holidays, and discussion of his writing, poetry readings, and frenetic political activity. Every letter contains word about Valda – although she was not a party member, by one account 'Valda was, if anything, more of a rebel than Grieve'.¹⁸¹ The letters report on Niven's comments on MacDiarmid's writing, tell of a lecture to the CPGB about Scottish poetry, discuss his televised interview with Malcolm Muggeridge, a platform shared with Malcolm X, and report his delight that the Party gave him six bottles of Glenfiddich for his 75th birthday.¹⁸² Whilst considering a book on Communism and Poetry he says 'I am completely opposed to the CPGB with regard to the "invasion" of Czecho-Slovakia'.¹⁸³ An interesting detail is MacDiarmid looking forward to a visit from 'Miroslav Holub, the Czech poet and distinguished pathologist'.¹⁸⁴ Beth Junor puts the position in material terms in her introduction to her volume of Valda's letters to MacDiarmid.¹⁸⁵ Writing sensitively about the couple's poverty, Junor says: 'Poets whose work is infused with

¹⁷⁹ See MS.27185, folio 118.

¹⁸⁰ Letters to Barbara Niven, NLS shelfmark MS.27158; John Manson, private correspondence, 11/6/11 and 21/12/11; Manson(2011).

¹⁸¹ Graham&Smith(1992), 64.

¹⁸² Folio 5, 5/11/56; folio 25, 11/8/61; folio 31, 3/3/62; folio 80, 30/12/64; folio 111, 17/8/67; Malcolm X, see also Bold(1988), 422.

¹⁸³ Folio 138, 7/8/69; see also Samuel(1985), 205-6.

¹⁸⁴ Folio 119, 30/7/68.

¹⁸⁵ Beth Junor (ed.), *Scarcely Ever Out of My Thoughts, The Letters of Valda Trevlyn Grieve to Christopher Murray Grieve*, (Edinburgh: Word Power Books, 2007), Junor(2007).

political thought or observation have usually had to live lives made more difficult' by social conditions with which we are unfamiliar today.¹⁸⁶ MacDiarmid's niece, Morag Enticknap, notes the emotional strength necessary to maintain lifelong commitment to a cause: 'He had faced life always with great courage, and he was indomitable to the end'.¹⁸⁷

Many of the charges related to MacDiarmid's politics simply seem misplaced. The supposed contradiction, however, between idealism and materialism in MacDiarmid's life and work is important because, as in 'On a Raised Beach', the tension between these domains is central to MacDiarmid's poetry. Herbert puts the matter succinctly in relation to MacDiarmid's long poem *To Circumjack Cencrastus*; Herbert notes 'the manner in which MacDiarmid's self-vaunted materialism is underpinned by a contradictory note of ecstatic spirituality'.¹⁸⁸ The only issue I take with Herbert's description is the word 'contradictory'. MacDiarmid similarly associates, as noted, in *A Drunk Man Looks at the Thistle*, socialism with divine providence. The historian Raphael Samuel in his book *The Lost World of British Communism* provides insight, some of it personal, into the mentality of communists in MacDiarmid's time.¹⁸⁹ There was a shared morality and vision in the communist world; communism, Samuel says, 'had affinities to a crusading order, a union of novices and initiates under a vow [...] to be true to a cause', communists were 'soldiers *in partibus infidelium* waging temporal warfare for the sake of a spiritual end'.¹⁹⁰ Samuel continues: 'Communism rested on a promise of redemption', 'Socialism was a sublime essence', it 'represented the highest form of human

¹⁸⁶ Junor(2007), xix.

¹⁸⁷ Morag Enticknap, 'A Memoir', in Gish(1992), 37.

¹⁸⁸ Herbert(1992), 171; Herbert's context is a passage from *To Circumjack Cencrastus*.

¹⁸⁹ Raphael Samuel, *The Lost World of British Communism*, (London: Verso, 2006); Samuel(1985).

¹⁹⁰ Samuel(1985), 45; in the lands of the unbelievers.

development', and as the state withered away, the vision corresponded to the 'eschatological terminals of the Christian cycle', and 'in the confident hypothesis of everlasting peace, to Christian prophecies of the after-life'.¹⁹¹ Being a Communist was a heady, emotionally consuming state of affairs. Communists believed in the 'transforming power of knowledge, and the emancipatory potential of science', and were in their idealised self-conception 'ambassadors of hope', convinced that 'mankind is advancing out of the darkness'.¹⁹²

Marx and Engels wrote in the *Communist Manifesto* that, in the face of the advancing bourgeoisie, 'All that is solid melts into air, all that is holy is profaned'.¹⁹³ MacDiarmid associated, implicitly and explicitly, the moral rightness of socialism with the moral rightness of religion; for example, in *The Battle Continues*, MacDiarmid says rhetorically to the pro-Franco poet, Roy Campbell: 'You have sinned against the Light'.¹⁹⁴ In 'The Skeleton of the Future', the connection is next to explicit.¹⁹⁵ This is the complete poem, starting with the subtitle.

At Lenin's Tomb

Red granite and black diorite, with the blue
Of the labradorite crystals gleaming like precious stones
In the light reflected from the snow; and behind them
The eternal lightning of Lenin's bones.¹⁹⁶

¹⁹¹ Samuel(1985), 51-2.

¹⁹² Samuel(1985), 50.

¹⁹³ Karl Marx and Friedrich Engels, *The Communist Manifesto*, (Oxford: Oxford World's Classics, 1998), 6.

¹⁹⁴ *CPHMD*, 943.

¹⁹⁵ *CPHMD*, 386.

¹⁹⁶ *CPHMD*, 386.

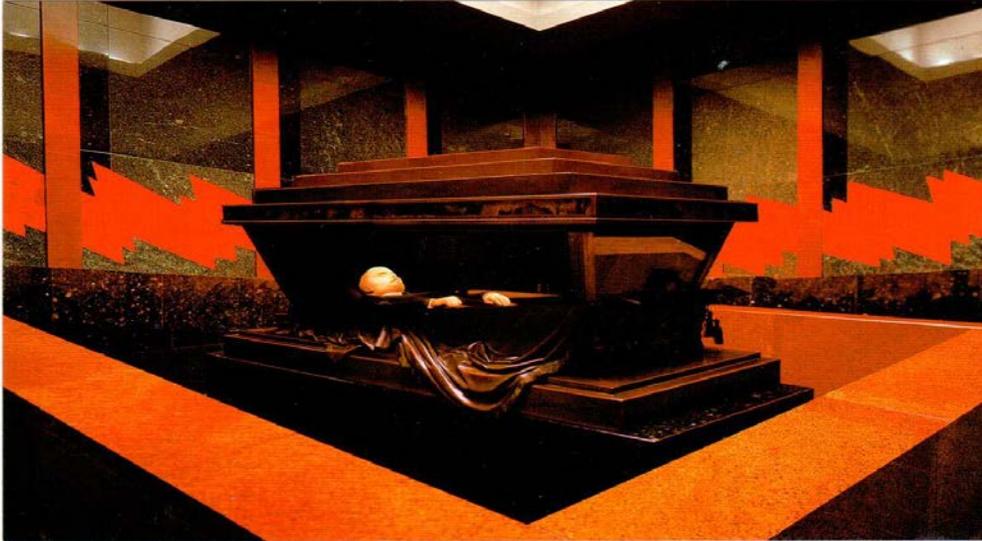


Figure 1. 'At Lenin's Tomb'. Moscow postcard 2012 ¹⁹⁷

MacDiarmid folds together stone, light, lightning, and veneration. The symbolism is powerful and confers the confidence to make strong, but grounded, remarks; for example, in *The Battle Continues*, MacDiarmid writes: 'There is nothing the Nazis and Fascists have done / That the English haven't done again and again'.¹⁹⁸ But MacDiarmid's fervour sometimes took a darker turn, which has repelled many people.

This is a verse from the 'First Hymn to Lenin':

As necessary, and insignificant, as death
 Wi' a' its agonies in the cosmos still
 The Cheka's horrors are in their degree;
 And'll end suner! What matters 't wha we kill
 To lessen the foulest murder that deprives
 Maist men o' real lives?¹⁹⁹

This is cold-blooded support for violence – but as a Marxist, MacDiarmid would have seen the Cheka's violence as countering the bourgeoisie's 'foulest murder'. It is not only communists who have argued that the end justifies the means. At the risk of deepening

¹⁹⁷ Permission: see Acknowledgements.

¹⁹⁸ *CPHMD*, 935.

¹⁹⁹ *CPHMD*, 298.

the controversy, and even approaching the narrowing legal limit of free speech, it seems obvious that support for violence is politically mainstream in Britain in 2015. It is valid to make a comparison: unprovoked major invasions, bombing of unprotected populations, drones, death squads, helicopter gunships terrorising villagers, and torture, do not seem to cause any moral qualms amongst politicians or in the media. From imperialism's manifest destiny to contemporary war, one's own state's violence is assumed to come with impunity, the people one's state kills remain uncounted, and support for one's own state's acts of occupation and war, however terrible, is never described as cold-blooded support for violence. MacDiarmid, as a Marxist, saw through this propaganda veil, but to be clear, what MacDiarmid wrote is reprehensible. MacDiarmid lowers himself to the same severely-compromised moral level as the Empire builders and today's warmongers. He lowers himself to the same level as Roy Campbell, to a place where what one is fighting for is irredeemably corrupted. In more distant terms, MacDiarmid's outbursts, which do not show him in a good light, nevertheless underline the warts-and-all honesty to be found in his texts.

With the consistency of MacDiarmid's thinking established, the way is paved for a wider consideration of the late text itself. Surely the conditions of its production are not irrelevant. A close up account of MacDiarmid's Shetland period (1933 – 1941), when the late text originated, can be found in the Whalsay History Group's *MacDiarmid in Shetland*.²⁰⁰ MacDiarmid's creativity at this time was intense.²⁰¹ Riach comments that *Lucky Poet*, which also originates from the same period, was probably 'written at high

²⁰⁰ Graham&Smith(1992).

²⁰¹ Graham&Smith(1992), 5, 7, 16.

velocity'.²⁰² MacDiarmid was writing incessantly, on any paper he could get hold of, including 'huge unmanageable pages of grocery paper' and partly used school exercise books.²⁰³ MacDiarmid's son Michael recalled pages 'scrunched so hard into a ball of desperate irritation' and thrown into the fire.²⁰⁴ Valda 'burned her fingers' and defied MacDiarmid's 'angry torment', to rescue these papers from the flames.²⁰⁵ In this way, Valda's reverse editing made a contribution to the extant text. Some of this material was typed on the island and preserved, but on leaving Shetland, portions of the *In Memoriam James Joyce* manuscripts 'being transported in leaky tea-chests', 'were soaked' and lost.²⁰⁶ Later much needed to be written to 'fill out' the resulting gaps.²⁰⁷ A large archive of manuscript and typescript, which may not yet have been fully explored, remains in the National Library of Scotland.

MacDiarmid's technique was to collect massive numbers of text samples.²⁰⁸ The Shetland period poems, Ruth McQuillan suggests, run from pages 385 to 1035 of *Complete Poems*.²⁰⁹ Naming schemes for parts, or all, of what is essentially the same body of material have come and gone. Buthlay refers to 'two colossal poems': *Cornish Heroic Song for Valda Trevlyn* and *Mature Art*, as underlying many of the fragments of poetry which were appearing up to the early sixties.²¹⁰ In 1939 *Cornish Heroic Song* was reported to be 'some 60,000 lines'.²¹¹ Buthlay comments: 'one boggles at being given a few pages of a poem said to be 60,000 lines long and then discovering that part of what

²⁰² *LP*, <12>.

²⁰³ Graham&Smith(1992), 55; e.g. *Red Scotland* manuscript NLS shelfmark MS.27035.

²⁰⁴ Graham&Smith(1992), 57.

²⁰⁵ Graham&Smith(1992), 57.

²⁰⁶ Riach(1991), 65.

²⁰⁷ Riach(1991), 65.

²⁰⁸ Graham&Smith(1992), 58.

²⁰⁹ Graham&Smith(1992), 5.

²¹⁰ Buthlay(1964), 97.

²¹¹ Buthlay(1964), 97.

one has been given is also attributed to another poem'.²¹² The 'Cornish Heroic Song for Valda Trevlyn' in *Complete Poems* is only about 230 lines.²¹³ The most thorough engagement with MacDiarmid's text complex is Herbert's study, *To Circumjack MacDiarmid*.²¹⁴ Herbert gives particular attention to 'purported "failures", incomplete works, and those aspects of his canon which can only be described as neglected', in order to establish 'the coherency of MacDiarmid's achievement'.²¹⁵ Herbert refers generally to the 'confused critical response to MacDiarmid's late work'.²¹⁶ The establishment of the *Complete Poems* canon, Herbert says, due to its chronological order, supports 'a reading of this epic as irremediably fragmented', leading to the 'classifying of its internal structure as rudimentary'.²¹⁷ Morgan questions: is this 'non-poetry or anti-poetry?', but is far sighted – 'it is only an anti-poetry in the dialectical sense that it opposes one conception of poetry', a conception which, the poet believed, is unequal to the task history places before it.²¹⁸

If MacDiarmid's late work is not exactly typical literary poetry, then perhaps there is some relationship to oral poetry. Repeated phrases, such as 'Ah Lenin', 'Ah Joyce', and 'A poetry like', are reminiscent of oral poetry, and so is the multiplicity of content for a specific form such as *The Kind of Poetry I Want*. There is in fact a striking resemblance between MacDiarmid's late text and some post-Milman Parry insights into

²¹² Buthlay(1964), 99.

²¹³ *CPHMD*, 704-12.

²¹⁴ Herbert(1992).

²¹⁵ Herbert(1992), xiv.

²¹⁶ Herbert(1992), 163.

²¹⁷ Herbert(1992), 163.

²¹⁸ Morgan(1974), 195.

oral poetry, as described in Alfred Lord's exposition of his own and Parry's work, *The Singer of Tales* (1960).²¹⁹ Lord writes:

The poet was sorcerer and seer before he became an "artist". His structures were not abstract art, or art for its own sake. The roots of oral traditional narrative are not artistic but religious in the broadest sense.²²⁰

Suspending disbelief – because *The Kind of Poetry I Want*, for example, is very strange and jarring when read aloud, even by MacDiarmid – it is just possible to imagine that the particular circumstances of composition led MacDiarmid to produce a text with something of the fluidity, the formulaic nature, and the redundancy, of oral poetry.²²¹ MacDiarmid's late work can be seen as 'religious in the broadest sense', and it is not structured as abstract art or philosophy. Perhaps the late poetry can be thought of as something like an oral poetry of the mind. Lord says, 'our neatly categorising minds work differently from the singer's', the oral form is 'ever changing in the singer's mind, because the theme is in reality protean'; the oral form is a 'living, changing, adaptable artistic creation', and the 'result is that characteristic of oral poetry which literary scholars have found it hardest to understand and accept, namely, an occasional inconsistency'.²²² The analogy can be pressed further. Lord writes of the 'supra-meaning' which develops in an oral performance, and notes that 'the communication of this supra-meaning is possible because of the community of experience of poet and audience'.²²³ Perhaps the sense of a 'supra-meaning' developing between singer and audience, or poet and reader, is a useful way to interpret Crawford's idea of MacDiarmid's oeuvre being a 'poetry of knowledge'. In this way the feeling of knowledge in MacDiarmid's late work

²¹⁹ Albert Lord, *The Singer of Tales*, (New York: Atheneum, 1973); Lord(1960).

²²⁰ Lord(1960), 67.

²²¹ On Cas.75(30), side 2, MacDiarmid reads *The Kind of Poetry I Want*.

²²² Lord(1960), 95, 94.

²²³ Lord(1960), 148.

arises when the reader's own knowledge, almost unconsciously, amplifies a particular passage.

A defining factor of the late text is MacDiarmid's technique of sampling. The process of sampling, or decontextualizing a fragment of (someone else's) text, confers on the sample a particular frozen status. Text samples are in a way like photographs, a snapshot record of their *momento mori*.²²⁴ The samples are statements of truth because they truly represent a moment of human thought, a property which persists in various degrees even after the sample has been re-contextualised by a poet in a poem. The process of selection and preservation could be said, in a thoroughly degraded way, to factualise the text samples. If so, then poetry constructed in this manner could genuinely be called a poetry of facts. Another feature of the samples, at this level of abstraction, is that they are all identical in status. In this view the idea of knowledge seems to disappear: the samples are data. Perhaps this reinforces the idea that the sense of knowledge in MacDiarmid's poetry arises from the reader's cognition. In the abstract view, no one sample is more privileged than any other: the samples are in their raw database state. Introducing the idea of a computational model of MacDiarmid's late poetry, Crawford suggests that the late corpus is 'literature and language on the edge of the computational' which resembles the 'textures and forms of the modern computer'.²²⁵

To build on Crawford's idea, two types of computational model are put forward. The first is crude, and serves to illuminate the observable chaos of MacDiarmid's late text. The second, drawn from the sub-field of information processing, postulates an abstract model of the late text comprising three conceptual entities, poetry, science, and

²²⁴ For a discussion of photographs in these terms see Robert Crawford, *The Beginning and End of the World*, (Edinburgh: Birlinn, 2011), 41-2.

²²⁵ Crawford(1995), 176.

politics; it is here, I believe, a measure of text-wide coherence begins to emerge. In both cases the idea of ‘computation’ must be lost if the model is to be meaningful – the purpose of the model is to signify a shift from poetry to the abstract world of software structures and forms. Very roughly, in the first scheme, MacDiarmid’s samples are the database of a computer system, the narratives and themes are equivalent to software processes, and the user interface or presentation layer is the actual poetry. Regarding the idea of software processes, in the model this is suggested as equivalent to something like compositional intent – there is no implication of algorithmic transformation. Using such a ‘computational’ model as a structural window on MacDiarmid’s late work introduces a measure of clarity as to how the late text came about; it is the start of an analytical framework within which further steps can be taken. It’s possible to see how the text can emerge as poetry in many different shapes and forms, and due to this almost unlimited flexibility, one can also appreciate the difficulty MacDiarmid had in creating particular edits of his text. Normally, with poetry, one thinks of the actual poem on the page as the work’s most concrete expression. However, with MacDiarmid’s late text, under this model, the physical presentation, as in *Complete Poems* and *Lucky Poet*, is the least concrete, or most abstract expression of the poetry. The software model turns the traditional view of a poem as a static, unique entity, on its head. It is as if MacDiarmid created, not poetry in the traditional sense, but a *poetry system*, which he was only partly able to control. The computational model explains the difficulties of both poet and reader with regard to the text. If there is no unique edit of the late text, and ontological uniqueness does not reside (typically) at the level of a particular poem, then this explains why any piece of text could reasonably be, and often actually is, placed more or less

anywhere. In this way it is valid and legitimate to make comparisons between poems, in the way, for example, I use passages of *The Kind of Poetry I Want* to support arguments in *In Memoriam James Joyce*.

The computational analogy can be made more concrete by comparing the poetry in *Lucky Poet* with that in *Complete Poems*. In *Lucky Poet*, the passage ‘Come, follow me into the realm of music ...’ from the final section of *In Memoriam James Joyce*, is repeated at length, and then linked with the phrase ‘I am always stressing the importance of fact – of thorough documentation’ to another poem altogether.²²⁶ MacDiarmid is using a different edit of his text to create a different poetic structure, and actually making this explicit with the prose link. The version of *The Kind of Poetry I Want* in *Lucky Poet* opens with the memorable image ‘I dream of poetry like a bread-knife / Which cuts three slices at once’.²²⁷ The same lines occur in the *Complete Poems* version about two and a half pages in.²²⁸ The poems remain synchronised for about nine *Complete Poems* pages, up to the poker reference: ‘A poetry that is – to use the terms of Red Dog – / High, low, jack, and the goddam game’.²²⁹ In *Lucky Poet*, MacDiarmid then draws other passages into the poem, typically with short prose links. The first such passage is a poem called ‘The Puffin’ which opens: ‘In my dealings with facts I resemble / One of the puffins we see in the Shetlands here’.²³⁰ There’s a passage from ‘Third Hymn to Lenin’, and, a little later, with the linking phrase ‘Again I say’, MacDiarmid picks up briefly from where he left off in the *Complete Poems* version.²³¹ The poems then diverge again with, in the

²²⁶ *LP*, 324; *CPHMD*, 1014; *LP*, 326.

²²⁷ *LP*, 115.

²²⁸ *CPHMD*, 1005.

²²⁹ *LP*, 127; *CPHMD*, 1024.

²³⁰ *LP*, 127.

²³¹ *LP*, 129; *CPHMD*, 1024.

Lucky Poet version, MacDiarmid making the linking process explicit with phrases like ‘And again’, or breaking the sections more completely with long passages of prose.²³² The quote I used about MacDiarmid’s desire for long poems to be ‘far too long / To be practicable for any existing medium’ is only in the *Lucky Poet* version, while the quote relating to *News from Nowhere* is only in the *Complete Poems* version.²³³

The difference between the two versions of *The Kind of Poetry I Want* is not like poetic revision in the way that the crescendo-less text labelled ‘On a Raised Beach [first version]’ is certainly a staging post towards the final poetic achievement.²³⁴ It’s more like the label *The Kind of Poetry I Want* represents not a poem, but a virtual theme which can be realised by different edits of the underlying text. In this way much that initially appears chaotic about MacDiarmid’s late work becomes coherent. The potential endlessness of *The Kind of Poetry I Want* now seems to be analytical; I suggest that the same types of principles could be brought to bear on the whole of the late text.

An archived folder is described in the NLS catalogue as ‘including typescripts closely related to *In Memoriam James Joyce*, but addressed to the sixteenth century Italian poet Teofilo Folengo’.²³⁵ Two typescripts in this folder vie for attention, one blue, one black: the heavily marked blue typescript is possibly the more complete version of a poem entitled ‘Mature Art’, subtitled ‘In Memoriam Teofilo Folengo’, and said to be in a note one of the shorter separable lyrics of *Cornish Heroic Song For Valda Trevlyn*.²³⁶ This typescript of ‘In Memoriam Teofilo Folengo’ contains some familiar science, such as ‘things not yet discovered are foreknown to Science’ from *In Memoriam James Joyce*

²³² *LP*, 131.

²³³ *LP*, 130, *CPHMD*, 1028.

²³⁴ *CPHMD*, 1458-65.

²³⁵ MS.27021; see also Riach(1991), 60-1.

²³⁶ MS.27021.

and the ‘glow-worm’ and ‘bread-knife’ passages from *The Kind of Poetry I Want*, as well as themes of language gathering and politics; there is also some material I don’t recall from elsewhere.²³⁷ It could be argued that ‘In Memoriam Teofilo Folengo’ is alternative, and at circa sixteen typescript pages, a satisfyingly compact, version of *In Memoriam James Joyce*; albeit that the lack of scale in the former poem means that the greatness of the latter is not replicated. ‘In Memoriam Teofilo Folengo’ can be seen as an independent product of MacDiarmid’s poetry system, a poem – I believe a satisfactory one – constructed from his database of poetry materials, and finding coherent expression in its own right.

If these arguments are true even to a reasonable extent, then the late text can be productively viewed as a radical adding together, or even a system for adding together, parts to make a whole. The whole as such, the complete text, flatly and literally, is near-undefinable and probably not comprehensible as a single entity; nevertheless it can be understood as componentised, and by considering MacDiarmid’s late work as a database of samples combined with a process of poem construction, an analytical method starts to appear, and a form of comprehension of the whole text becomes possible.

This is an argument about how to read MacDiarmid’s late text, not how to edit it: there would seem to be little possibility of arriving at a more definitive editing of MacDiarmid’s late work than that which already exists, nor is it likely scholars will discover a compelling narrative for the history of the text. It is necessary to abandon any hope of organising the poems by composition date; the concept is almost irrelevant – as Herbert has pointed out, even the publication date sequence in *Complete Poems* leads to a

²³⁷ MS.27021; CPHMD, 741; CPHMD, 1016, LP, 122; LP, 115.

fragmented reading.²³⁸ My proposal allows one to see clearly how this state of affairs has come about. The database/compositional process/variable window on the poetry is in fact unified: thus on this basis one could suggest that MacDiarmid's late work is neither fragmented nor unstable – there is an abstract whole or reference framework, or in other words a system-level view. It could, however, be countered that this scheme is so abstract, so general, that it could apply to an arbitrary, random text. I think there is only one defence against this charge, and it is necessarily subjective – a random text, except in conditions of infinite trial and error, could not produce poetry.

The statement that MacDiarmid's late work is neither fragmented nor unstable does not imply individual poetic completeness: MacDiarmid's late poems can never be considered complete in the traditional sense. I would argue too that the first computational model allows unanswerable editorial questions to be set aside, perhaps allowing a critical refocussing on the late text: for example, it could be asked if the loosening of formal control finds a parallel in MacDiarmid's politics in areas such as the withering away of the state, and to worlds like Nowhere, with its sense of benign anarchy. A notion of equality can be found, quite concretely in the case of science and literature, where there is no sense of relative status or privilege.²³⁹

If the first 'computational' model helps explain the observed late text, while on the one hand holding on to the idea of compositional intent, and on the other illustrating, by means of the unlimited flexibility of MacDiarmid's scheme, the difficulties of the situation the poet had got himself into, the second model tries to push further. The purpose of abstraction in information processing is to discover levels at which

²³⁸ Herbert(1992), 163.

²³⁹ See also Crawford(1995), 179.

representative simplifications of the underlying data appear, so that the detail may be added back around an orderly structure. Suppose at an abstract level MacDiarmid's late corpus comprises three conceptual entities: poetry, science, and politics. The entities are protean, as with oral themes, and they also stand for, or represent, a wider set of meanings. Poetry is the world of imagination, the spiritual domain, the non-material world, but also literally poetry, pushing in the extreme to collections of language and literature, as in *In Memoriam James Joyce*. Science and politics are related but separate, though they can both stand for materialism, and both overlap the realm of ideas. Science obviously stands for facts, and vice versa. MacDiarmid's late poetry both holds this triumvirate together, and tests how far they can be pulled apart. It is in this abstract domain where reasonably simple and coherent aesthetic order finally starts to emerge on a text-wide basis. One way to support this view is to argue, based on observation, that at this abstract conceptual level, as opposed to the more concrete compositional view of the earlier computational model, MacDiarmid's composition is *unique*. Further, the text under consideration is individually and emotionally meaningful in terms of the reader's ability to discover and engage with a poetic mind; this experience has been memorably described by Andrew Marr in a 2014 TV broadcast: 'MacDiarmid crawled up my nostrils and into my brain'.²⁴⁰ If one is poetically moved by MacDiarmid's incessant and insistent repetition, and his endlessly variable manipulation of just three simple concepts, poetry, science, and politics, then it is surely possible to claim that MacDiarmid's late text is coherent, integrated, of impressive poetic scope, and has integrity as an outstanding, and outstandingly radical, poem.

²⁴⁰ Andrew Marr, *Great Scots, Episode 3: Hugh MacDiarmid*, Broadcast, BBC2, 30/08/2014.

As an illustration, the poetic time and place in ‘On a Raised Beach’ is where the three entities, and their proxies and analogues, exist. There is opposition, ‘the battle between opposing ideas’, and ‘psychological warfare’ and a place where materialism and idealism, or ‘Being and non-being with equal weapons here / Confront each other’.²⁴¹ There is also resolution: ‘We must be humble. We are so easily baffled by appearances’, and ‘I am enamoured of the desert at last’.²⁴² The tension between materialism and idealism, between science and poetry, does not collapse – on the contrary, maintenance and preservation of difference is the means by which the poet becomes reconciled with reality.

The philosophy in ‘On a Raised Beach’ is a philosophy of difference. The unity is eclectic, as it must be, because there is no philosophy of everything. An attempt to create philosophical unity in ‘On a Raised Beach’ would risk totalitarianism. MacDiarmid in ‘On a Raised Beach’ avoids totalising; elsewhere he is constantly moderating and qualifying his own extremes. The ‘Cheka’s horrors’, for example, are moderated by the ‘resolution of the C. C. of the R. C. P.’ passage in *Lucky Poet*, by the ‘Zamyatin’ passage in ‘Talking with Five Thousand People in Edinburgh’, by Shestov, and by the aesthetic socialism of William Morris.²⁴³ An analogous argument could be made for ‘poetry’ which tends from extreme compilationism to bucolic lyricism. Science gets the contrarian treatment in ‘Ode to all Rebels’. In view of the preceding structural analysis, such text-wide arguments can be made – no single statement has precedence. MacDiarmid’s late work is not, then, ‘whaur extremes meet’, but where extremes are kept apart and

²⁴¹ *CPHMD*, 426, 424, 428.

²⁴² *CPHMD*, 425, 431.

²⁴³ *LP*, 152; *CPHMD*, 1158.

constantly re-worked.²⁴⁴ This is the poetic justification for the presentation of extremism. MacDiarmid's late poetry is about containing extremism, by channelling it, controlling it, and testing it by placing extremism in moderating and aesthetic contexts. In 'On a Raised Beach', the poet constructs reality as a sum of, and balance between, poetry, science, and politics, or their analogues.

Finally, the argument can be brought together, starting by briefly considering MacDiarmid's famous poetry of facts: the phrase surely means poetry *and* facts, or poetry and science. MacDiarmid never negates poetry, no matter how far he pushes it, so the phrase 'poetry of facts' cannot mean a poetry containing only facts, which wouldn't in any case be poetry. He does not synthesise poetry and science, or pretend that they are two aspects of the same thing. Taken as a whole, MacDiarmid's late text is more like the 'living, changing, adaptable artistic creation' of oral poetry.²⁴⁵ MacDiarmid's poetry changes and adapts, not through repeat performances, but because change and adaptation is inherent in the text's vast scale. A quote from *Lucky Poet* shows the dynamic and flexible way in which MacDiarmid thought of poetry and science. MacDiarmid introduces a passage with the remark: 'The best instance of the complementary and mutually corrective development of poetry and science is perhaps that cited in the following stanzas'.²⁴⁶ MacDiarmid argues in these stanzas that 'one of the great triumphs / Of poetic insight', was to prepare many minds 'For the conception of evolution'.²⁴⁷ This is so, he claims, because poetry sensitized the popular mind to the 'appeal of Nature', and thereby prepared the way for science's more detailed observations. In this conception,

²⁴⁴ *CPHMD*, 87.

²⁴⁵ Lord(1960), 94.

²⁴⁶ *LP*, 188.

²⁴⁷ *LP*, 188.

poetry and science are quite distinct, and they interact freely. Davie's response to MacDiarmid's late work seems not to catch this nuance, and to take too fixed a view of poetry and science. Writing in *Crisis of the Democratic Intellect*, Davie claims, 'the limitations of human nature', 'have completely disappeared as a result of his conversion to the point of view of modern science'.²⁴⁸ Davie experiences not a poetry of knowledge, but cogitative dissonance.

MacDiarmid did not 'convert to science', he added it to his poetry. MacDiarmid thought not in terms of synthesis, but in terms of integration of parts. Moreover, the integration is both physical, at the level of samples, and conceptual, as in poetry and science. MacDiarmid left behind metaphysics for a poetic model of reality based on the mutual co-existence of distinct and independent forces: science and poetry, politics and poetry, the material and the ideal. Perhaps as he saw it, by leaving behind *A Drunk Man Looks at the Thistle*, he at least isolated a tendency towards fatalism. In 'On a Raised Beach', the poet is 'not indifferent to the struggle yet / Nor to the ataraxia I might get / By fatalism'.²⁴⁹ The class struggle and the tranquillity of fatalism are both carried forward, sometimes leading to doubt and internal conflict, but this is reality not contradiction. Also in 'On a Raised Beach' he writes, 'Deep conviction of preference can seldom / Find direct terms in which to express itself'.²⁵⁰ MacDiarmid found direct terms, and also indirection: 'everything I write, of course / Is an extended metaphor for something I never mention'.²⁵¹ As one allows the extended metaphors, proxies, and analogies arising from MacDiarmid's trinity of poetry, science, and politics, to develop,

²⁴⁸ Davie(1986), 135.

²⁴⁹ *CPHMD*, 428.

²⁵⁰ *CPHMD*, 423.

²⁵¹ *CPHMD*, 745.

the subtleties of his poetry emerge on a text-wide scale. The multi-dimensional radicalism of this integration is the source of MacDiarmid's creative freedom to present evolution in a future-perfect tense, to say an incantatory prayer to mathematics, and to associate the unknown ontology of quantum mechanics with Nowhere.

III: THE HYBRID WORLDVIEW OF JUDITH WRIGHT

An Introduction to Judith Wright

From the point of view of the formal qualities of their verse, Hugh MacDiarmid's late corpus could hardly be more different from the lyrical and structured work of the Australian poet Judith Wright (1915 – 2000). The similarities between the writers, however, in other ways is quite strong: the poetry of both is driven by an equally intense passion and by moral outrage at the state of the world. In place of the Marxist philosophy which underwrites MacDiarmid's writing, Wright's poetry is conditioned by an intellectual synthesis which she developed with her husband, the philosopher J. P. McKinney, during the 1940s and 1950s, and which is recorded in McKinney's two published books.¹ Wright's moral causes were Aboriginal rights and conservation; these themes and others in her poetry are given remarkable heft by the hybridisation of the couple's synthesis of idealist philosophy and psychologised science, with the objective reality of the land and its people. There is a surprising range and amount of science to discuss in this chapter; surprising because explicit references to science generally only emerge in Wright's later poetry, though when it appears it is often thoroughly wound into the fabric of the poem. In general she deprecated scientific materialism for its value-free modes of enquiry, though in particular she appreciated the emergence of what she saw as the value-based science of ecology. Her use of physics is almost invisible, even several poems about nuclear devastation are allegorised. However, one of the most striking features of Wright's poetry is her use of a 'liberated' concept of time to intermediate historical episodes, particularly in relation to the land and the phases of Australian

¹ J. P. McKinney, *The Challenge of Reason*, (Brisbane: Mountain Press, 1950); McKinney(1950); J. P. McKinney, *The Structure of Modern Thought*, (London: Chatto and Windus, 1971); McKinney(1971).

history. There is sufficient background evidence related to her intellectual development to argue that she is both reading and creatively misreading Einstein's relativity – it is as if Wright is manipulating poetic form in terms of the relativistic frames of reference on which Einstein's theory is based.

Biology in Wright's poetry is more explicit than physics at least in terms of the observational precision of her nature poems; the same poems (and others) are given weight by a theoretical understanding of both Bergson's and Darwin's theories of evolution, as John Holmes shows in his pioneering essay, 'From Bergson to Darwin: Evolutionary Biology in the Poetry of Judith Wright'.² Relativity perhaps inspired an important mechanism (as befits the subject of mechanics) in Wright's poetry, and theoretical biology provides a foil to material reality, but there is also the presence of Jung and the wider ideas of her husband; this complex intellectual matrix is, however, by no means eclectic or random or haphazard in its poetic expression. Wright's diversified intellectualism is unified by a lifelong and unwavering morality based on her struggle for recognition of the compound colonial tragedy of Australia: displacement of aboriginal peoples from the land, the enforced introduction of equally displaced people to England's Gulag, and the subsequent scale and crassness of the destruction of the original landscape.³ Of these, Wright's defence of the Aboriginal peoples is by far the most 'controversial'; Wright's political and poetic struggles were, I believe it is secure to argue, based on the moral outrage caused by violent change, a lack of enduring values, and refusal to acknowledge the manifest truth.⁴

² Holmes(2012), 194-214.

³ Gulag: assertion supported from Robert Hughes, *The Fatal Shore*, (London: Vintage, 2003), 2, 581; Hughes(1986).

⁴ See Judith Wright, *Half a Lifetime*, (Melbourne: Text Publishing, 1999), 284; Wright(1999).

This Introduction seeks to develop an overview Wright's work, describing major aspects of her poetry and background, and ending with her writing about science. The considerations in this opening part of the chapter provide important contexts for the two sub-sections which follow; these put forward poetry and science arguments related to physics and biology. A useful way to begin is to trace a line of Australian poetic development through Les Murray's anthology *The New Oxford Book of Australian Verse*, which places, as I read it, Wright in a pivotal position.⁵ In this regard, A. D. Hope comments that Wright's first collection 'was an immediate success and marked an important dividing line and an important change in Australian poetry'.⁶ The organisation of Murray's anthology, by birth date of the poet (if known) and no more than three poems per writer, encourages a developmental view of Australian poetry. Murray's anthology also includes a substantial Aboriginal contribution, and this draws attention to the scant focus on native peoples in the work of Australia's white poets.⁷ In an essay, 'Aboriginals in Australian Poetry', Wright says, 'Poetry reflects social attitudes as much in what it leaves out as what it puts in' and noting this absence in her study, *Preoccupations in Australian Poetry* (1965), Wright refers to 'the silent war with the blacks'.⁸ In Murray's anthology, before the entry on Wright, the handful of white poets who mention Aborigines really only note their presence in passing, as for example in W. E. Harney's 'West of Alice'.⁹ Other examples are a mild lament for clearing the land in E. G. Moll's

⁵ Les Murray, (ed.), *The New Oxford Book of Australian Verse*, (Melbourne: Oxford University Press, 1986); Murray(1986).

⁶ A. D. Hope, *Judith Wright*, (Melbourne: Oxford University Press, 1975), 5; Hope(1975).

⁷ E.g. Murray(1986), 1, 36-8, 94-5, 175-9.

⁸ Judith Wright, 'Aboriginals in Australian Poetry', in Judith Wright, *Because I Was Invited*, (Melbourne: Oxford University Press, 1975), 138-50, 138; Wright(1975); Judith Wright, *Preoccupations in Australian Poetry*, (Melbourne: Oxford University Press, 1965), 77; Wright(1965).

⁹ Murray(1986), 134.

‘Clearing for the Plough’, and an Aboriginal presence is again simply noted in Roland Robinson’s ‘The Deep Well’.¹⁰

Wright says in ‘Aboriginals in Australian Poetry’, ‘the process of “civilising” Australia was a process of slaughtering, in more or less overt ways, the original inhabitants’, and that ‘Most people, in the nineteenth century, knew of matters best kept under wraps’.¹¹ Some examples she gives in this essay of poems in which the Aboriginals are actually the subject would pollute any anthology and show the soundness of Murray’s editorial strategy. Murray includes two poems from the Jindyworobak movement leader, Rex Ingamells (1913 – 1955). The first, ‘Unknown Land’, is a somewhat bitter poem which acknowledges the appropriation of the land: ‘Australia is a land that has no people, / for those that were hers we have torn away’; the second contains a text which purports to be a ‘Corroboree about Banka Banka’.¹² The name refers to Joseph Banks, and while the Aboriginals’, possibly authentic, mockery of the scientist’s obsession with blades of grass is amusing, the piece quickly seems patronising. Wright distanced herself from the Jindys: ‘Remembering what we had done to [the Aboriginal] culture, it was hard to feel that the Jindy tenets were in the best of taste’.¹³ Directly before his entry on Wright, Murray includes a poem by Joan Aronsten (1914 – 2013), ‘Ad Infinitum’.¹⁴ This poem seems to be about the destruction of the Aborigines: ‘The walls close in / and the bereaved shout within their walls of grief’.¹⁵ There is an implication that the land itself is overwhelming them: ‘but there is no end to the sand / that is moving towards them’;

¹⁰ Murray(1986), 136, 173-4.

¹¹ Wright(1975), 138.

¹² Murray(1986), 183-5.

¹³ Wright(1975), 146.

¹⁴ Murray(1986), 195.

¹⁵ Murray(1986), 195.

Aronsten was unable to express her depth of feeling, and the result is vague and confused.¹⁶

Murray's next choice, Wright's 'Nigger's Leap, New England' (1946) is a watershed in the anthology.¹⁷ The title of the poem aggressively re-names the location of a massacre – the driving of a group of Aborigines over a cliff – at a place which later became Wright family land. The actual place name, Darkie Head, deliberately obfuscates.¹⁸ Wright mocks the silence of the whites: 'Night runs an obscure tide', 'and beats with boats of cloud', 'against this sheer and limelit granite head', as if the very air was guilty.¹⁹ The darkness and air must hide the deed, and 'Make a cold quilt across the bone and skull / that screamed falling in flesh from the lipped cliff / and then were silent'.²⁰ She continues, knowing the massacre of Aborigines was far from unique: 'Here is the symbol'.²¹ There is also imagery of a shipwreck: 'night buoys no warning', and 'no bells / sound for her mariners'; Wright is perhaps mocking the idea, and likely white excuse, that the events were merely a tragic accident.²² This is the opening of the third stanza:

Did we not know their blood channelled our rivers,
and the black dust our crops ate was their dust?
O all men are one man at last.²³

¹⁶ Murray(1986), 195.

¹⁷ Murray(1986), 195-6; *CPJW*, 15-16.

¹⁸ See Veronica Brady, *South of My Days; A Biography of Judith Wright*, (Sydney: Angus and Robertson, 1998), 93; Brady(1998); Clarke, Patricia and Meredith McKinney, (eds.), *With Love and Fury; Selected Letters of Judith Wright*, (Canberra: National Library of Australia, 2006), 278; Clarke&McKinney(2006).

¹⁹ *CPJW*, 15.

²⁰ *CPJW*, 15.

²¹ *CPJW*, 15; far from unique, see e.g. Judith Wright, *The Cry for the Dead*, (Melbourne: Oxford University Press, 1982), 124-5, 190; Wright(1981).

²² *CPJW*, 15.

²³ *CPJW*, 16.

Blood and grain: the first two lines seem to represent a distorted Eucharist. When we drink and eat, though we do not know it, the land itself becomes the body and the blood of the victims. The bitterly ironic ‘O all men are one man at last’ substitutes for ‘do this in remembrance of me’; we do not remember, even though we partake of their bodies. The blasphemy at the heart of ‘Nigger’s Leap’, which is amongst the angriest sentiments in Wright’s poetry, remains, as far as I can tell, like the plight of the Aborigines, unnoticed. In an early book of critical essays on Wright’s poetry, two writers pretend ‘Nigger’s Leap’ refers to suicide, though the editor A. K. Thomson, in his introductory essay, authenticates Wright’s story; dating the event in 1844 and quoting Thomas Keating, a later station master in the area. Thompson writes, “‘A lot of the blacks got killed and a lot more crippled’”.²⁴ The third stanza of ‘Nigger’s Leap’ continues:

...We should have known
the night that tided up the cliffs and hid them
had the same question on its tongue for us.
And there they lie that were ourselves writ strange.²⁵

The poem says that we too will be swept away by ‘the night that tided up the cliffs’; but this does not suggest, as the critic Shirley Walker claims, that there is some ‘dark undercurrent of pessimism’ in ‘Nigger’s Leap’, or in this and other poems, a ‘pessimistic view of human nature’.²⁶ Pessimism would signify a negative teleology, a tendency to fear regression, a lack of belief in the possibility of change; pessimism is incompatible with activism. Wright may be warning that in time, justice will be done. She may simply be saying that all will suffer the fate of death; but it is not pessimistic to face the facts,

²⁴ Suicide: R. F. Brissenden, ‘The Poetry of Judith Wright’, 39-50, 43; T. Inglis Moore, ‘The Quest of Judith Wright’, 75-87, 75; authenticates: ‘Judith Wright – an Introductory Essay in Interpretation’, 1-38, 20-1; all in A. K. Thomson, (ed.), *Critical Essays on Judith Wright*, (Brisbane: Jacaranda, 1968).

²⁵ *CPJW*, 16.

²⁶ Shirley Walker, *Flame and Shadow*, (St Lucia, Queensland: University of Queensland Press, 1991), 29; Walker(1991).

however difficult – it is realistic. The critic Jennifer Strauss draws attention away from the massacre towards the human condition, thus diluting the poem’s political impact. Although she acknowledges ‘Nigger’s Leap’ is ‘focussed on the moral condition of the aggressors’, these aggressors, ‘have failed to understand that, because “all men are one man at last”, any act which obliterates part of life aligns the agent with that aspect of time/history which manifests itself as night/death and has the power to obliterate the landscape/all humans’.²⁷

Judith Wright’s forbearers and were amongst the early free settlers in Australia, arriving in 1827; she was born into their farming dynasty in New England’s tableland in northern New South Wales.²⁸ Well acquainted with the land, Wright was a passionate conservationist. She expressed horror of the changes to the Australian landscape caused by settler farming in her earliest published poems, notably ‘Dust’ (1946).²⁹ Her support for the Aboriginal cause can be traced to her learning from her father in the early 1940s the events described in ‘Nigger’s Leap’.³⁰ Wright recalled that this story ‘had sunk more deeply into my own life than [my father] would perhaps have liked, and was to influence me forever’.³¹ Wright travelled a long way from the ‘large c’ conservatism of her upbringing, but was never involved with extremes of politics. According to her biographer Veronica Brady, her contact with the philosopher John Anderson at Sidney University during 1934 was important in shaping her views: ‘[Anderson] was always the enemy of dogmatism, and his scepticism about the high political passions of the day

²⁷ Jennifer Strauss, *Judith Wright*, (Melbourne: Oxford University Press, 1995), 63; Strauss(1995).

²⁸ Wright(1999), 3.

²⁹ *CPJW*, 23-4.

³⁰ Wright(1999), 165; Brady(1998), 93.

³¹ Wright(1999), 165.

seems to have had its effect on her'.³² In 1945, reflecting that she might be seen as 'The Poet Militant' as a result of an upcoming radio broadcast of 'Dust', Wright remarked in a letter 'Did they but know how very unmilitant the poet is!'.³³ In 1971 she commented irritably: 'As to my political attitudes, I'm interested to know I have any'.³⁴ This quietist aspect of Wright's thinking, which at first seems at odds with activism, found important poetic expression. The final line of the third stanza of 'Nigger's Leap', 'And there they lie that were ourselves writ strange', though arresting, is more quiescent than the blasphemous beginning to the verse; perhaps she was shocked at her own anger, and needed to balance it with a more muted tone.³⁵

Another of Wright's famous poems, 'Dust', like 'Nigger's Leap', is also from her first collection *The Moving Image*, published in 1946.³⁶ The poem is an indictment of pioneering farming practice. Dust, a potent symbol in many Wright poems, was created by white farming; she relates her grandfather Albert's experience in a prose work, *The Generations of Men*:

[this was the first of the] great dust storms, whipped up by the rasping wind from the bared country of the far west, where the sharp hoofs of millions of sheep had loosened the light soil, tearing the thin cover of grass and roots that held it. It had been another sign, another wound delivered in the increasing struggle between man and land – the struggle whose marks Albert himself bore more deeply year by year.³⁷

The opening image of the poem is 'sick dust, spiralling with the wind', 'harsh as grief's taste in our mouths'.³⁸ The battle with the land is failing as 'The remnant earth turns

³² Brady(1998), 51; John Anderson, see also Davie(1986).

³³ Wright(1965), 72-5; Patricia Clarke and Meredith McKinney, (eds.), *The Equal Heart and Mind*, (St Lucia: University of Queensland Press, 2004), Clarke&McKinney(2004), 103; letter dated 5/11/1945.

³⁴ Clarke&McKinney(2006), 217; letter to Chris White, dated 12/03/1971.

³⁵ *CPJW*, 16.

³⁶ *CPJW*, 23-4, 15-16.

³⁷ Judith Wright, *The Generations of Men*, (Melbourne: Oxford University Press, 1959), 124; Wright(1959).

³⁸ *CPJW*, 23.

evil'.³⁹ Once though, 'Earth was kinder, suffering fire and plough'. There are two images here: the Aborigines managed the land with fire, and their long stewardship is contrasted with the brief decades of settler farming which turned the land into a dust bowl.⁴⁰ The farmers got carried away, and 'counted the beautiful money', and hoped for progress such that their child 'would never break his body / against the plough'.⁴¹ But dust overtakes their dreams, and worse, 'war's eroding gale scatters our sons / with a million other grains of dust'.⁴² The 'dust accuses', and 'we must make a new choice':

We must prepare the land for a difficult sowing,
a long and hazardous growth of a strange bread⁴³

We make a choice to increase our chance of success, but economic growth is hazardous, not foreordained. Wright acted on the issues raised in 'Dust' – she made her own 'new choice', and later became an activist.

Two of Wright's prose works, with overlapping but different themes, describe the settlement of Australia in terms of the displacement of the Aborigines and the rapid introduction of farming. The first, *The Generations of Men* (1959), quoted from above, is based on a diary kept by her pioneer grandfather from 1866 to 1890, and the second, *The Cry for the Dead* (1981), further explores this extensive diary, and adds her own research into the fate of the Aborigines.⁴⁴ In the latter work, Wright is frequently appalled by her findings, for example, when a member of the Queensland parliament circa 1901 voiced a commonly-held opinion: 'the law of evolution says the nigger shall disappear in the

³⁹ CPJW, 23.

⁴⁰ See e.g., Josephine Flood, *Archaeology of the Dreamtime*, (Sydney: Collins, 1983), 100; Flood(1983).

⁴¹ CPJW, 24.

⁴² CPJW, 24.

⁴³ CPJW, 24.

⁴⁴ Wright(1959); Judith Wright, *The Cry for the Dead*, (Melbourne: Oxford University Press, 1982), Wright(1981).

onward progress of white Australia'.⁴⁵ May Wright, the poet's much-loved grandmother, thought, again in common with many in her time, that the Aborigines should be regarded not as 'an inferior race, but as some superior animal'.⁴⁶ For Wright, the struggle to protect the land and the struggle for the rights of the native people were the same struggle.⁴⁷ In a 1987 paper, she advocates listening to and understanding the Aborigines as a policy for the conservation movement.⁴⁸ Noting the scale of the tragedy involved, Wright says the Aborigines are 'now known to have the world's oldest surviving culture'; she finds encouragement in concluding: 'it was also one so rich in inherited myth, art, and ceremony, and traditional wisdom, that after 200 years of almost unremitting attack it remains in some places, as alive and supportive as ever'.⁴⁹

Across Wright's poetry, a series of related perspectives on land and people are developed. The settler's battle with the land is lost in 'Soldier's Farm': the ploughland is 'vapoured with the dust of dreams'.⁵⁰ It is lost too in 'Brothers and Sisters', where 'the years grew like the grass and leaves / across the half-erased and dubious track / until one day they knew the plains were lost'.⁵¹ In 'Country Town', a poem of displacement and alienation, the depiction of re-created England in Australia is bitter with irony.⁵² Exiles sing of 'chains and whips and soldiers' in a 'landscape that the town creeps over; / a landscape safe with bitumen and banks' where 'The church is built, the bishop is

⁴⁵ Appalled: e.g., Clarke&McKinney(2006), 233; Wright(1981), 269.

⁴⁶ Wright(1959), 88.

⁴⁷ See e.g., Strauss(1995), 93, Wright(1999), 284.

⁴⁸ 'Search for a Public Environmental Ethic' in Judith Wright, *Going on Talking*, (Butterfly: Springwood, New South Wales, 1992), 105-7; Wright(1992); see also Judith Wright, *Born of the Conquerors*, (Canberra: Aboriginal Studies Press, 1991).

⁴⁹ Wright(1992), 107; oldest culture, see Flood(1983), 68, or Stephen Oppenheimer, *Out of Eden*, (London: Robinson, 2004), 58.

⁵⁰ *CPJW*, 11-12.

⁵¹ *CPJW*, 18.

⁵² *CPJW*, 13-14.

ordained'; the poetic voice cries: 'this is where we live / where do we live?'.⁵³ The displacement of people and land dove-tails with Wright's multivalent use of 'time', engendering a sense of slippage, a loss of mental anchor, a lack of control over events. The landscape itself is embedded with multiple allusions. In 'Half-Caste Girl', the hills 'belong to no people' recalling not just loss, but Cook's declaration that the land was *terra nullius*.⁵⁴ The hills 'my father's farther stripped', in the poem 'Eroded Hills', are 'like shoulders naked and whipped', the same as, very probably, the shoulders of the forced convict labourers who actually stripped the hills.⁵⁵ Some poems appear, at least at first, to celebrate Australian settlement. 'For New England', starts this way, but turns on a Jungian thought, [I] 'who am the gazer and the land I stare on', towards the 'jealous bones' of the ancient owners, undermining any complacency regarding the colonial project.⁵⁶

Wright's poem 'Bullocky' from her first collection, *The Moving Image*, much to her frustration, was read as a celebration of settlement. Here is the complete poem:

Beside his heavy-shouldered team,
thirsty with drought and chilled with rain,
he weathered all the striding years
till time ran widdershins in his brain:

Till the long solitary tracks
etched deeper with each lurching load
were populous before his eyes,
and fiends and angels used his road.

All the long straining journey grew
a mad apocalyptic dream,
and he old Moses, and the slaves
his suffering and stubborn team.

Then in his evening camp beneath

⁵³ *CPJW*, 13-14.

⁵⁴ *CPJW*, 19; owned by no one.

⁵⁵ *CPJW*, 81.

⁵⁶ *CPJW*, 22-3.

the half-light pillars of the trees
 he filled the steepled cone of night
 with shouted prayers and prophecies.

While past the campfire's crimson ring
 the star-struck darkness cupped him round,
 and centuries of cattlebells
 rang with their sweet uneasy sound.

Grass is across the waggon-tracks,
 and plough strikes bone beneath the grass,
 and vineyards cover all the slopes
 where the dead teams were used to pass.

O vine, grow close upon that bone
 and hold it with your rooted hand.
 The prophet Moses feeds the grape,
 and fruitful is the Promised Land.⁵⁷

The sense of the bullocky (bull drover) as the suffering pioneer allegorised as Moses leading Australians to the Promised Land is superficial. Instead the suffering brings madness, suggested in the first stanza by 'widdershins', and made explicit by the phrase 'mad apocalyptic dream', and emphasised again at the end of the fourth quatrain: 'he filled the steepled cone of night / with shouted prayers and prophecies'.⁵⁸ When the 'plough strikes bone beneath the grass', the suggestion of Aboriginal bones is perhaps deliberately not mentioned; the poet makes explicit two owners of the bones from the settler era: those of the cattle and the bullocky himself. With the reference to the Promised Land, the reader is almost invited to participate in the cover up – Canaan was not uninhabited. 'Bullocky' was widely anthologised until Wright put a stop to it. In a letter to her daughter Meredith in 1985, Wright said, 'I added to the storm of publicity by firmly removing 'Bullocky' from further use, since the bicentennial celebrations threatened to turn it into a sort of secondary national anthem'.⁵⁹ In a letter in 1986 to Stephen Murray-Smith (a publisher), Wright confirms her refusal to allow 'Bullocky' to

⁵⁷ *CPJW*, 17.

⁵⁸ *CPJW*, 17.

⁵⁹ Clarke&McKinney(2006), 409.

be used in anthologies in the future; she comments, 'I cannot and do not want to control the way in which poems are taught in schools; but the way this one has been interpreted is outright bad'.⁶⁰ She complains that the poem has been abstracted from its close context with 'Nigger's Leap' and 'Bora Ring' (a poem about the appropriation of Aboriginal land), a context which 'should have given the critics pause in assigning to me much if any admiration of the Pioneering Vision'.⁶¹

It is worth noting, in the light of the discussion in the MacDiarmid chapter, the way that isolation of parts of a larger text can lead to misunderstanding of the artist's perspectives. Shirley Walker, in her critical study from 1991, *Flame and Shadow*, misinterpreted 'Bullocky' in exactly the way which frustrated Wright.⁶² Walker writes, 'The settlers, it seems, are the chosen children of God, and sacrifice and suffering are necessary to win the land for them and make it fruitful'.⁶³ A little later, Walker, noting the difference between 'Bullocky' on the one hand, and 'Nigger's Leap', and 'Bora Ring' on the other, describes this apparent discrepancy as 'Wright's ambivalent attitude towards white colonial history'.⁶⁴ Even in 1991, an honest telling of history must be obfuscated. A second book-length critical work, Jennifer Strauss's 1995 *Judith Wright*, takes into account Wright's essay 'Reading and Nationalism' (first published 1987, and made widely available in the 1992 collection *Going on Talking*).⁶⁵ In this essay Wright makes similar points about the importance of poetic context to those quoted from her letters. Strauss writes: 'It would seem reasonable [...] that teachers (and critics) might have a

⁶⁰ Clarke&McKinney(2006), 410.

⁶¹ Clarke&McKinney(2006), 410.

⁶² Walker(1991).

⁶³ Walker(1991), 21.

⁶⁴ Walker(1991), 27.

⁶⁵ Strauss(1995); 'Reading and Nationalism' in Wright(1992), 45-7.

useful role to play in restoring lost contexts'.⁶⁶ Rose Lucas and Lyn McCredden's 1996 collection *Bridgings* includes an essay on Wright entitled 'Through a Web of Language'.⁶⁷ The writers comment: Wright's poetry 'focuses increasingly on the socio-historically constructed oppositions of White/Aboriginal and human (especially White) society/the natural environment, in a way which renders the dissolution or conflation of those differences more politically problematic'; this both acknowledges Wright's vision of history, and undermines it with the phrase 'socio-historically constructed'.⁶⁸ An essay by John Hawke from 2001, however, concedes that 'Bullocky' (and also 'South of My Days'), 'have too often been decontextualized from her oeuvre as a whole, and praised for their superficial conformity to the demands of hegemonic nationalist concerns'.⁶⁹

Once a poem is read in a particular way, it is very difficult to read it differently. Perhaps Wright in 'Bullocky' was unclear, or too quiet about her concerns. On re-reading the poem, its power derives from its subtlety: I don't think this view holds. Wright remarks in 'Reading and Nationalism': the response to 'Bullocky', 'makes the poem a bad one, since I evidently failed to convey my point'; but surely the response to 'Bullocky' says more about the prevailing cultural censorship in Australia, or the ignorance (wilful or not) of some critics, than it does about Wright's poetry.⁷⁰ As Veronica Brady puts it in an essay from 2001, 'Wright was in fact more sophisticated intellectually than many of her critics'; witness Vincent Buckley's comment, in the

⁶⁶ Strauss(1995), 16.

⁶⁷ 'Through a Web of Language' in Rose Lucas, and Lyn McCredden, *Bridgings: Readings in Australian Women's Poetry*, (Melbourne: Oxford University Press, 1996), 18-28; Lucas&McCredden(1996).

⁶⁸ Lucas&McCredden(1996), 26.

⁶⁹ John Hawke, 'The Moving Image: Judith Wright's Symbolist Language', in *Southerly*, Vol. 61, No. 1, 2001, 160-78, 173; Hawke(2001).

⁷⁰ Wright(1992), 47.

context of ‘Bullocky’ and other poems, from 1957: ‘Miss Wright tends to think of nature in such terms as savages use – as something to be feared’.⁷¹

The science in Wright’s poetry, the deep and interesting science, is more emergent than explicit; however, in presentations, articles, and essays, she writes a considerable amount on the subject. A useful collection of Wright’s views on science can be found in a series of nine papers which form the ‘About Conservation’ section of the collection *Because I Was Invited* (1975).⁷² The nine pieces were written between the mid-sixties and 1972 and are thematically similar, though tailored for the different audiences she was addressing. In the first essay in the sequence, ‘Conservation as a Concept’ (1968), she sets out the scale of the challenge for activists: ‘It involves, not only the need to revise most radically our exploitative techniques, but to revise a whole attitude of mind and feeling that are very deeply rooted in our dealings with the natural world’.⁷³ In part, as picked up in ‘Education and the Environmental Crisis’ (1970), she is referring to the ‘Judeo-Christian inheritance’ with its sense of ‘arrogant domination over nature’ which, Wright thinks, needs to be revised ‘very drastically indeed’; though she adds, referring to St Francis, ‘there is no need to go outside Christianity’ for such a revision.⁷⁴ In greater part, however, she is calling for what she saw as the value-free scientific way of looking at the world to be revised. ‘[T]he whole basis of the scientific and technological revolution’, Wright says in ‘Conservation as a Concept’, ‘involved as its first postulate the separation of man from nature’.⁷⁵ This separation involved the objectification of

⁷¹ Veronica Brady, ‘The Politics of Poetics’ in *Southerly*, Vol. 61, No. 1, 2001, 82-8; Vincent Buckley, *Essays in Poetry*, (Melbourne: Melbourne University Press, 1957), 163.

⁷² Wright(1975), 189-256.

⁷³ Wright(1975), 189.

⁷⁴ Wright(1975), 219-20.

⁷⁵ Wright(1975), 190.

nature in physics: the incomprehensible ‘flux of waves and/or particles of which nothing can be said except mathematically’; and also the habit of the scientist who ‘has excluded, and has not needed, any concern with the ideas of value and meaning *in his laboratory*’.⁷⁶

Rounding to her theme, she charges modern physics in particular with allowing ‘illegitimate inferences’, which ‘contribute their bit to our state of mind’:

the conclusion, for instance, that Relativity Theory implies that the vanishing of the concept of the absolute from the procedure of physics applies to the human world as well, so that every individual standpoint is merely relative; and the inference from quantum theory that imports the notion of ‘chance’ as governing atomic events into the human world as well and thinks of it as and thinks of it as invalidating the very idea of purposiveness.⁷⁷

She argues that the separation of meaning and value from scientific enquiry has become manifest ‘on the human level’, and, linking her ideas to those of her husband Jack as she often does (this time implicitly), extends her argument to philosophy where ‘ideas of meaning and value are seen as meaningless and valueless’.⁷⁸

A hallmark of Wright’s more polemical writing is that she will find a way to mitigate her stronger claims, without changing her position. In ‘Conservation as a Concept’ she is hopeful that a ‘new science has arisen in the new studies of ecology, which are moving into the human as well as the biological fields’; this could be ‘a new kind of understanding which shall take into account actual living processes and interdependencies’, and might represent ‘a new spark’, which can ‘jump across the gap which at present separates the arts and sciences’.⁷⁹ That gap appears in familiar form in ‘Science, Value and Meaning’ (1969), which was originally a presentation to a symposium to commemorate the 70th birthday of Sir Macfarlane Burnet (1899 – 1985), a

⁷⁶ Wright(1975), 191; italics original; c.f. McKinney(1950), 13.

⁷⁷ Wright(1975), 192; see also McKinney(1950), 91-3.

⁷⁸ Wright(1975), 192.

⁷⁹ Wright(1975), 193.

distinguished medical scientist.⁸⁰ She begins by quoting C. P. Snow: ““Neither the scientific system of mental development, nor the traditional (literary), is adequate for our potentialities, for the world in which we ought to begin to live””.⁸¹ Wright says: ‘That is true enough, and I for one agree with it’; then, ‘But I think Sir Charles over-simplified the problem’.⁸² Wright identifies the real split as not ‘between scientists and literary intellectuals’, but between ‘the two sides of our human nature’.⁸³ This position is refined by associating the ‘creative and imaginative’ with both scientists and practitioners of the arts, and contrasting this with the ‘the manipulative power-hungry side of us which seizes on the achievements of science and transforms them into technological machinery for uses which scientists themselves, as well as artists, often cannot help but deplore’.⁸⁴ Goethe, Wright argues, understood this, and his ‘real fear was not of the intellect, but of its triumph at the *expense* of the other side of us’.⁸⁵ Wright concludes in Wordsworthian tones: ‘the marvellous world of micro-entities, of the atom and its nucleus’, ‘are waiting to be realised by the imagination [...] The artist should be following every step of the scientist, celebrating every new revelation turning it from fact into imaginative knowledge’.⁸⁶

Wright often criticised science, seeing it as inextricably linked to environmental degradation; she deprecated what she saw as its lack of values and its way of thinking.⁸⁷ Many of her criticisms of science are well targeted. For example, she reports that the ‘real

⁸⁰ Wright(1975), 196-202.

⁸¹ Wright(1975), 196; from ‘A Second Look’, Snow(1959), 63.

⁸² Wright(1975), 196.

⁸³ Wright(1975), 196.

⁸⁴ Wright(1975), 196.

⁸⁵ Wright(1975), 199.

⁸⁶ Wright(1975), 200; see also McKinney(1950), 3-4.

⁸⁷ E.g., Clarke&McKinney(2006), 362-3, 424-6, (letters to Len Webb, dated 25/10/1982 and 9/07/1987); Wright(1975), vii-xii.

goodwill of most anthropologists tends to be blotted out, in Aboriginal eyes, by the very scientific objectivity of their investigation', which seems to them 'cold and inhuman'.⁸⁸ Wright had a particular philosophical understanding of science; she saw its worldview as problematic and sought to change it. In essays concerned with active campaigns, however, she seems to have worked hard to attract scientific interest and was well aware of the pivotal role science could play in conservation struggles, as it did, for example, in her early and unexpectedly successful campaign to save the Great Barrier Reef in 1966.⁸⁹ She returns to Goethe in other essays, but not to Snow or Wordsworth. In several places her vocabulary is reminiscent of F. R. Leavis (who is never mentioned), for example, in the terms 'materialist-utilitarian', and 'economic and technological Gradgrinds'; but that is where any similarity to Leavis ends.⁹⁰ There is a rare mention of Darwin in 'Wildlife Conservation and the Teacher', which rounds on the Darwinian insight: 'man is himself a natural being, though he tends to forget it; he is the resultant of millions of years of adaptation to this planet'.⁹¹

The interplay between poetry and science finds incisive expression in some of Wright's poems. 'Swamp Plant', from her collection *Fourth Quarter* (1976), includes the lines: 'Only science, then, has noticed you, / not poetry. / It's that way round in this country, / upside-down as ever'.⁹² In similar fashion, 'Encounter' opens: 'Knowing altogether too much about beetles: / Latin names, classifications, numbers – six legs, four wings'.⁹³ The poet nearly falls asleep in 'Geology Lecture', but counters the lecture by

⁸⁸ Wright(1975), 152.

⁸⁹ Wright(1975), 230, 208-10.

⁹⁰ Wright(1975), 251, 254.

⁹¹ Wright(1975), 217, 218.

⁹² *CPJW*, 367.

⁹³ *CPJW*, 368.

remembering the forces ‘which in the Modern age could melt these stones / so fiercely, that time might never start again’.⁹⁴ In ‘Eve to Her Daughters’, Wright’s Eve teases her husband (a bit of a scientist): ‘The earth must be made a new Eden / with central heating, domesticated animals, / mechanical harvesters, combustion engines ...’.⁹⁵ This investigating Adam also ‘had to unravel everything, / because he believed that mechanism / was the whole secret’.⁹⁶ Particularly in later poems, comments on science are wound thoroughly into Wright’s poetry: the lines ‘Too little / diversity / means instability / the scientists say. / No fooling’ from ‘Brief Notes from Canberra’ are typical.⁹⁷ The final poem in *Collected Poems*, ‘Patterns’, recalls Wright’s darker notes.⁹⁸ The poem opens with a quote relating to the Bhagavad-Gita, used by the leader of the Manhattan Project, Robert Oppenheimer: “‘Brighter than a thousand suns’”, and is built in couplets on the theme of nuclear war: ‘The play of opposites, their interpenetration – / there’s the reality, the fission and the fusion’; the poem ends: ‘We are all of us born of fire, possessed by darkness’.⁹⁹

A late collection of essays, *Going on Talking* (1992), covers similar ground to those in *Because I was Invited*, though with interesting additional themes. It is worth quoting the first paragraph of ‘Writing in a Nuclear Age’:

One great difficulty about writing in this nuclear age is that the writer has in effect to deal with two different kinds of world – or more. One of them is ‘the world we think we know’ – the so called solid material world with its linked chains of cause and effect, action and reaction, nouns and verbs as it were, with which our languages deal and which to an unknown extent those languages construct. And language is the writer’s medium and instrument, locking us into that macroscopic ‘world we think we know’. It is not designed to deal with the

⁹⁴ *CPJW*, 323.

⁹⁵ *CPJW*, 233.

⁹⁶ *CPJW*, 233.

⁹⁷ *CPJW*, 354.

⁹⁸ *CPJW*, 426.

⁹⁹ See Jungk(1958); *CPJW*, 426.

second world, the shadow world in which relativity and quantum theory operate and in which matter does not exist, having been now, as Whitehead put it, 'identified with energy, and energy is sheer activity'. Jeans put it in this way: 'the history of physical science in the 20th century is one of progressive emancipation from the purely human angle of vision'. And Eddington said: 'the stuff of the world is mind-stuff'.¹⁰⁰

Wright adds: 'How to deal with this double-vision world has been one of my main poetic problems'.¹⁰¹ The remainder of the short essay discusses Wright's poetic responses to the threat of nuclear war – the violent proof of the existence of the scientific shadow world. 'Writing in a Nuclear Age' seems to confirm the centrality of science to Wright's thinking. Instead of science appearing explicitly on the surface of her poetry as hard facts, Wright's science (for the most part) is implicit, underlying, a 'shadow world' where hard science is made soft, where the ineffable resides, where the paradox of existence and non-existence is enacted. Wright so powerfully creatively misreads science that it can sometimes almost represent a spiritual dimension in her poetry. Science in Wright's poetry is the imaginative world of unanswered questions and unknown connections which underlies the historical realism of 'Nigger's Leap', or the natural realism of some poems in her *Birds* sequence. Wright has turned science into a paradox of hard facts versus unreality, and she has done so by exploiting the edge of science itself, turning relativity and quantum mechanics back in on themselves. The apparent subjectivity of observation, the dissolution of time, the uncertainty, and the unreality of twentieth century physics are the model for the shadow world in Wright's poetry. Wright has turned science on its head, which is why it is mostly invisible. By doing so, she can be regarded as a highly accomplished poet of science.

¹⁰⁰ Wright(1992), 39-44, 39; c.f. McKinney(1950), 11-15.

¹⁰¹ Wright(1992), 39.

Time and Physics

Wright's intellectual development was stimulated and nourished by her partner (later husband), the autodidact philosopher J. P. McKinney (1891 – 1966).¹⁰² Patricia Clarke notes, in her introduction to a volume of the couple's early letters, *Of Equal Heart and Mind*, 'the depth and range of their philosophical reading'.¹⁰³ McKinney published, according to Clarke, what amounted to 'a joint project in everything but authorship' in *The Challenge of Reason* (1950); the ideas the pair developed, Clarke adds, 'had an even more profound effect on Judith's poetry, beginning with "The Moving Image"', the title poem of Wright's first collection (1946).¹⁰⁴ Alongside Jung, who was 'of immense interest to them both', the couple studied modern physics, which it seemed to them was dismantling possibility of belief 'in a world of solid independent objects'.¹⁰⁵ Wright combined the spirit of Wordsworth with an awareness that 'the intellectual side of Western man', dominated at the expense of 'the feeling-side'.¹⁰⁶ With this ever-present balance, Wright re-imagined science, most explicitly physics, in the creative hybrid of her poetry. A comment in the preface to a book Wright valued, Richard Wilhelm's translation of the Taoist classic, *The Secret of the Golden Flower*, provides a suggestive link: 'We have to see that the spirit must lean on science in the world of reality, and that

¹⁰² E.g., Brady(1998), 500; Wright(1975), xi-xii; Clarke&McKinney(2004), 108, 154.

¹⁰³ Clarke&McKinney(2004), xii.

¹⁰⁴ Clarke&McKinney(2004), 154; McKinney(1950); Clarke&McKinney(2004), xii.

¹⁰⁵ Clarke&McKinney(2004), 10, 7; see also, Clarke&McKinney(2004), 53, 55, 90-1, 98, 137; Jung, e.g., Brady(1988), x (note 7), 135, 138, 212, Wright(1975), 29.

¹⁰⁶ Clarke&McKinney(2006), 275-6, letter to Shirley Walker dated 10/8/1975.

science must turn to the spirit for the meaning of life'.¹⁰⁷ Wright's assimilation of ideas from physics, particularly in relation to relativistic time, is the subject of this sub-section.

Time in Australia was suddenly re-defined. Writing of his country's foundation, the art critic and historian Robert Hughes says:

No other country had such a birth, and its pangs may be said to have begun on the afternoon of January 26, 1788, when a fleet of eleven vessels carrying 1,030 people, including 548 male and 188 female convicts, under the command of Captain Arthur Phillip in his flagship *Sirius*, entered Port Jackson or, as it would presently be called, Sydney Harbour. [...] One may liken this moment to the breaking open of a capsule.¹⁰⁸

Suddenly and (as it turned out) irreversibly, time in the Western sense had begun. The first recorded words of the local population to the invaders were 'Go away!'.¹⁰⁹ But clearly the British did not, and Western time, in the sense of national and individual destiny, was established. This 'Progress' would be rationalised in the nineteenth century as in accord with Divine law. In 1849 a settler remarked: 'Nothing can stay the dying away of the Aboriginal race, which Providence has only allowed to hold the land until replaced by a finer race'.¹¹⁰ Later in the century Social Darwinism, and the racist theories of Francis Galton would add the (apparent) sanction of Natural Law to statements of this kind.¹¹¹ The Aboriginal view of time could hardly have been more different from that of Europeans. According to the anthropologists Ronald and Catherine Berndt, the Aborigines had a 'spiritual bond linking man with nature in all its aspects', which has 'no counterpart in our own philosophy'; for them 'man is not spiritually a being apart, but springs from the same source as all other forms of life', and 'past, present and future are

¹⁰⁷ Richard Wilhelm, *The Secret of the Golden Flower*, (London: Kegan Paul, Trench and Trubner, 1942), viii; Wilhelm(1942); 'Wright valued', see Clarke&McKinney(2006), 369, letter to Barbara Blackman 9/9/1983.

¹⁰⁸ Hughes(1986), 2.

¹⁰⁹ Hughes(1986), 84.

¹¹⁰ Hughes(1986), 7.

¹¹¹ For a discussion of Galton, see Graves(2001), e.g., 94-5.

merged into one “eternal” reality’.¹¹² This sense of compressed time is often loosely referred to as the Aboriginal Dreamtime.¹¹³ To Western eyes however, the Aborigine was ‘dismissed as a feckless, improvident simpleton, living for the day with “no thought for the morrow”’.¹¹⁴

The title poem of *The Moving Image*, gathers together personal reflections with images of the Australian tragedy.¹¹⁵ The first line of ‘The Moving Image’ commands in the manner of Dylan Thomas: ‘Here is the same clock that walked quietly’.¹¹⁶ This is a four dimensional image. The line recalls Einstein’s thought experiments which imagine clocks associated with three dimensional frames of reference. Wright has developed poetically Einstein’s idea that there are multiple simultaneous times, each one with its own physical associations. It is as if Einstein, for Wright, released time from its Western bondage of progress and destiny, and allowed her to make it relative, to alter its rate of flow, to change its direction, to coil and uncoil it. The notion of time developed by modern physics becomes, paradoxically, the palette for her portrayal of the continental-scale imposition of Western destiny. According to her biographer, Wright, ‘even when she wrote about familiar landscapes’, saw them ‘from a double vision, that of commonsense, and that of contemporary physics which she was reading with Jack’.¹¹⁷ Brady writes that ‘This gave her an angle of vision which was no longer human but sub-linguistic’.¹¹⁸ Wright was not concerned with just the invisible and the inexplicable, but also the violent energy which made the invisible manifest. Quoting from a record in the

¹¹² Ronald and Catherine Berndt, *The First Australians*, (Sidney: Ure Smith, 1954), 68; Berndt(1952).

¹¹³ See Flood(1983), 11.

¹¹⁴ Berndt(1952), 41.

¹¹⁵ *CPJW*, 3-6.

¹¹⁶ *CPJW*, 3.

¹¹⁷ Brady(1998), 136; (Jack McKinney).

¹¹⁸ Brady(1998), 136.

National Library archive, Brady explains that, in order to “visualise the horrors of Hiroshima and Nagasaki” Wright translated the landscape into ‘another frame of reference’, citing ‘Night after Bushfire’ as an example.¹¹⁹ Note the close association in Brady’s description between the ‘sub-linguistic’ and ‘frame of reference’: physics seems to be pushed out of the real world into the primordial mind. This same mode of thought is evident in Wright’s comment that regarding the ‘flux of waves and/or particles’, ‘nothing can be said except mathematically’, and also the shadow world of science alluded to in ‘Writing in a Nuclear Age’.¹²⁰ All this is consistent with the Wright/McKinney philosophical synthesis which also incorporates Jung’s idea of the common sub-consciousness. Consistent again is Jung’s remark that ‘Even physics volatilizes our material world’.¹²¹ In ‘The Moving Image’ time and place are released from fixed constraints, but the poem does not become vague or detached, even though it has a dreamlike quality – this is possibly because its physics, though internalised, retains a certain solidity and rigor.

This is the beginning of ‘The Moving Image’:

Here is the same clock that walked quietly
through those enormous years I half recall,
when between one blue summer and another
time seemed as many miles as around the world,
and a world a day, a moment or a mile¹²²

The de-personalisation of the self to a clock immediately generalises this reflection on childhood. The rhythm of the clock, of the blue summers, swells among ‘enormous years’ and seems to subside to infinity as time becomes indistinguishable from space. In the

¹¹⁹ Brady(1998), 136.

¹²⁰ Wright(1975), 191; Wright(1992), 39-44.

¹²¹ C. G. Jung, *Modern Man in Search of a Soul*, (London: Kegan Paul, Trench, Trubner and Co., 1933), 245; Jung(1933).

¹²² *CPJW*, 3.

lines which follow the quotation, time suddenly accelerates, and time and the world ‘faster spin until / mind cannot grasp’.¹²³ The formless pulsing of space and time then transitions into form, like collective childhood changing to individual adulthood:

Each of us followed it to a different hour
that like a bushranger held its guns on us
and forced our choice.¹²⁴

Time moves from subjective to objective. Formlessness becomes destiny at the point of a gun – like the disturbance of a quantum system, unreality becomes reality at the time of observation. As the poem develops, Wright improvises on time with the freedom and the discipline of a jazz musician. The poem is housed in pentameters, echoing the ‘clock that walked quietly’. The laws of physics place no constraint on the direction of time: some of Wright’s images in ‘The Moving Image’ reverse time:

Does the heart know no better than to pray
that time unwind its coil, the bone unbuild
till that lost world sit like a fruit in the hand –
till the felled trees rise upright where they lay¹²⁵

The ethereal feeling in the early part of the poem is brought into contrast with harsher images; her repeated symbol ‘dust’ signifies the present: ‘Dust blows harsh from the airfield’.¹²⁶ As seen from an aeroplane, the world is ‘evil and small’, and in entropic decay.¹²⁷ It is ‘brittle and easy to break’, ‘like a dried head from the islands’, and ‘there is no end to the / breaking’.¹²⁸ Like dust, the poem refuses to settle. Australia’s convict past is recalled by ‘poor Tom of Bedlam’, ‘whose nights and days were whipmarks on his

¹²³ *CPJW*, 3.

¹²⁴ *CPJW*, 3.

¹²⁵ *CPJW*, 3.

¹²⁶ *CPJW*, 4.

¹²⁷ *CPJW*, 4.

¹²⁸ *CPJW*, 4.

back'.¹²⁹ Progress is represented as a kind of cyclic madness: there is 'nothing but the tick of the clock and a world sucked dry:

Till the tide of life come back, till time's great tide
Roar from our depths and send us mad again
With a singing madness, like poor Tom of Bedlam¹³⁰

Some poems identify time with consciousness itself. For example, in 'The World and the Child', a precise, literal image of light is fused with the child's being: the child 'is a wave / that timeless moves through time, imperishably bright'.¹³¹ At the speed of light, time does not exist, there is only timelessness. The ideas which inform Wright's poems stand out more clearly if the theoretical background to Wright's understanding of modern physics is explored. Fortunately, there is an expression of these ideas in J. P. McKinney's *The Challenge of Reason*.¹³²

McKinney's argument in this book hinges on a putative pre-Socratic / post-Socratic watershed which led from 'mental-experience analysis to the modern physical-experience analysis'.¹³³ McKinney forms a characterisation of relativity which fits into this picture; he says: 'Relativity tells us that the "world" or "nature" is a complex of experiences'.¹³⁴ To arrive at this, McKinney seems to extend Einstein's view that 'our concepts and systems of concepts [...] represent the complex of our experiences'.¹³⁵ Einstein referred to a type of common consciousness which he relates to reality: 'We are accustomed to

¹²⁹ *CPJW*, 5.

¹³⁰ *CPJW*, 4-5.

¹³¹ *CPJW*, 36.

¹³² McKinney(1950).

¹³³ McKinney(1950), 88.

¹³⁴ McKinney(1950), 71.

¹³⁵ Albert Einstein, *The Meaning of Relativity*, (London: Methuen, 1946), 2; Einstein(1922); referenced in McKinney's bibliography.

regard as real those sense perceptions which are common to different individuals'.¹³⁶

Using this, McKinney positions relativity as representing the philosophical watershed, as if physical experience is the individual, and the world, or the complex of experiences, is the common mental experience: he says, 'Relativity represents the point of contact between the individual's consciousness and the common-consciousness'.¹³⁷ McKinney is transposing Einstein's reality to the common consciousness, and latching onto the 'observer' as the counterpoised individual; it is compelling to read his work as a synthesis of Einstein's perceptual realism with Jung's hypothesised relationship between the individual consciousness and a common subconscious.¹³⁸ Einstein's theory is internalised; Jung's is somewhat externalised: the common *subconscious* is transposed to a common consciousness.

McKinney's work, or Jung's, do not need to be assessed here in terms of philosophy – their analytical part is lost, when, in the same manner as the creative misreading of science, they are transformed by Wright's poetry into emotions, feelings, or aesthetic concepts. Wright, almost quoting McKinney, said: 'it is not man, but Man, who knows'.¹³⁹ One can see this idea of common consciousness repeatedly in her poetry. For example, 'Northern River' ends with an image of 'the sea that encompasses', 'and holds the memories / of every stream and river'.¹⁴⁰ The sense of the individual merging with the general is also in these lines from 'For New England': (I) 'who am the swimmer and the mountain river', 'who am the gazer and the land I stare on'.¹⁴¹

¹³⁶ Einstein(1922), 2.

¹³⁷ McKinney(1950), 72, 76.

¹³⁸ Jung(1933), 214-16.

¹³⁹ Wright(1999), 211; almost quoting from McKinney(1971), 297.

¹⁴⁰ *CPJW*, 7

¹⁴¹ *CPJW*, 23.

McKinney analyses quantum mechanics in a similar way to relativity, by relating physical theory to mental existence. He says quantum mechanics ‘appears as the conscious and deliberate formulation of that which was primitively unconscious and intuitive; what was originally an unconscious reaction now becomes a conscious mental process’.¹⁴² Jung talks of the primitive “‘pre-logical” state of mind’, in a world of “‘collective representations”” and of consciousness as the ‘late born descendent of the unconscious’.¹⁴³ This is resonant imagery if harnessed into McKinney’s phrase. The primitive unconsciousness of formless representations catches the immaterial ‘internal’ world of quantum mechanics, and McKinney has also caught the quantum transition to the ‘conscious and deliberate’. It is useful to probe one step further into the theory of relativity using a text from McKinney’s bibliography: Albert Einstein’s *Relativity*.¹⁴⁴

In order to conceptualise relativity, and Judith Wright’s poems, it is necessary to abandon the notion of a single fixed, shared space; instead one must imagine space deconstructed into a potentially infinite number of arbitrarily defined individual spaces. Einstein calls these sub-spaces ‘reference bodies’, in Wright’s terms they are moving images. In his thought experiments, Einstein populates the reference bodies with clocks, immediately recalling Wright’s ‘Here is the same clock that walked quietly’, which opens ‘The Moving Image’.¹⁴⁵ In a remarkably simple series of reasoned steps involving the relative perception of events and questioning of the notion of simultaneity, Einstein concludes that if, as he insists, the laws of physics are to be invariant between reference bodies, in particular that the speed of light is a universal constant, then time must be

¹⁴² McKinney(1950), 75.

¹⁴³ Jung(1933), 144, 145, quoting Levy-Bruhl; 216.

¹⁴⁴ Einstein(1920).

¹⁴⁵ *CPJW*, 3.

specific to each individual reference body.¹⁴⁶ In other words, the price of demanding the invariance of the laws of physics is that *objective* time becomes relative to the observer. Einstein concludes the main part of his argument with a memorable statement of the general principle of relativity.¹⁴⁷ An arbitrarily chosen, non-rigid, non-inertial, four-dimensional curvilinear co-ordinate system, or reference body, ‘might appropriately be termed a “reference-mollusc”’.¹⁴⁸ One must imagine space as comprising an infinite number of such molluscs, all in relative motion with regard to each other, then: ‘The general principle of relativity requires that all these molluscs can be used as reference-bodies with equal right and equal success in the formulation of the general laws of nature; the laws themselves must be quite independent of the choice of mollusc’.¹⁴⁹

To a physicist, this is a principle of unspeakable beauty; unspeakable, but thinkable in terms of mathematics. Irrespective of an arbitrarily complex deconstruction of space, the loss of Euclidian geometry, and absolute time, *the universe remains lawful*. Einstein’s molluscs are suggestive of the way Wright’s moving images interact and collide, each bearing their own unique time. Einstein’s deconstructed time-bearing spaces, and his insistence on universal lawfulness, may also have appealed to Wright because of an alignment with her wider reading. In his preface to *The Secret of the Golden Flower*, Wilhelm comments: ‘[Chinese philosophy] is built on the premise that the cosmos and man in the last analysis obey common laws; that man is a cosmos in miniature and is not divided from the great cosmos by any fixed limits’.¹⁵⁰ Joseph Needham observed the

¹⁴⁶ More precisely, the laws of physics are covariant, according to the Lorentz transform, between reference bodies.

¹⁴⁷ The other foundation of Einstein’s general theory is the Principle of Equivalence between gravity and acceleration.

¹⁴⁸ Einstein(1920), 99.

¹⁴⁹ Einstein(1920), 99.

¹⁵⁰ Wilhelm(1942), 11.

connection between Taoism and modern physics: ‘in spite of the mysticism, it is clear from all we know of the Taoists’, that there is ‘an affirmation of the unity of Nature, a unity that now, in the twentieth century, lies, we know, like universal gravitation, at the very foundation of post-Newtonian natural science’.¹⁵¹

Wright and McKinney ‘would read and discuss works about contemporary physics’.¹⁵² They called their first shared house ‘Quantum’.¹⁵³ In a letter of 1945 Wright reminded McKinney, ‘don’t let the connection between the time-theories from Newton onwards slip out of your mind’.¹⁵⁴ Wright seems to have been inspired by physics to encapsulate her poetic world as four dimensional images in space-time. In the ‘Half-Caste Girl’ the voice of a dead child yearns for the ‘hills that belong to no people’.¹⁵⁵ In ‘The Blind Man’, hills ‘naked as a whipped back’ bear the scars of the convict era.¹⁵⁶ In ‘Dust’ the earth is ‘steel-shocked’ by settler farming.¹⁵⁷ The most prominent word in ‘Bullocky’, ‘widdershins’, or anti-clockwise, is a direct challenge to Progress.¹⁵⁸ As ‘Bullocky’ develops different space-times, real and imagined, interact and collide: Biblical time, a time of ‘fiends and angels’, the dream time of the future, the times of the bones, and the poetic present time. ‘Bullocky’'s inability to settle in time works with the overt theme of madness to create a poetically controlled sense of confusion which

¹⁵¹ Colin Ronan, (abr.), *The Shorter Science and Civilization in China*, 5 vols., (Cambridge: Cambridge University Press, 1997), Vol. 1, 89; Needham(1978).

¹⁵² Brady(1998), 126; see also Clarke&McKinney(2004), 53, 55, 90-1, 98, 137.

¹⁵³ Brady(1998), 126.

¹⁵⁴ Clarke&McKinney(2004), 95; letter dated [?] 28/10/1945.

¹⁵⁵ *CPJW*, 19.

¹⁵⁶ *CPJW*, 63.

¹⁵⁷ *CPJW*, 23.

¹⁵⁸ *CPJW*, 17.

gradually eats away at the poem's superficial sense of celebration, and shifts the sense towards historical realism.¹⁵⁹

This is the opening of 'Night after Bushfire', an allegory of nuclear devastation:

There is no more silence on the plains of the moon
and time is no more alien there, than here.¹⁶⁰

Time is transported to an alien space, raising an observer paradox: time in the scene of devastation is as meaningless as sound when there's no listener; there is no point to time when there are no living beings. This recalls the disappearance of time after nuclear war at the end of 'Geology Lecture': 'time might never start again'.¹⁶¹ In 'Letter to a Friend' Wright contemplates the entropic dissipation of time: 'The small waves vanish on the shore', as the poet lives an 'eternal speech / with the dead'; then:

The small waves grow,
gather strength and run forward.
Having come out of Nothing, they desire All.
Like the waves you are broken.
You who were all are made nothing,
returned to the river.¹⁶²

In one reading of these lines, the rush of colonialism washes away the older peoples, but the invaders are a wave – implicitly suggesting, in time's cycles, they too will fade. This sense of time resonates with 'Nigger's Leap': 'the night that tided up the cliffs and hid them / had the same question on its tongue for us'.¹⁶³ In a poem dedicated to Wright's late husband, 'The Vision' contains the couplet: 'There is a single source to which all time's returned. / That was the single truth your learning learned'.¹⁶⁴ This is not quite the

¹⁵⁹ *CPJW*, 17.

¹⁶⁰ *CPJW*, 37.

¹⁶¹ *CPJW*, 323.

¹⁶² *CPJW*, 56.

¹⁶³ *CPJW*, 16.

¹⁶⁴ *CPJW*, 263.

same as the cyclic time suggested by the tidal images, but nevertheless is related. The protagonist in the 'The Blind Man' is named Jimmy Delany, for whom 'time is a cracked mask'.¹⁶⁵ The gold rush is over; half demented, 'he sits and sings / where the wind raises dry fountains of faded gold'.¹⁶⁶ The poem switches to a song of lament, a yearning for the reversal of entropy, a re-creation of structure, as the earth is remade from dust:

Who will gather the dust to a sphere, who will build us a world?
Who will join atom to atom, the waiting seed to seed?
Who will give the heat of the sun to death's great grave of cold
and deliver the countries of the heart, in the womb of a dust-grain furred?¹⁶⁷

Time contains the potential for evolutionary progress, related to suffering, on 'the road from protoplasm to man' in 'Pain'.¹⁶⁸ Evolution is stalled in 'The Cycads': the ancient trees 'watch the shrunken moon, but never die', 'for time forgets the promise he once made'.¹⁶⁹ In 'The Mirror at the Fun Fair', time has 'small rat-teeth', gnawing away.¹⁷⁰ Time, in 'The Bones Speak' is dissipation: 'The pulse', 'that only memory of time', is 'crumbled to darkness'.¹⁷¹ Time is cyclic again in 'time's recurrent / morning' from 'The Child', and destructive in: 'time that brings us harm, / and undoes our knowledge' from 'The Bushfire'.¹⁷² For 'The Idler', 'time sprang from its coil and struck his heart'.¹⁷³ In 'Waiting', settlers are trapped in time's grip as the 'circling days weave tighter', and the 'spider / Time binds us helpless till his sting go in'.¹⁷⁴ And in 'Bora Ring', time and place and people are lost as easily as a dream:

¹⁶⁵ *CPJW*, 63.

¹⁶⁶ *CPJW*, 64.

¹⁶⁷ *CPJW*, 66.

¹⁶⁸ *CPJW*, 31.

¹⁶⁹ *CPJW*, 39.

¹⁷⁰ *CPJW*, 46.

¹⁷¹ *CPJW*, 54.

¹⁷² *CPJW*, 34, 47.

¹⁷³ *CPJW*, 13.

¹⁷⁴ *CPJW*, 10.

The hunter is gone: the spear
 is splintered underground; the painted bodies
 a dream the world breathed sleeping and forgot.¹⁷⁵

In Einstein's thought experiments, clocks move through time, creating their own time as they do so; similarly, Wright's moving images are both apart from time and part of time, as the poet shifts freely between variable objective time and subjective time. Entropy plays its part too, as time dissipates, vanishes, or destroys. In the manner of the Wright/McKinney synthesis, time is consciousness in both a general and individual sense: time is our embodied collective sense experience, while it gnaws away at individual beings like 'small rat-teeth'.¹⁷⁶ Time is the lord of all, and no lord at all. The poems discussed, and many others, are built around time, almost made out of time distilled into images. Physical theory is only occasionally explicit; the poet has re-imagined the theory, broken its encasement of reason, and brought it into the world of feeling. In an analogous manner, historical reality is re-imagined as emotional truth. Wright's poetic themes and variations creatively hybridise the internal and the external worlds. Perhaps it was awareness of her own success in the fusion of rational thought and poetry, which allowed Wright to challenge with such confidence the divisive implications of the 'two cultures' argument, and say 'it is the interaction of the poetic and rational principles in us that has led to all the great discoveries', the 'great poet is great, not because he is wholly given over to the poetic principle, but because he is capable of rational thought as well as intuitive relationship', and similarly the 'great scientist is great for exactly the same reason'.¹⁷⁷

¹⁷⁵ *CPJW*, 8.

¹⁷⁶ *CPJW*, 46.

¹⁷⁷ 'Poetry and Universities' in Wright(1975), 35-41, 41.

A Hybrid Worldview

A completely separate strand of science in Wright's work has been analysed by John Holmes in his 2012 essay 'From Bergson to Darwin: Evolutionary Biology in the Poetry of Judith Wright'.¹⁷⁸ In this concluding section of the Wright chapter I argue that by building on, and widening the scope of, Holmes's analysis, Wright's creative hybrid of idealism and realism comes into full view. I hope to show that Bergson's vitalism was overtaken by the developing Wright/McKinney synthesis, and that Holmes's characterisation of Wright's Darwinism is equivalent to what I have called her natural realism. In his editor's introduction to *Science in Modern Poetry* (the volume which includes his essay), Holmes says, 'Wright's vitalism is widely recognised by scholars of her poetry', but that 'Wright's profound doubts over Bergson, expressed in the self-same poems' have not been recognised.¹⁷⁹ He is referring to the fact that 'Walker in particular has argued that [...] vitalism is central to Wright's poetry throughout her career' – a view which Holmes, while corroborating the presence of Bergson, more widely challenges.¹⁸⁰ Holmes charts the breakdown of vitalism in Wright's work, arguing that 'the ambiguities within her poems suggest she was uneasy with the casuistry of Bergson's argument'.¹⁸¹ However, if Holmes's posited transition from Bergson to Darwin is described in terms of the development of Wright's hybrid worldview, then the ambiguities disappear. There is a sense too in which Wright's use of vitalism could be described as cherry picking: as Holmes's comment about the breakdown of Bergsonism in 'the self-same poems'

¹⁷⁸ Holmes(2012), 194-209.

¹⁷⁹ Holmes(2012), 14-15.

¹⁸⁰ Holmes(2012), 196.

¹⁸¹ Holmes(2012), 201.

suggests, there is always some factor other than vitalism at play in Wright's poems; this constant probing and mediation of ideas is characteristic of her best work.

Holmes opens his essay with a selection of Wright's writing on science from some of the same essays I discussed in the Introduction to this chapter. Then Holmes turns to Wright's second collection *Woman to Man* (1949), the collection in which, he argues, Bergson's 'influence is most clearly felt'.¹⁸² The first poem he studies is 'Conch Shell', a meditation on an empty shell, 'a windless shelter housing nothing', and the imagined former life within it.¹⁸³ This is the last of the poem's three stanzas.

And here, half-guess, half-knowledge, I contract
into a beast's blind orbit, stare deep down
the cliffs not I have climbed; your prodigal,
probe with my sense your senseless life –
since life, the force that leapt between your poles,
burns forward still in me against the night.¹⁸⁴

There are compelling references to Bergson's *élan vital* in this stanza. Citing vitalism's 'notion of "life" and "force" akin to magnetism or electricity – "a current sent through matter", in Bergson's words', Holmes identifies, for example, the 'force that leapt between your poles', and the way life 'burns forward' as unquestionably Bergsonian.¹⁸⁵ The influence of vitalism on 'Conch Shell' goes further: Bergson writes concerning molluscs, 'the animal that shuts itself in a citadel or in armour condemned itself to a partial slumber'; he refers to this state as a 'torpor'.¹⁸⁶ This is resonant with the 'beast's blind orbit' and the imagined creature's 'senseless life'.¹⁸⁷ Bergsonian torpor appears in another mollusc poem, 'The Nautilus' (1956): Wright says the creature 'conspires with

¹⁸² Holmes(2012), 196.

¹⁸³ *CPJW*, 29.

¹⁸⁴ *CPJW*, 29.

¹⁸⁵ Holmes(2012), 197.

¹⁸⁶ Henri Bergson, *Creative Evolution*, (London: MacMillan, 1928), 138; Bergson(1911).

¹⁸⁷ *CPJW*, 29.

time to shroud itself'.¹⁸⁸ Vitalism is key, but I find that there is more than vitalism in 'Conch Shell': Jung's influence also seems to be present.¹⁸⁹ The poet says, 'I contract / into a beast's blind orbit', as if merging with the primitive psyche; note Wright's delicate individuation when the consciousnesses meet: she stares 'deep down / the cliffs not I have climbed'.¹⁹⁰ The stanza could be read as if it is the psychic contact, the awareness of the common subconscious, which reveals the presence of the life force.

Holmes carefully picks apart the twists and turns of Bergson's theory as it struggles to remain consistent, whilst accommodating the privileged evolutionary progress towards humanity with the obvious diversity of non-human life; Bergson finds it necessary to introduce consciousness into his theory. Holmes relates that Bergson argued, "consciousness or rather 'supra-consciousness' must be "at the origin of life", its defining feature'.¹⁹¹ Holmes writes:

The *élan vital* is thus a drive to re-generate this pre-existent mind. It is an 'aspiration' after all, as well as an 'impulsion'. The unconscious *élan vital* is consciousness itself, moving towards its own realisation. And because '[e]verywhere but in man, consciousness has come to a stand', it is humanity alone that 'continues the vital movement indefinitely'.¹⁹²

The Bergsonian 'supra-consciousness' though is quite different from, indeed opposite to, Jung's hypothesised relationship between the individual consciousness and a common *subconscious*.¹⁹³ In 'Conch Shell', the poet *contracts* into 'a beast's blind orbit'.

It is worth exploring Jung's ideas further, because they are absorbed completely into the Wright/McKinney synthesis, whereas Bergson is not mentioned in McKinney's

¹⁸⁸ *CPJW*, 187-8, 187; first published 1956, see Shirley Walker, *Judith Wright (Australian Bibliographies)*, (Melbourne: Oxford University Press, 1981), 69; Walker(1981).

¹⁸⁹ *CPJW*, 187-8.

¹⁹⁰ *CPJW*, 29.

¹⁹¹ Holmes(2012), 198; citing Bergson.

¹⁹² Holmes(2012), 198-9; citing Bergson, square bracket original.

¹⁹³ Jung(1933), 214-16.

books.¹⁹⁴ Jung writes: our psyche ‘carries within it discernible traces of primeval evolution, and it is certainly a whole that functions purposively – for otherwise we could not live’.¹⁹⁵ Jung rejects the *élan vital*, remarking ‘As long as this undertaking is restricted to the misty heights of speculative philosophy, no great harm is done’, but ‘if we should operate with this idea in the lower range of practical psychology [...] we should find ourselves involved in the most hopeless difficulty’.¹⁹⁶ Jung’s basis for this is a further rejection what he calls ‘naturalistic values’ (or seeing things in physical terms) in order to restore the spirit to life; he says ‘everything spiritual is an illusion from the naturalistic standpoint’.¹⁹⁷ This does not harmonise with Bergson, who wrote that ‘Consciousness, in man, is pre-eminently intellect’.¹⁹⁸ Wright is not likely to have agreed with this; reflecting on Jung, she said: ‘we are emotional, thinking, physical, intuitional all at once’.¹⁹⁹ Wright’s reflection on these ideas can be seen in a letter to Walker in 1976, where she evaded the idea of the life force, and shifted the perspective, via physics and Jung, to McKinney’s synthesis:

As for the life force; well, I don’t think that even scientists any longer regard the physical and the psychic as separate, and all the work being done seems to confirm this – what is the observer, what the observed? Can you tell the dancer from the dance? [...] Jack’s own work implied that we are part of a unity with ‘nature’ and that human thought is the development of that relationship.²⁰⁰

Elsewhere in the same letter Wright says ‘[Jung’s influence] certainly shows up in *Woman to Man* and *The Gateway*’.²⁰¹

¹⁹⁴ The third and final section of McKinney(1950) is concerned with psychology.

¹⁹⁵ Jung(1933), 216.

¹⁹⁶ Jung(1933), 217.

¹⁹⁷ Jung(1933), 218.

¹⁹⁸ Bergson(1911), 281; Bergson qualifies this in a typical doubling back, but the point remains.

¹⁹⁹ Brady(1998), 212.

²⁰⁰ Clarke&McKinney(2006), 291; letter dated 14/8/1976.

²⁰¹ Clarke&McKinney(2006), 291; see also Walker(1991), 213, 211.

It is possible to add substantially to Holmes's account of Bergsonian breakdown within a single poem by introducing Wright's contra-progressive treatment of time, for example the cyclic sense of time in 'The Child'. This is the final stanza.

Spring is always the red tower of the may-tree,
 alive, shaken with bees, smelling of wild honey,
 and the blood a moving tree of may;
 like a symbol for a meaning; like time's recurrent
 morning
 that breaks and beckons, changes and eludes,
 that is gone away;
 that is never gone away.²⁰²

The stanza echoes an earlier phrase in the poem – 'the blood's leap and retreat'.²⁰³ Life, symbolised by blood, becomes a seasonal flowering, individually; generally it ebbs and flows like the tide, and change may beckon, but it also eludes. The above stanza portrays a natural rhythm of life where change is possible – but the life force, the blood's leap, struggles to make change happen, and retreats. Vitalism in this poem is elusive and changeable; it is also, strongly against the grain of Bergson's theory, seemingly passive, and trapped within the cyclic confines of time's recurrent morning.

In another poem from *Woman to Man*, 'The Cycads', vitalism seems strongly present, this time moderated by Taoism.²⁰⁴ Wright may be reflecting on Bergson's remark that 'the vegetable renounced consciousness in wrapping itself in cellulose membrane'.²⁰⁵ In the poem, the trees' life force is weak: the cycads' 'smooth dark flames flicker at time's own root'.²⁰⁶ The antique trees 'keep the old bargain life has long since broken', as 'time forgets the promise he once made' and the cycads are consigned to

²⁰² *CPJW*, 34.

²⁰³ *CPJW*, 34.

²⁰⁴ *CPJW*, 39-40.

²⁰⁵ Bergson(1911), 138.

²⁰⁶ *CPJW*, 39.

Bergsonian sleep.²⁰⁷ This sense appears again, but perhaps drifts from Bergson a little, as ‘change forgets’ the cycads, ‘Among the complicated birds and flowers’.²⁰⁸ Wright appears to be meditating on an aspect of Bergson’s theory, while also probing it. Wilhelm’s commentary on Taoism mentions a ‘life-principle’ and a ‘downward movement of life-processes’; the latter is reminiscent of ‘time’s own root’.²⁰⁹ There is a typical Wrightian fusion of ideas is present in ‘The Cycads’.

Holmes addresses the conceptual difficulties of Bergson’s theory: ‘the problem with vitalism is that it provides no *a priori* grounds on which to weigh one [...] view against another, no basis for determining where the right choice lies, nor what the relation is between the choices we as individuals or polities make and the supposed direction of the *élan vital*’.²¹⁰ Wright’s only detailed prose concerning vitalism is in an essay ‘William Baylebridge and the Modern Problem’, originally a lecture delivered in 1954.²¹¹ Challenging Walker’s and Strauss’s reading of this essay, Holmes argues that ‘Wright herself exposes this [inability to choose] failing within vitalist thinking’.²¹² Holmes earlier drew attention to Bergson’s privileged teleology of humankind, spiced up with Nietzsche; towards the end of *Creative Evolution*, Bergson writes: ‘It is as if a vague and formless being, whom we may call, as we will, man or superman, had sought to realise himself, and had succeeded only by abandoning a part of himself on the way’. Bergson continues: ‘the whole of humanity, in space and in time, is one immense army galloping beside and before and behind each of us in an overwhelming charge’.²¹³ Bergson’s theory

²⁰⁷ *CPJW*, 39.

²⁰⁸ *CPJW*, 39.

²⁰⁹ Wilhelm(1942), 13, 16.

²¹⁰ Holmes(2012), 203.

²¹¹ Wright(1975), 115-128.

²¹² Holmes(2012), 203.

²¹³ Bergson(1911), 281, 286; italics removed.

is pre-loaded with a sense of destiny, implicitly Western. Holmes charts the theory's influence and rise in the inter-war years when it was 'to many not only a convincing thesis but close to self-evident'; but the full horrors of the Second World War, 'made the myth of progress barely tenable'.²¹⁴ Rounding on his theme of transition in Wright's thinking, Holmes says, 'Wright's disillusionment with vitalism owes more to politics than to science. But as her politics become increasingly activist, so her understanding of biology becomes more rigorously scientific'.²¹⁵ He adds: 'This turn away from Bergsonian vitalism towards Darwinian ecology can be traced in Wright's poetry'.²¹⁶ Holmes cites as an example of Wright's move away from vitalism the title poem of *The Two Fires* (1955), 'Wright's fullest and most direct response to the threat of nuclear war'.²¹⁷ 'The Two Fires' can be read, Holmes argues, as in part 'a grotesque *reductio ad absurdum* of vitalist principles'.²¹⁸ It is not difficult, though, to see how Wright would have felt that the Bergsonian worldview was incompatible with *all* her activism, not just her conservationism; she could use the softer parts of vitalism in poems such as 'Conch Shell', and because her wider philosophical synthesis was developing, vitalism could quietly be ditched.

Clarke and McKinney, introducing their volume of Wright's letters, note a change of the sort identified by Holmes, 'from the private, domestic, literary self to the public conservation activist', adding that Wright 'herself described it, in typical Jungian terms, as a shift in middle age from introversion to extroversion'.²¹⁹ The demands of activism

²¹⁴ Holmes(2012), 201, 201-2.

²¹⁵ Holmes(2012), 204.

²¹⁶ Holmes(2012), 204.

²¹⁷ *CPJW*, 119-20; Holmes(2012), 202.

²¹⁸ Holmes(2012), 202.

²¹⁹ Clarke&McKinney(2006), xii.

meant that there were ‘increasing periods of poetic silence’; indeed Wright’s later poetry, with exceptions, tends to be simpler or less assured – but there is no evidence that her philosophy changed with her increasingly public life.²²⁰ The essay ‘Writing in a nuclear age’, from 1987, is evidence that it didn’t. Bergson seems to enter Wright’s poetry already castrated, shorn of his hubris; vitalism is never taken literally, but is always creatively misread. In her poetry one of vitalism’s fates is to be fused with Jung’s conception of the psyche, or she may trap the life force and probe the theory for weaknesses. John Hawke, although his focus is on Wright’s symbolist language, adopts a similar approach to myself: reading McKinney’s philosophical works in order to gain an understanding of the thinking behind her poetry.²²¹ Quoting from *The Challenge of Reason*, Hawke asserts that McKinney identifies primordial consciousness as the ‘time when ‘knowing and being were one’; this, Hawke says, is a ‘world of Bergsonian “events”, in which the outer world and “the inner flux of human consciousness...are merged into a sort of continuum”’.²²² However, McKinney does not mention Bergson, and I can find no secure allusion: vitalism, I believe, is absent from McKinney’s work – which helps explain why Wright did not treat Bergson’s theory holistically, but rather was inclined to cherry-pick.

There is ample evidence to support Wright’s increasing interest in ecology as her activism increased, some of which is quoted in my chapter introduction. As Holmes puts it, ‘From the 1960s, the growing evidence of environmental destruction led her to formulate this problem in ecological terms themselves derived from Darwin’.²²³ But this

²²⁰ Clarke&McKinney(2006), xiii.

²²¹ Hawke(2001).

²²² Hawke(2001), 165; McKinney(1950), 42.

²²³ Holmes(2012), 204.

doesn't account for her activism in support of Aboriginal rights; if Holmes's argument is widened a little, and the concept of realism, present in her earliest poems such as 'Nigger's Leap' and 'Dust', is introduced, then a fuller picture emerges. I would argue too that all Wright's activism was driven by a unifying moral outrage, rather than a reformulation of her ideas in ecological terms – the attraction of ecology, it is clear from her essays, was that she saw it as a value-based form of science, and therefore one which she could readily support.

As early as *The Moving Image*, Wright's acceptance of the impersonality of *inanimate* nature is clear; in 'Waiting', 'time lifts no knife to heal or to destroy / and did not cause, and cannot cure, our pain'; this natural realism dovetails with the historical realism of poems from the same collection, for example, 'Bora Ring'.²²⁴ This sense of mediated realism (as always, vying with other ideas) is again explicit in a poem from *Woman to Man*, 'The Flood'.²²⁵ This is a poem with Biblical overtones of washing away corruption: 'How strange these sudden panics are. / There's a run on / money', and a pause before the rain: 'the noise in the Stock Exchange / drops for a second; the bleating of lambs in the abattoirs / dies down'.²²⁶ There is a denial of purposeful intervention as the poet asks 'Where is our awkward Noah[?]'²²⁷ Then, as 'the waters rise quietly':

They do not chose their victims or give reason.
Neither the good nor the bad, neither man nor creature
is favoured. This is the forgotten logic of nature.²²⁸

Forgotten by whom? – Bergson perhaps. A Darwinian reading of these lines, however, would not catch the full sense of the poem. After the flood a cyclic of re-creation ensues,

²²⁴ *CPJW*, 10, 8.

²²⁵ *CPJW*, 41-4.

²²⁶ *CPJW*, 41.

²²⁷ *CPJW*, 42.

²²⁸ *CPJW*, 42.

depicted in four-dimensional imagery: ‘the aeon-tide of earth’, ‘moves me on its gradual mammoth-shoulder’.²²⁹ There is a Bergson-like reference to ‘the sap that moves within me’; and also a more Biblical sense of creation:

...I see your brilliant crystal eyes
pierced in the clay, I know you.
You are Man.²³⁰

The poem ends: ‘Uncouth beasts, roots of earth / we stare with love into each other’s eyes’.²³¹ In ‘The Flood’ the world the poet deplores is washed away by its own logic, without discrimination; but creation re-asserts itself – both in terms of an innate life force, and also with a sense of Divine intervention. Here is Wright’s struggle of ideas: there is no ambiguity if ‘The Flood’ is understood in terms of a synthesis of various idealist philosophies, hybridised with an acute sense of realism.

Holmes turns to Wright’s collection *Birds* (1962), to press his case that Wright had left vitalism behind; he argues that *Birds* gives ‘an overall impression of biology as ecology’, and ‘depicts a natural world governed by the same needs and preoccupations as those described by Darwin’.²³² There is no argument about the predominance of natural realism in these poems. ‘Silver Terns’ (1960-1), describes an explosive incident, with the terns feeding on a shoal of fish, and with a bonito feeding in turn on both birds and fish.²³³ This is a selection of lines, starting with the beginning of the third stanza, and ending with the final quatrain:

The sea was pocked with sudden silver fountains
where the birds dived, so swift and clever

²²⁹ *CPJW*, 43.

²³⁰ *CPJW*, 43, 44.

²³¹ *CPJW*, 44.

²³² *CPJW*, 161-81; Holmes(2012), 206.

²³³ *CPJW*, 71-2; Walker(1981), 78.

[...]

That shoal the big bonito harried,
and they took fish and diving bird together

[...]

All morning it went on, that slaughter
with white birds diving, obstinate with hunger

[...]

The morning was as gentle as a pearl,
the sea was pocked with sudden silver fountains;
you would not guess the blood unless you saw it,
that the waves washed from feather and from scale.²³⁴

It is tempting to find an allegory in 'Silver Terns'. Its overt natural realism could symbolise the historical tragedy of the higher orders of colonialism benefiting from the struggle for existence of the lower orders. Also, the chance knowledge of a massacre and the transition from calmness back to calmness, for me, resonates with senses of 'Nigger's Leap'. Walker says the *Birds* poems serve 'as a summation of Wright's true attitude towards nature', this is 'honest, clear-eyed and chilling'.²³⁵ She continues, in the *Birds* sequence there is an 'overall impression', 'not only of the determinism and impersonality of nature, but also of the active cruelty and violence of the natural world'.²³⁶ Walker refers to the 'blood-thirsty fury' of 'Silver Terns'; but Wright's language in this poem is calm and measured. The birds are 'swift and clever', though 'obstinate with hunger'; and the scene soon fades: 'you would not guess the blood, unless you saw it, / that the waves washed from feather and from scale'.²³⁷ In what amounts to a feeding frenzy on the poetry, Walker says that in '*Birds* there is a sense of the malevolence of nature'.²³⁸ In

²³⁴ *CPJW*, 71-2.

²³⁵ Walker(1991), 142.

²³⁶ Walker(1991), 142.

²³⁷ Walker(1991), 142-3; *CPJW*, 171-2.

²³⁸ Walker(1991), 143.

Walker's reading of 'Nigger's Leap' and 'Bora Ring', however, Wright was supposed to be 'ambivalent', now she is suddenly 'clear eyed'. In order to account for the difference, Walker posits a change in Wright, and entitles the chapter from which the quotes immediately above are drawn, 'Changing Attitudes to Love and Process'.²³⁹ Walker claims that Wright had an 'increasingly realistic view of the impersonality and cruelty of nature'.²⁴⁰ This is contradicted by Wright's aforementioned letter to Walker, where she referred to her philosophy as a search for unity of nature.²⁴¹ An alternative reading of 'Silver Terns' could suggest that Wright is well aware of the difficulty of a unified philosophy of life, in fact she confronts the reader with it. If animals behave like this, as we can think, out of necessity, and humans are manifestly just as violent, what then is the relationship to necessity? Wright simply throws the question open.

Generally, Holmes's thesis with respect to *Birds*, holds, though there are two exceptions which further illustrate that Wright tended to think in terms of an intellectual synthesis, rather than an individual theory of life. This is the first stanza of 'Pelicans' (1960).

Funnel-web spider, snake and octopus,
Pitcher-plant and vampire bat and shark –
These are cold water on an easy faith.
Look at them, but don't linger.
If we stare too long, something looks back at us;
something gazes through from underneath;
something crooks a very dreadful finger
down there in an unforgotten dark.²⁴²

Holmes says 'Wright's menacing "something" is less a revelation of malevolence within nature than a projection of this malevolence onto nature by the human mind'; I believe it

²³⁹ Walker(1991), 126-152.

²⁴⁰ Walker(1991), 144.

²⁴¹ Clarke&McKinney(2006), 291; letter to Walker dated 14/8/1976.

²⁴² *CPJW*, 171; Walker(1981), 73.

is correct to say that the poet is self-aware in this regard, at the same time, however, there is something quite un-Darwin-like about these lines.²⁴³ The poet is unsettled by her engagement with nature; there is no sense of the impersonal. The dominant image in the second part of the stanza is psychological; the poet is again encountering the primitive subconscious, as in ‘Conch-Shell’; this time it’s not torpor but danger she senses.

There is a similar sense of physical and psychological merging in the poem ‘Wounded Night-Bird’ (1960).²⁴⁴ In her shock at finding the creature, the poet reminds herself ‘the devil is no bird’. Lifting the helpless animal, she seems to feel its life force:

From nerve to nerve I felt the circuit blaze.
 Along my veins his anguish beat; his eyes
 flared terror into mine and cancelled time
 and the black whirlpool closed over my head
 and clogged my throat with the cry that knows no aid.
 Far down beneath the reach of succouring light
 we fought, we suffered, we were sunk in night.²⁴⁵

The electrical metaphor in the first quoted line is reminiscent of ‘the force that leapt between your poles’ from ‘Conch-Shell’.²⁴⁶ There seems to be physical union, then, as time is cancelled, the poet finds psychological union with the evolutionary past. This again is a typical Wright hybrid of theories of life, vying with a more materialist, or simply realist, outlook.

Holmes makes a sound point for Wright’s Darwinism when he notes the final poem in the *Birds* sequence, ‘Extinct Birds’ (1960); thinking of Darwin’s emphasis on extinction, and quoting A. D. Hope, he writes that ‘this poem retrospectively casts “its

²⁴³ Holmes(2012), 207.

²⁴⁴ *CPJW*, 170; date: Walker(1981), 76.

²⁴⁵ *CPJW*, 170.

²⁴⁶ *CPJW*, 29.

prophetic light over all the rest””.²⁴⁷ Introducing the final passage in his essay, Holmes says ‘Wright returns to the issue of manmade extinction in her famous poem “Lament for Passenger Pigeons”’.²⁴⁸ First published in 1972, ‘Passenger Pigeons’ is collected in *Alive* (1973).²⁴⁹ Wright’s prominent epigraph seems to quote Wittgenstein ironically: ‘Don’t ask for the meaning, ask for the use’; as Holmes notes, this is a direct challenge to the instrumentalist worldview.²⁵⁰ Holmes draws attention to Wright’s generalisation of the issue of conservation: ‘The theme of Wright’s poem is not the bird itself, but humanity’s ever-increasing encroachment on and destruction of nature’; he points out that Wright is reminding us that we face a choice – implicitly recalling his earlier discussion that vitalism can provide no grounds for choice. ‘Lament for Passenger Pigeons’, Holmes writes, ‘is at once the lament it claims to be and a call for action. In both regards, it is grounded in a Darwinian understanding of ecology incompatible with a Bergsonian theory of evolution in which the *élan vital* works out its destiny through humanity’.²⁵¹ Holmes is surely correct, though I would add that Wright’s epigraphic challenge to instrumentalism, with its attendant assertion of meaning, combined with a Darwinian understanding, is a good example of her creative hybrid.

A surprising conclusion to this chapter is that Wright was a deeply engaged poet of science, and an accomplished creative misreader. She manipulated complex ideas from Jung, Taoism, Bergson, Darwin, relativity, quantum mechanics, and McKinney with great skill, and used them as the creative foil to the realism which can be associated with

²⁴⁷ *CPJW*, 170; date: Walker(1981), 74; Holmes(2012), 207; Hope (1975), 17. Holmes is referring to the originally published sequence, not that in *CPJW*.

²⁴⁸ Holmes(2012), 208; *CPJW*, 319-20.

²⁴⁹ Walker(1981), 94; *CPJW*, 319-20.

²⁵⁰ *CPJW*, 319; Holmes(2012), 208.

²⁵¹ Holmes(2012), 209.

her moral anger and activism. Wright's search with McKinney for a philosophical synthesis was driven by their mutual need to explain a world torn apart by war and destruction; her activism was a response to manifest injustice and value-free economic development. To aid her struggles, poetic and political, science could be pressed to the service she required of it. In 'The Flood', science is 'the forgotten logic of nature'; in 'Eve to Her Daughters', science is almost synonymous with the partial knowledge, the half-understanding which she teasingly ascribes to Adam; and in 'Night After Bushfire', 'The Two Fires' (referring to Hiroshima and Nagasaki), and 'Patterns', science is the agent of violent destruction.²⁵² Science is exploited, sometimes mercilessly, but it is never denied. For all the misreading and psychologisation, and also her deprecation of materialistic values which she associated with science, there is no trace whatsoever in Wright's poetry or her wider writing of the developing tendency to deny scientific knowledge. Strangely, possibly in part because the science in Wright's poetry is sometimes all too literal, as in her depiction of nuclear devastation, it seems to remain intact. In Wright's poetry, science is never alien, and poetry and science as a description hardly seems interdisciplinary, so pure and elegant is science's poetic expression. Wright develops an immense span of thought from 'Nigger's Leap' to 'Silver Terns'; her systemic inclusion of science, though internalised, or consigned to the shadow world, retains its abstract structure, and her poetry, like the universe of general relativity in the face of arbitrary complexity, remains lawful.

²⁵² *CPJW*, 42, 232, 37-8, 119-20, 426.

IV: EDWIN MORGAN, STAR MAKAR

Introduction

Judith Wright's engagement with science was deep, but there remain many aspects to her poetry which lie outside the scope of poetry and science. The same is true for parts of Hugh MacDiarmid's overall corpus, though science is an essential part of the integration in his late work. Only with Miroslav Holub, of the four poets considered in the present thesis, does the heading of poetry and science cover the majority of the poet's work. For the Scottish poet Edwin Morgan (1920 – 2010), the heading of poetry and science again allows only partial coverage of his writing; this is notwithstanding the fact that he embraced science and scientific culture and promoted the trope of scientific adventure in his science-fiction poetry and techno-shock in his computer poems, and on this basis created an internationally recognised artistic persona. To define clearly Morgan's relationship with science – and his use of ostensibly scientific material for poetic ends – it is necessary in this chapter to distinguish science from technology. From the perspective of scientific materialism, Morgan's science fiction is unambiguously not science at all; the value of the conceits of imagined science, such as dematerialisation beams, time travel, telepathy, and so on, lies not in what can be said about the science, but in what can be said about the poetry which includes such materials. The science in Morgan's science fiction is plainly mythologised, but the poet's imagined science, at its most effective, is a poetic device like any other, and for Morgan, sometimes a stage where contemporary concerns of hope and despair can be enacted. If the science, with exceptions, in Morgan's poems is largely imaginary, then on the other hand the poet's engagement with technology, in its widest sense, is thorough to the point of completeness. At one end of

the scale the technology which is normally associated with science, for example, computers, cryptography, cameras, and tape recorders, is represented in a wide section of Morgan's work and includes a cryptographic poem which is so technical it almost excludes poetry. At the other end of the scale, advanced technical skills of the literary type, form, metre, rhyme, and cadence, are the bedrock of Morgan's entire canon. So extensive are Morgan's technical skills as they push into sound poetry, concrete poetry, and poems of word morphology, that there is often no clear distinction between science-associated technology and traditional literary technical skill; almost any imaginable synthesis of these may be realised in this Scottish Makar's work. Morgan brings technology and technical skill together as art in the manner of craft – his poems are intricately designed made objects; they are created with the same merged skills of hand, eye, and mind that are abundantly demonstrated in concrete physical form in the well-known scrapbooks which Morgan created over a significant portion of his early life.¹

The chapter follows these ideas in three sub-sections. The first discusses Morgan's science fiction poetry; the following two sections consider his computer poetry. The first of these concerns a single poem (or section of a poem, 'The Whittrick, Dialogue VIII'), and the second centres on the three works Morgan called his simulated computer poems.² Before that, it is useful here briefly to introduce Morgan's work in more general terms. In addition to writing poetry, Morgan was a prolific translator of Old English and European poetry. Such work included, for example, his highly regarded *Beowulf* (1952),

¹ University of Glasgow Special Collections: MS Morgan C/1–16; 16 scrapbooks kept from the early 1930s to 1966, see McGonigal(2010), 40-1.

² *CPEM*, 111-16; 142, 177, 522.

and his rendering of the Russian poet Mayakovsky in *Scots* (1972).³ The introduction to his 1961 collection of translations, *Sovpoems*, is close to a poetic manifesto.⁴ The introduction opens: ‘These translations are issued with a desire to redress a balance’.⁵ Morgan claims ‘what Blok did with symbolism, what Mayakovsky did with futurism, what Neruda did with surrealism, holds a lesson for us which we don’t learn from our Yeats, Stevens, Pound or Eliot’.⁶ That lesson is ‘that literary movements should serve the ends of life as well as the ends of art’.⁷ Morgan cautions against bourgeois detachment; he compares Larkin’s ‘Church Going’ with Yevtushenko’s ‘The Partisans’ Graves’, and writes: ‘The graves in the churchyard are to [Larkin] only “so many dead”. What does he care about who they were, how they died, what they lived or died for?’.⁸ In a passage relevant to reading his science fiction, Morgan writes that in the West ‘the arts have become a sort of fascinating mental fantasy’, where the aim is to convince ‘a sceptical world that the materials used are more interesting than the mind that shapes them or the end it shapes them to’.⁹ It can be argued, on this basis, that science fiction for Morgan was a form of engagement with life, not withdrawal from it.

Chris Jones includes a chapter on Edwin Morgan’s *Beowulf* in his book *Strange Likeness* in which he considers the lingering importance of Old English to modern writing.¹⁰ Referring to translation theory, Jones outlines ‘two more-or-less opposing

³ Edwin Morgan, *Beowulf*, (Manchester: Carcanet, 2000); Edwin Morgan, *Collected Translations*, (Manchester: Carcanet, 1996), 105-155; Morgan(1996).

⁴ Morgan(1996), 27-31.

⁵ Morgan(1996), 27.

⁶ Morgan(1996), 27.

⁷ Morgan(1996), 27.

⁸ Morgan(1996), 28-9, 53-4.

⁹ Morgan(1996), 31.

¹⁰ Chris Jones, *Strange Likenesses*, (Oxford: Oxford University Press, 2010), 123-181; Jones(2006).

theoretical positions'.¹¹ Characterising these positions in political terms, Jones says one position is that 'the target language of the translation should colonize the foreign text', and the other point of view considers 'that the foreign text should itself be allowed to colonize the host language (letting the subaltern speak)'.¹² Morgan took this theory seriously in his translations, but playfully engages with putative source-language intrusion in his own work, and sometimes casts himself as the subaltern. He sometimes coupled this approach with a widespread use of *zaum*, a word coined by the Russian poet Alexi Kruchonykh to mean a "'transrational" sound-poetry which involve[s], in effect, the creation of an imaginary language'.¹³

Morgan's playful poem 'Interview' opens:

- When did you start writing sound-poetry?
- Vindaberry am hooksma tintöl ensa ar'er.¹⁴

This and other *zaum* may contain references to one of the many European languages Morgan knew, but to most ears the sound-poet speaks in pure sound. The fuzzy sound of 'The Mummy', by contrast, is a sound joke, and can be translated. In the poem, the swaddled Rameses II is being interviewed in Paris, and is able to make himself understood.¹⁵

- M' n'm 'z 'zym'mndias, kng'v kngz!
- Yes yes. Well, Shelley is dead now.
He was not embalmed. He will not write
about Your Majesty again.

¹¹ Jones(2006), 128.

¹² Jones(2006), 128-9.

¹³ Quoting from the introduction to *Wi the Hail Voice*; Morgan(1996), 110.

¹⁴ *CPEM*, 411-12, 411.

¹⁵ *CPEM*, 397-99, 398.

In the anti-imperialist fable ‘The First Men on Mercury’ (1973) the Mercurians speak in almost pure *zaum*, with only a tantalising handful of translatable words.¹⁶ ‘The First Men on Mercury’ uses the science-fiction conceit of telepathy to express a range of human concerns from a blunt response to imperial intent, sending the Earthlings home speaking Mercurian, to the more positive suggestion of the ability of cultures to learn from each other.¹⁷

Translation in some of Morgan’s work is abstracted to codification schemes. ‘The Computer’s First Code Poem’ (1973) is a cryptographic work demonstrating Morgan’s analytical skills; the pure rationality of the encryption in this poem is a consideration when reading the more ‘concrete’ word-morphology computer poems.¹⁸ The word matrices which Morgan called ‘emergent’ poems are a transparent codification, without missing keys. These poems are based on a found or a chosen quotation which is completed in the final line. The preceding lines select letters from the found quote, to make remarks which modify and qualify it. For example in the emergent poem ‘Dialeck Piece’ (1967), Morgan combines codification with sound to effect two bathetic reductions.¹⁹ The chosen closing quote is the line from Burns’s ‘To a Mouse’: ‘a daimen icker in a thrave’ (roughly, a rare ear of corn in a bale); a famous passage in Burns’s poem is: ‘I’m truly sorry man’s dominion / Has broken nature’s social union’.²⁰ In the emerging poem Morgan reduces the ploughboy’s fine sentiment to ‘I am Mick the Dick’; this is further reduced as one realises that the ‘Dialeck’ of the title contains the necessary

¹⁶ *CPEM*, 267-8.

¹⁷ *CPEM*, 267-8.

¹⁸ *CPEM*, 277.

¹⁹ *CPEM*, 134.

²⁰ *The Complete Poems and Songs of Robert Burns*, (New Lanark: Geddes & Grosset, 2009), 83-4.

letters – and the sound – to summon up an image of robotic extermination.²¹ Morgan is imagining a part of Burns’s nagging conscience which never made it into verse, and also the mouse’s, very reasonable, point of view: the felt truth in this poem arises, as with ‘The First Men on Mercury’, from its correspondence with our sense of natural justice, our innate sympathies.

The emergent poem ‘Message Clear’ (1968), whose foundation line is ‘I am the resurrection and the life’, gained a claim to scientific truth which Morgan was not in the least expecting.²² The editor of *Scientific American* requested permission to publish this poem because:

One of our readers has written to us to comment on the fact that the poem bears an uncanny resemblance to a technique whereby biochemists have determined the sequence of amino acids in a protein and of nucleotides in a nucleic acid.²³

This unexpected reading is an accidental effect of translation, but when one casts as wide a net as Morgan, strange likenesses (to borrow Jones’s phrase) become likely to appear.

Morgan drew into his own work European influence encountered while translating: surrealism is widely apparent, for example in this passage from ‘Rider’ (1973):

Lucretius was found lying under the flary walls / of a universe in the
crab nebula / crying
the dancers brought him water / where he lay he rose, froze / in a
mandala like a flame / blessing
the darkness of all disbelievers²⁴

²¹ *CPEM*, 134.

²² *CPEM*, 159, first published in *TLS*.

²³ MS Morgan L/5, letter of 18/01/1966 from Dennis Flanagan to the editor of the *TLS* (subsequently forwarded to Morgan).

²⁴ *CPEM*, 278-81, 279.

There is a distinct sense of scepticism here regarding know-it-all materialism, a sense which is not usually associated with Morgan, although a distance from materialism is also apparent in the developing use of science in his early work.

The first poem (aside from a short prologue) in Morgan's *Collected Poems* is 'Dies Irae' from 1952.²⁵ This poem of shipwreck and dreams within dreams establishes the poet's visionary potential, and perhaps, his finding of a poetic identity with respect to MacDiarmid. Lines often seem to walk straight into 'On a Raised Beach', as when the poet takes 'bloody steps along those rocks / That did not wince to break my flesh anew'; but the more dreamlike quality of 'Dies Irae' effects a separation from MacDiarmid.²⁶ Further establishing the poet's vision, the climax of the poem is an encounter with God: 'I was taken into the blaze and the recession, / My flesh forgot to burn in mortal transgression'.²⁷ This passage is reminiscent of the meeting with the Star Maker, the Creator, in Olaf Stapledon's 1937 novel *Star Maker*, a book which Morgan had read before 1940.²⁸ 'Cape of Good Hope' (1955), another poem underpinned by a religious faith, contains Morgan's first significant reference to science in *Collected Poems*.²⁹ A passage which opens 'Newton lost the key of peace', contains the following, as if spoken by Newton:

Hermetic apocalypse
And translucent paradox:
But this crystal fellowship
That held my wine of science
Shattered when I drained the wine.³⁰

²⁵ *CPEM*, 21-4.

²⁶ *CPEM*, 21.

²⁷ *CPEM*, 23.

²⁸ Olaf Stapledon, *Star Maker*, (London: Penguin, 1988), 223-231; Stapledon(1937); Morgan read, see Hamish Whyte, (ed.), *Nothing Not Giving Messages*, (Edinburgh: Polygon, 1990), 270; Whyte(1990).

²⁹ *CPEM*, 61-75.

³⁰ *CPEM*, 67, 68.

Materialism destroys mystery and disturbs the poet; later in the poem the imagined voice of Mayakovsky refers to ‘science with its secret face / Unmoralled and terrible’.³¹ The ending of the poem tries to muster hope, and lashes out against war:

Moonbent rocket, rocket warhead,
Houses shudder but the heavens are revealed
And faith will anneal you

Shockwave and flashburn, forcewave and flashforce,
The future has flashed, O destroyers, O martyrs
If you will have charity³²

This charity ‘is the love that materiality / must learn’, and also ‘the materiality / That love must seize to be saved from despair’; a sort of dialectic compromise is made.³³

The next work in *Collected Poems* is *The Whittrick: a Poem in Eight Dialogues*, from 1961, though not published until 1975.³⁴ The final dialogue, Morgan’s first full scale engagement with technology and artificial intelligence, is discussed later; the first dialogue is between MacDiarmid and James Joyce and contains, in the manner of the whittrick (Scots for a ferret, hardly ever seen), a fleeting reference to science. The passage is in Scots, and MacDiarmid is speaking:

The world, for aa that it’s gruppen wi sair decreets
O physics, stound and steid, will preeve to you and me
Yon auld camsteerie ghasitlie place Lucretie thocht
He had exitit fae the nature o things.³⁵

Morgan often adopted characters or voices in this way, and though the thoughts expressed always appear to be Morgan’s, the character provides a tilting nuance. In the passage just quoted, Morgan seems to be using MacDiarmid’s strongly stated anxiety to

³¹ *CPEM*, 71.

³² *CPEM*, 75.

³³ *CPEM*, 75.

³⁴ *CPEM*, 79-116.

³⁵ *CPEM*, 79.

assert the view that the state of the world and its science shows Lucretius was wrong about materialism. The passage is, however, finely poised and it is difficult to offer a secure interpretation; it has the elusive quality of the whittrick. However, the sense of a tempered gloom regarding science seems to be present, and here and elsewhere Morgan's poetry occasionally engenders a feeling of conditional materialism which contrasts with his artistic persona. Morgan never had quite the uncritical attitude to science he publically liked to pretend he had.

A hallmark of Morgan's canon is sequences of poems, sometimes in tight series, sometimes more loosely grouped. The *Instamatic Poems* (1972 and after) are based on putative images taken from the then-new rapid-fire photography introduced by the Instamatic camera.³⁶ The five poems of 'The Moons of Jupiter' narrate with detachment callous and exploitative extra-terrestrial mining operations; their fatalism is quite chilling.³⁷ *From the Video Box* is a sequence of twenty-seven unusual poems based on the idea of a broadcast right of reply to television programmes.³⁸ These are anonymous character poems which draw a faint and uneasy line between assumed and authorial voices, especially in moments of violence or rage.³⁹ Morgan places one of the voices in 'that disgruntled and half-idle mood I'm sure you know'.⁴⁰ Many of the poems have this sense of bad temper which interacts with the anonymous speaker's perception.⁴¹ Sensibilities are modified further by the intrusion of flaky technology, as in 'I watched that scratch video that scratch video / last night we watched that last night I was' – the

³⁶ *CPEM*, 217-229, 383.

³⁷ *CPEM*, 390-4.

³⁸ *CPEM*, 479-500.

³⁹ *CPEM*: e.g. poem 8, 485-6, poem 24, 497.

⁴⁰ *CPEM*, 484.

⁴¹ *CPEM*: e.g. poem 5, 483-4, poem 6, 484, poem 16, 490-1, poem 22, 495-6.

seeming disruption of the poetic voice by the technology contrasts with the complex but measured metrical lines in which the thought is rendered.⁴² The sequence *Sonnets from Scotland* (1984) describes a series of observations made by alien time travellers; the cheeriness of lines such as ‘Diving in the warm seas around Bearsden’ from ‘Carboniferous’ or the witty temporal ambiguity of an ancient coin with the words ‘*Respublica Scotorum*’, is casually juxtaposed with much darker poems such as ‘After Fallout’ and ‘Computer Error: Neutron Strike’.⁴³ Douglas Dunn finds the sentiment in ‘After Fallout’, if not ironic, ‘close to damnable’.⁴⁴ ‘Morgan is content’, Dunn argues, ‘with a nuked globe and an aftermath in which the survivors contrive “the freer ages”’; Dunn says ‘It is here that the ethics of science fiction can be called into question’.⁴⁵ The apparent glibness of some of the *Sonnets from Scotland* is shocking; I believe there is a very real sense of near-fatalistic despair in some of Morgan’s work, disguised but also in some ways emphasised by juxtaposed cheeriness. There are a good number of informally grouped love poems in *Collected*, and it’s notable that in general the use of inventive techniques in these is radically scaled back.⁴⁶ The love poems, however, are especially poignant and direct examples of Morgan’s universal theme of hope, or more abstractly, the possibility of hope, as against the very real possibility of despair. Morgan’s personal vulnerability due to his homosexuality, illegal in Scotland until 1980, cannot be ignored when reading his poetry. For example, the sense of fear in ‘The Suspect’, where a police officer says to the poet, ‘do you think / we don’t know what you are’, is palpable.⁴⁷

⁴² *CPEM*, poem 6, 484.

⁴³ *CPEM*, 436-57, 437, 455, italics original, 452-3, 453.

⁴⁴ Douglas Dunn, ‘Morgan’s Sonnets’, in Robert Crawford and Hamish Whyte, (eds.), *About Edwin Morgan*, (Edinburgh: Edinburgh University Press, 1990), 75-89, 87; Dunn (1990); Crawford & Whyte (1990).

⁴⁵ Crawford & Whyte (1990), 88.

⁴⁶ Exceptions include ‘Without it’ and ‘London’: *CPEM*, 187-8, 249-52.

⁴⁷ *CPEM*, 170.

John Holmes has written penetratingly in his book *Darwin's Bards* about Morgan's adventure into the far past in 'The Archaeopteryx's Song' (1977), a poem which illustrates how an imaginary and impossible situation can feel uncomfortably true.⁴⁸ As Holmes says, 'Archaeopteryx is the most famous "missing link" in evolutionary history', 'A dinosaur with wings and feathers, or a bird with teeth, hands and a tail bone, it was first discovered in Bavaria in 1861, only two years after *The Origin of Species* was published'.⁴⁹ Speaking in the first person, an Archaeopteryx fossil comes to life, emerging from the rock, to soar above the dinosaurs, those 'dumb tons', with their 'Damnable plates and plaques'.⁵⁰ The Archaeopteryx foretells a great future for its lineage, as 'The lords of creation', who 'are in my mate's next egg's next egg's next egg'.⁵¹ As the proto-bird's mental vision develops it becomes increasingly contemptuous of its evolutionary past: 'do you imagine / I am ever going to crawl again?'.⁵² As Holmes points out, this is a science fiction poem; the closing two lines are: 'I will teach my sons and daughters to live / on mist and fire and fly to the stars'.⁵³ Holmes says 'By putting these thoughts into the head of a non-human missing link, Morgan holds up a mirror to our myths of our own evolution', 'we see a distorted, strange, half-comic image of ourselves'; 'Equally though', Holmes continues, 'the poem reminds us' intelligent life 'might have been birds after all'.⁵⁴ While there is an echo in the poem of the avian worlds in *Star Maker*, Stapledon's writing is not ironic; Morgan, however, parodies the

⁴⁸ Holmes(2009); *CPEM*, 403.

⁴⁹ Holmes(2009), 32.

⁵⁰ *CPEM*, 403.

⁵¹ *CPEM*, 403.

⁵² *CPEM*, 403.

⁵³ Holmes(2009), 32; *CPEM*, 403.

⁵⁴ Holmes(2009), 32, 33, 33.

arrogance of a mere accident of natural selection (us).⁵⁵ There is an increasing sense of discomfort as the poem develops, and the apparent note of hope at the end is overwhelmed by the bad-tempered and arrogant form of life which emerges from the rock, as if some things never change.

Morgan described his long poem *The New Divan* (published 1977), which is set nominally in the Middle East during the Second World War, as ‘a hundred short poems very loosely linked together’, and in a separate interview noted, ‘It must be difficult to interpret because it’s partly imaginary, with invented characters, and partly has real characters, including myself’.⁵⁶ What applies to characters in *The New Divan*, also applies to place and time, the real and the fictional are nearly indistinguishable as they drift past and through each other. *The New Divan* is composed of rapidly changing sequences of images: Morgan manipulates imagery in *The New Divan* in an analogous manner to the way words shift and change in, say, ‘Unscrambling the Waves at Goonhilly’.⁵⁷ Morgan’s shifting imagery in *The New Divan* is reminiscent of the moving four-dimensional images of Wright’s ‘The Moving Image’, but unlike Wright, Morgan is not seeking historical realism, mainly he is working through personal themes. Rodney Edgecombe comments that ‘Rather like the “Windows” computer program, *The New Divan* opens several files at once, and keeps them open while it shifts them round the screen’; Edgecombe’s metaphor is helpful but doesn’t catch the morphology of the images.⁵⁸ David Kinloch’s essay ‘The Case of the Missing War: Edwin Morgan’s “The

⁵⁵ Stapledon(1937), 114-18.

⁵⁶ *CPEM*, 293-330; Marshall Walker, ‘Let’s go’, in Whyte(1990), 54-85, 56; Christopher Whyte, ‘The Power of Things Not Declared’, in Whyte(1990), 144-87, 147-8.

⁵⁷ *CPEM*, 191.

⁵⁸ Rodney Edgecombe, *Aspects of Form and Genre in the Poetry of Edwin Morgan*, (London: Cambridge Scholars Press, 2003), 48; Edgecombe(2003).

New Divan”” pushes further.⁵⁹ Kinloch discusses the French writer Gilles Deleuze, whose work he characterises as a ‘metaphysics in which the concept of multiplicity replaces that of substance’; building on this, Kinloch describes the perhaps pivotal poem 50 as ‘a Tarkovskian image of fragility, an *atmosphere* rather than a *meaning*’.⁶⁰ Kinloch also identifies the reference to ‘passwords’ in poem 4 as a hint that Morgan is writing in code.⁶¹ There are a number of threads of science in *The New Divan*, often most effectively read as imagery. One of the most striking is in poem 30, which seems to centre around a recurring character who could be called the partisan.⁶² The partisan is aware of the fragility of his cause, that ‘his gifts were not / of stone’, but his language is universal and with it ‘he picks up the three / worlds and the seven seas’; he is also ‘WANTED’, like a wild-west outlaw. This is the final passage in the poem:

[...] In thought space-docks,
 in words the thoughts, dark softwear not spun over
 by hesitant light-pens, rise. Ships like peacocks
 spread vanes near Mars, wear out, are souvenirs.
 Their very scrap’s too active yet by half.
 I put it in lead – like this – immediately.⁶³

Morgan’s materials for this imagery are exotic, but the pictures invoked are true to life. The partisan’s soaring ambition, which ‘In thought space docks [...] rise’, is contrasted, using the conflationary spelling of ‘softwear’, to his disposability in war, while more powerful supervisory forces hesitate. Struggles repeat throughout the universe, but reduce to a souvenir, a Che Guevara tee-shirt – though Morgan’s partisan’s ideas remain too powerful to handle. The poet’s position is poised between respect for the partisan and

⁵⁹ David Kinloch, ‘The Case of the Missing War’, in *Scottish Literary Review*, Vol.4, No. 2, Autumn/Winter 2012, 85-103; Kinloch(2012).

⁶⁰ Kinloch is quoting Deleuze from *The Stanford Encyclopaedia of Philosophy*; Kinloch(2012), 87, 94.

⁶¹ Kinloch(2012), 98.

⁶² *CPEM*, 304.

⁶³ *CPEM*, 304.

non-involvement, between emotional engagement and practical realism, coloured by fatalism. If the events were real, as a serving soldier, Morgan would have been flirting with treason.

The establishment at Goonhilly on the Lizard Peninsula in Cornwall, near the sea, is a communication base station famous for its role in the first live trans-Atlantic television broadcast via the satellite Telstar in 1962. Morgan's poem 'Unscrambling the Waves at Goonhilly' (1962/3), is a column of thirty six seven-letter words which scramble fish and sea-mammal names, and finally unscramble them to make the word 'telstar'.⁶⁴ The effect is that the fish names are scrambled by sea-waves, as the words roll into one another: 'narphin / hadwhal / nardock / teldock / hadstar'.⁶⁵ In a similar way, though on a far more elaborate scale, the images in *The New Divan* seem to melt into one another. The passage from poem 30 picked out above has 'thought space-docks', rolling into 'dark softwear', 'light-pens', spaceships, and radioactivity.⁶⁶ Like separating amoebae, one image gives birth to another in quick succession. As with 'Goonhilly', which ends with six real names, seemingly born from the waves, poem 30 ends on a coherent thought born from the sequence of images.⁶⁷ The initial obscurity of *The New Divan* arises from verbal economy with which the images are drawn, and the speed with which, as in 'Goonhilly' one becomes the next. This rational solidity is the *joie de vivre* and delight of Morgan: poems as different as 'Goonhilly' and *The New Divan* share a floor plan. The combination of limitless variety and structural unity is a feature of the Mandelbrot set. Roger Penrose says: 'The Mandelbrot set is certainly no invention of any

⁶⁴ *CPEM*, 191.

⁶⁵ *CPEM*, 191.

⁶⁶ *CPEM*, 304.

⁶⁷ *CPEM*, 191, 304.

human mind. The set is just objectively there in the mathematics itself. If it has meaning to assign an actual existence to the Mandelbrot set, then that existence is not within our minds, for no one can fully comprehend the set's endless variety and unlimited complication'.⁶⁸ The set seems to represent a natural unity of objective reality and imagination, nature's hallucinations even: it is as if Morgan's Mandelbrot mind derives the limitless from the concrete, unbounded fantasies from a deep structural realism.

Poetry and Science Fiction

The most striking thing about Morgan's science fiction poems is that, in terms of thematic content, they are almost unremittingly bleak. From nuclear war to the end of the universe, there is precious little hope expressed, and when hope appears it can frequently be read as forlorn. Even an apparently obvious exception, 'The First Men on Mercury', loses its shine of optimism when it is remembered that its thwarted imperialists are likely to return in greater force.⁶⁹ I would like to take seriously the fairly clear pattern of emotional despair in the science fiction poems, and also Morgan's injunction from the introduction to *Sovpoems*, that we should not read poems as if 'the materials used are more interesting than the mind that shapes them or the end it shapes them to'; to do so it will be necessary to consider Morgan's comments on his own work.⁷⁰ First though, it's worth an initial run through of a range of Morgan's science fiction, to make the central argument of this section. Two of Morgan's most famous science-fiction poems,

⁶⁸ Penrose(2004), 16-17.

⁶⁹ *CPEM*, 267-8.

⁷⁰ Morgan(1996), 31.

‘Memories of Earth’ and ‘In Sobieski’s Shield’, discussed individually towards the end of the section, represent alternate poles of authorial optimism.⁷¹

In ‘Last Message’ (1973) the survivors of a nuclear war are sealing themselves in a pyramid, ‘to lie a thousand / thousand thousand years’, while ‘on the plains’, ‘the Forms clash in blue / our enemies’.⁷² The following poem ‘Frontier Story’ (1973) opens ‘Meanwhile, back at the ranch factory’; the setting of this piece is dystopic, and it seems great factories are turning out replicas of a former human society, though these revert ‘to dust at the touch / of air’.⁷³ ‘Spacepoem 3: Off Course’ (1973) is built with short phrases separated with a spaced caesura: the montages of images suggest a ship in chaos and a lifeline cut, recalling a similar image in Stanley Kubrick’s 1968 film, *2001 A Space Odyssey*.⁷⁴ In ‘Space Sonnet’ (1977) a prisoner’s words are rendered with missing letters, possibly as a result of torture or ‘*what they call their penal therapy*’ (where the italicised letters are missing in the original).⁷⁵ In ‘Instamatic the Moon February 1973’, a Soviet lunar mission discovers a monolith as if from *2001 A Space Odyssey*; on the side of the monolith is an inscription which recalls an early computer command line and might decode to suggest the theme of the film: the luring of a human specimen to the obelisk’s universe.⁷⁶ Perhaps the irony in the poem is that the Soviet mission was unmanned. ‘The Worlds’ (1979) struggles to find hope as ‘Men / bring life and death both’; the ‘Particle Poems’ (1979) seem mostly benign, but end with shocking violence: ‘Go / bid the soldiers shoot’; in ‘Era’ (1979), ‘A silicon-based life replaced us’; and ‘The Mouth’

⁷¹ *CPEM*, 330-40, 196-8.

⁷² *CPEM*, 262.

⁷³ *CPEM*, 263.

⁷⁴ *CPEM*, 268.

⁷⁵ *CPEM*, 341.

⁷⁶ *CPEM*, 383; decoding discussed with Russell Jones, private emails 23, 26, 28/01/13, and presented in Russell Jones, *Broken Wor(l)ds: Edwin Morgan’s Science Fiction Poems*, PhD thesis, (The University of Edinburgh, 2014), 103; Jones.r(2014); see also MS change in MS Morgan P/1/630.

(1979) is a poem with an affinity to Stapledon's *Star Maker* which portrays the end of the universe as a stasis in the form of an computer loop, which collapses into the unknown.⁷⁷

'A Home in Space' (1979) could be read as a poem of freedom, as a 'band of tranquil defiers' agree to cut communication with Earth; but it's a strange freedom – the defiers seem to be part of the machine as 'Eyes, hands, food-tubes, screens, lenses, keys were one'.⁷⁸ Notwithstanding positive senses of freedom in the poem, irony is easier to find than hope. The mining operations on 'The Moons of Jupiter' (1979) scarcely offer hope; as McGonigal comments, 'In "Io", the surface of the planet is a scarred industrial landscape that might well be Lanarkshire [...] but is also like hell (these are sulphur mines)'.⁷⁹ At the end of the sequence the narrator reflects with resignation: 'These / memories, and love, go with the planetman / in duty, and in hope, from moon to moon'.⁸⁰ The sadness of these lines comes from the fact that it is not clear what the narrator could be hoping for. *Sonnets from Scotland*, as noted, has cheerier elements, but these are surely counterpoints to the sequence's three nuclear apocalypses and the human sacrifice depicted in 'The Ring of Brodgar'.⁸¹ There are a few counter examples, but these are mainly neutral rather than hopeful. 'Clone Poem' (1979), for instance, is playful, and 'Thoughts of a Module' (1973) is descriptive of a U. S. moon landing.⁸² 'From the Domain of Arnheim' (1968), on the other hand, is a dark poem where time travellers observe an early human tribe as 'They sang naked, and kissed in the smoke'.⁸³ But the observers create a disturbance which upsets the tribe, and one of them throws a fire brand

⁷⁷ *CPEM*, 383, (*Hamlet*, Act 5 Scene 2), 384-6, 386-7, 388-9.

⁷⁸ *CPEM*, 387-8.

⁷⁹ *CPEM*, 391-4, McGonigal(2010), 256.

⁸⁰ *CPEM*, 394.

⁸¹ *CPEM*, 452, 452-3, 453, 438-9.

⁸² *CPEM*, 389-90, 266.

⁸³ *CPEM*, 198-9, 198.

‘where our bodies would have been’⁸⁴ The narrator comments that this was the manner ‘they would deal with every imagined power / seen or unseen’.⁸⁵ The self-centred reflection of the departing narrator either chills or is ironic, or both: the last line is: ‘From time the souvenirs are deeds’; the reader may conclude that these time travellers toy with god-like delusions, and are simply collecting instances of their intrusive meddling.⁸⁶

There are several places where exploration of the world and exploration of space are linked, as in poem 5 of ‘New Year Sonnets’: ‘Martian badlands are the west for minds/ that cannot rest in watching schooners sail / beyond the Golden Gate’; but any sense of optimism is negated if the reader infers the influence of Ray Bradbury’s allegorical tragedy of the colonisation of America, *The Martian Chronicles*.⁸⁷ ‘On the Way to Bernard’s Star’ at first sight appears to be an optimistic space poem; it is the final poem from the sequence *Planet Wave*, included in Morgan’s 2007 collection *A Book of Lives*.⁸⁸

This poem charts a hopeful voyage ‘not far off the speed of light’, which ends on the sighting of a pleasant-looking world, and the traveller leaving the ship: “‘Open the hatch,” I said’.⁸⁹ However, this bright prospect is undermined by the bitter realism of an earlier poem in the sequence, ‘Easter Island’, which ends: ‘On the horizon, the first ship from Europe: / trinkets, missionaries, trousers, smallpox, guns’.⁹⁰ It has to be admitted though that ‘Islands’, is an optimistic poem which extrapolates, in a Polynesian context,

⁸⁴ *CPEM*, 199.

⁸⁵ *CPEM*, 199.

⁸⁶ *CPEM*, 199.

⁸⁷ *CPEM*, 407-10, 408; Ray Bradbury, *The Martian Chronicles*, (London: HarperVoyger, 2008); Bradbury(1951).

⁸⁸ Edwin Morgan, *A Book of Lives*, (Manchester: Carcanet, 2007), 23-43, 43; Morgan(2007).

⁸⁹ Morgan(2007), 43.

⁹⁰ Morgan(2007), 35.

earth-bound discovery to space exploration: ‘Take the voyage out then! Drink the milk of space!’.⁹¹

The poem ‘A Visit’ was originally published in 1991 in the collection, *Hold Hands Amongst the Atoms*.⁹² It was re-published by Morgan in his final collection *Dreams and Other Nightmares* (2010), and selected by Russell Jones for his 2012 anthology of science-fiction poems, *Where Rockets Burn Through*.⁹³ The voice in ‘A Visit’ seems to be an indigenous speaker suffering from someone else’s exploration:

[...] Whether they have nothing,
or have become tired of whatever brilliance
it was they swooped from, or are merely knocking
by chance on this world’s half-hinged storm door
[...]
If you attack us, we shall not be gentle!⁹⁴

There is something of the sense of ‘The First Men on Mercury’ in ‘A Visit’ – exploration is linked with imperialism and its looming destructive impulse. Poems such as ‘Space Sonnet’ and ‘The Moons of Jupiter’ also demonstrate that imperialism is oppressive for many of the perpetrators.⁹⁵ In addition to holding anti-imperialist views, Morgan was throughout his life defiantly anti-war. There are many indications of this, including references to Vietnam, and the poem ‘The War on the War on Terror’ from *A Book of Lives* (2007).⁹⁶ Morgan’s anti-war feelings are even more explicit in his scrapbooks. A photo-montage, ‘The Lemmings’, is an anti-war piece, as is an early word-montage poem which could be called (from its first line) ‘Despite Gloomy Forecasts’ (probably January

⁹¹ *CPEM*, 195.

⁹² Edwin Morgan, *Hold Hands Amongst the Atoms*, (Glasgow: Mariscat, 1991), 51.

⁹³ Edwin Morgan, *Dreams and Other Nightmares*, (Glasgow: Mariscat, 2010), 56; Russell Jones, (ed.), *Where Rockets Burn Through*, (London: Penned in the Margins, 2012), 67; Jones.r(2012).

⁹⁴ Jones.r(2012), 67.

⁹⁵ *CPEM*, 341, 391-4.

⁹⁶ E.g., *CPEM*, 253; Morgan(2007), 104.

1940).⁹⁷ The scrapbooks record page after page of images of mushroom clouds, and the attendant horror in Hiroshima; as McGonigal puts it: 'Photo-images of atomic weapons counter more optimistic images of human endeavour such as the Russian space programme'.⁹⁸ There is a newspaper headline from 1956: 'U.S. Ability to Inflict Devastation Improving'.⁹⁹ Rational existential gloom is repeatedly voiced in Morgan's science fiction poems; I understand this as a disguised way to work through feelings of despair.

Moving on to consider Morgan's comments in prose, there are two essays, 'A Glimpse of Petavius' and 'The Poet and the Particle', both from 1963, which cover similar ground.¹⁰⁰ In these essays, Morgan seeks to establish the legitimacy of science in poetry; in the former he writes, 'What involves man involves reality; what involves many men is the great neglected material of our poetry'.¹⁰¹ In a number of comments in the interviews collected in Hamish Whyte's *Nothing Not Giving Messages* (1990), Morgan builds on his conviction that poetry should include science, and explicitly associates science with optimism.¹⁰² In 1971 he said to David Smith 'The space age will perhaps bring a kind of epic poetry back'.¹⁰³ Speaking with Robin Hamilton, also in 1971, he reflected that his science fiction works take 'a long view of the human species and its adventures', and that 'it's not so much the science or scientific ideas that are important', to far-future situations, but 'human beings and how they would react'.¹⁰⁴ In an interview with Marshall Walker in 1975, Morgan is asked if he conceded that technology has its

⁹⁷ MS Morgan C/3, 65; MS Morgan C/1, 390.

⁹⁸ E.g. MS Morgan C/9, 1600, 1605-6, 1746; C/10, 1866; C/14, 2743; McGonigal(2010), 81.

⁹⁹ MS Morgan C/13, 2679.

¹⁰⁰ Morgan(1974), 3-15; 16-19.

¹⁰¹ Morgan(1974), 14.

¹⁰² Whyte(1990).

¹⁰³ Whyte(1990), 20.

¹⁰⁴ Whyte(1990), 32.

horrors; he responds, ‘I think that many of the things that are horrible or repellent are perhaps phases of a long-term process that is not going to be horrible in the end’.¹⁰⁵ He quickly qualifies: ‘This may be a somewhat Olympian view of things’.¹⁰⁶ In response to a question about the ‘Yeats-Eliot-Stephens axis’, Morgan distances himself from the pessimism of ‘The Waste Land’: ‘I do find a considerable element of repulsion in the view of life taken in the poem’, and adds, ‘This is true even more in the view of life I detect in Yeats’.¹⁰⁷ At the end of the interview he comments: ‘I think it goes without saying that we shall go to other environments and adapt to other environments and adapt to them physiologically like in Stapledon’s *Last and First Men*’.¹⁰⁸ In *Nothing Not Giving Messages* there are a number of explications of poems, though McGonigal comments, ‘EM disliked analysing his own poetry, feeling like many other poets an almost superstitious respect for its mystery’.¹⁰⁹ Discussing Morgan’s poem ‘What is “Paradise Lost” really about?’, Hamilton asked if it was ‘a sort of attempt to answer when somebody asked you what you believed’.¹¹⁰ Morgan responded, ‘I should just perhaps refer them to the poem and let them work it out for themselves!’.¹¹¹ On the issue of what one believes, he elaborated:

[...] when you’re writing poetry or creating any work of art, the whole thing is thrown into the melting pot right away and what you think you believe is not necessarily what you actually do believe, and you may not even really believe as much as you think you believe, or even say in speech or in prose, that you actually believe.¹¹²

Morgan was occasionally candid.

¹⁰⁵ Whyte(1990), 64.

¹⁰⁶ Whyte(1990), 64.

¹⁰⁷ Whyte(1990), 66.

¹⁰⁸ Whyte(1990), 84-5; Olaf Stapledon, *Last and First Men*, (London: Methuen, 1934); Stapledon(1930).

¹⁰⁹ McGonigal(2010), 243.

¹¹⁰ *CPEM*, 200; Whyte(1990), 37.

¹¹¹ Whyte(1990), 37.

¹¹² Whyte(1990), 37.

It's worth a brief discussion of the science fiction and related background to Morgan's work. Morgan's interest in the writing of Olaf Stapledon (1886 – 1950), can be established from his book collection which is housed in the Mitchell Library in Glasgow. He owned most of Stapledon's novels; and inside his copy of one of the study-biographies of Stapledon in the Mitchell's collection there is a thick pile of cuttings of reviews and miscellany related to the science-fiction writer.¹¹³ As well as the Stapledonian undertones already mentioned, some events in 'In Sobieski's Shield' perhaps relate subtly to the physiological adaption Morgan notes in the interview with Marshall Walker.¹¹⁴ As a result of the dematerialisation described in 'Sobieski's Shield', the narrator has 'only / four fingers', and his son 'only one nipple'; this might be physiological adaption tugging both backwards and forwards: backwards in the regressive sense of loss of fingers, forwards in the sense of increasing divergence between male and female typology.¹¹⁵ The collective alien observer in *Sonnets from Scotland* also seems Stapledonian.¹¹⁶ Another likely influence on Morgan is Ray Bradbury's *The Martian Chronicles*.¹¹⁷ Bradbury's intricate portrayal of telepathy in this work has an affinity with the same conceit in 'The First Men on Mercury'; and if Bradburian telepathy is carried into 'In Sobieski's Shield' it would suggest that all the events could be in the narrator's mind.¹¹⁸

Jack London was another favourite Morgan author, although unfortunately, his poetic portrait of the novelist in 'Jack London in Heaven' seems to miss the American

¹¹³ Morgan's copy of Leslie A. Fiedler, *Olaf Stapledon, A Man Divided*, (Oxford: Oxford University Press, 1983).

¹¹⁴ *CPEM*, 196-8; Whyte(1990), 84-5.

¹¹⁵ *CPEM*, 196, 197.

¹¹⁶ Stapledon(1937).

¹¹⁷ Bradbury(1951).

¹¹⁸ Bradbury(1951), esp. 27-50, 53-78; *CPEM*, 267-8, 196-8.

writer completely. That said, there is a powerful analogue between the imagined experience of Morgan's soaring visions and London's. *The Star Rover*, London's 1914 novel, is set on death row in San Quentin prison, where the protagonist, who is subjected to torture, narrates:

In a few minutes of loosed subconscious I have sat in the halls of kings, above and below the salt, been a fool and a jester, man-at-arms, clerk and monk [...] I have lain by the meagre shade of sun-parched sagebrush by dry water-holes [...] I have been a sea-cuny and bravo, scholar and recluse.¹¹⁹

If *Star Rover*'s visionary scenarios were used as an analogue to Morgan's imagined experiences, then it would darken the poet's work considerably. Another London novel, *Before Adam* (which Morgan retained among the 'good book-booty' on his final nursing-home shelves), develops its vision of human origins through a series of dreams.¹²⁰ In an interview, Morgan referred to his 'Openness to experience', as his 'Jack London bit'.¹²¹ If London's influence on Morgan's poetry is accepted, then the edgy excitement of adventure in the science fiction and other work becomes strongly coupled an acute sense of impending tragedy.

One of Morgan's most well-known science fiction poems is the ambitious 'Memories of Earth' (1973).¹²² This poem is set in what might be the world of the observers of *Sonnets from Scotland*, or of the alien visitors in 'From the Domain of Arnheim'.¹²³ We follow a mixed-sex group of 'time-people' as they observe a series of past Earth events, from the horrific to the hopeful; unlike *Sonnets from Scotland*, the reader is aware of the observational team and their society, and drawn into their

¹¹⁹ Jack London, *The Star Rover*, (Gloucester: Alan Sutton, 1986), 3, 39; London(1914).

¹²⁰ Jack London, *Before Adam*, (London: Hesperus Classics, 2004), London(1906); McGonigal(2010), 411; quote from 'From a Nursing Home' (2005).

¹²¹ Whyte(1990), 102.

¹²² *CPEM*, 330-40.

¹²³ *CPEM*, 437-457, 198-9.

viewpoint. ‘Memories of Earth’ is cast in blank verse which accommodates the poem’s dense information and its modes of observation, movement, and reflection; the verse form seems to endow the narrator with a sense of moral truthfulness. The time travellers live in an autocratic society governed by ‘the Council’, who authorise the mission to retrieve the memories of Earth; the record ‘survives’ on two tapes, the ‘playing’ of which is the central structure of the poem.¹²⁴ A major part of the conceit is that the party must undergo a shrinking process ‘near the atomic sub-structure’ to enter Earth, which brings them into the domain of Heisenberg’s uncertainty principle.¹²⁵ This principle is central to the poem, and the particular way in which it is implemented can be traced to Morgan’s copy of Erwin Schrodinger’s *Science and Humanism*, held in the Mitchell library.¹²⁶

In *Science and Humanism* Bohr and Heisenberg’s interpretation of (their own) uncertainty principle is challenged by Schrodinger; key passages in this argument have been side-barred by Morgan.¹²⁷ Following Penrose briefly, the uncertainty relation is expressed as follows.

$$\Delta x \Delta p \geq \hbar$$

Penrose says according to the principle ‘it is not possible to measure (i.e. to magnify to the classical level) both the position and the momentum of a particle accurately at the same time’, and moreover ‘there is an *absolute limit* on the product of these accuracies’.¹²⁹ This means that ‘If the position were measured to *infinite* precision, then

¹²⁴ *CPEM*, 331.

¹²⁵ *CPEM*, 332.

¹²⁶ Erwin Schrodinger, *Science and Humanism*, (Cambridge: Cambridge University Press, 1951); Schrodinger(1951).

¹²⁷ Schrodinger(1951).

¹²⁸ Penrose(1989), 321; The symbol Δ is ‘range’ or ‘spread’; x is position; p is momentum; \hbar (h bar) is Planck’s constant, a known number; the relationship symbol means ‘greater than or equal to’.

¹²⁹ Penrose(1989), 321; italics original.

the momentum would become *completely* uncertain', and vice versa, and all the stages in between.¹³⁰ Such is the physics of the uncertainty principle, but its interpretation, especially in terms of the role of human agency, has always been controversial. Schrodinger addresses this issue directly in a section of *Science and Humanism* entitled 'The Alleged Break-down of the Barrier between Subject and Object'. Schrodinger, writing in English, summarises the principle.

We cannot make any factual statement about an object without 'getting in touch' with it. This 'touch' is a real physical interaction. Even if it consists only in 'looking at the object', the latter must be hit by light rays and reflect them into the eye, or into some instrument of measurement. This means that the object is *interfered with* by observing it.¹³¹

Bohr and Heisenberg, Schrodinger states, hold that the principle implies that 'the object has no existence independent of the observing subject', and that 'the direct physical, causal, influence between [subject and object] is regarded as *mutual*'.¹³² Schrodinger concludes the section:

What remains doubtful to me is only just this: whether it is adequate to term one of the two physically interacting systems 'the subject'. *For the observing mind is not a physical system, it cannot interact with any physical system.* And it might be better to reserve the term 'subject' for the observing mind.¹³³

Schrodinger seems to be seeking an escape route from the mutuality of the uncertainty relation, from a descent into outright subjectivity, as implied by Bohr and Heisenberg. He allows that a physical system is changed by the interaction, but implies that the mind is not. Morgan is not going to let Schrodinger have his refuge – he creatively misreads the quoted passages (mostly side barred) to gain the sense of the uncertainty principle used in the poem: that the interaction is mutual, that the mind is the subject, and that both

¹³⁰ Penrose(1989), 321; italics original.

¹³¹ Schrodinger(1951), 47-53, 49; italics original.

¹³² Schrodinger(1951), 53; italics original.

¹³³ Schrodinger(1951), 53; italics original.

observer and observed are changed. This is next to explicit in ‘Memories of Earth’; the narrator is reflecting on his experience on Earth:

It seems this is a world of change, where we,
observing, can scarcely fix the observed
and are unfixed ourselves.¹³⁴

If the Earth which the travellers find is subject to quantum physics, implying also the notion of chance or probability, the travellers’ own world, by contrast, could be seen as representing classical physics: the clouds the party see on Earth are ‘not fixed / as ours are in a chosen set but free / to drift’, and even ‘birds can come and go / unchecked’.¹³⁵ At one point near the start of the poem, the narrator chides himself with what sounds like a Council slogan: ‘Surprise / comes from old microstructure thinking’, as if in some way quantum uncertainty has been banished from the travellers’ own world.¹³⁶ Before they travel the party are sent to ‘anti-brainwashing sessions’, in an attempt – futile as it turns out – to stop the travellers being affected by the events they are to witness. The duty of the observers is ‘to record whatever we have found to be’ on Earth and ‘meditate on everything recorded’, until ‘the plain figure of promised order appears’. But the party is unable to make classical observations: on arrival on Earth, the landscape ‘melts / at the edges like a photograph in flames’.¹³⁷ As the travellers are orienting themselves, Morgan introduces relativity into the poem; he must have considered relativity when reading *Science and Humanism*, because the relevant passage is side-barred. Schrodinger writes: ‘two events may happen in such a way that *either of them* may be regarded as the earlier

¹³⁴ *CPEM*, 337.

¹³⁵ *CPEM*, 333.

¹³⁶ *CPEM*, 332.

¹³⁷ *CPEM*, 333.

one'.¹³⁸ Morgan writes regarding the Earth: 'its images, its messages, its life must come to us like an eternal present'; he continues, referring now to quantum mechanics, 'by our very meagrest interfering / we trigger fragments of the vanished prints'.¹³⁹ The first memory of Earth which appears to the travellers is the vicious execution, in the form of a mock coronation on a red-hot throne, of a Hungarian peasant revolutionary, 'King' Dozsa.¹⁴⁰ The party looks at the scene, seeing more and more detail, 'till suddenly the whole scene snaps tight shut'.¹⁴¹ Trying to fix an object too much in one dimension, causes it to completely unfix in another. The desperation of the King Dozsa scene is alleviated by a series of images which recall various montages in Morgan's scrapbooks: Wordsworth on a mountain, a drive-in movie in the US, the antics of Tom and Jerry.¹⁴² This passage has a fleeting, fragile quality, the images are detailed, but they disintegrate quickly. After witnessing a scene from Auschwitz, the narrator, who we now know is called Erlkon, comforts his companion Baltaz; he notes 'She's changed / I'm changing'.¹⁴³ The subject is the mind. The final memory, before the travellers return, is of Polynesian adventurers; it is almost as if by the very strain of Auschwitz the party has willed into existence this sustaining memory. Along with Wordsworth, the Polynesians represent the poem's figure of hope.¹⁴⁴ On their return, the de-briefing does not go well, the report was 'totally deplored, useless / to contemplate, ruinously incomplete'. The Council, they are told, would be 'training non-susceptibles' (classical observers) 'for a

¹³⁸ Schrodinger(1951), 48; italics original.

¹³⁹ *CPEM*, 333.

¹⁴⁰ *CPEM*, 334.

¹⁴¹ *CPEM*, 334.

¹⁴² *CPEM*, 335.

¹⁴³ *CPEM*, 336.

¹⁴⁴ *CPEM*, 338.

further expedition'.¹⁴⁵; in the final section of the poem the party appear to have become dissidents; this stanza opens: 'We meet / in secret now, the six of us, from time / to time, and study how to change this life'.¹⁴⁶

Colin Nicholson comments on 'Memories of Earth' in his essay, 'Remembering the Future: Edwin Morgan's Science Fiction Poetry', and covers similar ground in his book-length work on Morgan: *Edwin Morgan, Inventions of Modernity* (2002).¹⁴⁷ In his essay, Nicholson writes that 'Memories of Earth' adapts Heisenberg's uncertainty principle by 'Deconstructing realism's assumed equation of epistemology and the representation of external facticity for experiencing subjects'.¹⁴⁸ Casting the principle in epistemological terms suggests Nicholson might be undermining the knowledge structure of the poem and suggesting unreliable narration, but he does not do this. Instead Nicholson discusses the relationship between the poem's narrative and its events: 'suspension between simultaneity, linear narrativity, and reconstructive recall', 'complicates our time-travellers' encounters', and 'their experience of sensation beyond approved discourse alienates them from a prescriptive home environment'.¹⁴⁹ This suggests, rightly I believe, that Morgan is using types of narrative form to develop a questioning attitude in his protagonists. Nicholson illustrates his point with Erlkon's words as he prepares to brief the Council, 'We made our report in troubled confusion, / memories flashing between sentences / to make us falter'.¹⁵⁰ Again Nicholson verges on questioning the reliability of the poem's narrative. He may have considered this

¹⁴⁵ *CPEM*, 339.

¹⁴⁶ *CPEM*, 339, 340.

¹⁴⁷ Colin Nicholson, *Edwin Morgan, Inventions of Modernity*, (Manchester: Manchester University Press, 2002); Nicholson(2002); Colin Nicholson, 'Remembering the Future', in *The Yearbook of English Studies*, Vol. 30, 2000, 221-233; Nicholson(2000).

¹⁴⁸ Nicholson(2000), 226.

¹⁴⁹ Nicholson(2000), 224.

¹⁵⁰ Nicholson(2000), 224; *CPEM*, 339.

possibility, and then backed off for lack of evidence, as I have done. Nicholson's conclusion is convincing and catches the romantic sense of the poem; quoting from *Paradise Lost*, he writes: "'Memories of Earth' sings of aliens' 'first disobedience, and the fruit / Of that forbidden tree, whose mortal taste / Brought pain into their world, and all their woe'", and this 'transgression', 'expands the subject towards political freedom'.¹⁵¹ This, in analytical terms, fits well with the poem, but Milton's words soar far above 'Memories of Earth'. The story of 'Memories of Earth' seems simply to replay a cold-war narrative of Western-style humanity releasing itself from mechanical and oppressive totalitarianism, the sort of plot used repeatedly on *Star Trek*. But the tyranny is too cardboard, and the oppositions too obvious for any genuine feeling of hope to be developed. Perhaps Dunn was right, and Morgan's science fiction may relate 'Undeserved or unlearned feeling', and thus it is difficult for the poem to escape sentimentality.¹⁵²

Morgan's witty, and very dark, poem 'In Sobieski's Shield' (1964) describes the experience of a human family – mother, father, and son – who have evacuated from their home planet to the named constellation in the Milky Way 'the day before solar withdrawal'.¹⁵³ The travellers' journey is accomplished by means of a mildly dysfunctional *Blake's 7*-like dematerialisation transport system, which according to the narrator is, 'the best technique / who said the only technique'.¹⁵⁴ The erratic re-materialisation echoes George Langelaan's 1957 story *The Fly*, where an insect accidentally enters the dematerialisation experiment of a pioneering scientist, resulting in

¹⁵¹ Nicholson(2000), 227.

¹⁵² Dunn(1990), 85.

¹⁵³ *CPEM*, 196-8, 196.

¹⁵⁴ *CPEM*, 196.

an exchange of heads between man and beast.¹⁵⁵ Morgan perhaps alludes to *The Fly* in the lines, 'I wouldn't have been / utterly surprised if some of us had turned out / mice or worse', but he resists the grotesque in this poem. 'In Sobieski's Shield' is written as a stream of consciousness, devoid of punctuation and almost uncapitalised. Commentators have noted that the poem is *in medias res*, or told from the midpoint of the events described, but as this is science fiction one could go further and suggest that the central conceit is telepathy. This is perhaps suggested by the early phrase '*who said* the only technique' (my italics), where the narrator seems unable to individuate the speaker.¹⁵⁶ The events of the poem are clearly in the narrator's mind; this might be the literal as well as the figurative situation. 'In Sobieski's Shield' is a fast and exciting read: one is propelled through the poem by a springy trochaic metre punctuated by iambic breaths in lines of variable length sometimes stretching to seven or eight feet. Despite this overt dynamism, however, the narrator's mind is surprisingly calm as he comes to terms with the events which are apparently taking place.

The poem opens with scientists cast as prophets celebrating their prediction of the end of the world: 'well the prophets were dancing in the end much / good it did them and the sun didn't rise at all'.¹⁵⁷ The narrator's family 'weren't amongst the frozen', having been dematerialised 'in a hurry it's true'.¹⁵⁸ They were sent to a planet in the region of Sobieski's Shield, 'to the best of my knowledge'.¹⁵⁹ On re-materialising, the narrator observes the 'harsh metallic plain / that belches cobalt from its craters', yet he stoically

¹⁵⁵ *The Fly*, film, 1958.

¹⁵⁶ *CPEM*, 196

¹⁵⁷ *CPEM*, 196.

¹⁵⁸ *CPEM*, 196.

¹⁵⁹ *CPEM*, 196.

accepts, 'it was / all they could do for us'.¹⁶⁰ There is also a 'lake of mercury', though the liquid metal is 'confused with / what is it blood'.¹⁶¹ In a much commented on passage, the narrator recalls his apparent interaction, when dematerialised, with a particularly dark episode in human history, the 'great war was it called France Flanders fields'.¹⁶² The narrator finds he has acquired a tattoo from a 'dead arm' in the trenches, and reflects that now 'we are bound to all that lived'.¹⁶³ Perhaps the travellers' atoms have been scattered in space; in any case a key motif is their imperfect re-construction.¹⁶⁴ His wife has an unfamiliar 'beautiful crown of bright red hair', which might symbolise her role as the new Eve, in this (as the poem allows the reader to believe) group of the last humans.¹⁶⁵ She is also the frailest of the three, and the narrator tries to 'hide the sobbing / shuddering first breaths of her second life'; ever thoughtful, the narrator ponders the words 'second life': 'I don't / know what made me use that phrase'.¹⁶⁶ In the darkest moment of the poem, towards the end, the narrator perhaps foresees his wife's death: 'as I run my hand through her / amazing hair streaming on my shoulder I feel / a fist shaken in a shell-hole turn in my very marrow'.¹⁶⁷

At the end of the poem, some innate urge seems to propel the narrator onwards (the others are not consulted) – 'let's take our second / like our first life out from the dome' – they don their space suits and prepare to leave their protective environment: 'it's hard / to go let's go'.¹⁶⁸

¹⁶⁰ *CPEM*, 196.

¹⁶¹ *CPEM*, 197.

¹⁶² *CPEM*, 197.

¹⁶³ *CPEM*, 197.

¹⁶⁴ *CPEM*, 197.

¹⁶⁵ *CPEM*, 196.

¹⁶⁶ *CPEM*, 196.

¹⁶⁷ *CPEM*, 197-8.

¹⁶⁸ *CPEM*, 198.

‘In Sobieski’s Shield’ appears to depict the survival not just of a family, but of the agonies and trials of humanity. Speaking with Marshall Walker, and asked to reflect on the darkness in this and other poems, Morgan agreed, and added, ‘I would regard “In Sobieski’s Shield” as not being finally dark’.¹⁶⁹ Morgan elaborated: ‘It was meant to be a poem about shock’ – reaction to dematerialisation – and, with the final ‘Let’s go’, ‘a kind of acceptance of the unknown’.¹⁷⁰ However, I believe there is sufficient evidence in ‘In Sobieski’s Shield’ to support a different reading. Morgan sets up an acute dialectic between the narrator’s laconic assessment of his family’s altered circumstances, and the narrator’s urgent and somehow innate need to leave their protective dome. The tension between change and remaining unchanged is palpable in the closing passage: the narrator can still cry and laugh, he is whole, indivisible, though re-born. The poem then ends:

...the old moon’s in
the new moon’s arms let’s take our second
life like our first out from the dome are the suits
ready the mineral storm is quieter it’s hard
to go let’s go¹⁷¹

The last two words of the poem, ‘let’s go’, echo the last spoken words of both acts of Samuel Beckett’s *Waiting for Godot*; however, the actual final line of both acts is the stage direction, ‘*They do not move*’.¹⁷² If Morgan’s allusion is taken seriously then an alternative narrative is generated, one which, by throwing a blanket of stasis over the poem, resonates with the strange sense of equilibrium already present in the narrator’s mind.

¹⁶⁹ Whyte(1990), 82-3.

¹⁷⁰ Whyte(1990), 83.

¹⁷¹ *CPEM*, 198.

¹⁷² Samuel Beckett, *Waiting for Godot*, (2 acts), http://samuel-beckett.net/Waiting_for_Godot_Part1.html, http://samuel-beckett.net/Waiting_for_Godot_Part2.html; 29/03/2015; Beckett(1953).

Russell Jones, in the critical section of his 2014 creative writing PhD thesis: ‘Broken Wor(l)ds: Edwin Morgan’s Science Fiction Poems’, discovers another literary allusion in ‘In Sobieski’s Shield’.¹⁷³ The phrase ‘the old moon’s in / the new moon’s arms’ refers to an illusion called planet shine, the appearance of the old and new moon together caused by a secondary reflection of the sun’s light from the earth.¹⁷⁴ Jones notes the relationship to stanza seven of the old Scottish ballad, ‘Sir Patrick Spens’:

‘Late, late yestere’en I saw the new moon
Wi’ the auld moon in hir arm,
And I fear, I fear, my dear master,
That we will come to harm’¹⁷⁵

Concerned by the omen, Sir Patrick reluctantly agrees to captain a ship carrying Scottish noblemen, but there is a storm which leads to the death of all on board. Noting this, Jones writes: ‘However Morgan avoids the ballad’s tragic end, instead offering the possibility of a new beginning for the narrator and his family’.¹⁷⁶ Jones also suggests that poem 45 of *The New Divan* is a likely later allusion to ‘In Sobieski’s Shield’, because the former poem contains the suggestive lines: ‘Watching the speeded up universe is dreadful / but who knows what’s the speed of gods and / prophets, is their only metal / mercury’.¹⁷⁷

This is a later passage from poem 45:

[...] We’ve endured
the frames per second thing but a
reality that rolls off in vapours
is still on the cards¹⁷⁸

¹⁷³ Jones.r(2014).

¹⁷⁴ *CPEM*, 198.

¹⁷⁵ Margaret Ferguson, Mary Jo Salter, Jon Stallworthy, (eds.), *The Norton Anthology of Poetry*, 5th edn., (New York: Norton, 2005), 103-4.

¹⁷⁶ Jones.r(2014), 149.

¹⁷⁷ Jones.r(2014), 144; *CPEM*, 309-10.

¹⁷⁸ *CPEM*, 310.

There is a sense of end and illusion and the possibility that what appears to be real could turn to vapour; if Morgan is referring back to 'In Sobieski's Shield', then the distinct sense of death in these lines would support my alternative reading of the science fiction poem.

There are other indications that 'In Sobieski's Shield' is a poem about the extinction of humanity: at the opening of the poem the most basic inductive law we live by is broken – the sun doesn't rise; and the 'second life', ('that phrase again'), could refer to the afterlife.¹⁷⁹ It's not difficult to understand why Morgan would have hesitated to destroy the mystery of this poem by offering a full explication. As thoughts combine, break up, and re-combine in a calm and almost quiet manner in the narrator's mind, this sense of stillness is counteracted by the almost caricatured compulsion to press forward to the concluding 'let's go'. Switching on this phrase with a note of Beckettian nihilism is incredibly strong; '*They do not move*' freezes the poem and the last representatives of humanity, rendering them unable to embark on a mission which is apparently crucial to their survival.¹⁸⁰ But the probability of survival of this small group, if it ever existed at all, must be low. Perhaps the 'frames per second thing' is over, and reality has dematerialised; perhaps there are omens of a fatal shipwreck; perhaps the new Eve will die; perhaps humanity's final mission is as futile as waiting for Godot. In the same way as some of Holub's poems, 'In Sobieski's Shield' supports layered and interacting senses. The overt sense is an apparent affirmation of continued human life, but this is undermined by numerous covert indications that the mission will fail. Setting aside the

¹⁷⁹ *CPEM*, 197. A counter-argument might point out suggestions of survival: according to, e.g., Simon Winder, the Polish king Jan Sobieski (1629-1696), 'seemed to have ended a horrific era of evisceration for Poland', and went on, as part of the 'Holy League' against the Ottomans, to become 'the saviour of Christendom'; see Simon Winder, *Danubia*, (London: Picador, 2013), 184-5.

¹⁸⁰ Beckett(1953).

materials used, and considering ‘the mind that shapes them or the end it shapes them to’, ‘In Sobieski’s Shield’ can be read as an ironic poem of despair; it is a dark reflection on the personal and political risks attendant on Morgan’s life and time.¹⁸¹ The everyday need to carry on with hope is transposed to an exotic setting where the probability of a positive outcome is very low. The poem is an engagement with life, however harsh the possibilities, and not a withdrawal, though ‘In Sobieski’s Shield’ is heavily disguised by an exotic setting, its empathetic narrating mind, and a laconic wit.

The Whittrick Dialogue VIII – prophecy or parody?

Shifting for the remainder of this chapter from science to technology, specifically to a discussion of Morgan’s computer poems, it is worth recalling at the outset Morgan’s words in the interview with Robin Hamilton: when you are writing, ‘the whole thing is thrown into the melting pot’ and ‘what you think you believe is not necessarily what you actually do believe’.¹⁸² The point at issue is that while Morgan, in many public remarks, accepted and even welcomed the idea of artificial intelligence, the way in which his poetry engages with the issue leads me to question his stance. This is partly, I would argue as a long-term AI sceptic, because it’s simply not possible to imagine – at any plausible level of engineering rigor – what an intelligent machine would actually be. AI hyperbole is gathering pace again today, this time backed by powerful commercial interests. But there is absolutely no evidence that any non-mechanical machines have been developed, even though, now as in the 1960s, there are the usual claims that such things are just round the corner. What’s interesting in the context of this chapter is that

¹⁸¹ Morgan(1996), 31.

¹⁸² Whyte(1990), 37.

the argument are exactly the same today as they were in the 1960s, notwithstanding the vast increase in *quantitative* computer power.

Morgan's first and perhaps his fullest work on the issue of machine intelligence was written as early as 1957 in 'The Whittrick', specifically in the final part of this poem: 'Dialogue VIII: Grey Walter and Jean Cocteau'.¹⁸³ W. Grey Walter (1910 – 1977), the author of *The Living Brain* (1953), was a neurophysiologist and pioneering cyberneticist who, according to a *Times* obituary (folded inside Morgan's copy of the book in the Mitchell), 'became interested in the modelling of behaviour and made such scientific "toys" as a mechanical tortoise'.¹⁸⁴ The scale of Walter's claim is set out in the author's preface to the Pelican edition of *The Living Brain*.

The imitation of living creatures by working models has advanced and extended to the point where there are several genera and species of artificial animals, displaying many features of the flesh in metal counterparts.¹⁸⁵

To give an indication of Walter's tone, in a later passage he says:

We now come to an electromechanical creature which behaves so much like an animal that it has been known to drive a not usually timid lady upstairs to lock herself in the bedroom, an interesting blend of magic and science.¹⁸⁶

As if nothing has changed but the engineering medium, an article in the *New Scientist* of 24 November 2014 claims that a digital creature which 'has an artificial brain precisely modelled on that of a nematode worm' is about to be created.¹⁸⁷ In 'Dialogue VIII' the whittrick's elusive, perhaps imagined, presence in the earlier dialogues finally enters centre stage as an apparently living machine. The narrative of the poem has Walter

¹⁸³ *CPEM*, 77-116; 111-16; MS Morgan B/1/5 is a notebook which contains the complete manuscript of 'The Whittrick'; it is dated July – September 1957.

¹⁸⁴ W. Grey Walter, *The Living Brain*, (London: Penguin/Pelican, 1961); Walter(1953); *The Times*, 9 May 1977.

¹⁸⁵ Walter(1953), 15.

¹⁸⁶ Walter(1953), 112.

¹⁸⁷ *New Scientist*, 24/11/2014.

proudly showing off this electromechanical creature to the French writer Jean Cocteau, while the poem maintains a background note of technical realism supplied by two Scots-speaking assistants, Roddy and Eck.¹⁸⁸ Morgan makes use of the fact that Walter was a follower of Pavlov – in order to get the whittrick working Eck explains ‘I hut it wan, and it’s aa right’.¹⁸⁹ Morgan’s Walter introduces Cocteau to his previous creations with their biological names such as *Machina speculatrix* in a passage which draws directly from *The Living Brain*, and again alludes to Pavlov: one of the machines was ‘a teachable little beast, *Machina / Docalis*. We kicked him and blew whistles; he learned’.¹⁹⁰ Cocteau is invited to question the whittrick: ‘Whittrick, what is my name?’.¹⁹¹ The response is a Morgan joke: ‘Cock Toe’.¹⁹² Cocteau asks, ‘Whittrick, the square root of minus one – ’; the whittrick responds, ‘Is an imaginary, expressed by a small *i*’.¹⁹³ Walter declares, ‘It’ll read your thoughts soon’.¹⁹⁴ Morgan’s Walter proceeds to wax lyrical about his device, and is provocative to the poet: ‘The poem you write is already foreshadowed’.¹⁹⁵ Cocteau becomes sceptical, lyrical, defensive, in a passage in which he compares the whittrick unfavourably to local seagulls, and muses on the nature of life in a delicately ambiguous allusion to *The Winter’s Tale*: ‘The statue moves, Hermione breaths. What is life?’¹⁹⁶ Walter says: ‘You fear what I hope: the created may create’; Cocteau responds with what seems like a decisive rejection of machine intelligence: ‘That it will never do with neither

¹⁸⁸ *CPEM*, 111-16; Cocteau: e.g. MS Morgan C/12, 2313, 2314, 2335, 2344.

¹⁸⁹ Walter(1953), 52-4, 127-30; *CPEM*, 113.

¹⁹⁰ cf. Walter(1953), 117-8, 155; *CPEM*, 112.

¹⁹¹ *CPEM*, 114.

¹⁹² *CPEM*, 114.

¹⁹³ *CPEM*, 114.

¹⁹⁴ *CPEM*, 114.

¹⁹⁵ *CPEM*, 114.

¹⁹⁶ *CPEM*, 115.

will nor wit / The whittrick in the fields has far more wit than it'.¹⁹⁷ The ending of the poem parodies Walter at his visionary (or unhinged) best. The actual Walter writes regarding his creations: 'As totems they foster reverence for the life that they have so laboriously been made to mime in so humble a fashion – and still would foster it even should they, creatures of "sorcery" peering into the dim "electrobiological" future in search of a *deus ex machina*, look up at us and declare that God is a physiologist'.¹⁹⁸ The poem ends on a farcical note: the whittrick is getting out of control, about to speak when it has not been spoken to, and disturbing its creator; the creature then says to Morgan's Walter: '*Now Faustus, what wouldst thou have me to do?*'.¹⁹⁹

'Dialogue VIII' may be effectively read as a parody on machine intelligence. Walter's claims in *The Living Brain* are outlandish; Morgan's text draws from the book, but, as in the references to Pavlov, always seems to mock. In the portrayal of Cocteau, perhaps the Morganesque heart of the poem, there is a distinct sense of recoil from the apparently living machine. The reference to Hermione from *The Winter's Tale* could suggest the inanimate coming to life, but more powerfully suggests illusion.²⁰⁰ Roddy and Eck are constantly aware of the machine's limitations: 'It's getting gey hot, sir, will I switch it aff now?'.²⁰¹ The 'whittrickmath', as Morgan calls it in an unpublished 'dedication' associated with the poem in manuscript, surely parodies machine self-awareness.²⁰² The whittrick knows of the 'small *i*', and that it is imaginary – this surely contains the meaning that the whittrick's intelligence is illusory.²⁰³ My argument could,

¹⁹⁷ *CPEM*, 116.

¹⁹⁸ Walter(1953), 118; God outside the machine.

¹⁹⁹ *CPEM*, 116; MS Morgan B/1/5 references quote: 'Faustus Sc. 3 – Meph'.

²⁰⁰ *A Midsummer Night's Dream*, Act 5 Scene 3.

²⁰¹ *CPEM*, 116.

²⁰² MS Morgan B/1/5.

²⁰³ *CPEM*, 114.

however, be challenged from the poem's first epigraph which explains that the square root of minus one, the imaginary, can be seen as passage between 'two truths of the real domain' – if this is granted status then it could be argued that the whittrick of 'Dialogue VIII' is perhaps portraying the passage to real machine intelligence.²⁰⁴ Or perhaps this epigraph is as crafty as a whittrick. The second epigraph (not present in manuscript) is a short quote from Act IV Scene 1 of *A Midsummer Night's Dream*; Oberon says: 'Silence awhile. Robin, take off this head'.²⁰⁵ This implies unmasking, breaking the spell, revealing the mundane truth – precisely what Morgan seems to be doing in regard to *The Living Brain*.²⁰⁶

The foregoing reading of 'Dialogue VIII', namely that the poem is a parody of artificial intelligence, is controversial in terms of other critical responses, and also when Morgan's own published comments are taken into account. Edgecombe sees the whittrick (the machine) as 'set to change the course of human history'.²⁰⁷ Edgecombe accepts that 'the poet seems ultimately to counter Dr Walter's Promethean claims', but at the same time he states that Morgan grants the whittrick a 'miraculously independent "mind"'.²⁰⁸ Edgecombe adds that this is one of the 'very few poems' in which 'the admittedly rare', 'misgivings Morgan entertains about our technical future' are articulated.²⁰⁹ Nicholson seems simply to accept the possibility of artificial life; he says 'the whittrick has transmuted [from its incarnation in the previous dialogues] into a genetically engineered evolution of machine intelligence'.²¹⁰ McGonigal discusses Morgan's comments on 'The

²⁰⁴ *CPEM*, 79.

²⁰⁵ *CPEM*, 79.

²⁰⁶ Walter(1953).

²⁰⁷ Edgecombe(2003), 101.

²⁰⁸ Edgecombe(2003), 101.

²⁰⁹ Edgecombe(2003), 101.

²¹⁰ Nicholson(2002), 53.

Whittrick' in a letter to a potential publisher, Erica Marx, in August 1957; Morgan wrote to Marx: 'The Whittrick in general stands for truth or reality'.²¹¹ Morgan goes on to say with respect to the final dialogue, which McGonigal notes at that point had not been written, that 'The whittrick thus finally becomes a machine that is made to talk and think creatively'.²¹²

A page in the Glasgow University archive suggests, however, that Morgan, as he worked on 'Dialogue VIII', was unsure where to centre the truth of his poem.²¹³ The relative scrawl of Morgan's writing on this page suggests the composition of the poem was in progress. The page is headed 'Cocteau', and amidst writing of difficult legibility, there is a passage: '... le Bête Profheé [prophète?] is dedicated to "that truth which is truer than truth, what [Goethe?] called the truth to wh [sic] reality is opposed and wh is the gt [sic] conquest of [?] poets"'.²¹⁴ It's difficult to know how to read this, and whether irony is involved or not; I don't think it is, however it suggests that Morgan was unclear about how to represent Cocteau's point of view. The published poem's Cocteau decisively rejects the prophetic beast, and in this regard it's hard not to agree partly with Edgecombe's comment that 'Dialogue VIII' is an (uncharacteristic) warning of the Promethean arrogance of science. In a 1971 interview with Robin Hamilton two years before 'The Whittrick' was finally published, Morgan refers to the 'Promethean dream' specifically in the context of Grey Walter's work; he says: 'I don't myself find this frightening or bad'.²¹⁵ In this interview Morgan appears to be in sympathy with Walter,

²¹¹ McGonigal(2010), 120.

²¹² McGonigal(2010), 121.

²¹³ MS Morgan B/1/5.

²¹⁴ MS Morgan B/1/5; the final '[?]' above replaces 'Cxx' in the manuscript, which might abbreviate 'all centuries'.

²¹⁵ Whyte(1990), 34-5.

saying with regard to artificial creatures that ‘They are already perhaps a kind of half-life’; Morgan doesn’t avoid the problems such things would cause if actually created, but concludes he ‘would perhaps like to write about it’, in order to ‘place it in some kind of context of art’.²¹⁶ Morgan may have drifted from the context of Walter’s creations here, otherwise his use of the future tense is puzzling – ‘The Whittrick’, including ‘Dialogue VIII’ was complete (apart from the second epigraph), according to the University archive, by September 1957.²¹⁷ It’s possible that Morgan added the second epigraph, with its sense of returning to normality after a vivid dream, when he realised that the poem as actually written had drifted from the sense of the first epigraph – realisation of the seemingly impossible – as it had drifted from the probable sense of the ‘Cocteau’ page in the archive.²¹⁸ Reading ‘Dialogue VIII’ as a parody seems to push against the grain, it privileges the text over authorial comment; or does it? If Morgan’s future tense in the Hamilton interview is taken literally then Morgan appears to acknowledge that he hadn’t yet written benignly about artificial life.

Poetry and Software

The sense of tongue-in-cheek parody in ‘Dialogue VIII’ is direct; there don’t seem to be competing layered senses, with one undermining the other, as in ‘In Sobieski’s Shield’. Morgan seems to be teasing computers rather than warning of any potential for a Promethean threat, Edgecombe’s comment notwithstanding. The same seems to be true of his three ‘simulated computer’ poems, ‘The Computer’s First Christmas Card’ (1963), ‘The Computer’s Second Christmas Card’ (1965), and ‘The Computer’s First Birthday

²¹⁶ Whyte(1990), 35.

²¹⁷ MS Morgan B/1/5.

²¹⁸ MS Morgan B/1/5.

Card' (1966).²¹⁹ I will try to establish the parodic, AI-sceptical sense of the simulated computer poems in this final section of the chapter, first by considering, very briefly, the depth of Morgan's technical skill.

In addition to the three simulated computer poems, Morgan wrote two other 'The Computer's First...' poems, though of different character. Regarding 'The Computer's First Dialect Poems' (1970), Morgan says: 'The mechanical part comes from the fact that I culled from the glossary of Robert Burns's complete poems', 'the most Scottish, the most ethnic words, like a computer programmed to spot and spit out anything non-English'.²²⁰ The poem was then composed from this collected word set. 'The Computer's First Code Poem' (1968), is next to 100% pure rationalism; it is not a simulated software program – there is no relationship between the code in the poem and a computer language – though it is compelling evidence of a similar skillset.²²¹ 'Code Poem' is a piece of analytical cryptography strikingly similar in form to many of the examples in Helen Fouché Gaines *Cryptanalysis* (1939), a book which Morgan owned; considerable further evidence of Morgan's depth of thinking on the subject can be found in the archive records, 'Cybernetics (1945 – 1985)', which contains a collection of cuttings, many underlined.²²² In a letter where he discusses 'Code Poem', Morgan comments: 'I have taken an interest in cryptography since I read Edgar Allan Poe at school'.²²³ Nothing can be added to McGonigal's comments on 'Code Poem'; and note also McGonigal's

²¹⁹ *CPEM*, 177, 142, 522; simulated computer poems: Whyte(1990), 258.

²²⁰ *CPEM*, 276; Whyte(1990), 221-2.

²²¹ MS Morgan P/1/338(a) and (b): the complete solution to 'Code Poem', also the substitution table which is used to generate the published text; but not the key.

²²² Helen Fouché Gaines, *Cryptanalysis*, (New York: Dover, 1956), e.g. 137, 215; includes cuttings from 1977 to 2000, with technical articles on, for example, public key encryption; 'Cybernetics (1945 – 1985)': MS Morgan L/8/1-5.

²²³ Letter to Charles Mossman, 2/06/1971, MS Morgan L/5; folder: 'Concrete poetry corr 1971'.

comments about Morgan's attitudes towards technology.²²⁴ The purity of 'Code Poem's analytics demonstrates Morgan's knowledge; such skills are key in making the computer poems convincing.

'The Computer's First Christmas Card' is formally a concrete poem set out as a vertical block of text, ten characters wide and thirty-five lines long.²²⁵ The computer seems to have been set the task of arriving, by a heuristic process, at the phrase 'Merry Christmas' – it gets tantalisingly close, but fails.²²⁶ Here are the final five lines.

```
m e r r y C h r i s
a m m e r r y a s a
C h r i s m e r r y
a s M E R R Y C H R
Y S A N T H E M U M 227
```

It's difficult to show without typesetting that the first two characters on the penultimate line are in a smaller font size than those in the rest of the poem.²²⁸ It is almost as if the computer is drawing breath before its final capitalised pronouncement; more subtly, in computer terms, it could be read as an error creeping in right at the end, disrupting the final guess.

In 'The Computer's First Birthday Card' (1966), the computer is given the apparently simple task of re-arranging the words 'many returns happy' into a well-known birthday greeting.²²⁹ This poem portrays a less stable heuristic and greater stochastic level than 'First Christmas Card', with the computer dropping into control characters on

²²⁴ Nothing can be added: except to note the line order in McGonigal(2010), 237, vis-à-vis MS Morgan P/1/388(a) and (b); attitudes: McGonigal(2010), 189, 197, 287, 335.

²²⁵ *CPEM*, 177.

²²⁶ *CPEM*, 177; the lines are transposed into a proportional font to preserve the text matrix appearance.

²²⁷ *CPEM*, 177.

²²⁸ This font size reduction, quite clear in *CPEM*, 177, is not apparent in a typescript of the poem, nor in a card printing, both found in Acc 4848/Box 69.

²²⁹ *CPEM*, 522.

one line and binary in another.²³⁰ The higher level of randomness leads, however, to a successful outcome. The final seven lines are:

```
raise police pay p
ost early for chri
stmas watch forest
fires get well soo
n bon voyage KRRGK
many happy returns
eh? eh? eh? eh? eh? eh? 231
```

The computer seems to be referencing a database which contains amongst other things, trade union and government slogans. The cog-crunching ‘KRRGK’, which might be an early fragment of Mercurian, presages the coherent birthday greeting articulated in the penultimate line.²³² The final line, not present in manuscript, inflects the meaning: although successful, the computer is made to seem puzzled by the strange idiomatic semantics of ‘many happy returns’, with its play on the control character ‘return’.²³³

‘The Computer’s Second Christmas Card’ is a matrix which looks like a core dump.²³⁴ The final two lines are:

```
lstop subst itute track merry chris tmasa ndgoo dnewy
earin 1699? check digit banks orryi n1966 endme ssage 235
```

The computer is successful in its second attempt to construct a Christmas greeting, though it settles for the unidiomatic ‘good new year’, and needs two tries to get the year right (for which it apologises).²³⁶ The ‘Second Christmas Card’ shows two levels of engineering abstraction: embedded control commands (underlined) and the program’s

²³⁰ *CPEM*, 522.

²³¹ *CPEM*, 522; with some font size and spacing adjustment.

²³² *CPEM*, 522.

²³³ MS Morgan P/1/328; *CPEM*, 522.

²³⁴ *CPEM*, 142.

²³⁵ *CPEM*, 142; re-cast into a proportional font.

²³⁶ *CPEM*, 142.

internal workings. The start condition at the beginning of ‘Second Christmas Card’ is ‘goodk kkkkk’, followed by the control command ‘unjam’.²³⁷ There is a sense of conflation of hardware and software – mangled printout, and looping on the letter ‘k’ (an aural signifier for Christmas). The computer is able to fix itself and start again. This idea still resonates in the AI community: an article from 2013 in *New Scientist* is entitled, ‘Machine, heal thyself’, and the accompanying image shows a computer apologising for an error.²³⁸

The literary critical perspective tends to focus on the concrete aspects of the simulated computer poems.²³⁹ Nicholson simply notes that the two Christmas card poems ‘generate their comic printouts from technological error’; Edgecombe, referring to ‘Second Christmas Card’, says the poem breeds ‘new meanings out of the command matrix in DOS’, (DOS wasn’t invented until around 1980, at least twelve years after the poem was written).²⁴⁰ In contrast, Robert Crawford, sure-footedly, says ‘First Christmas Card’, ‘is to be celebrated for the same reason as the semi-literate pioneers of the Channel Tunnel’, who in Morgan’s poem ‘O Pioneers!’, misspell, in an extant inscription, a dedication to their heroic effort.²⁴¹

In the simulated computer poems, Morgan portrays a normally invisible intermediate level of software engineering abstraction. The most abstract engineering level, the user interface, would normally display only the result – ‘Merry Chrysanthemum’ in the case of the ‘First Christmas Card’.²⁴² The most concrete level is

²³⁷ *CPEM*, 142.

²³⁸ *New Scientist*, 16/02/2013, 21.

²³⁹ For a comprehensive round-up from this perspective, see Jones.r(2014).

²⁴⁰ Nicholson(2002), 98; Edgecombe(2003), 105.

²⁴¹ Crawford&Whyte(1990), 119, *CPEM*, 189.

²⁴² *CPEM*, 177.

the source code, or the program, in ‘compiled’ binary form. The intermediate level portrayed in the poems would not normally be concretely manifest, except for the purpose of debugging, where the code might be ‘instrumented’ to make the internal workings visible. However, the intermediate level would always be manifest in the *developer’s imagination* which reifies the internal workings of the written software. The simulated computer poems are not code as such, nor the final output, but a working picture of the executing software, akin to a mechanic’s mental image of an active internal combustion engine. In these three poems Morgan has convincingly portrayed the imagined but real software *execution space*.

Morgan, in a short piece, ‘Notes on simulated computer poems’ (1968), said his concern in was to ‘take an ironic but not antipathetic look at the relations that will exist between computer creativity and human creativity’.²⁴³ He imagined the simulated computer poems as ‘servo-mechanism[s]’.²⁴⁴ A servo-mechanism is a class of mechanical device which is self-correcting through the use of negative feedback from an external reference which might be, for example, a thermostat. Morgan had an impressive grasp of how a servo-mechanism might be implemented as a heuristic process in the complex environment of software – a starting condition or initial guess is given, and we can see his imagined algorithms thrashing about – substituting, trying, failing, then at points apparently reaching out to a reference source for a new phrase, and starting again.

Morgan further imagined his computers ‘scanning a semantic as well as a formal “store”’, but a semantic database, to any serious level, is beyond the purview of digital

²⁴³ Whyte(1990), 258-9, 258.

²⁴⁴ Whyte(1990), 259.

computers.²⁴⁵ A suggestion that Morgan realised this is in the anarchic poem ‘Adventures of the Anti-sage’ (1976), which might be about scepticism.²⁴⁶ In the third section of the poem, ‘ELECTRONIC’, the anti-sage is trapped inside a computer, ‘thinking about thought’. He then, ‘with a sudden laugh’:

exploded in a printout WISDOM
THERE IS
NO WISDOM THERE
IS NO WISDOM THERE IS NO
WISDOM THERE IS ²⁴⁷

The capitalisation would seem to make the point unambiguously; though just to make sure, the anti-sage says to the men in white coats, “‘Nothing! – get it – / zero – clowns! – hidden there [’]’”.²⁴⁸

Morgan’s three imagined engineering computer poems portray the curious non-physical materiality which is a property of computers. The computer is *actually* streaming binary digits and altering the state of transistors; categorically, it has no inherent knowledge or intent. The quasi-physical *action* of the software (portrayed in the poems) manipulates data and adds programed intent; the software is both knowable in principle and completely analytical in a real computer, even if stochastic processes are involved. There is however a seductive analogy between computer hardware and software, and the human brain and mind; this is the basis of the dream of artificial intelligence. Morgan was writing in the wake of not just Grey Walter, but a coterie of ‘visionary’ thinkers such as Herbert Simon, who according to Russell and Norvig’s undergraduate text book *Artificial Intelligence*, said in 1957:

²⁴⁵ Whyte(1990), 258; to be clear: a computer, subject to analytical limits, cannot encode meaning as such, though it can characterise it using formal techniques.

²⁴⁶ *CPEM*, 367-9.

²⁴⁷ *CPEM*, 368.

²⁴⁸ *CPEM*, 368-9.

It is not my aim to surprise or shock you – but the simplest way I can summarize is to say that there are now in the world machines that think, that learn and that create. Moreover, their ability to do these things is going to increase rapidly until – in the visible future – the range of problems they can handle will be coextensive with the range to which the human mind has been applied.²⁴⁹

Russell and Norvig might regard Simon's claim as premature, but not outlandish, as evidenced by their own claim:

For thousands of years, we have tried to understand *how we think*; that is, how a mere handful of matter can perceive, understand, predict, and manipulate a world far larger and more complicated than itself. The field of artificial intelligence, or AI, goes further still: it attempts not just to understand but to *build* intelligent entities.²⁵⁰

Morgan defended his pro-artificial intelligence position against a sceptical Jack Rillie (a literary critic and university colleague of Morgan's), in two radio broadcasts on what was then the BBC Third Programme. A transcript of the broadcasts, recorded on 6 July 1964, is preserved in the University of Glasgow archive.²⁵¹ The broadcasts were entitled: 'The Computer and the Critic', and 'The Computer and the Creator'. The discussion in some ways parallels Morgan's Jean Cocteau/Grey Walter dialogue; in my reading of the transcriptions, Rillie, playing the Cocteau of the piece, carries the day. Rillie objects to Morgan's futurism with specific and thought-out arguments; he asks, for instance, why 'human interference' in programming a computer doesn't make the machine 'far more like a tool than an independent creator'.²⁵² Morgan sidesteps this challenge, and on a number of occasions is reduced to vague assertions such as 'I think you are

²⁴⁹ Stuart Russell and Peter Norvig, *Artificial Intelligence*, (London: Prentice-Hall, 1995), 1st edn. (3rd edn., 2010 invariant as quoted), 20.

²⁵⁰ Russell&Norvig(1995), 1; italics original.

²⁵¹ MS Morgan L/8/1.

²⁵² MS Morgan L/8/1.

underestimating what a machine can possibly do'.²⁵³ While Morgan sticks doggedly to his formal line, under pressure, he is notably more conditional in his statements.²⁵⁴ For example, discussing a computer-generated poem which has not impressed Rillie, Morgan says 'this [is a] paradoxical mixture I admit of freewheeling and mathematics' – in other words it isn't at all clear what it is.²⁵⁵ Towards the end of the second debate, Rillie suggests a 'correspondence theory of truth'; Rillie says, 'of course [a poem has] got to be true to itself, of course it's got to be self-consistent, its got to be whole. But it's also got to be true to the whole human situation outside of itself'.²⁵⁶ Again Morgan responds with fanciful appeals to the future: 'Machines should eventually be able to receive and ingest a very wide variety of stimulus from [...] outside'.²⁵⁷ Morgan's argument, that machine intelligence is simply a matter of time, is still heard today; but notwithstanding that, computers are far more networked today than in the 1960s, and it's hard to see how they are any more intelligent.

In 1984 John Searle's Reith Lectures lent serious weight to the anti-AI cause. Some months afterwards Morgan delivered an address, 'Computers, Poetry and Society', organised by the Computer Science department at the University of Edinburgh.²⁵⁸ In preparation, Morgan had studied the arguments around Searle's position, as indicated by underlined press cuttings stored in the Glasgow archive.²⁵⁹ A manuscript of the address survives, and Morgan appears of have opened with a clear statement of Searle's position, namely: (i) computers have no intentionality, and (ii) computers don't understand what

²⁵³ MS Morgan L/8/1.

²⁵⁴ MS Morgan L/8/1.

²⁵⁵ MS Morgan L/8/1.

²⁵⁶ MS Morgan L/8/1.

²⁵⁷ MS Morgan L/8/1.

²⁵⁸ MS Morgan L/8/2; date of talk 13/02/1985.

²⁵⁹ MS Morgan L/8/3, e.g., *TLS* 14/12/1984 (about Searle), *The Listener*, 10/01/1985 (by Searle).

they are doing.²⁶⁰ Morgan responds, reflecting the tone of some of the articles he had read: ‘Well, neither of these arguments is really so straightforward as Searle seemed to claim’.²⁶¹ Keen to maintain a long-held position, Morgan suggests that computers ‘can include a mixture of rules and randomness which is strikingly like the working of the creative process’.²⁶² It is not difficult to detect a lack of conviction in these words, perhaps reflecting doubts which had been nagging him for some time: the poet must have been aware that his formulation seems to accept Searle’s argument, while still insisting on machine creativity; and Morgan can hardly have missed the fact that he does not assign any role to emotion in the creative process.²⁶³ Searle continues to make robust anti-artificial intelligence arguments, for example, in the essay ‘What Your Computer Can’t Know’ from the *NYRB* of 9 October 2014.²⁶⁴

Morgan the poet, it can be argued, was unable to execute on his intent to portray computer creativity in part because creativity cannot be specified, isolated, or defined, and also in part because of his commitment to intellectual honesty and poetic truth. In the first part, portraying computer creativity couldn’t be done, so Morgan portrayed his own. He almost said as much: ‘My use of irony or comedy in most of these [simulated computer] pieces was conceived as the best way of drawing attention to some of the human/electronic relationships which will have to be investigated’.²⁶⁵ In the second part, Jack Rillie’s correspondence theory of truth (which I borrowed earlier) is in fact Morgan’s route to poetic truth. Rillie might have pointed out, if Morgan’s computer

²⁶⁰ MS Morgan L/8/2, paraphrased.

²⁶¹ MS Morgan L/8/2.

²⁶² MS Morgan L/8/2.

²⁶³ Doubts: see letter to ‘Mr Kendall’, 29/10/1974, MS Morgan L/8/2.

²⁶⁴ John Searle, ‘What Your Computer Can’t Know’, *NYRB*, 9/10/2014; see also letters: *NYRB*, 18/12/2014.

²⁶⁵ Whyte(1990), 258.

poems could only work by some form of magic (or a supposed future technology), then they could not be true, in any poetic sense of the word. They would not correspond to the outside world, they would not be true to life. Instead, these poems *do* correspond, at a reasonable level, to real computers. Under Rillie's argument Morgan's computer poems can claim poetic truth, although if they had conformed to the poet's intent, this would not be the case. Further, the truth these three poems contain is material, factual, and concrete; they are unique and special in Morgan's body of work. The simulated computer poems portray the *convergence* of the imagined and the real. Imagination and engineering are reified as a single entity. Within a tightly specified microcosm, imagination and actuality are in practice *unified*. The three simulated computer poems are concrete both in form and content: mental and physical are cemented together. The poems seem like a pure distillation of much of what Morgan was trying to achieve. They are a material origin, a locus, a launch pad from which the mind can soar. Five decades after they were written, Morgan's simulated computer poems retain a refreshing, teasing perspective on computers from a poet with the analytical skill to make them convincing, in a culture which – in this engineer's opinion, then as now – takes the idea of machine intelligence far too seriously.

V: MIROSLAV HOLUB: THE POETRY OF MATERIALISM

Introduction

It is likely that Hugh MacDiarmid met Miroslav Holub in 1968, though I could find no further details; he devotes, however, several pages of *Lucky Poet* to his meeting in Scotland with the Czech writer Karel Čapek (1890 – 1938).¹ Edwin Morgan notes meeting Holub at the Edinburgh Science Festival in 1998 in his obituary of the Czech poet, which appeared later the same year in the *Scotsman*.² Morgan writes in the obituary that Holub, ‘contributed hugely to what poetry could or should do in a world where science and technology had become so salient’.³ Although Judith Wright and Holub never met, their poetry shares an intellectualism and a deceptive sparseness. Holub (1923 – 1998) was an eminent biological and medical scientist who wrote or collaborated on numerous research papers and published a monograph: *Immunology of Nude Mice*.⁴ His poetry is conditioned by his professional career, and sometimes ventures into the laboratory where experiments were carried out on mice and other animals for the purpose of medical science. All commentators note that his poetry responds through relentless use of allegory to the ideological distortions of the Communist state in which he lived. Holub’s verse, however, also expands widely into Bohemian history and culture in its response to ideological distortion and oppression; as the poet comments: ‘The spirit of

¹ NLS: MS.27158, Folio 119, 30/07/68; *LP*, 107-10.

² Edwin Morgan, ‘Miroslav Holub’, *The Scotsman*, 17/07/1998.

³ *The Scotsman*, 17/7/1998.

⁴ Miroslav Holub, *Immunology of Nude Mice*, (Boca Raton, Florida: CRC Press, 1989); Holub(1989); the foreword to Miroslav Holub, *The Dimension of the Present Moment*, (London: Faber and Faber, 1990) says Holub wrote three monographs; Holub(1990).

Kafka lived in Prague centuries before he was born'.⁵ Literary, historical, and political connections to Czech culture in Holub's poetry can be found with the aid of Angelo Maria Ripellino's seminal *Magic Prague* (1973) and other studies, as well as original literary sources.⁶ The Czech academic Jiří Holý's university primer, *Writers Under Siege, Czech Literature Since 1945* (2008), notes the importance of Jaroslav Hašek (1883 – 1923) and Karel Čapek to post-war writers: 'They were the inspiration for those authors who portrayed the great "small events" of everyday life, sometimes with compassion for life in all its forms, sometimes with humour, parody, satire and imaginative exaggeration'.⁷ Holub's poetry is located in the tradition described by Holý; but more than anything, as this chapter argues, it is characterised by the poet's rejection of ideology and idealism, and his forceful presentation of scientific materialism as a secure, perhaps the only secure, foundation for judgement.

The chapter develops its arguments in three sections. 'The Anatomy of Nude Poems' explores the workings of Holub's verse in terms of literary tradition, surrealism, and some of his methods for disguising senses and meanings. 'Materialism Pinned Down' starts with Holub's political situation and then focuses on the case for Holub's scientific materialism through a range of poems including two set in the laboratory, 'Suffering' and 'Skinning'.⁸ The final section of this chapter is called 'Controversy and Synthesis'. It opens with controversy in a discussion of what is seen as Helen Small's

⁵ 'In Search of the Enemy' in Miroslav Holub, *Shedding Life*, (Minneapolis: Milkweed Editions, 1997), 228-38, 237; Holub(1997).

⁶ Angelo Maria Ripellino, *Magic Prague*, (London: Picador, 1995); Ripellino(1973); Peter Demetz, *Prague in Black and Gold*, (London: Penguin, 1998); Demetz(1997); Derek Sayer, *The Coasts of Bohemia*, (Princeton: Princeton University Press, 2000); Sayer(1998); Derek Sayer, *Prague, Capital of the Twentieth Century*, (Princeton: Princeton University Press, 2013); Sayer(2013).

⁷ Jiří Holý, *Writers Under Siege, Czech Literature Since 1945*, (Brighton: Sussex Academic Press, 2010), 219; Holý(2008).

⁸ *CPMH*, 105, 284.

idealist reading of Holub's 'Intensive care unit'; this is followed by an examination of the poet's syntheses.⁹ In the latter regard, based on a hint in Holub's essay 'Poetry and Science', a quantum mechanical reading of 'The root of the matter' is suggested.¹⁰

The chapter draws on the translations in Bloodaxe's *Poems Before and After* with one exception, the rendering of 'Brief reflections on the test tube' included with Holub's essay 'Poetry and Science'.¹¹ The titular capitalisation convention of *Poems Before and After* is also followed.¹² The phrase 'before and after' refers to the watershed of the crushing of Alexander Dubček's Prague Spring in 1968. A second watershed is noticeable in the poetry: the fall of communism in the Velvet Revolution of 1989. The *Collected Works of Miroslav Holub* have been published in Czech in three volumes by the Moravian house *Carpe Diem*: volume I (*Básně (Poems)*, 2003), volume II (*Cestopisné prézy (Travel Notes)*, 2003), and volume III (*Eseje a sloupky (Essays and Columns)*, 2005), all edited by Michal Huvar.¹³

The Anatomy of Nude Poems

Holub initially published some poetry shortly after the Second World War, but his early formative period seems to have been the time, as Jiří Holý and Jan Culík put it in their essay 'Miroslav Holub', when 'hard-line communism became slightly more liberal in the second half of the 1950s'.¹⁴ Holub was associated with other Czech writers inspired by

⁹ Helen Small, 'The Function of Antagonism', in Holmes(2012), 19-37; Small(2012); *CPMH*, 421.

¹⁰ 'Poetry and Science' in Holub(1990), 122-46; *CPMH*, 113-18.

¹¹ Holub(1990), 122-46; c.f. *CPMH*, 157.

¹² *CPMH*.

¹³ See Holý(2008), 238; italics added as appropriate; all other italics in quotations throughout this chapter are original.

¹⁴ Jiří Holý and Jan Culík, *Miroslav Holub*, <http://www2.arts.gla.ac.uk/Slavonic/Holub.htm>, 16/10/2012; this reference given on Culík's University of Glasgow website: (<http://www.gla.ac.uk/schools/mlc/staff/janculik/#tabs=1>, (9/2/14): Holý, J. and Culík, J., (2001) 'Miroslav

the French Surrealist poet Jacques Prévert and Italian cinematic neorealism, grouped around the journal *Kveten* (*May*).¹⁵ Holub formulated his programme in an article ‘Our ordinary day is firm land’, published in *Kveten* in September 1956.¹⁶ Holý and Culík say that ‘Holub and his colleagues wished to get away from abstract ideological proclamations’; ‘Only by capturing life around us’, Holub wrote in the *Kveten* article, ‘we may be able to express its dynamism’.¹⁷ This radical, demotic approach also entailed giving up ‘regular, rhymed and melodious poetry and to adopt irregular and free verse’.¹⁸ Holub’s ‘poetry of the everyday’, whose ‘heroes are obscure working people’ or the ‘pawns of history’, is saturated in responses to oppression.¹⁹ For example, an early poem, ‘Cinderella’, re-tells the fairy tale in terms of quiet submission to the yoke of oppression; in Holub’s version there is ‘no prince that charms’.²⁰ But as with many Holub poems, there is more than just a literal reading: ‘Cinderella’ is also an allegory of the need for integrity in day-to-day science. Cinderella’s mundane task, sorting peas, is performed with rigorous honesty, and there is something precious: ‘a gossamer of truth’.²¹

Jaroslav Hašek’s classic Czech novel of the Great War *The Good Soldier Švejk* (1922-3), responds to oppression by mockery of authority.²² This significant, powerful, and anarchically funny work remains in print in the UK. It can be roughly characterised by imagining the bureaucrats of Franz Kafka’s *The Castle* at war, unable to come to terms with the partly Chaplin-like protagonist Švejk, with, as Holub puts it, his ‘way of

Holub’ in: *Dictionary of Literary Biography*, Brucoli Clark Layman, The Gale Group, London, Boston, Detroit, San Francisco, pp. 139-145; Holý&Culík(2001).

¹⁵ Holý&Culík(2001).

¹⁶ Holý&Culík(2001).

¹⁷ All quoted from Holý&Culík(2001); no translation of the *Kveten* article has been located.

¹⁸ Holý&Culík(2001).

¹⁹ Holý(2008), 237; Holý&Culík(2001).

²⁰ *CPMH*, 23-4.

²¹ *CPMH*, 23-4.

²² Hašek(1923).

saying no by saying yes'.²³ Hašek was an anarchist, a notorious trickster, a writer for the serious scientific journal *Animal World*, sacked for inventing animals such as the 'sulphur-bellied whale' and speculating that 'werewolves would soon be sold as pets', a Hapsburg soldier who defected to the Russians, and a Bolshevik commissar, among other things.²⁴ Holub's life was not as colourful as Hašek's – nor as tragic: Hašek drank himself to death while writing his great novel – but Holub's writing is replete with an apparent Švejkian innocence at every 180 degree reversal of meaning. Such plausible innocence is found, for example, in the poem, 'How we played the Gilgamesh epic' (published 1986).²⁵ In Holub's 'Gilgamesh' a puppet relates the cuts which the puppet master makes to the text: 'To make the play suitable for juvenile audiences the puppeteer deleted all questionable passages, such as Enkidu's fornication with the Lady of Easy Virtue'.²⁶ N. K. Sanders's *The Epic of Gilgamesh* discusses this scene in terms of the 'civilising' of the 'natural man' Enkidu.²⁷ In Holub's censored version, Enkidu will be civilized in a more appropriate manner: the re-cast seductress gives a lecture on 'the advantages of a school education'.²⁸ All the puppets are crazily miscast, and Gilgamesh is cut to ribbons, all for well-intentioned and apparently practical reasons – Holub mocks, but he never sneers.

Holub's poetry is often constructed from powerful, sometimes obscure, imagery deeply rooted in surrealism. His surrealism is not dreamlike – Holub's verse is wide-awake – it is a means, as Maurice Nadeau puts it in his *History of Surrealism* (1964), 'to

²³ Franz Kafka, *The Castle*, (Oxford, Oxford World's Classics, 2009); Kafka(1926); 'No' in Holub(1997), 258.

²⁴ Quotes: Ripellino(1973), 223, 224; general support: Ripellino(1973), 223-33; Demetz(1997), 346-8.

²⁵ *CPMH*, 238-40.

²⁶ *CPMH*, 238-40.

²⁷ N. K. Sanders, trans., ed., *The Epic of Gilgamesh*, (London: Penguin, 1972), 22, 30-1, 62-9.

²⁸ *CPMH*, 238.

penetrate reality'.²⁹ Quoting André Breton, Nadeau might have been describing Holub's work: the aim of surrealism is to 'arrive at an ever more precise and at the same time ever more passionate apprehension of the tangible world'.³⁰ The surrealist poets Jacques Prévert (1900 – 1977) and Vítězslav Nezval (1900 – 1958) are often cited as influential in Holub's work, and the continuity of technique is sometimes striking.³¹ Prévert's 'Procession', in Edwin Morgan's translation, combines amusing word play with a liturgical feel.³² Here is a selection of lines:

A gallows-composer with a music-bird
[...]
A St Helena duck with Napoleon and oranges
[...]
A member of the prostate gland with a hypertrophy of the French Academy
[...]
A *terrible* surgeon with a dental *enfant*
And the general of the oysters with a Jesuit-opener³³

Prévert-like reversals and switches of meaning appear throughout Holub's work.

Nezval's 'Prague with fingers of rain' opens with a negative, again reminiscent of Holub: 'It is not in anything'.³⁴ Pragueness, Nezval writes, is not 'In how a bird perches on your forehead', nor 'In the smell of tramcars while the bells of St Loretto ring out', nor 'In how a frankfurter tastes in the vaults which date back to the Thirty Years War';

Pragueness is in the poet:

I am the tongue of your bells but also of your rain
[...]
I am the tongue of your slovenliness but also of your melancholia
[...]

²⁹ Maurice Nadeau, *The History of Surrealism*, (London: Jonathan Cape, 1968), 35; Nadeau(1964).

³⁰ Nadeau(1964), 35.

³¹ E.g. Neil Astley, (ed.), *Bloodaxe Poetry Introductions*, 2, (Tarnet, Northumberland: Bloodaxe, 2006), 31, 36; Astley(2006); Holý&Culík(2001).

³² Morgan(1996), 272-3.

³³ Morgan(1996), 272-3.

³⁴ Vítězslav Nezval, *Prague with Fingers of Rain*, (Tarnet, Northumberland: Bloodaxe, 2009), 61-2; Nezval(1936).

I am the tongue of your fire siren but also your legends
 [...]

 To future generations I bequeath my experience and a long sigh³⁵

One can feel the breath of Nezval's sigh in many Holub poems, often more darkly. 'Collision', for example, is a poem about a traffic accident and is suspended in the moment of death; there is a deep sigh of every-day tragedy.³⁶ Resonating with both Prévvert and Nezval, this and many other Holub poems combine surrealist imagery and litany. Holub writes of the accident: 'all that was left of the car / was a grotesque pretzel with a chunk bitten off / by the dentures of a demented angel'.³⁷ The poet searches for meaning with a litany of questions:

And what about the magnetic monopoles
 escaping after the Big Bang [...]

What about the giant molecular clouds
 under the galaxy's shoulders [...]

What about the loneliness of the first genes
 accumulating amino acids in shallow primeval pools [...] ³⁸

'Collision' ends with the death of 'the professor who understood the approximate universe / but forgot the traffic rules'.³⁹

'Žito the magician' is a short and abrupt poem with a precisely-defined plot: it contrasts the variable appearance of reality with absolute mathematical certainty.⁴⁰ The abruptness, combined with the presentation of a single strong idea is suggestive of a puppet play: surely Žito is a stock Czech puppet playing the part of Kepler at the court of Rudolf II (1552 – 1612), the melancholy and tyrannical King of Bohemia, Holy Roman

³⁵ Nezval(1936), 61-2.

³⁶ *CPMH*, 215-16.

³⁷ *CPMH*, 215.

³⁸ *CPMH*, 215-16.

³⁹ *CPMH*, 215-16.

⁴⁰ *CPMH*, 69.

Emperor, and patron of art, science, and alchemy.⁴¹ Žito, ‘To amuse His Royal Majesty’, agrees that reality is a matter of perception – he can make ‘Frogs into footmen’, ‘a Minister out of a rat’, grow daisies from his finger-tips.⁴² This illusionism perhaps represents Kepler earning his living at the court by casting horoscopes.⁴³ Žito can make a star black and water dry – words are only conventions.⁴⁴ But when asked by a student to ‘Think up sine alpha / greater than one’, Žito grows pale and sad: Terribly sorry. Sine is / between plus one and minus one’. Knowledge of the absolute in the presence of temporal power is dangerous: Žito exits the stage: he ‘leaves the great royal empire’, and returns ‘to his home / in a nutshell’.⁴⁵ Kepler retreats to his kernel of truth. The mathematical example is well chosen. Kepler was ‘a Pythagorean at heart’, and sine performs a surreal transformation of its own: it changes a triangular function into the undulating sine wave.⁴⁶ Plays, of course, contain many meanings. Victoria MacKenzie in her 2013 PhD thesis, *Contemporary Poets’ Responses to Science*, observes that Holub is making a literary-critical point.⁴⁷ Holub’s use of mathematical precision, she notes, ‘gives the lie to I. A. Richards’s term “pseudo-statements”’ which are not supposed to be verifiable.⁴⁸

Holub’s reference to Kafka in ‘Jewish cemetery at Olšňay, Kafka’s grave, April, a sunny day’ is obviously explicit.⁴⁹ His other references to Kafka are more suggestive. ‘A

⁴¹ For the back story see e.g. Demetz(1997), 190-4; Ripellino(1973), 62-4; or John Banville, *Prague Pictures*, (London: Bloomsbury, 2003), 130-95; Banville(2003).

⁴² *CPMH*, 69.

⁴³ Demetz(1997), 193-4; Banville(2003), 167; Ripellino(1973), 62-4.

⁴⁴ *CPMH*, 69.

⁴⁵ *CPMH*, 69.

⁴⁶ Demetz(1997), 190; see also Holub(1997), 183 for a different nuance.

⁴⁷ MacKenzie(2013), 59; as MacKenzie is aware, Holub reflects on this point in Holub(1990), 134-5. See also my Chapter I.

⁴⁸ MacKenzie(2013), 59.

⁴⁹ *CPMH*, 204.

dog in the quarry’ recalls the ending of *The Trial*, where Josef K. is taken to a quarry to die ‘like a dog!’.⁵⁰ ‘The dangers of the night’ expresses a fear of metamorphosis.⁵¹ At the parable level, Holub’s tale of investigating moles in ‘Brief reflection on cats growing in trees’, resembles Kafka’s short story ‘Investigations of a Dog’.⁵² In Kafka’s teasing parody of the scientific method, the dog is contemplating the source of its food:

Our scientific knowledge, which generally makes for an extreme specialisation, is remarkably simple in one province, I mean where it teaches that the earth engenders our food [...] Those who have preserved even a little freedom of judgement in scientific matters – and their numbers are truly small, for science draws a wider and wider circle around itself – will easily see, without having to make any specific experiment, that the main part of the food discovered on the ground in such cases comes from above; indeed customarily we snap up most of our food, according to our dexterity and greed, before it has reached the ground at all.⁵³

Science, according to the investigating dog, ‘recognises two chief methods of procuring food; namely the actual preparation of the ground, and secondly the auxiliary perfecting process of incantation, dance, and song’.⁵⁴ Holub’s parable also wittily portrays a rationalism flawed by the inability to see the whole. Moles, in the days when they ‘still had their annual general meetings’, make two conflicting above-ground observations on the nature of what grows in trees: birds or cats.⁵⁵ A venerable mole decides the question, and after making a further observation in the dark, declares: ‘Birds and cats are optical illusions produced / by the refraction of light’, ‘In fact’, the venerable mole continues, ‘things above // Were the same as below, only the clay was less dense and, / the upper roots of the trees were whispering something’; Holub writes: ‘And that was that’.⁵⁶ This

⁵⁰ CPMH, 74, Franz Kafka, *The Trial*, (London: Penguin, 2000), 178; Kafka(1925).

⁵¹ CPMH, 167.

⁵² CPMH, 144; ‘Investigations of a Dog’ in Franz Kafka, *The Complete Short Stories*, (London: Vintage, 2005), 278-316; Kafka(1922).

⁵³ Kafka(1922), 302-3.

⁵⁴ Kafka(1922), 303.

⁵⁵ CPMH, 144.

⁵⁶ CPMH, 144.

seeming perfection of knowledge is a nice counterpoint to ‘Žito the magician’, and perhaps challenges the reader to find the reverse pseudo statements, the lines which aren’t verifiably false.⁵⁷ Holub, however, often likes to end with a nagging doubt. The moles give up making observations, and no longer presuppose the existence of cats, ‘Or if so only a little’.⁵⁸

Kafka seems in his three novels to parody the irrational dressed up as rational; his protagonists yearn for the sanity of reason. Kafka’s vision of oppression is to be trapped in paradoxes and circular logic, as if caught in something like a waking dream. Holub’s poetry also abounds in contradictions and illogic, and similarly explores our limits, our inability to quite come to terms with the world around us; but Holub’s writing is not dreamlike, and there is often a Swiftian sense of escape at least to the next problem. Holub’s Cinderella, however, is trapped, and so is the old woman in ‘Brief reflection on an old woman with a barrow’.⁵⁹ In the latter poem Kafkaesque oppression is fully determined, the irrational is locked down with mathematical certainty. Holub’s target in ‘an old woman’ is poverty as a divinely ordained state of affairs – there is no need to believe he is thinking only, or at all, about communism in this poem. The poem surely responds to the Biblical phrase ‘For ye have the poor always with you’.⁶⁰ Thus ‘an old woman O’, with her ‘barrow B’, form a system moving ‘at constant velocity v ’, to ‘a constant destiny’.⁶¹ It’s an independent, isolated, complete, unchanging system. Holub ends with a litany of definitions: the ‘unit Our daily bread’, the ‘unit As we forgive

⁵⁷ *CPMH*, 69.

⁵⁸ *CPMH*, 144.

⁵⁹ *CPMH*, 23, 148.

⁶⁰ Matthew 26:11; also John 12:8.

⁶¹ *CPMH*, 148.

them', ending with the 'unit of life-fulfilment Amen'.⁶² Unlike 'Cinderella', there is no hint of the dignity of labour or the truth of an honest existence in 'Brief reflection on an old woman with a barrow'.⁶³

Holub was frustrated by mechanical thinking and simplistic worldviews – to counteract this his poetry sometimes disguises multiple meanings as a sort of meta-allegory for the hidden complexity of life. 'Conversation with a poet' (published 1982), for example, has two forms and both literal and allegorical readings.⁶⁴ Holub mentions 'Conversation' in his essay 'Poetry and Science'; his context is the search for a synthesis of poetry and science, a common origin, and he is examining his own feelings and emotions in the performance of one or the other activity.⁶⁵ A symmetry in 'Conversation with a poet' between 'scientist' and 'poet' in the poem is clearly implied in the essay.⁶⁶ It is a small step to substitute further 'experiment' for 'poem'; in doing so (as well as making a few minor grammatical adjustments) a second (implicit) form of 'Conversation with a poet' is generated. For copyright reasons it is not possible to quote the poem in the implicit 'science' form; it is worthwhile doing so as a thought experiment, however, as Holub's verse reads naturally in the implicit version, and has distinctly different nuances from the explicit text. The explicit version of 'Conversation with a poet' opens:

Are you a poet?
 Yes, I am.
 How do you know?
 I've written poems.
 If you've written poems it means you *were* a poet. But now? ⁶⁷

⁶² *CPMH*, 148.

⁶³ *CPMH*, 23, 148.

⁶⁴ *CPMH*, 192.

⁶⁵ Holub(1990), 142-4.

⁶⁶ *CPMH*, 192; Holub(1990), 142-4.

⁶⁷ *CPMH*, 192.

The poet (or scientist) says he will write (or experiment) again, but the interrogator expresses scepticism suggesting that a poem (like an experiment) is a unique event which cannot be reproduced. The poet (or scientist) responds that he believes the circumstances of the notional future poem (or experiment) will be the same; the interrogator responds: 'If you believe that then you won't be a poet and never were a poet'.⁶⁸ At the end, the poet, whose confidence seems shaken by this argument, asks, 'And who are you'.⁶⁹

In both the explicit and the implicit forms of 'Conversation with a poet', every activity is once off, things only exist in the moment they happen, if you think you can make the same thing happen again, then you can't be what you claimed to be in the first place.⁷⁰ Regarding the explicit version, MacKenzie points out that the poem was written during the 'time when the Communist government had designated [Holub] a "non-person" and forbidden him from officially publishing his work in Czechoslovakia'.⁷¹ Holub's route to rehabilitation involved a public self-criticism; Holý comments: 'In 1973 a statement was published in his name in which Holub seemed to revoke his previously held "incorrect" views'.⁷² Holý also notes, 'After the fall of Communism, Holub argued that the statement came out without his knowledge, and that no one would publish his protest at the time'.⁷³ Holub's political situation is considered more widely in the next section; but perhaps the agony of self-criticism is in 'Conversation'. In the original 'poetry' version of the poem, the allegory, as MacKenzie suggests, is 'a reaction to the

⁶⁸ *CPMH*, 192.

⁶⁹ *CPMH*, 192.

⁷⁰ *CPMH*, 192; 'in the moment', c.f. Holub(1990), 143.

⁷¹ MacKenzie(2013), 55-6.

⁷² Holý(2008), 237.

⁷³ Holý(2008), 237.

political situation’, that is, censorship, with ‘the poet turning on the interrogator in the final line’.⁷⁴

The implicit ‘science’ version of ‘Conversation with a poet’, however, not only has a different meaning, but a different reaction to authority. The ‘science’ version exposes a key question relating to the scientific method: how valid is it to extrapolate from one experiment to the next? The naïve view that circumstances can be exactly reproduced is laid bare as sloppy thinking – the interrogator is *right* on this point. The would-be scientist admits defeat, and the final sentence can be read as an enquiry as to the nature of the more knowledgeable voice. If ‘Conversation’ is a reflection on self-criticism, it leaves in the mind both the desire for individual freedom, and the need to learn.

The self-criticism allegory works technically, but appears to fall short emotionally: the poem seems at first too cool to express agony. The emotional side of the poem emerges, I think, by reference. *An Ordinary Life* is the final novel of Karel Čapek’s acclaimed modernist trilogy.⁷⁵ In a pivotal passage of the novel, the ordinary man’s previously complacent view of his own life is subject to an internal interrogation.⁷⁶ There is a resonant edginess between Čapek’s passage and Holub’s poem. Čapek’s story involves the ordinary man abandoning poetry (as Holub may have thought he would have to) and also his bohemian circle, for a junior position in the railway.⁷⁷ At one point, the

⁷⁴ MacKenzie(2013), 56; MacKenzie’s wider context is Holub’s identity as a poet.

⁷⁵ *An Ordinary Life* in Karel Čapek, *Three Novels*, (North Haven, CT: Catbird Press, 1990); Čapek(1934); the trilogy is unnamed; the preceding two novels are *Hordubal* and *Meteor*. Acclaimed: see Thomas Ort, *Art and Life in Modernist Prague*, (New York: Palgrave MacMillan, 2013), 5, 16; Ort(2013); for a discussion of the trilogy see Ort(2013), 174-98.

⁷⁶ Čapek(1934), 396-405.

⁷⁷ Čapek(1934), 396-405.

interrogated voice asks: ‘who are you’?⁷⁸ Čapek’s passage is heavy with anxiety and self-doubt – it seems that Holub has re-modelled this scene to imply the agony he needs to convey in ‘Conversation with a poet’, but would rather not admit explicitly. The deceptively simple ‘Conversation with a poet’ thus develops through three levels, literal, allegorical, and referential. There are probably no truly simple Holub poems.

The poem ‘Animal rights’ contains Holub’s most shocking lines.⁷⁹ It presents a graduation of sympathy, starting with, ‘Pity for dogs / that cry / (boundless pity)’.⁸⁰ Holub was a dog lover. The next lines are: ‘Pity for mice / that squirm // Pity for earthworms / that wither helplessly / (limited pity)’.⁸¹ It sounds like a distorted echo of the Sermon on the Mount; but then the poem ends:

Patients
with progressive amyotrophic lateral sclerosis
can just fuck off. They shouldn’t have been born.
Hieronymus Bosch be with them
for ever and ever amen.⁸²

No pity at all. Holub would have been aware that the condition referred to is the one Stephen Hawking (b. 1942) suffers from. This poem is a bitter attack on animal-rights campaigners. Unsurprisingly, due to the nature of his work, Holub opposed what he regarded as naïve and self-appointed critics of animal experiments.⁸³ Holub comments in an interview, perhaps thinking of this poem: ‘To me, an earthworm qualifies for the same moral feeling as a dog. I hate hierarchies. Morality must be absolute’.⁸⁴ ‘Animal rights’ is

⁷⁸ Čapek(1934), 398.

⁷⁹ *CPMH*, 313.

⁸⁰ *CPMH*, 313.

⁸¹ *CPMH*, 313.

⁸² *CPMH*, 313.

⁸³ See e.g., Miroslav Holub, ‘Chemical Common Sense’ in *LRB*, 4 July 1996; Holub(1996); Suzanne O’Shea, Interview with Miroslav Holub in *The Poetry Ireland Review*, No. 30 (Autumn – Winter, 1990), 67; O’Shea(1990).

⁸⁴ O’Shea(1990), 67.

a brutal parody of false moral hierarchies. Forcing the issue into the open with black humour, Holub is suggesting that the consequence of excess sympathy for animals is a lack of sympathy for suffering people. This particular poem doesn't appear to give any ground, but Holub's poems work together. Subtlety and complexity emerge from sets of poems in the themed collection *Vanishing Lung Syndrome* (1990), to which 'Animal rights' belongs.⁸⁵ 'The sun of hope', several pages on, opens: 'They'll certainly remember, / in the twenty-third century'.⁸⁶ This, you suspect, means 'certainly' in the sense of 'certainly won't'. Those who won't remember are 'preserved / in liquid nitrogen, / implanted in a uterus'.⁸⁷ In the futuristic world, replete with treatment for depression, Holub says 'they will remember themselves / actual calves'.⁸⁸ Perhaps they will remember: 'The sun of hope' *is* an animal rights poem.⁸⁹

Seamus Heaney notes in his finely-titled essay on Holub, 'The Fully Exposed Poem', that 'We forget we are reading a translation'.⁹⁰ Warming to the Shakespearian feel of Holub's '*dramatis personae*', 'Whatever the reason', Heaney continues, '[Holub] has found in English an emotional and literary climate that suits perfectly'.⁹¹ It is the sound, however, which is the greatest loss of translation, not just the Czech words, but the rhythms of the Czech Bible, the incantation of the church service, the hum of language. Yet, cadences develop with comprehension – as litanies are sensed, or as birds

⁸⁵ *CPMH*, 271-326.

⁸⁶ *CPMH*, 321.

⁸⁷ *CPMH*, 321.

⁸⁸ *CPMH*, 321.

⁸⁹ *CPMH*, 321.

⁹⁰ Seamus Heaney, 'The Fully Exposed Poem' in *The Government of the Tongue*, (London: Faber and Faber, 1989), 45-53, 50; Heaney(1989); on translation, see also Holub's comment to Dennis O'Driscoll in a 1984 interview in Astley(2006), 34; O'Driscoll(1984).

⁹¹ Heaney(1989), 50.

flap or dogs bark, as bells ring (there are lots of bells), as puppets clunk and clack.⁹² A mental cacophony is induced by the phrase ‘the hysterical barking / of cats’ from ‘What else’.⁹³ For me, the rhythm of Bob Dylan’s ‘A hard rain’s a-gonna fall’ towards the end of ‘Suffering’ is unmistakable.⁹⁴ Like Dylan, Holub took a strongly anti-war stance, for example in poems such as ‘Casualty’ and ‘The fly’.⁹⁵ Holub’s lyric in ‘Suffering’ ironically reverses Dylan’s sense.⁹⁶ After the horrors portrayed in ‘Suffering’, the poet’s mind wanders to an ironic utopia: ‘In which I met a general covered with oak leaves / In which I met ambulance men who could find no wounded ...’.⁹⁷ The English versions of Holub’s poems are remarkable, even though reference and allusion probably run quite deeply. To a British reader, the Czech notes in ‘Brief reflection on killing the Christmas carp’ are comprehensible; and this poem thrills and amuses with its extreme reverse bathos of the marvellously exaggerated comparison of the dying fish to Galileo’s defiant resistance after he was forced to recant: ‘And yet it moves’.⁹⁸ ‘On the origin of 6pm’, for me though, only communicated as a poem on reading a passage in *The Good Soldier Švejk*, where Švejk agrees on parting from a comrade, both bound for the front, to meet after the war at a certain tavern in Prague at 6pm.⁹⁹ There is a scene, a battlefield remembered years later, also in *Švejk*, which seems to prefigure ‘The fly’.¹⁰⁰

⁹² Bells, e.g., *CPMH*, 73, 150, 226, 235, 237, 317, 322, 329, 334.

⁹³ *CPMH*, 276.

⁹⁴ Bob Dylan, ‘A Hard Rain’s A-Gonna Fall’ from *The Freewheelin’ Bob Dylan*, released May 1963 (although Dylan had recorded and performed it before this); Dylan(1963); *CPMH*, 105-6; ‘Suffering’ was first published in 1963, so the timing just about works.

⁹⁵ *CPMH*, 30, 52.

⁹⁶ *CPMH*, 105-6.

⁹⁷ *CPMH*, 106.

⁹⁸ *CPMH*, 154.

⁹⁹ *CPMH*, 183; Hašek(1923), 394-5.

¹⁰⁰ Hašek(1923), 230; see also Ripellino(1973), 241-2.

The figure of Faust in ‘The root of the matter’ may be read with more confidence in the light of Ripellino’s comment on the tendency in puppet theatre for the puppets to be cast in inappropriate roles (as in ‘How we played the Gilgamesh epic’); thus, for example, a Faust may come ‘close to the Czech Punch – Kašpárek by name’.¹⁰¹ Local nuance is occasionally to the fore, but Holub’s special type of fastidious erudition is wide-ranging. The critic David Graham, in his essay “‘The Frightened Fawn of Sense’: Mind and Nature in the Poetry of Miroslav Holub’, identifies the British King Canute speaking, ‘though with typically modern, layered ironies’ in Holub’s ‘Man cursing the sea’.¹⁰² Moreover, this is not the Canute who ‘has become emblematic of royal arrogance’, but Canute as the story was first recorded: ‘the moral did not concern pride but the evils of sycophancy’.¹⁰³

Richard Dawkins’s *The Extended Phenotype* (1982), explores the projection of phenotypes into animals’ characteristic behaviour; for example, birds building nests, beavers’ dams, and termites’ mounds.¹⁰⁴ Termites’ monoliths may take generations to complete; Dawkins compares termite builders to ‘medieval masons’, who would work ‘a lifetime on one cathedral and never meet their colleagues who would complete it’.¹⁰⁵ Holub’s development of this idea in terms of humanity’s expression of itself in art and artefacts, and these being housed in all their variousness, is the subject of his poem ‘The British Museum’.¹⁰⁶ There is a clear reference to Dawkins’s earlier work, *The Selfish*

¹⁰¹ Ripellino(1973), 97.

¹⁰² David Graham, ‘The Frightened Fawn of Sense: Mind and Nature in the Poetry of Miroslav Holub’ in *The American Poetry Review*, Vol. 16, No. 4 (July/August, 1987), 31; Graham(1987); Graham’s title is a quote from ‘Wisdom’, *CPMH*, 119.

¹⁰³ Graham(1987), 31.

¹⁰⁴ Richard Dawkins, *The Extended Phenotype*, (Oxford: Oxford University Press, 1999), 200; Dawkins(1982).

¹⁰⁵ Dawkins(1982), 200.

¹⁰⁶ *CPMH*, 393.

Gene in the couplet: ‘Only our genes are eternal / from body to body’, lines which also echo the continuity of endeavour, from termites to medieval masons.¹⁰⁷ The ending of the poem links our traditional emotional centre and our genetic makeup to the production of art and craft: ‘The British Museum is in us, / in our very hearts, / in our very depths’.¹⁰⁸ Holub’s poems are like models of reality, distilled insights; it is as if these are pinned up for display like butterflies in a collection in all their variety and similarity, or carefully presented like items in a cabinet of curiosities: the poetic effect is both individual and cumulative. Holub’s work is drawn together in a British Museum of life, the parts are related to the whole as in one of Archimboldo’s composite faces.¹⁰⁹ Holub’s form is individual and composite, sparse and expansive. Holub’s beaver’s dam, his extended phenotype, his poetry, is a pure vision of complexity. This sense of necessity engenders the poetry’s resonant sense of integrity, well expressed by Heaney: it is the ‘emotional reliability’, and the ‘obedience to what is generally true’ that ‘constitutes one of the main attractions of Holub’s work’.¹¹⁰

Materialism Pinned Down

The writer and medical doctor Iain Bamforth, in his article on Holub, ‘Applied Poetry’ (2001), gives the most concise account of Holub’s contribution to science I have found.¹¹¹ Noting that the monograph *Immunology of Nude Mice* ‘established Holub’s reputation as a leading experimental scientist’, Bamforth writes: ‘One of Holub’s key

¹⁰⁷ *CPMH*, 393; Richard Dawkins, *The Selfish Gene*, (Oxford: Oxford University Press, 2006); the quasi-immortality of genes is a central idea of this work, see e.g. chapter 3, 21-45, esp. 34; Dawkins(1976).

¹⁰⁸ *CPMH*, 393.

¹⁰⁹ Archimboldo was court painter to Rudolf II.

¹¹⁰ Heaney(1989), 49.

¹¹¹ Iain Bamforth, *Applied Poetry*, available at: <http://www.questia.com/library/journal/1P3-68908310/applied-poetry>; 25/11/2013; see bibliography for further details; Bamforth(2001).

discoveries was that the omentum – the apron of abdominal fat – in mice acts as an immunological historian: it retains a physical record of battles won'.¹¹² Bamforth is a writer with a philosophical outlook, however, and in his essay he tries to fit Holub into various philosophical categories. Bamforth claims, for example, that Holub was a 'disciple' of Immanuel Kant – Holub was no one's disciple.¹¹³ Elsewhere Holub is a 'neo-Malthusian' or moving close to 'classical liberalism'.¹¹⁴ Bamforth claims that Holub's 'In the microscope' represents a 'Hobbesian war of all against all' – but this seems to go much further than the poem, which reads more like a metaphor for class oppression.¹¹⁵ Bamforth's politicised assertion that 'For forty years, science was all over the place in the countries of the Eastern Block – but it was Marxist-Leninist science, counter-science', can be challenged.¹¹⁶ Holub deprecated Lysenko, but Bamforth contradicts what he has mentioned himself, Holub's important discovery. Holub wrote in 1990 'we are not so badly off in science, even within institutions such as the Academy of Sciences, or this or that institute passively established after the Russian model'.¹¹⁷ He wrote again in 1996 that science 'enjoyed a reasonable degree of freedom under the communists'.¹¹⁸ The situation for science wasn't perfect, but neither is it in the West, where it can be influenced by commercial pressure, or worse.¹¹⁹ Bamforth's essay sits very uneasily with Holub's consistent and un-ideological writing.

¹¹² Holub(1989); Bamforth(2001); see also Holub's own description in a 1990 interview with Dennis O'Driscoll in Astley(2006), 35; O'Driscoll(1990).

¹¹³ Bamforth(2001).

¹¹⁴ Bamforth(2001).

¹¹⁵ *CPMH*, 28; Bamforth(2001).

¹¹⁶ Bamforth(2001).

¹¹⁷ Miroslav Holub, 'Prague Diary' in the *LRB*, 14 June 1990; Holub(1990b).

¹¹⁸ Holub(1996).

¹¹⁹ Worse: see 'What's Driving the Chaotic Dismantling of Canada's Science Libraries?' by Andrew Nikiforuk, dated 23 Dec. 2013, on the website <http://thetyee.ca/News/2013/12/23/Canadian-Science-Libraries/>, 13/02/2014.

It would not be possible to construct an argument for Holub's materialism via Marxism or dialectical materialism – Holub had a bellyful of all that, and it gave him indigestion. The sense is of scientific materialism throughout. Holub was a balanced and consistent thinker, as free of ideology as is possible, and though neither a philosopher or politician, he was an informed observer. Holub's consistency is demonstrated by his post-communist poetry, which does not flip mental states, but shows an ongoing concern for ideological corruption of values. As in 'Conversation with a poet', Holub always sees both sides: Holý and Culík point out (in the context of Holub's untranslated travel writing), for example, that Holub was 'enchanted as well as worried by the United States'.¹²⁰ Holub's consistent thinking, as expressed throughout his poetry, from the communist era, through its fall and beyond is, I would argue, one of the most important observations which can be made of his work. He was not slave to any political system, and will not fit into the category of freedom-loving writer trapped under communism, as most Western commentators seem to assume. Holub's lack of ideological predilections is the complement to my argument that his poetry is a profound expression of materialism.

Holub's post-communist poem 'The duties of a dustbin', from the collection *Supposed to Fly* (1994), opens with the couplet: 'To take up all post-Bolshevik baroque, / balderdash, barnacles, bankruptcies, barristers' wigs'.¹²¹ In Bohemia, the word 'baroque' is symbolic and emotive. Ripellino writes:

The Baroque came to Bohemia in the first half of the seventeenth century, during the Thirty Years War. Its appearance coincides with events ruinous for Czech lands, that is, with the victory of Ferdinand II at the Battle of White Mountain (1620) and the Peace of Westphalia (1648). [...] Initially, then, the Baroque thrust itself, a foreign body, upon the Czechs. It was the pacifying, propagandist art of the oppressors, and aggressive symbol of the Counter-Reformation, of subservience to the Hapsburgs, the

¹²⁰ *CPMH*, 192; Holý&Culík(2001).

¹²¹ *CPMH*, 352;

scorn of the Church Triumphant at the anguish of a defeated nation. Initially, then, Czechs viewed the Baroque with hostility, like a narcissus born of a rotten onion.¹²²

In ‘Aloof’ from *The Rampage* (1997), ‘The self expands like / an elastic wart, swells like / a cattle tick / pumped with paradise gas’.¹²³ In ‘The Pied Pipers’, also from *The Rampage*, ‘skinny, grubby, scraggly-bearded / Pied Pipers’ seem to return the children, and also the rats.¹²⁴ In the new capitalist order ‘instead of information / there’s only going to be Truth’, and this ‘truth puffs up / in our homes like a cuckoo’s egg’, ‘it howls and trumpets, / like a dead driver, slumped against his car-horn’, and swells ‘like a pot of porridge’.¹²⁵ ‘Truth’ here is quite distant from the elusive but grand scientific truth, the ‘splendid silver bulldozer / in the tumbling darkness’, of ‘Suffering’.¹²⁶ The image of the magic porridge pot surely stands for the central myth of capitalism: infinite growth. All this is unsettling to any Western reader looking for a potted morality tale about the evils of communism from a newly-free writer, and probably also to Czech dissidents, many of whom were Holub’s fellow writers. This, in addition to the fact he had high quality and (presumably) well paid work, while many dissidents had to take building or cleaning jobs, along with his foreign travel rights, and the simple fact that, since his *Kveten* days he probably didn’t mix in literary circles, may help explain Holub’s second ostracization, this time under the new capitalist order.¹²⁷ Robert Crawford, after a visit to the Czech Republic in 2013, noted: ‘I was struck (as before) by how much suspicion of Holub there was there among people I met. Of the local residents it was some Americans long resident there who were clear he was a great poet, while several Czechs seemed wary of

¹²² Ripellino(1973), 187-8.

¹²³ *CPMH*, 390.

¹²⁴ *CPMH*, 388-9.

¹²⁵ *CPMH*, 388-9.

¹²⁶ *CPMH*, 105-6.

¹²⁷ The writer and dissident Ivan Kílma said: ‘Almost all my banned colleagues had to earn their living as labourers’; quoted from Philip Roth, ‘A Conversation in Prague’, in the *NYRB*, 12/04/1990; Roth(1990).

him; one even said to me he might have been “a spy””.¹²⁸ Holý and Culík say ‘Some of his fellow Czechs could not accept Holub’s self-criticism, there were even unfounded allegations of his alleged cooperation with the communist secret police’.¹²⁹ Crawford and Holý and Culík suggest the allegations arose because of his travel rights, and presumably Holý and Culík can say the allegations are unfounded because nothing incriminating has been found in the communist-era files.¹³⁰ It’s worth noting that the Czech writer Milan Kundera (b. 1929), who fled to Paris in the early 1970s, has also been ostracised in the new order – this, along with the hardships suffered by dissidents, is discussed in ‘A Conversation in Prague’ between Ivan Kílma and Phillip Roth in the *New York Review of Books*, 12 April 1990.¹³¹

Perhaps Holub’s political situation can be compared with that of another writer of great integrity, Seamus Heaney. Heaney walked a tightrope with regard to Irish Republicanism: if he had, for example, written in support of political prisoners, Bobby Sands, or the hunger strike, he would, at the very mildest, have been branded a ‘controversial’ figure. If he had refused to apologise (self-criticise), he would have been stigmatised by the British establishment, and his career as a poet might have been marginalised. Similarly, Holub passively co-operated with the communist state in order to pursue his career as a scientist. In Dennis O’Driscoll’s interviews with Heaney in *Stepping Stones* (2008), Heaney is challenged directly on how Holub ‘should’ have responded to communism, and his answer, for me, draws a line under the issue.

¹²⁸ Robert Crawford, private email to the author 8/12/13; Crawford(2013).

¹²⁹ Holý&Culík(2001).

¹³⁰ Crawford(2013); Holý&Culík(2001); it should be noted that the communist era files, according to Katie Garvan on the website <http://theargus.net.au/Prague/?p=182>, 9/12/13, ‘are now available for people to view, both digitally and in hard copy – although most of the files contain solid black shapes covering information such as names of spies and information gathered by them’.

¹³¹ Roth(1990).

[O'Driscoll] Miroslav Holub, the subject of one of your essays, held an important research job in communist Czechoslovakia and was not an active dissident. How do you regard poets like Holub and Tadeusz Różewicz, who reached varying degrees of accommodation with officialdom?

[Heaney] What I'd say about them is what I'd say about any poet: the task was to take the strain of being themselves in their own time and place, to survive without compromising their moral and artistic self-respect; the ones you mentioned seem to have managed that. I find it hard to adjudicate in these areas. Presumptuous, even.

Let me push you nevertheless, with a hugely hypothetical question: had you been a poet in say, post-war Romania or Poland, how do you think you would have dealt with the demands of the Communist Party for socialist realism and conformity to the party line?

Whatever answer I give to that is going to sound either too self-deprecatory or too self-inflatory. Still, going on how I worked in my own political circumstances, I believe I might have found a way to maintain a hygienic distance, found some non-confrontational but still contrarian stance. I risk saying this because I began as the lad who wrote 'Requiem for the Croppies', in 'official' Northern Ireland in 1966, and over the years have had to keep parrying demands for poetry that would fall into line with one or other party – or para-party.¹³²

Without knowing exactly what either poet thought, both were constrained by radical circumstances, and both acted with moderation.

The most material fact of all – death – is never far away in Holub's poetry; in his day-to-day work Holub was the agent of death for the greater purpose of human life. This moral compromise disturbed him, as one of his most powerful poems, 'Suffering' (published 1963), shows.¹³³ The 'Ugly creatures, ugly grunting creatures' of the poem are, according to an essay, 'Vietnamese socialist minipig[s]' which 'resembled a semibald porcupine caught in a frontal collision between two armoured cars'.¹³⁴ For reasons of scale and morphology they were promising experimental subjects, and Holub

¹³² Dennis O'Driscoll, *Interviews with Seamus Heaney*, (London: Faber and Faber, 2008), 386-7; O'Driscoll(2008).

¹³³ *CPMH*, 105-6.

¹³⁴ *CPMH*, 105-6; 'On Pigs as a Laboratory Vacuum', in Holub(1997), 56, 57.

and his team were endeavouring ‘to catch up with bourgeois pseudoscience and surpass it’.¹³⁵ Holub writes in the poem ‘Suffering’:

They close ugly blue eyes,
The open ugly blue eyes,
and
they’re
dead.

But I ask no questions,
no one asks any questions.¹³⁶

After death, the ugly creatures are free to ‘graze in the greenish-blue pool / of the chromatogram’.¹³⁷ Holub continues:

Naturally no one asks
Whether these creatures wouldn’t have preferred
to live all in one piece,
their disgusting life¹³⁸

And if they wouldn’t have preferred being ‘Incredibly terrified / Incredibly happy’ in their ‘muddy stinking little world’.¹³⁹ The poem’s final stanza includes lines which echo ‘A Hard Rain’s A-Gonna Fall’, as noted above. Dylan’s lines respond to the maternal refrain, ‘Oh, where have you been, my blue-eyed son? / Oh where have you been, my darling young one?’.¹⁴⁰ Well, the blue-eyed sons have been chopped up and allowed to ‘run in pieces along the white expanse / of the paper electrophore’ and driven for a dip ‘in alcohol / in xylol’; but rest assured, the ‘bits of animals are satisfied’, ‘like kittens at the bottom of the pond’.¹⁴¹ And the darling young ones of the experimental team have lost their innocence.

¹³⁵ Holub(1997), 56.

¹³⁶ Holub(1997), 56; *CPMH*, 105-6.

¹³⁷ *CPMH*, 105-6.

¹³⁸ *CPMH*, 105-6.

¹³⁹ *CPMH*, 105-6.

¹⁴⁰ Dylan(1963); Dylan’s song is based on the traditional ballad ‘Lord Randall’.

¹⁴¹ *CPMH*, 105-6.

‘Suffering’ doesn’t need an allegorical reading – Holub has administered a strong enough dose of reality to be going on with. However, the couplet which starts, ‘But I ask no questions ...’ occurs three times, and has a sinister, collusive ring.¹⁴² The exaggerated, relentless, damning of the creatures for their ugliness, their degradation, is chilling.

‘Civilised’ attitudes towards native peoples, the Aborigines, the Roma, as well as more than a hint of the victims of the Nazis, press forward strongly. ‘Naturally no one asks’ if the pigs would have preferred not to be cut into pieces, their lives are disgusting.

‘Suffering’ positively shouts: we must ask questions. Some things can be justified (this is not an animal rights poem), but words are slippery – someone might be exploiting our emotional blind spot. If Holub is responding to T. S. Eliot’s famous phrase ‘human kind / Cannot bear very much reality’, he is suggesting we must force ourselves to bear reality if we want to least have a chance of telling the difference between right and wrong.¹⁴³ In ‘Burnt Norton’, Eliot’s famous phrase is uttered by a bird, chasing the poet out of a garden.¹⁴⁴ Holub is saying, come and have a look in my laboratory.

¹⁴² *CPMH*, 105-6.

¹⁴³ ‘Burnt Norton’ in e.g. T. S. Eliot, *The Complete Poems and Plays of T. S. Eliot*, (London: Faber and Faber, 1969), 172; Eliot(1935).

¹⁴⁴ Eliot(1935), 172.

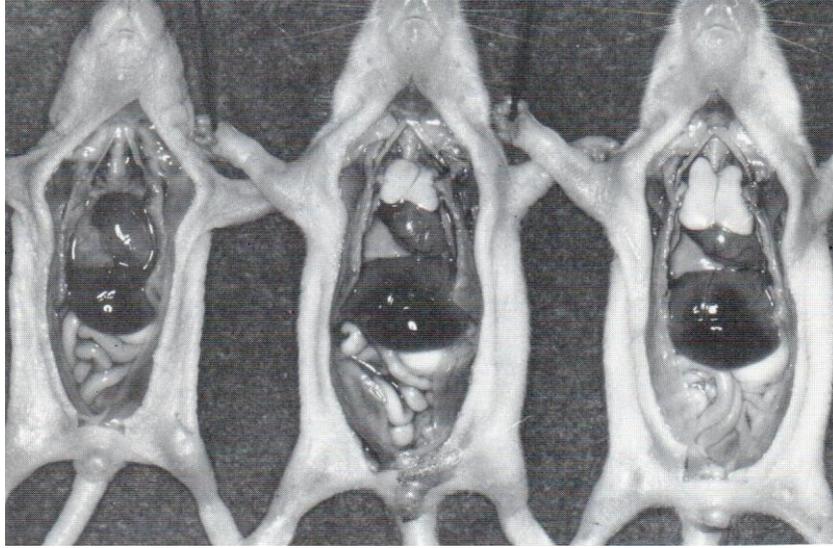


Figure 2: Materialism Pinned Down ¹⁴⁵

‘Skinning’ (written between 1985 and 1989) begins: ‘We make a noose’.¹⁴⁶ A laboratory animal, a rabbit as it turns out, is to be killed and skinned. The poem is structured as a pedagogical lecture on the technical process of skinning, such as Holub probably delivered many times, which falls to pieces as the narrator’s mind becomes overwhelmed by a horrific and insane vision. A response to the poem is that too much reality leads to madness; this explicit sense persists, though it is also strongly reversed. The instruction continues, the noose is tied to a ladder, the hind legs pulled, the noose tightened. The narrator says, ‘We cut the skin all around. It’s easy’.¹⁴⁷ There then follows an interjection, Biblical in nature, which governs the poem.

In the beginning the fact created the Word.
And the Word hovered over the abyss.
Then go your ways and I will be in your mouth

¹⁴⁵ Holub(1989), 44; original caption: Macroscopical appearance of thymuses in 7-day-old NFS/N *nu/nu* (left), *nu/+* male (centre) and *+/+* male (right). The *+/+* thymus was 1.85 times heavier than the *nu/+* thymus. (From Kojima, A., Saito, M., Hioki, K., Shimanura, K., and Habu, S., *Exc. Cell Biol.*, 52, 107, 1984. With permission).

¹⁴⁶ Date: *CPMH*, 274; poem: *CPMH*, 284-6.

¹⁴⁷ *CPMH*, 284-6.

*and I will teach you what you should say.*¹⁴⁸

Holub has materially re-configured Genesis and John: the fact is the creator and the created is the Word.¹⁴⁹ The fact is God: the sense slips between metaphorical materialism, and literal paradox. The ‘Word’ is free though, and potentially catastrophic. The italicised couplet is from Exodus, where God is speaking to Moses; Moses is to speak with the word of God.¹⁵⁰ The passage is known as the appointment of Aaron.

Several verses later, God speaks to Moses regarding Aaron:

And he shall be thy spokesman unto the people: and he shall be, *even* he shall be to thee instead of a mouth, and thou shall be to him instead of God.¹⁵¹

God will speak to the people through Moses, and Moses in turn will pass this permission to speak God’s word on to Aaron; Moses shall be to Aaron ‘instead of God’. In Holub’s context, there is a sense of distance from the Biblical text, here the word of God becomes the word of man.

The lecture on skinning re-commences, but the teacher’s concentration is breaking down and the language becomes muddled with imagery.

... we cut around the forelegs
push the joints through and break off
the paws, crack crack the first word, crack the last word,
from here up to the morning star, a rustling
of satin can be heard, as if
a blue sky was being torn into strips.¹⁵²

It is as if physical violence is done to all words, from first to last, as they are broken from the body, detached from reality with the paws, set free. The morning star is the planet Venus, also the goddess of love. A rustling presence in heaven seems disturbed. Perhaps

¹⁴⁸ *CPMH*, 284-6.

¹⁴⁹ Genesis 1:1, John 1:1.

¹⁵⁰ Exodus 4:12; assumed to be Czech wording.

¹⁵¹ Exodus 4:16.

¹⁵² *CPMH*, 284-6.

love is being violated. Soon the rabbit is divided into two parts, the skin and the skinless body. The narrator has a vision where the two parts come back to life.

Already the first skinned rabbit
starts running on broken-boned limbs,
romping through fields and green pastures
[...]
and thousands of naked bloody zombies
run into city streets
in mindless oblivion ¹⁵³

The empty skins have the happier lot in this bifurcated world. These ‘empty grey skins’ live in the ‘countryside with yellow flowers along the brook’, and touch whiskers ‘with Diderot’. ¹⁵⁴ Meanwhile ‘the naked rabbit bodies crowd together / under the lash of the pied pipers’, and there is ‘nakedness raped / by nakedness’. ¹⁵⁵ There is a striking resemblance to the Eloi and Morlock peoples in H. G. Wells’s *The Time Machine*. ¹⁵⁶ The vision is of a class society so extreme that the ruling class and the proletariat have become separate species and exaggerated stereotypes of how they see each other.

The development of the Wells-like vision is interrupted by other powerful imagery. Holub references ‘I am Goya’ by Russian poet Andrei Voznesensky (1933 – 2010); this is the second stanza:

I am the tongue
of war, the embers of cities
on the snows of the year 1941
I am hunger ¹⁵⁷

¹⁵³ CPMH, 285.

¹⁵⁴ CPMH, 286.

¹⁵⁵ CPMH, 286.

¹⁵⁶ H. G. Wells, *The Time Machine*, (London: Penguin, 2005), e.g. 46-9 ;Wells(1895).

¹⁵⁷ Andrei Voznesensky, ‘I am Goya’, quoted from the website <http://lumpy-pudding.tumblr.com/post/661229/-i-am-goya-byandrey-voznensensky-1933-june-1>, 20/1/14; Voznesensky(1933); also translated by Morgan, see Morgan(1996), 191-2.

This resonates with Holub's earlier lines: 'the subcutaneous tissue gives off / a mild stench, like distant smouldering cities'. Voznesensky's third stanza echoes the hanging, much more terribly:

I am the gullet
of a woman hanged whose body like a bell
tolled over a blank square
I am Goya ¹⁵⁸

This is closely followed by a reference to the Moloch passage in Allen Ginsberg's *Howl!*, which has the sense of cursing America.¹⁵⁹ The introduction of Moloch to the poem ties into Wells's novel, and also brings in the darkness of Čapek's *The War with the Newts*, where the salamanders adopt Moloch as their god.¹⁶⁰ The penultimate stanza seems to reference the Inquisition, and returns to the theme of fact and word.

the Spanish gabble of the word
stripped of fact,
the drain of fact, left behind
by the word,
an empty Ferris wheel,
swooping across the abyss
and towards the zenith. ¹⁶¹

The word has lost its association with fact, and takes off like a flying saucer towards some unspecified ultimate. The poem ends:

And it all started
with a mere noose
and a ladder,
or whatever,
to heaven. ¹⁶²

¹⁵⁸ Voznesensky(1933).

¹⁵⁹ Allen Ginsberg, *Howl!*, (San Francisco: City Lights Books, 2002), 21-3; Ginsberg(1956).

¹⁶⁰ Čapek(1936), 226.

¹⁶¹ *CPMH*, 286.

¹⁶² *CPMH*, 286.

Utopia, or the route to utopia, started with a hanging. It seems like cruel irony to orient the foregoing bitter vision towards heaven, but the sense of this ending is surely the Christian idea of sacrifice and redemption. Except that there is sacrifice in this poem, but no redemption.

It's useful to divide the discussion of 'Skinning' into two parts: first the poem itself, then the poem in conjunction with an earlier Holub poem, 'Wisdom'.¹⁶³ 'Skinning' is resolutely anti-ideological: when words lose contact with facts, they cannot be trusted. The poem condemns war and class oppression, and perhaps also has the same or larger set of targets as George Orwell's *1984*.¹⁶⁴ Orwell also warns against denying facts; the broken protagonist, towards the end of the novel, unconsciously traces in the dust on a table: '2 + 2 = 5'.¹⁶⁵ There is a clear sense in the poem that words free from facts are dangerous. However, Holub has introduced a governing paradox: God is fact. This paradox forces an additional sense into the poem – facts are not sacred and are not to be worshiped. Remaining sceptical, surely the poet says, is remaining sane.

'Wisdom' (published 1969) is a much earlier and very different Holub poem, but there's a suggestive link to 'Skinning'.¹⁶⁶ The earlier poem is about the impending death from tubercular meningitis of 'A small boy not yet bound / by the hempen fetters of speech'.¹⁶⁷ The suggestive link is that both 'Skinning' and 'Wisdom' have a couplet which makes a similar point: 'Wisdom' reflects, 'There's nothing in the mind that / hasn't been in life'; 'Skinning', referring to the rabbit as its largest sense organ is being

¹⁶³ *CPMH*, 284-6, 119-20.

¹⁶⁴ George Orwell, *1984*, (London: Penguin, 2003); Orwell(1949).

¹⁶⁵ Orwell(1949), 334.

¹⁶⁶ *CPMH*, 119-20, 284-6.

¹⁶⁷ *CPMH*, 119.

removed, says ‘There’s nothing in the mind that wasn’t / in the senses’.¹⁶⁸ The wisdom of the earlier poem is the wisdom of innocence, unencumbered by the word, in the presence of incontrovertible fact. The child who bears pure reality knows wisdom. If this is linked to ‘Skinning’, then the death of the rabbit, the death of innocence, is the destruction of wisdom, and the destruction of wisdom leads to madness. In an essay, Holub quotes a remark of Josef Čapek’s (Karel’s artist brother and collaborator) which seems relevant: Josef said, ‘the true opposite of wisdom is not stupidity but madness’.¹⁶⁹ Pushing further, the pedagogical part of ‘Skinning’ is most likely to have been based on personal experience. Even if the vision, the madness, is scaled back, there remains a clear sense of inner disturbance at this taking of a life – there must be a secure moral foundation if such work is to be done. ‘Wisdom’ provides one.¹⁷⁰ It is clearly noted in the earlier poem that meningitis was still fatal at the time the boy died, with the equally clear implication that this was not the case at the time ‘Wisdom’ was written.¹⁷¹ Medical science had progressed through precisely the kind of work described in ‘Skinning’. ‘Wisdom’ provides the justification, even the redemption, the secular redemption, which Holub appears to seek in the final stanza of ‘Skinning’.¹⁷² By entering Holub’s laboratory, and by bearing its reality, the reader is forced to check their own moral security with what’s happening; Holub is providing the material evidence trusting that superficial responses to the poem are unlikely.

Holub never lets go of the idea that words and facts must be questioned. His early classroom poems, perhaps inspired by his mother’s anecdotes, are playful with

¹⁶⁸ *CPMH*, 119, 284.

¹⁶⁹ ‘Wisdom as a Metaphor’ in Holub(1997), 184-200, 200.

¹⁷⁰ *CPMH*, 119-20.

¹⁷¹ *CPMH*, 120.

¹⁷² *CPMH*, 119-20, 284-6.

denotation, meaning, and authority.¹⁷³ In ‘Napoleon’, the children are asked what the said historical figure did: ‘Won a war, the children say. / Lost a war, the children say. / No one knows’.¹⁷⁴ Both things the children say are true, but the way it’s said makes it wrong. A child pipes up: ‘Our butcher had a dog / called Napoleon’ – the dog was beaten and died: ‘all the children are now sorry / for Napoleon’.¹⁷⁵ A denotation error.

Facts, in ‘The sick primer’, are a matter of wishful thinking and poor wording:

the children are good and work hard.
But that isn’t really quite true,
the leaves drop in autumn
but that isn’t really quite true
flames burn, the moon shines,
but that isn’t really quite true¹⁷⁶

In ‘The teacher’, ‘The earth rotates, / says the young pupil. / Not so, the earth rotates, / says the teacher’.¹⁷⁷ This and other tautological violations occur because ‘teacher knows best’.¹⁷⁸ Words and letters are often literally slippery, sliding off their pages, as in ‘A well-read man’.¹⁷⁹ ‘Alphabet’ is constructed from images suggesting the incompleteness of literary knowledge.¹⁸⁰ In ‘Discobolus’, individual excellence, as if in the present, is challenged in a fine snatch of slippery party language.¹⁸¹ The athlete is about to throw, when someone says:

– Just a moment,
we still have to discuss this,
purely as a matter of form,
– You don’t know the situation,

¹⁷³ Holub’s mother was a French and German teacher who ‘had a very strong influence on her son’, see Holý&Culík(2001).

¹⁷⁴ *CPMH*, 34.

¹⁷⁵ *CPMH*, 34.

¹⁷⁶ *CPMH*, 45-6.

¹⁷⁷ *CPMH*, 67.

¹⁷⁸ *CPMH*, 67.

¹⁷⁹ *CPMH*, 221-2.

¹⁸⁰ *CPMH*, 43.

¹⁸¹ *CPMH*, 80-1.

comrade ¹⁸²

Discobolus turns to stone, and, as a statue, safely unable to do anything, is admired ‘by the finest pedagogues’, as a symbol of ‘the courageous human heart’. ¹⁸³ There is an image of fish trying to speak in ‘The gift of speech’; in ‘Punch’s dream’, the puppet is determined to speak in his own voice, but all that comes out is ‘Hi there, kids, you’re a great bunch’. ¹⁸⁴ Words may not come at all, or if they do they might be somebody else’s, or they might be deceitful, or if not all that then they’re probably paradoxical. Only the material world is secure – this point is firmly nailed down in Holub’s materialist masterpiece: ‘Immanuel Kant’. ¹⁸⁵ Kant, according to Wikipedia, ‘makes the claim that an external environment is necessary for the establishment of the self’. ¹⁸⁶ Holub’s poem turns on the point conveniently made by Wikipedia that ‘Kant would want to argue that there is no empirical way of observing the self’. ¹⁸⁷ The immunologist Holub has discovered an empirical, internal definition of self:

The philosophy of white blood cells:
 this is self,
 this is non-self.
 [...]
 And he knows nothing about it,
 though this is just the critique
 of pure reason.

Deep inside. ¹⁸⁸

¹⁸² *CPMH*, 80-1.

¹⁸³ *CPMH*, 80-1.

¹⁸⁴ *CPMH*, 111, 237.

¹⁸⁵ *CPMH*, 201.

¹⁸⁶ http://en.wikipedia.org/w/index.php?title=Immanuel_Kant&printable=yes, 12/01/2014, p10 of the printable version; Wikipedia(2014).

¹⁸⁷ Wikipedia(2014), p10 of the printable version.

¹⁸⁸ *CPMH*, 201.

Words, for Holub, are not always slippery, language is not inherently deceitful, suitably anchored words can express precise and meaningful thought. The only reliable anchor is physical reality.

Holub's poems demonstrate that there is more to science, and of course poetry, than facts. Central to Holub's writing is the knowledge that facts are complex and not always what they seem: facts always interact with the way they are expressed. Except in mathematics, there is no unambiguous fact: 'the word' must be questioned. Scepticism is as important in science as facts. Holub's materialism does not conform to literary criticism's mechanical stereotype: his verse is warm, humorous, human-scale, achingly filled with suffering, and his distillations of the human condition are knowingly incomplete. Holub does not claim to be in possession of a theory of everything. Physical reality is not fully determined, definitive, free of ambiguity, or devoid of mystery, either in itself or in its interaction with our senses and our language. As with the investigating moles, there are limits to our knowledge of which we may never become aware (or if so only a little). Reality is much too complex to describe in a unified way – but material reality is, Holub is repeatedly saying in his poems, our only secure foundation.

Controversy and Synthesis

Helen Small's essay 'The Function of Antagonism: Miroslav Holub and Roald Hoffmann', in John Holmes's collection *Science in Modern Poetry*, begins with a discussion of literary criticism and science which in many ways is open and balanced.¹⁸⁹ She is right to point out, for instance, that 'Current work in "literature and science" is, in

¹⁸⁹ Small(2012).

short, interdisciplinary principally from the vantage point of the humanities'.¹⁹⁰ (An important exception is Robert Crawford's *Contemporary Poetry and Contemporary Science*).¹⁹¹ She also discusses the philosopher Bernard Williams's observation regarding the damage done 'to the prestige of the humanities in the eyes of scientists and educated audiences generally', by 'the philosophers and theorists who would have us believe that there is no such thing as truth obtainable in language', and that there is 'no scientific truth uncontrolled by social forces'.¹⁹² However, she asks: 'How can literary criticism give an accurate account of the *content* of science, as distinct from its rhetoric, without becoming merely a reduced report and without retreating into a form of minimal positivism?'.¹⁹³ Her purpose in this essay is not to answer this question, but rather to examine a number of poems, written by scientists, about science; however, my response to Small's rhetorical question would be that scientific content is beyond literary theory's purview. Small has framed the problem: if science is more than rhetoric, how can theories from the realm of texts and discourse have any relevance? She refers to science as 'a form of fact-based knowledge'; but Holub's writing shows that this is a completely inadequate way of describing science – science is a materialist discipline, not a collection of facts, which in any case are not straightforward as they might seem.¹⁹⁴ In the wider zone of controversy between literary criticism and science this insufficiency of description dominates; in the current unsatisfactory engagement, literary theorists seem surprisingly unaware of the limits of their own theories: it's noticeable, for example, that there is no theory of the contingency of theories which claim that science is contingent.

¹⁹⁰ Small(2012), 19.

¹⁹¹ Crawford(2006).

¹⁹² Small(2012), 22.

¹⁹³ Small(2012), 25; italics original.

¹⁹⁴ Small(2012), 25.

The controversy between literary criticism and science is strongly delineated by Small's reading of Holub's 'Intensive care unit', one of his last-published poems.¹⁹⁵ This is the complete poem.

God's insects stuck on pins
betrayed heroes of the abdominal cavity.

Cracked faience of whining puppets,
human soul dripping from plastic tubes.
Behind white curtains a scene
from the war of the salamanders
is endlessly getting ready.

And liturgies change
and souls change
and blushings and palenesses change
and winged prophets change
and writers of chronicles change and
gods change.

But amikacin,
the antibiotic,
is the only one.¹⁹⁶

The cells of the immune system, which Holub refers to elsewhere as the bearers of 'the inner wisdom of the body', are like glorious but dead butterflies, pinned down, inoperative.¹⁹⁷ There is damage, severe pain, life is draining away, and there is a haunting image of an endless rehearsal of a scene from Čapek's *War with the Newts*.¹⁹⁸ Depending on the scene, the mood lightens (barely), or darkens – the outlook for the patient is not good. The liturgy which follows opens by violating its own sense of constancy, contradicting itself. Ebb and flow, blushings and palenesses, individual life and life in general, are set amongst humanity's changing temporal and spiritual narrative. Holub's liturgy, which some would call heretical, summons time on a grand scale, and compresses

¹⁹⁵ *CPMH*, 421.

¹⁹⁶ *CPMH*, 421.

¹⁹⁷ The Holub quote is presented in O'Driscoll(1984) in Astley(2006), 35, but is actually, according to a footnote, from O'Driscoll(1990).

¹⁹⁸ Čapek(1936).

it into a moment of recitation – it’s like a secular prayer to ward off superstition while the medics have their fingers crossed. The final stanza stops the liturgy of change, and locks onto the life-saving God of the moment. The feeling is of relief. Learning from Wikipedia that amikacin (as Small notes) is typically used to treat hospital-acquired infections allows the poem’s back story to develop: the doctors have been let down by their own hospital.¹⁹⁹ The medical system itself is the betrayer of the cellular heroes. The image of the broken puppet becomes more shocking, suggesting careless handling; the salamander scene engenders disbelief that something as terrible as this can be happening; the hospital and the liturgy contradict themselves. Holub is showing that hospitals can be dangerous and intensive care is a brutal experience; but the liturgy suggests no medical practice is forever. ‘Intensive care unit’ is a fully-exposed Holub poem (to use Heaney’s phrase), constructed from strong, complex images which linger, deepen, and clarify with referential comprehension. It is not remotely triumphalist. The ethics of the poem emerge from the betrayal. ‘God’s insects’, Holub’s ‘betrayed heroes of the abdominal cavity’, are the subject of his life’s work as an immunologist – this is a passionate call to improve medical practice.

Small also picks up the unsettling nature of this poem, but her interpretation is radically different from that suggested above. She says: “‘Intensive Care Unit’ would be a triumphalist poem by a scientist rather than an ethical achievement by a scientist poet if it were not for a persistent undercutting of the authority of science’.²⁰⁰ Small claims that ‘undercutting starts with the dehumanised quality of the hospital scene, where patients like pinned insects, gutted carcasses, broken dolls, are subjected to technological

¹⁹⁹ Amikacin: Wikipedia, 11/2/2014.

²⁰⁰ Small(2012), 36.

solutions to human problems'.²⁰¹ Next Small asserts that Čapek's *War with the Newts* is a 'dark satire on Nazi science', and that 'if the humility of mere accuracy and the sense that drugs should not be treated as God are lost' from the poem, then Holub's reference to this work suggests that if 'all is made secondary to scientific progress, one would be left with Nazi science, a false religion worshipping the latest drug'.²⁰² Čapek's novel plays on a large stage, and does contain a number of choice parodies of science, British, French, American, and German; but Nazi science is not a clearly isolable sense in the novel, and there is no suggestion of the same in 'Intensive care unit'. Small's misleading introduction of Nazi science seems to confuse her reading – she needs to qualify: 'Not that the drug itself is sinister, of course. It makes people better'; although at the end of the paragraph she appears to contradict this: the 'possibility [of Nazi science] is hinted at, perhaps, in the sinister accuracy of the word "amikacin", which achieves the poetry of pure denotation'.²⁰³ What is sinister about accuracy? In the final sentence of her essay, Small's claim that Holub is 'undercutting' science in 'Intensive care unit' is consolidated.²⁰⁴ She says: 'poetry, as this poem shows supremely well, may be a way of anchoring science, of keeping its provisional truths true to their provisionality'.²⁰⁵

A throw-away remark Small makes would not deserve attention, except that such comments are widespread: unfortunately, she colours her narrative with an unnecessary sneer at both science and religion, 'Scientists in their priestcraft [...]'.²⁰⁶ Science is fully analytical, continuously questioning itself, and well aware of the limits of its own

²⁰¹ Small(2012), 36.

²⁰² Small(2012), 36.

²⁰³ Small(2012), 36.

²⁰⁴ Small(2012), 36; *CPMH*, 421.

²⁰⁵ Small(2012), 37.

²⁰⁶ Small(2012), 36.

theories; it is nothing like a religion. The failure to see the difference between science and religion arises from a failure to take either of them seriously, and ultimately, a denial of facts. The significant issue to discuss, however, is Small's use of literary-critical formulations as an analytical tool and as a point of conclusion. In using unquestioningly concepts such as 'authority' and 'provisionality' to characterise science, Small is following the near-universal humanities practice, although it is acknowledged that there are important exceptions where science is discussed in an open and balanced manner.²⁰⁷ To be clear, the scrutiny of science is not objected to, it is essential both inside and outside the scientific community. The problem arises when closed-loop discourses are applied to the discussion of science, discourses with which it is impossible to engage without accepting their terms, and whose terms are configured to admit only a certain point of view. For example, it is absurd to describe the vast complex of science in terms of any single attribute; but to reduce the status of science as a whole to the loaded concept of 'authority' is completely misleading. If the term 'authority' applies at all, science has a very large number of interacting levels and types of authority. Moreover, the assertion that someone is 'undercutting the authority of science' is paradoxical: in scientific practice questioning *increases* legitimacy.

Small's concluding remark asserting the 'provisionality' of the entirety of science echoes widespread practice in the humanities and reflects idealist thinking about science from Kuhn to postmodernism; also thinkers more friendly to science have grappled with the fact that, in science, some things are plainly provisional, just as some are statistical, and the fact that some parts of science are in a state of change because the state of our knowledge is incomplete. The objection to Small's remark, which in its context

²⁰⁷ Exceptions, e.g., Crawford(2006); Holmes(2009), esp. 1-22.

foregrounds idealist thinking, however, is simple: it is completely inadequate to characterise the vast complex of science. Antibiotics, for example, do change; but the underlying molecular model does not. Dietary science, in the absence of a complete theory of the body, is empirical and its advice may change as studies proceed; these considerations do not apply to the laws of thermodynamics, yet both are drawn by implication of Small's general statement under the totalising umbrella of 'provisionality'. The assertions of literary and cultural theories of science have all the rigor of the conclusions drawn by Holub's investigating moles in his parody of inductive logic, 'Brief reflection on cats growing in trees', except there is no nagging doubt.²⁰⁸ Literary criticism's 'theories', and the discourse on science at its heart, fail to admit science's materialism; sometimes even the possibility of materialism is denied. Science is wrenched from its foundation, treated like a set of abstract ideas, or a cultural artefact, and reduced to an object of study, although there is so much distortion that it is no longer science which is being studied. Such 'theories' are bound to fail because they cannot account for the success of science's description of the physical world, and the technology derived from it.

At one level this is just unfortunate; it doesn't really matter if literary theory is meaningless when applied to science. What's troubling, though, is the closed and self-fulfilling nature of the discourse. The comparison to Orwell's Newspeak is more than suggestive. It's not possible, for example, to argue that Holub is not 'undercutting the authority of science' in 'Intensive care unit' because, in accepting the formulation, a discussion of the credibility of science as a whole is imposed. 'Provisionality' is also dictatorial in its intent: literary theory does not acknowledge that in science certain things

²⁰⁸ *CPMH*, 144.

are changing within a framework of accumulating knowledge, so the ability to express this is removed from the discourse. The descriptive poverty of literary criticism's discourse on science eliminates, in a blanket fashion, all traces of complexity, intricacy, and balance. The difficulty faced by scientists attempting to engage with literary criticism's position on science is in essence a political one: the terms of the discourse carry the assumptions of specific idealist theories, and therefore the same terms cannot simply be picked up and used; the underlying theories need to be exposed first.

Productive dialogue between literary criticism and science is not possible without open, neutral, and mutually understood expressions. It is highly regrettable, in my view, that so much discussion is conducted without such expressions, and without the inherent biases in terms such as 'provisionality' being presented for critical appraisal. A useful step forward for the interdisciplinary study of Literature and Science would be to re-position literary and cultural theories of science as hypotheses so that they could be subject to evidence-based scrutiny.

It should be noted that Small is writing within the terms of an established discourse: it is this which is being criticised, not the limited scope available to one scholar to make wider assessments in a short essay; in addition Small is herself responding to Holub's outspoken remarks about humanities academics in his final essay – hence her title: 'The Function of Antagonism'.²⁰⁹ Her response in the first part of the essay is balanced and thoughtful, but her reading of 'Intensive care unit', and the terms used to characterise science, can be questioned.²¹⁰ A more subtle Holub essay than his final one, 'Poetry and Science', opens with a reading of 'Waiting for the Barbarians' by

²⁰⁹ Crawford(2006), 11-24; Small(2012).

²¹⁰ Small(2012); *CPMH*, 421.

the Greek poet Constantine Cavafy (1863 – 1933), in which Holub mischievously associates barbarians with scientists.²¹¹ The main purpose of Holub’s essay, however, is to find synthesis. Examining, for example, his own subjective experience of writing a poem, he compares it to laboratory work in terms of the discipline, the trial and error, and the sense of a ‘unique inner atmosphere’.²¹² Holub says that, for him, the moment of “‘finding it”, the moment of success’, in poetry or science, is ‘virtually identical’: ‘The emotional, aesthetic and existential value is the same’; it is ‘A strong feeling of reality’.²¹³ ‘Yes’, Holub writes, ‘there is a common root of so-called creativity’.²¹⁴ Holub’s feeling of normal routine life, interspersed with the rare moments of successful completion of a poem or experiment is elaborated, he remarks, in his poem ‘Conversation with a poet’, a translation of which follows in his essay.²¹⁵ As the essay closes, Holub synthesises even further by shifting the meaning of culture to the biological sense, finishing with a fine translation of his definitive one culture poem, ‘Brief reflection on the test tube’.²¹⁶

‘Poetry and Science’ also hints at the interpretation of the poem ‘The root of the matter’.²¹⁷ Quoting (perhaps from memory) Heisenberg’s comment, ‘Even in science the object of research is no longer nature itself, but man’s investigation of nature’, Holub remarks, ‘The root of the matter is not in the matter itself, as I put it in a poem’.²¹⁸ This is only a hint, not a reading, but it legitimises a quantum mechanical approach to the poem.

‘The root of the matter’ (published 1969) runs to six pages and is divided into four

²¹¹ Holub(1990), 122-46, Cavafy: 122-3.

²¹² Holub(1990), 142-3.

²¹³ Holub(1990), 142-3.

²¹⁴ Holub(1990), 142.

²¹⁵ Holub(1990), 142-3.

²¹⁶ Holub(1990), 145-6; cf. *CPMH*, 157.

²¹⁷ Holub(1990), 122-46; *CPMH*, 113-8.

²¹⁸ Holub(1990), 128.

sections.²¹⁹ It is a free-verse narrative constructed of images which are interspersed with a second italicised voice.²²⁰ The form, surely, is again puppet theatre, this time a play in four acts, with the images representing the scenes. The relationship between puppet master and puppet is a strong metaphor for ‘the involvement of the observer in the observed’, a remark which is adjacent to Holub’s quote from Heisenberg in the former’s essay.²²¹ This idea is developed further by placing the observer’s italicised voice literally inside the poem giving the impression of a single interacting system. The protagonist is the everyman Czech Faust, with his stock puppet theatre companion, a black poodle, entering in act two.²²²

Act one of ‘The root of the matter’ is set in the open, perhaps in a park.²²³ Faust seems to be both with and against the ebb and flow of a crowd. In one image he ‘walks around like a grandfather clock’, suggesting the movement of a pendulum.²²⁴ In another he ‘walks around like a run-down battery / on a movable pavement’ – he is part of a moving system.²²⁵ The first act introduces at least three types of senses in the various images or scenes. There is a sense of probabilistic outcome, often mischance: a nail which bends at the first stroke or a puddle stepped into. There is a sense of unresolved outcome, or in quantum terms, entangled states, for example: ‘the weather’s either cloudy or set fair’.²²⁶ And there’s the sense of a system, as in the moving pavement, or the way in which Faust becomes part of the crowd.²²⁷ There are suggestive references to two

²¹⁹ *CPMH*, 113-18.

²²⁰ *CPMH*, 113-18.

²²¹ Holub(1990), 128.

²²² Stock companion: *CPMH*, 227, 232; act two: *CPMH*, 114-16.

²²³ *CPMH*, 113-14.

²²⁴ *CPMH*, 113.

²²⁵ *CPMH*, 113.

²²⁶ *CPMH*, 113.

²²⁷ *CPMH*, 113.

quantum paradoxes. The observer's remark '*Nothing has happened but we / always saw it coming*', which is repeated towards the end of act four, suggests, in an inverse sense, the strange paradox where the mere probability of something happening, even if it does not occur, can have a material outcome.²²⁸ Physical effects can arise, according to Penrose, from 'things that might have happened, although they did not in fact happen'.²²⁹ At one point Faust has a choice of five roads. The choices are written serially, as they must be, but nothing else in the text suggests seriality, and in the quantum context the passage brings to mind the celebrated paradox of wave-particle duality where a photon of light must pass through two slits at once.²³⁰ One of the roads is in fact banned: Faust 'takes the banned road past the council offices'.²³¹ Perhaps this little paradox opens the door to the larger one, where Faust takes all five roads at once.

In act two Faust comes across a black poodle; Holub puts in parenthesis the word 'naturally' in this connection, suggesting that Faust and the dog together are a single state.²³² The poodle is running round in smaller and smaller circles, 'like an ominous spider / spinning its vast web'.²³³ There is then the first of many references to the poem's title, which develops into the refrain '*The root of the matter is not / in the matter itself*'.

– Look, now we shall see
the poodle's true kernel,
the root of the matter²³⁴

But it's neither a kernel nor a root, it's a web, a network of interstices. Perhaps Holub is saying that the root of matter is an array of gaps. The pace of the poet-observer's

²²⁸ *CPMH*, 113.

²²⁹ Quote: Penrose(1994), 240; generally: Penrose(1994), 239-40, 268-70.

²³⁰ *CPMH*, 114; see e.g. Penrose(1989), 299-304.

²³¹ *CPMH*, 114.

²³² *CPMH*, 114.

²³³ *CPMH*, 114.

²³⁴ *CPMH*, 114.

interjections quicken, and seems to presage, or cause by observing, the one real event in the poem: the death of the poodle. The brief death scene opens as if Damocles's sword drops:

suddenly
like a knife that falls
 half-blade into the ground
a bus slips through
and
the poodle's run over and dies ²³⁵

The bus just slips through – knowledge of a quantum system is always incomplete. The third act introduces the themes of blood and the word, echoed at the end of the poem. Faust lifts the dead dog, and its blood clothes him 'like a chasuble put on' ²³⁶ He places the dog on a book, and the 'letters drink up the blood', the 'pages suck it in'. ²³⁷ The act ends with the poet alluding to Ginsberg's *Howl!*. ²³⁸ Reversing the sense of mingling with the book, Holub seems to be thinking of *Howl!* as a performance poem, detached from the written word: '*Howl! You won't have any / trouble with your spelling*'. ²³⁹ The words are quiet, but the sense is of rage.

As the final act starts, Faust is trying to rationalise what has happened, to find meaning. Faust says: 'Dog and nothing but a dog / who might have been the allegory of creation / and are no more than the very meaning of death'. ²⁴⁰ Holub puts an end to this futile speculation in the following, stunning, image:

[...] there is no
mystery
except the thread which from our hands

²³⁵ *CPMH*, 116.

²³⁶ *CPMH*, 116.

²³⁷ *CPMH*, 116.

²³⁸ Ginsberg(1956).

²³⁹ *CPMH*, 117; Ginsberg(1956).

²⁴⁰ *CPMH*, 117.

leads round the far side of things, round the collar of the landscape
and up the sleeve of a star ²⁴¹

One way to read this image is to allow the opening phrase ‘no mystery except’ to sit with its unwritten complement, ‘all is mystery except’, as if in two simultaneous states. The interplay between these two senses then conditions the rest of the image. In the former (written) sense we think we know all about life, except we are mysteriously subject to an unknown force. In the latter sense the only thing we know for certain is we are collared to the universe like a dog, but, because we are aware of it, perhaps there is a thread of understanding. The fourfold meaning (two parts to each state) becomes richly complex as the various senses ripple through each other; as the permutations develop, the image gathers the feel of theoretical physics. The sense of the image is collective; it is the entire theatre of life which is collared. Another quantum paradox is also suggested:

instantaneous action at a distance, which results from the collapse of entangled states.²⁴²

There is an image, ‘no more than / crunched bones’, shortly after Faust’s speculation that the dog might have been the ‘allegory of creation’, which appears to refute the idea of allegory.²⁴³ There are multiple senses to life, the ‘The root of the matter’ seems to say, but they are all literal. Death is literal and that’s it. Faust himself seems to be dying as the poem ends. The final scene brings together the themes of blood, the word, and the lack of allegory:

All in all India ink
is the blood’s first sister
and song is just as final
as life and death
and equally without allegory,
without transcendence

²⁴¹ *CPMH*, 117.

²⁴² See Penrose(1994), 240-6.

²⁴³ *CPMH*, 117.

and without fuss.²⁴⁴

Words are our life blood and song is the life of words. Song relates to life and death through its timed and timeless qualities. There is no allegory, no transcendence, no possibility of further interpretation. Life is literal, which doesn't mean it's simple. This powerful expression of materialism is also a stopping point in terms of science's end theory, quantum mechanics – there is nothing more, though it's still paradoxical and mysterious.

The poem's synthesis of poetry and science is expressed, with typical Holub mischief, in the second act:

like a cat, like a mouse,
like a black-burning bush,
*there is poetry in everything. That
is the biggest argument
against poetry*²⁴⁵

Poetry and science is a cat and mouse game, but it is not determined which is which. Holub was probably imagining Schrodinger's famous dual-state feline.²⁴⁶ The burning bush is black, seemingly inverting the burning bush of the Old Testament; instead of God's commands, there are those of the devil, and this is the argument against poetry. The word 'poetry' in the quote could equally well be 'science', which can also be diabolical. There is symmetry, poetry and science are entangled states, like the sides of a tossed coin in mid-air. Some of us end up as one, some the other, and occasionally the coin lands on its edge, and someone ends up as both. In the essay 'Poetry and Science' Holub writes: "There is no such thing as a "scientist" and there is no such thing as a "poet"; these roles are only realised in the rare moments of success in either field, and in

²⁴⁴ CPMH, 118.

²⁴⁵ CPMH, 113.

²⁴⁶ See Penrose(1989), 375-8.

these moments, there is a 'strong feeling of reality'.²⁴⁷ The moment of realisation in Holub's essay passage is like the moment of quantum observation. Simon Armitage, in his essay in *Contemporary Poetry and Contemporary Science*, makes a resonant comment on the role of 'poetry'. Armitage writes, 'science didn't drop the bomb on Hiroshima', 'It was a poetic nightmare-vision of hell-fire [...] that opened the bomb-hatch'; like Holub, Armitage draws poetry onto the same moral plane as science.²⁴⁸

'The root of the matter' is a haunting poem. It feels inhabited by the ghost of the oppressed Hordubal, the eponymous protagonist of the first novel of Čapek's trilogy.²⁴⁹ A case could be made for a relationship between 'The root of the matter', *Hordubal*, and the wider trilogy; if successful it would provide a literary counterpart to the science-based reading suggested here.²⁵⁰ Holub's themes of plurality, complexity, the mysterious nature of events, and the limit of knowledge, echo Čapek's. A link to the trilogy would introduce a philosophical theme into 'The root of the matter' which the title seems to imply; however, the current quantum reading perhaps suggests this: the root of matter is not in matter itself, because, in the quantum mechanical world, there is no matter itself, there is only a system of suspended possibilities, some of which sometimes become real.

The 'cat and mouse' passage in 'The root of the matter' is expressing a synthesis of poetry and science in terms of physics. Holub develops in the poem 'Brief Reflection on the Test Tube' another synthesis, this time in terms of biology.²⁵¹ In the essay 'Poetry and Science', Holub reflects on the human condition: we live 'in an age dominated by the

²⁴⁷ *CPMH*, 144, 143.

²⁴⁸ Simon Armitage, 'Poetry, Science, and the Art of the Metaphor', in Crawford(2006), 110-22, 120; Armitage(2006).

²⁴⁹ *Hordubal* in Karel Čapek, *Three Novels*, (North Haven, CT: Catbird Press, 1990); Čapek(1933).

²⁵⁰ Čapek(1933).

²⁵¹ *CPMH*, 114; Holub(1990), 146; c.f. *CPMH*, 157.

giants of management and manipulation, by untamed autonomous superstructures which look down on us as if at an easily manageable culture'.²⁵² He continues: 'And this is the last aspect [described in this essay] of reality where there is a total amalgamation of poetry and science: some sort of actual or potential hope in the world of autarchic actions'.²⁵³ The essay, by way of illustration, then concludes with the poem 'Brief Reflection on the Test Tube'.²⁵⁴ Here is part of the second stanza:

you have a look – and it grows,
a little sea, a little volcano,
a little tree, a little heart, a little brain,
so small you don't hear it pleads
to be let out,
and that's the whole point, not to hear.²⁵⁵

The idea of hope which Holub usefully mentions in his preamble is the hope of worthwhile endeavour, not of release. It is reflected in the poem in the phrase 'look – and it grows', in the stanza which follows, where question marks change into exclamation marks, and in the reflexive ending:

And the point is
that for the moment you forget
you yourselves are

In the test tube.²⁵⁶

To conclude, using the word science as a proxy for materialism – there is nothing peripheral about science in Holub's work. It's not an engagement with or a response to science in any sense. Holub's poetry is unthinkable without science. It's not as if science was something external, something he 'believed' in, something he might undermine or

²⁵² Holub(1990), 145.

²⁵³ Holub(1990), 145.

²⁵⁴ Holub(1990), 146.

²⁵⁵ Holub(1990), 146.

²⁵⁶ Holub(1990), 146.

not believe in at some point. He just thought that way. Scepticism in science is not undermining, it's mandatory. It is precisely this sceptical attitude which Holub forces into the open that makes his poetry such an important literary expression of scientific materialism. Moreover, this work is important because of its cross-cultural harmony, its balance and symmetry: like standing between parallel mirrors, Holub's poetry is reflected scientifically, and his science is reflected poetically, into an apparently infinite distance.

CONCLUSION

The structure of this thesis, the types and forms of the arguments which have been made, and the relationship between them, are the result of the particular experience I have brought to this work, balanced by the considerable amount I have learned during the course of the research. There are, as far as I can tell, very few active in Literature and Science who are from a scientific background, and perhaps even fewer who have carried this through to a detailed study of science in poetry. I'm sure my experience of encountering the humanities is typical of many from a scientific background to the extent that, on discovering the vigorous attacks which have been taking place on scientific materialism, from Thomas Kuhn to postmodernism, one feels a robust response is unavoidable. Two well-known scientific encounters with contemporary thinking on science in the humanities are those of the biologist E. O. Wilson and the physicist Alan Sokal. Wilson's response was to write *Consilience*, a search for a bigger picture within which a unity of knowledge could be found.¹ Unfortunately, in my view, this proved to be too great a challenge, and the result is unconvincing. Sokal's initial response was parody and ridicule, which developed into a rounded philosophical counter-argument in *Intellectual Imposters* (with Jan Bricmont), and *Beyond the Hoax*.² Sokal's parody and the subsequent 'science wars' generated a great deal of noise, and may or may not be one of the factors in what I believe to be the improving interdisciplinary atmosphere; but nevertheless, a great deal is still said about science in the humanities which takes no

¹ Wilson(1998).

² Sokal&Bricmont(1997); Sokal(2008).

account of what Sokal and all the other scientists who sought to defend their discipline in volumes such as *Theory's Empire*, have written.³

The structure of this thesis is thus based on a balance between a range of considerations. Sokal's work stands as the reference defence of science against relativizing attacks, but it generated a great deal of division, and today, it seems like little account of it is taken. It seemed impossible for me to avoid further controversy in my engagement with Poetry and Science, if only because scientific materialism is not understood as a default position in the interdiscipline; on the other hand, too much controversy would have risked a divisive thesis which could have been dismissed as just another scientist's rant. Further, my main objective was to undertake a detailed exploration of science in poetry, and to do this I needed an open and unbiased approach to what science in poetry might actually be, and how best to interpret it. To this end the idea of the creative misreading of science developed in Chapter I seemed to be a way of explicitly abandoning any preconceptions which the reader might have otherwise inferred from my background. The introductory preamble to Chapter I overviews how the particular balance implemented here was arrived at, that balance being that a provisional interdisciplinary working compromise is essential if the joint subject is to progress. A two-thread strategy has therefore been followed: one thread is a firm statement of scientific materialism, principally in the Kuhn section in Chapter I and the response to Helen Small in Chapter V; this is complemented by a second thread which might be seen as surprisingly open to the idealisation of science and its expression in the imaginative domain as poetic art. In defence of the latter part of this position I would argue that, certainly, art is not exempt from an obligation for fidelity to the real world – this idea was

³ Patai&Corrall(2005).

discussed in conjunction with Morgan's writing in Chapter IV – but at the same time art must be free to surprise and to challenge our preconceptions. Perhaps the particular balance which has been found is not perfect. I believe all four poets studied have been successful in integrating science and poetry, and I have only lightly touched on a counter-example of poetic science (J. H. Prynne's *The Plant Time Manifold Transcripts*) where failure could be robustly argued.⁴ A full chapter on Prynne was in fact considered, but rejected on the grounds that his appropriation of science, and perhaps his poetry, would have necessitated a sustained attack – this, it seemed to me, violated my principal of contained controversy, would risk unnecessary division, and could detract from my effort to make a positive contribution, from the perspective of scientific materialism, to the interdisciplinary subject of Poetry and Science.

In Chapters II to V, my objective was to explore, in as detailed a manner as possible, the phenomenon of science in poetry. To do this, I sought to develop my own analysis of each poet's writing – in each case, weighed with great care, this turned out not to be in agreement with a significant amount of the existing critical opinion. Thus a sceptical attitude towards some of the existing literary commentary is surely quite marked in these chapters; on the other hand, the same critical attitude towards the poets may have seemed a little veiled. For completeness, therefore, a few further remarks should be made. In the MacDiarmid chapter the suggestion was made in the Introduction that one could read the poetry by making one's own edit of the late text – in the single-minded effort to press home my main points, the implication that making a personal edit necessarily implies leaving out much which is difficult (in a bad way), sometimes even ugly, and unenlightening to read, was not developed. The point was made that

⁴ Prynne(2005), 233-42.

MacDiarmid's text is unedited, but I felt it would have been out of scope to discuss which parts text which might be ripe for editing out. Also, during the discussion of the computational model, it was noted that there are aspects to MacDiarmid's work which look like a system for making poetry (though some might dispute that so much cutting and pasting could constitute poetry), but MacDiarmid was unable to control this system fully. This point too could have been followed into a more critical appraisal of the late text – but again, on the basis that one must remain focussed on the main theme, the point was not developed.

Regarding Judith Wright's work, a slightly paradoxical situation was highlighted in the chapter Introduction where her most explicit remarks about science are to be found in her later poetry, of which a handful of examples were given. Attention was re-directed towards what I called the 'deep and interesting' science in her (in my view) much richer early work. Thus a critical view of what could be seen as a lightweight approach to science in this later work was not developed in the interest of exploring what I do believe to be an impressive depth of thinking in her early poetry.

Perhaps more critical attention was addressed towards Morgan's poetry than the others with the discussion of Douglas Dunn's comments, the assessment of 'Memories of Earth', and the siding with his adversary in debate, Jack Rillie. I could have brought out more clearly that much of his science fiction poetry is unconvincing; again, however, this was not my point – I was interested in identifying the bleakness of the themes in this poetry in support of my own argument. Morgan's work, clearly, is uneven, and it could have been argued that sometimes the mask used to disguise his personality was just that, a mask with little behind it. This, however, would have involved a sensitive discussion of

Morgan's personal life, briefly alluded to but not developed, and would have distracted from the focus on science and technology. Perhaps an unexpected note in the Morgan chapter was the software engineer's outright rejection of artificial intelligence; this, I would argue, is fully compatible with the wider perspective of sceptical materialism. A regret with the Morgan chapter is that space was not available for a proper discussion of what might come to be seen as his masterpiece, *The New Divan*.⁵ Such a discussion would require chapter-length consideration. There are rich veins of science in this work, and also a use of imagery and surrealism which could have been drawn through the poet's own *Collected Translations* into a comparative discussion with some of Holub's poetry.⁶

Regarding Holub, without a knowledge of Czech, a better assessment of the translations of his work is not possible; there are opinions on some websites, but it's simply not possible to provide a personal judgement on the matter.⁷ In one instance, for the poem 'Brief reflection on the test tube', the translation in the essay 'Poetry and Science' seemed clearer and more elegant than that in *Poems Before and After*; more widely one can only comment that the power Holub's work delivers in English is quite remarkable.⁸ Holub's essays, it can be noted, were referred to for support, but generally held in the background. Further attention to the essays would have been interesting, but I suspect that there are translation issues and also context-of-writing issues, which could not be addressed without Czech, or a greater biographical knowledge of the poet. While a great deal of Holub's work has been translated, there are notable gaps. A selection of his

⁵ *CPEM*, 293-330.

⁶ Morgan(1996).

⁷ See e.g., comments at <http://www.complete-review.com/authors/holubm.htm>, 7/11/2015.

⁸ Holub(1990), 122-46; c.f. *CPMH*, 157.

journalism – a regular column for the popular science magazine *Vim* – is available in *The Jingle Bell Principle*, but none of his travel writing (aside from several short quotes), which forms a stand-alone volume in his Czech *Collected Works*, is available in English.⁹

A consistent theme through all four chapters is what used to be called (when I was at university in the 1970s) ‘modern physics’ – relativity and quantum mechanics. Before ending the thesis by reflecting on its political aspects, it’s worth a look at one distinguished physicist’s view of modern physics today, as a way of highlighting the literary attitudes to science at the time when all four poets were writing.

The physicist Steven Weinberg (b. 1933) in a 2013 essay in the *New York Review of Books*: ‘Physics: What We Do and Don’t Know’, surveys physics’s well known achievements, and then its spectacular non-achievement: a unified theory which incorporates gravity (general relativity) and quantum mechanics.¹⁰ For the last three decades the candidate unifier has been string theory; Weinberg comments, ‘String theory if true would not invalidate theories like the standard model or general relativity; they would just be demoted to “effective field theories,” approximations valid at the scales of distance and energy we have been able to explore’.¹¹ Weinberg continues: ‘Unfortunately, although we do not know the exact underlying equations of string theory, there are reasons to believe that whatever these equations are, they have a vast number of solutions’.¹² This leads to the concept of the multiverse – bubbles of universes formed at the so-called time of ‘inflation’ after the big bang. Our universe (in this scheme) is one of

⁹ Miroslav Holub, *The Jingle Bell Principle*, (Newcastle Upon Tyne: Bloodaxe, 1992); short quotes, e.g. Holý&Culík(2001); *Czech Collected Works*, see final paragraph of the Introduction to Chapter V.

¹⁰ Steven Weinberg, ‘Physics: What We Do and Don’t Know’ in the *New York Review of Books*, 7/11/2013; Weinberg(2013).

¹¹ Weinberg(2013).

¹² Weinberg(2013).

these bubbles, corresponding to one of the solutions to the putative string theory equations. ‘If this is true’ writes Weinberg, ‘then the hope of finding a rational explanation for the precise values of the quark masses and other constants of the standard model that we observe in our big bang is doomed, for their values would be an accident of the particular part of the multiverse in which we live’.¹³ Weinberg concludes:

Such crude anthropic explanations are not what we hoped for in physics, but they may have to content us. Physical science has historically progressed not only by finding precise explanations of natural phenomena, but also by discovering what sorts of things *can* be precisely explained. These may be fewer than we had thought.¹⁴

This near-fatalism in physics is quite recent – it may not of course persist, and would be robustly challenged by many physicists, including Lee Smolin in his 2013 *Time Reborn*.¹⁵ However, the back-projected effect of Weinberg’s speculation is to blunt, for example, MacDiarmid’s remark, ‘The ultimate triumph of mankind is already implicit in the revolution in physics’; the revolution in physics has not (at least yet) led to the grand unified theory of everything, or if it has, Weinberg is suggesting that such a theory would be without analytical power.¹⁶ It’s difficult to imagine Wright and McKinney being excited by ‘crude anthropic explanations’ as they sought to build an alternative intellectual worldview to the one which they saw as responsible for the war which had just ended with the nuclear bombing of Japan. Likewise, it’s difficult to imagine that Morgan, fascinated by the prospect of unbounded progress and exploration, would have been impressed by Weinberg’s suggestion that the aspects of the universe amenable to scientific explanation ‘may be fewer than we had thought’. The writing of these three

¹³ Weinberg(2013).

¹⁴ Weinberg(2013); italics original.

¹⁵ Smolin(2013).

¹⁶ *LP*, <9>.

poets, in this particular regard, now seems tightly bound to their time. The same considerations, however, do not apply to Holub: 'The root of the matter' seems to use quantum mechanics to explore the limits of knowledge.¹⁷ There is little trace of scientific triumphalism in Holub's work, (with the possible exception of 'Immanuel Kant'), rather the poet is mostly concerned with the responsible application of the knowledge which has been discovered.¹⁸ Thus the development of science in poetry through the four chapters presents a contrast between literary assimilation of science, and a more reflexive inside view of the subject.

All four poets discussed were sceptical of the political order in which they lived. An association between science and political scepticism persisted through the twentieth century (an early exemplar would be the life of J. B. S. Haldane), and is encapsulated in the title of Freeman Dyson's essay 'The Scientist as Rebel', quoted from in the Introduction.¹⁹ This association, I suggest, is key to the motivation of the four poets to consider integrating science in their work. At the time when all four poets were writing (generally speaking), science was starting to overcome moral distortions such as innate inequality and eugenics, and could more easily be seen as an ally of poetry. MacDiarmid, in part echoing Walt Whitman, welcomed the potential for science to liberate humanity. Wright discovered intellectual excitement in modern physics, and found that science was an ally in her conservation struggles. Morgan found that by embracing science and experimental poetry he could position his artistic persona as anti-establishment with respect to the traditional literary domain. Holub drew attention to the association between scientists and barbarians in Constantine Cavafy's 'Waiting for the Barbarians'; and

¹⁷ *CPMH*, 113-18.

¹⁸ *CPMH*, 201.

¹⁹ Dyson(1995).

perhaps Holub found science a place where scepticism and independent thought could be maintained.²⁰

Pushing harder, it could be argued that the materialism of science was the common factor which enabled all four poets to ground their political thinking. MacDiarmid wrestled with the alternative seductions of materialism, fatalism, and idealism in 'On a Raised Beach', and emerged with a poetic view, widespread in his late text, that these factors must be held together, almost as mutually corrective forces, lest one or the other gets out of control. The extent to which the poet achieved an integrated moderation in his life and work will continue to tantalise or divide his critics in strong measure. Wright found a different means to express the dialectic of materialism and idealism, though materialism transmutes in her work to the more open concept of realism. Wright's search for a poetry which combined a historically realistic view of the destruction of the Aboriginal people and their culture with an ethereal spirituality was hauntingly successful; indeed, the trinity of concepts, poetry, science, and politics introduced in Chapter II is arguably more neatly encapsulated in Wright's work than MacDiarmid's. There is little expression in Morgan's poetry or his life of political causes in the activist sense, though the emotional expression of political belief, for example a strongly felt Scottish nationalism, is widely present in his writing. His sympathy for the grounded poetry of Eastern Europe, as compared to what he saw as the idealist pessimism of T. S. Eliot, is clearly stated in the introduction to *Sovpoems*, and in various interviews.²¹ Elsewhere, Morgan's talent for misdirection seems at first sight to throw attention away from political concerns, or sometimes appears as unsophisticated

²⁰ Holub(1990), 122-46, Cavafy: 122-3.

²¹ Morgan(1996), 27-31; e.g., Whyte(1990), 66.

worldviews either from Olympian heights, or the routinely prosaic, as in ‘Memories of Earth’.²² One reading would be that the poet’s need for an intensely private and hidden life is related to the unevenness in his writing; however, elegant expressions of political thought, as in ‘The First Men on Mercury’, are still widespread in Morgan’s work.²³

Another example is poem 92 of *The New Divan*, which seems to be a disguised, but passionate, anti-war statement – Morgan’s famous ‘war poem’ might be better described as an anti-war poem.²⁴

Holub, like Morgan, was not politically active, though his relentless interrogation of power and ideology, both under communism and capitalism, make him arguably the outstanding political theorist of the four. In Holub’s poetry of everyday life the plight of the victims of oppression might occur anywhere, even under the microscope: ‘Here too are the dreaming landscapes / lunar, derelict. [...] And cells, fighters / who lay down their lives / for a song’.²⁵ Holub was not as free as the other three poets to develop an independent political analysis, but the sceptical materialism he so forcibly expressed drives further into political philosophy than MacDiarmid’s visceral socialism, Wright’s somewhat apolitical activism, or Morgan’s emotional politics. Holub does not deny that ideas are essential, but ideas must always be checked and tested as best they can for moral integrity and against the reality of the factual world, lest ideas become ideology. If ideas are let loose from facts, if their proponents do not even question the known outcomes of their ideas, let alone the potential consequences, a situation such as Western rulers face in 2015 with respect to the War in the Middle East, may develop: that is,

²² *CPEM*, 330-40.

²³ *CPEM*, 267-8.

²⁴ *CPEM*, 327.

²⁵ *CPEM*, 28.

fantasy visions of power and fact denial; warnings against such ideological distortion can be found, for example, in Holub's poems 'Suffering' and 'Skinning'.²⁶

The study of poetry and science, for all its troubled history, and for all it leaves out of almost any poet's wider canon, nevertheless has the ability to penetrate deeply, at least in the four case studies presented, into poetic art. Once it is accepted by the scientist that science in art is no longer material science, and cannot conform to the same rules, then it is possible to explore the emotions and beliefs, such as fear, mistrust, euphoria, and hope, which science itself provides no secure means to express. This study shows, and I suggest it is true more widely, the importance of including a political analysis with the study of poetry and science, because part of science's attraction to poets is surely its inescapably complex relationship with contemporary power: on the one hand innocent, and on the other central.

²⁶ *CPMH*, 105, 284.

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