AGAINST ORIGINALITY:
What is Lost without Discourse between Poetry and Philosophy of Science?

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Submitted in partial fulfillment for the degree of Doctor of Philosophy

School of English, Communication and Philosophy

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2020

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This work has not been submitted in substance for any other degree or award at this or any other university or place of learning, nor is being submitted concurrently in candidature for any degree or other award.

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Word count: 37,998

Summary

This thesis explores the interpretation of science through poetry and poetry through science, while drawing on insights from the social sciences and discourses that transcend disciplinary boundaries. The critical commentary serves as an introduction and a warning about the transdisciplinary work in the creative component of my dissertation. The creative component of my dissertation, titled, *Phenomenology of the Feral* puts forth an answer to the question: what is lost without discourse between poetry and philosophy of science?

This thesis will introduce the transdisciplinary theorists who have taken up residence in the gulf between the humanities and the natural sciences. I have coined two phrases: *Alice in Wonderland Philosophy* and *Through the Looking Glass Poetics* to describe which side of the divide between the humanities and natural sciences the intellectuals originally located themselves. *Alice in Wonderland Philosophy* is approaching the arts and humanities from training and qualifications in the natural sciences, and symmetrically *Through the Looking Glass Poetics* is approaching the natural sciences from training and qualifications in the arts and humanities. I give a science-based interpretation of J.H. Prynne's *The Plant Time Manifold Transcripts* through a close reading of the poem. This reading is characteristic of a radical approach to *Alice in Wonderland Philosophy*, an interpretation that relies on the reader understanding the scientific theory as opposed to the poetry in the text. Finally, I will locate my own creative writing in the gulf between the humanities and natural sciences. The literature naive approach is replaced with the science naive approach as an application of *Through the Looking Glass Poetics*. This interpretation explores my transdisciplinary work from the humanities side of the gulf through literary criticism by engaging with reviews of the published creative component.

Contents

Acknowledgements

I am indebted to Dr. Ailbhe Darcy and Dr. Richard Gwyn for their guidance on my research during a difficult time in my life. Their constancy made it possible for me to return to my dissertation again and again. Richard lured me back to thinking about philosophy, poetry and science with many cups of coffee; nothing was too tangential for us to consider. Ailbhe never tired of taking me out for ice-cream, sprinkles, and fishing for halibut. Any halibut left in this manuscript are my mistake alone. I do not regret that we did not accomplish any of our goals for this time, because we were terribly ambitious when we made them.

I would like to remember Dr. Paul Grobstein, the once and future white rabbit of my poetry. I am forever thankful to Ann Dixon and Serendip for providing a living archive of Paul Grobstein's life and work that was invaluable to my research.

I would like to thank Rhian Rattray for answering every last administrative question of mine, sometimes several times. It is important to note that Dr. James Miller insisted I begin a PhD, helped me formulate my research project, and then distracted me by co-authoring our collection of poems, *Strays*. I need to acknowledge that Nate Walker is probably the only person who knows exactly how many different ways I can misspell transdisciplinary…

I need to acknowledge Tami Randall who took care of the shadow rabbit and the tiger lily and never tired of sharing their stories with me.

I would like to thank my friends for their strange and endless support of me during this time. Dr. Wanda O'Connor gave me the benefit of her friendship, experience as a student two years ahead in the program, and stress-relieving cat photos. Christie Collins was my companion navigating the university. Idha Toft Valeur reminded me of work-life balance no matter how many times it made me angry! Maris Ogg helped me with many things outside of academia and your business. Meredith Martindale and Ryan Thut fed me and let me sleep in their living room before and after so many transatlantic flights. Gretchen Comcowich kept me company while I worked on my dissertation or babysat me, you decide.

Dr. David Spittle was tirelessly enthusiastic about my research; unfortunately, he was also as tirelessly enthusiastic about my side projects.

I would like to acknowledge Karen Ann Hoopes Cadwalader, Dr. Maryellen Nerz-Stormes, and Dr. Anne Dalke for helping me to locate the chickens, the nightmare, and the mackerel.

I would like to thank SJ Fowler for listening to me talk about Paul Grobstein and the white rabbit so often we were the silver and gold rabbits going down the rabbit hole.

My PhD journey would have been impossible without my husband, Andrew, who carried many heavy books back and forth across the Atlantic Ocean as my research needs demanded. The final revisions and formatting would not have been bearable without the company of Jade (herself a feral cat always).

A paper that does not have references is like a child without an escort walking in the night in a big city he does not know: isolated, lost, and anything may happen to it. On the contrary, attacking a paper heavy with footnotes means that the dissenter has to weaken each of the other papers, or will at least be threatened with having to do so, whereas attacking a naked paper means that the reader and the author are of the same weight: face to face. The difference at this point between technical and non-technical literature is not that one is about fact and the other about fiction, but that the latter gathers only a few resources at hand, and the former a lot of resources, even from far away in time and space.

Bruno Latour, *Science in Action: How to Follow Scientists and Engineers Through Society* (Cambridge, Massachusetts: Harvard University Press, 1988) p. 33.

INTRODUCTION: AGAINST POETRY

The fox knows many things, but the hedgehog knows one big thing.[1]

'The Hedgehog and the Fox' is an alternative telling of the Fox and the Cat fable, popularized by Aesop's Fables, in which the former knows many strategies for evading a pack of hounds, and the latter only knows one strategy. The fox must analyze the situation and determine which strategy is best to employ under the specific circumstances at hand, because he has so many possible courses of action available, while the hedgehog has no options to consider and swiftly acts. At the end of the fable, the still-contemplating fox is killed by the hounds and the hedgehog lives another day; resulting in the moral that it is better to know one thing very well than to know many things and to have to choose between them. Alternative interpretations of the moral are more extreme and state that it is useless to know many things, because it is impossible to think through all the contingencies, so 'Better one safe way than a hundred on which you cannot reckon.'[2] The implication is that the fox has less valuable knowledge than the hedgehog, that depth is preferable to breadth, and that disciplinary work is preferable to transdisciplinary work.

The fox and the hedgehog parable reads as a valuable allegory for the process of writing a doctoral dissertation, because it dramatizes the ways in which the structuring of knowledge is implicit in the vast majority of intellectual discourse, and quite explicit in the academy. The fox is an abnormal intellectual, and to extend the analogy, one who knows many discourses. My research explores the interpretation of science through poetry and

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[1] Berlin quoting Archilochus

Isaiah Berlin, *The Hedgehog and the Fox: An Essay on Tolstoy's View of History*, 2nd edn (Princeton, NJ: Princeton University Press, 2013), p. 1.

[2] Aesop, *The Fox and the Cat*, (2019) <https://www.bartleby.com/17/1/38.html> [accessed 5 December 2018].

poetry through science while drawing on insights from the social sciences and discourses that transcend disciplinary boundaries. Such a project requires a fox because it is dependent upon engaging with multiple discourses in the service of discussing my research question: what is lost without discourse between philosophy of science and poetry. The exploration of how contemporary scientific research can be incorporated into poetry and how poetry can be incorporated into scientific research requires an abnormal intellectual, because it is a transdisciplinary project. I will discuss how the abnormal intellectual differs from the normal intellectual in ways that are result in generative new directions for research. The Oxford English dictionary defines abnormal as 'deviating from what is normal or usual, typically in a way that is undesirable or worrying,' and that is just how the abnormal intellectual behaves. An abnormal approach to creative writing is not only possible but beneficial to all the humanities, social sciences, and natural sciences because it transcends disciplinary boundaries.

In the critical commentary, of this dissertation, I will defend the fox, the knower of many things, the transdisciplinary intellectual, and the abnormal academic, by showing that compelling intellectual questions exist that can only be discussed by foxes. My unusual academic credentials locate my knowledge in the humanities and natural sciences, which qualifies me to address the question: what is lost without discourse between philosophy of science and poetry. I hold a bachelor's degree in Biology and Chemistry from Bryn Mawr

College and a master of fine arts degree from Kingston University London.[3] My knowledge of biology and chemistry is deeper than that of some other transdisciplinary practitioners because I trained as a scientist and conducted supervised laboratory research into biochemistry and neurobiology. I have a broad knowledge of the natural sciences because I was assessed in my coursework at university as an aspiring scientist. The rigor of such a curriculum from an elite university and the knowledge it imparts cannot be readily duplicated through self-education.

As a result this breadth and depth of expertise in the natural sciences and poetry, I can engage in meaningful bidirectional exchange with both scientists and poets. I conceive of the audience for my work as being both poets and scientists, rather than either poets interested in science or scientists interested in poetry. In the critical commentary, which consists of this introduction and the three following chapters, I will move between disciplines in the humanities, social sciences, and natural sciences to develop a transdisciplinary approach to creative writing. Such a transdisciplinary approach is not only possible, but beneficial to the humanities, social sciences, and natural sciences by broadening the audience of field and increasing the impact of research.

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[3] AB Biology and Chemistry Bryn Mawr College 2010
thesis: Parsing Cancer Metaphors
supervisor: Paul Grobstein

MFA Kingston University London 2015
dissertation: Exhalation Halves Lambda
supervisor: Andrea Stuart

Against Hedgehogs

I will use this introduction to contextualize the contemporary intellectual work of foxes through Thomas Kuhn and Richard Rorty's philosophies; the fox is an abnormal intellectual. This will allow me to attend to the complicated relationship between originality and the transdisciplinary research created by the abnormal individual. Kuhn describes progress in the natural sciences as occurring in two stages, normal science which corresponds to the hedgehog and revolutionary science which corresponds to the fox.[4] Research traditions as paradigms are the one thing that the hedgehogs know; they have come to be emblematic of academic inquiry in the humanities and social sciences as well as the natural sciences. Paradigms are the summaries of observations that researchers use to derive meaningful research questions and predict new observations; every hypothesis comes from a paradigm. Hedgehogs succeed by promoting the value of choosing a methodology, applying it to a question, producing new data, and then publishing their research in prestigious academic journals dedicated to their disciplines, because their work fits neatly into the disciplinary paradigm. Kuhn writes that these researchers:

> Whose research is based on shared paradigms are committed to the same rules and standards for scientific practice. That commitment and the appearance of consensus it produces are requisites for normal scientific practice, i.e., for the genesis and continuation of a particular research tradition.[5]

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[4] My utilization of cute furry animals to illustrate philosophy of science arguments continues into the creative component of my dissertation and later my poetry.

[5] Thomas S. Kuhn, *The Structure of Scientific Revolutions*, 50th Anniversary Edition edn (Chicago, IL: University of Chicago Press, 2012), p. 11.

Students become professors and train a new generation to engage in normal scientific research that perpetuates the paradigm through intellectual history, indeed; this process explains the conservation of knowledge. The paradigm is not questioned under ordinary conditions; it is preserved, extended, and strengthened by scientists as the one thing that hedgehogs know.[6] When normal science comes to crisis through the accumulation of multiple empirical results that are irreconcilable with the paradigm, then a scientific revolution occurs. It is during this time, when scientists must adjudicate between competing paradigms and knowledge of many things is therefore essential to the advancement of the discourse, that foxes are essential to their fields of inquiry. Foxes specialize in choosing between multiple epistemologies; they are slower than hedgehogs, because they are taking time to think through the competing paradigms before choosing. The ways in which foxes engage with multiple potential paradigms constitutes a different practice than that of hedgehogs; revolutionary science constitutes a different practice and requires different methods from normal science. Both normal science and revolutionary science contribute to human progress; foxes and hedgehogs perform complementary roles in Kuhn's philosophy of science.

Rorty extends this complementary relationship beyond the history and philosophy of science towards all intellectual discourse, mirroring Kuhn's categories while allowing us to speak about critical theory and literature as well. I recast the hedgehog and the fox as normal and abnormal discourse; indeed, my discussion will utilize abnormal discourse to oscillate

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[6] Michael Polanyi, *Personal Knowledge: Towards a Post-Critical Philosophy*, Corrected edn (London: Routledge, 1962), p. 55-56.

between engaging with philosophy of science and poetry. Abnormal discourse is the research output of the abnormal intellectual, and as an abnormal intellectual, my dissertation will be abnormal discourse. I am a fox and Rorty's characterization of abnormal discourse allows me to reflect more fully on my own work as an abnormal intellectual. Rorty's abnormal discourse functions as an affirmation of the postmodern condition; it embraces the state of multiple narratives as multiple discourses. Abnormal discourse does not exist above or meta to normal discourse, it exists as one among many without hierarchy. It can operate between two normal discourses, between a normal discourse and another abnormal discourse, or between two other abnormal discourses. Abnormal discourse transgresses intellectual boundaries to create a dialogue: this combination of epistemology and methodology enables me to engage in meaningful discussion with practitioners in literary and scientific communities. I am using the term 'abnormal' to bring practitioners of these two discourses into dialogue in and around my writing.

The creative component of my dissertation, titled, *Phenomenology of the Feral* explores the question: what is lost without discourse between poetry and philosophy of science? My poetry and poetics aim to elucidate a solution to the problem C.P. Snow asked over a fifty years ago in his infamous *Two Cultures* thesis delivered as the first part of the 1959 Rede Lectures at the Senate House Cambridge. He writes: '[l]iterary intellectuals at one pole—at the other scientists, and as the most representative, the physical scientists. Between the two a gulf of mutual incomprehension—sometimes (particularly among the young) hostility and dislike, but most of all lack of understanding.'[7] It is this lack of understanding that my dissertation seeks to challenge with respect to philosophy of science,

[7] C. P. Snow, *The Two Cultures and a Second Look* (New York: Cambridge, 1964), p. 3.

the natural sciences, and poetry. My abnormal writing will demonstrate the potential for a poetry and poetics that engage in meaningful bidirectional exchange with multiple discourses. In its broadest definition, philosophy of science is meaningful bidirectional exchange between philosophers and scientists utilizing psychology, science studies and medicine (among other disciplines) to inform philosophy; and using philosophical analysis and theories to inform science. Philosophy of science, practiced as an abnormal discourse, would always be revolutionary science because it would always be comparing and contrasting paradigms and discourses; it would be the domain of foxes. The critical commentary aims to present a clarification of the multiple discourses utilized in the creative component; to contextualize the abnormal discourse relating to poetry for the normal poet and literary critic, and to make familiar what was foreign in the poetry. I characterize my own poetry as abnormal poetry; that is, the dialogue between abnormal discourse and poetry.

As an intellectual, I locate myself in the gulf that C.P. Snow characterized as separating the humanities from the natural sciences. My creative and critical work enter intro and emerge from the gulf in order to engage philosophers of science, poets, and scientists in a meaningful bidirectional exchange. By the phrase bidirectional exchange, I mean that poets and scientists can explore one another's disciplines through my creative work. To put it most simply, I see my work as a path through the gulf, one that becomes increasingly easy to traverse the more people that travel it. Like college students creating desire lines or cow paths on the college campuses in order to be able to move more directly from one building to another more easily, so I am one many treading a path through the gulf between the poetry and the natural sciences. I am extending the range of contemporary poetry and poetics towards science and extending the range of contemporary scientific research towards poetry

and poetics. My work is distinct from those poets who are writing about science for the purpose of interesting other poets in extinction, nature, and technology, because I am also writing for the scientists. My intended audience is broader; it transcends any one discipline as I am writing for both poets and scientists in my creative and critical work.

My defense of the fox as an intellectual is deeply indebted to Isaiah Berlin's essay, 'The Hedgehog and the Fox,' in which he characterized various influential novelists and playwrights as either foxes or hedgehogs. His thesis is that Count Lev Nikolaevich Tolstoy is a fox who wanted to transform himself into a hedgehog, and that this struggle makes sense of his religious beliefs and literary career. Berlin interprets the parable as a metaphor for poetics, he writes that:

> For there exists a great chasm between those, on one side, who relate everything to a single central vision, one system, less or more coherent or articulate, in terms of which they understand, think and feel – a single, universal, organizing principle in terms of which alone all that they are and say has significance – and, on the other side, those who pursue many ends, often unrelated and even contradictory, connected, if at all, only in some de facto way, for some psychological or physiological cause, related to no moral or aesthetic principle.[8]

Pursuing many ends or many answers to the question what is lost without discourse between philosophy of science and poetry is precisely what the creative component of my dissertation aims to accomplish by means of abnormal poetry. My intention is not to create an alternative

[8] Berlin, p. 2.

to poetry or experimental poetry, rather, to specifically locate my contribution to literature as that narrow space where abnormal discourse and experimental poetry overlap. I will utilize Rorty's abnormal discourse to characterize the practice of incorporating science and philosophy of science into poetry; specifically, my work will draw on biochemistry, developmental biology, and neurobiology. The abnormal poetry I will produce will indeed draw on psychological and physiological principles as well; I embrace these multiple elements of my poetics.

Against Foxes

The critical commentary will be divided into three chapters following the introduction, moving from my inspiration and intentions for the creative component, through close readings of two science poets, and concluding with an assessment of the success of my own science poetry by engaging with reviews of the poems. I have organized the critical commentary in accordance with Rorty's notion of how to achieve self-understanding through the creation of a narrative of how I arrived at the practice of abnormal writing. My critical commentary will move through my lived experience as well as study in my undergraduate and graduate degrees. Rorty writes: '[i]f we have a plausible narrative of how we became what we are, and why we use the words we do as we do, we have all we need in the way of self-understanding.'[9] Many of the words that I employ in my critical and creative writing originated in the natural sciences and philosophy of science; therefore, they represent the foreignness of scientific and philosophical terminology. The critical commentary serves as an introduction and a warning to the reader of what abnormal or foreign discourse is to come in the creative component of my dissertation. I have attempted to characterize my intellectual origins and intentions here in order to orientate the reader with respect to the trajectory of my dissertation. There is some entanglement between education and epistemology in which I question what I know and how I know it as well as how I can communicate what I know to others. Rorty defines this sort of complex reflective practice as edifying philosophy; when we engage with our knowledge in partial and metaphorical ways in order to make connections with the unfamiliar or unknown. He writes:

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[9] Richard Rorty, *Philosophy as Poetry (Page-Barbour Lectures)*, Kindle edn (Charlottesville, VA: University of Virginia Press, 2016), Kindle locations 868-869.

> Since "education" sounds a bit too flat, and *Bildung* a bit too foreign, I shall use "edification" to stand for this project of finding new, better, more interesting, more fruitful, ways of speaking. The attempt to edify (ourselves or others) may consist of the hermeneutic activity of making connections between our own culture and some exotic culture or historical period, or between our own discipline and another which seems to pursue incommensurable aims in an incommensurable vocabulary. But it may instead consist of "poetic" activity of thinking up such new aims, new words, or new disciplines, followed by, so to speak, the inverse of hermeneutics: the attempt to reinterpret our familiar surroundings in the unfamiliar terms of our new inventions… For edifying discourse is *supposed* to be abnormal, to take us out of our old selves by the power of strangeness, to aid us in becoming new beings.[10]

The creative and critical components of my dissertation are, indeed, edifying and abnormal; they are intended to make poetry and philosophy of science commensurable discourses. The structure I have deployed parallels my own intellectual development, because it was only after encountering Grobstein's applied neurobiology[11], and beginning to engage with the works of Barad, Kuhn, Rorty, that I began to write poetry. As part of the function of the creative writing doctoral dissertation is to allow the student researcher to reflect on their academic and professional development, it feels important to me to reproduce my unusual intellectual history here.

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[10] Richard Rorty, *Philosophy and the Mirror of Nature*, 30th anniversary edn (Princeton, NJ: Princeton University Press, 2017), p. 360.

[11] Applied neurobiology is synonymous with abnormal neurobiology in Grobstein's terminology and will be elucidated in the following chapter.

In his introduction to the University of Virginia Press' 2016 publication of Rorty's Page-Barbour Lectures, Michael Bérubé discusses the importance Rorty placed on continuing intellectual exchange. Rorty prioritized a shared progressive movement away from the origin of the argument and towards a point of view that was different and novel. He was more concerned with imagining how an adopting a particular argument might change the world, rather than proving his argument logically and beyond a shadow of a doubt. Berube characterizes this approach as a movement away from 'from explicit persuasion to implicit invitation.'[12] Rorty sought to move the line of philosophical argument away from the appearance-reality distinction by conducting a thought experiment into a future where the distinction does not matter, and inviting the audience and/or reader to investigate this other world. He employed thought experiments in which he had already won the argument in order to prove the merit of his argument through taking its implications seriously. Rather than telling the audience or reader why his philosophy is better than the alternative, Rorty illustrates the different world that his interpretation will yield. Berube writes of Rorty:

> [he] would have been satisfied, instead, with having persuaded some people, by argument and by example, that a fully secular world, in which people no longer trouble themselves about the distinction between appearance and reality, is a pleasant place to live. It is a modest goal—suitable, no doubt, to those who think modestly about things like human goals; but perhaps Rorty wanted above all, and with good reason, to teach us how to traffic in modesty.[13]

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[12] Rorty, *Philosophy and the Mirror of Nature*, p. 317-318.

[13] Rorty, *Philosophy and the Mirror of Nature*, p. 340-344.

The methods Rorty employs to persuade are complementary; he tells his audience or reader through explanation and argument why his view is better and he shows what sort of world would be made possible by taking his argument seriously. He invites the audience or reader to inhabit this future-alternate world with him and to experience the difference. In the creative and critical components of my dissertation, I will invite the reader to explore my work where there is discourse between experimental poetry and philosophy of science and many more supporting fields of inquiry. My dissertation aims to create the different world that results from dialogue between poetry and philosophy of science for the reader to experience.

Against Development

Dear reader, you are cordially invited to attend to the extraordinary life and death of the white rabbit with reference to Alice in Wonderland, Alba (the green fluorescent rabbit), philosopher of science Paul Grobstein. The white rabbit is being employed in the following chapter in the same way in which I employed the fox, as a cute furry mammal vehicle for a complex metaphorical discussion of abstract philosophical theories. I will follow the white rabbits down into C.P. Snow's gulf between the humanities and the natural sciences. I will introduce, in the order in which I came to their work, the transdisciplinary theorists who have taken up their residence in the gulf. I have coined two phrases: *Alice in Wonderland Philosophy* and *Through the Looking Glass Poetics* to describe which side of the divide between the humanities and natural sciences the intellectuals originally located themselves. *Alice in Wonderland Philosophy* is approaching the arts and humanities from training and qualifications in the natural sciences, and symmetrically *Through the Looking Glass Poetics* is approaching the natural sciences from training and qualifications in the arts and humanities. My reading of the philosophy of science of Karen Barad and Paul Grobstein demonstrates *Alice in Wonderland Philosophy* and illustrates two career trajectories that are similar to mine. I will then discuss *Tractography* by SJ Fowler and *A Dialogue on Love* by Eve Kosofsky Sedgwick as examples of *Through the Looking Glass Poetics* and significant influences on my work in content and form. With these white rabbits, I will show how collaborative poetry projects are an important approach to dialogue through a discussion of philosophy of science and the haibun form. I intend this chapter to present the reader with grounding in the development of my exploration of the gulf between the humanities and

natural sciences through transdisciplinary research and establish a framework for interpreting transdisciplinary texts in the following chapters.

In the second chapter, I invite the reader of J.H. Prynne's *The Plant Time Manifold Transcripts* to approach the text from the natural scientist's side of gulf. As Prynne invites scientists to read his poetry about science seriously, so do I invite the reader to engage with a science-based interpretation of *The Plant Time Manifold Transcripts* and my close reading of the poem. Approaching science poetry from the scientists' side of the divide is what I shall term the literature-naïve approach. The naïve approach is characterized by using the other discourse in a Prynne poem as the basis for interpretation, instead of utilizing literary theory, which would be the traditional approach. Let me be clear about the methodology here, I am conducting a close reading of a science poem that foregrounds the scientific discourse and backgrounds the literary criticism in my interpretation. This reading is characteristic of a radical approach to *Alice in Wonderland Philosophy*, an interpretation that relies on the reader understanding the scientific theory as opposed to the poetry in the text. This entrance of science into poetic discourse is only possible because of Prynne's rigorous utilization of scientific theory and terminology in the text. The *Plant Time Manifold Transcripts* are a partial translation of science into poetry; the remainder, the foreignness of the text is so great, that it is more readily interpretable for scientists than for poets. The discussion will then turn towards comparing and contrasting with the scientific and medical discourse usage in *A Dialogue on Love* by Eve Kosofsky Sedgwick, with attention to the potential of reclassifying *The Plant Time Manifold Transcripts* as a haibun instead of prose poem. This chapter illustrates an alternative strategy for engaging scientists with poetry; by introducing scientists

to poetry that reflects their own specific research interests, and thereby situating poetry within scientific discourse.

The final chapter of the critical commentary invites the reader to follow me out of a discussion of established science-poets and into a discussion of my own emerging work, *Phenomenology of the Feral*. Here, I will locate my own transdisciplinary work in the gulf between the humanities and natural sciences. I will use the converse of the methodology I employed in the previous chapter to analyze *The Plant Time Manifold Transcripts*, by replacing the literature naive with the science naive approach. This journey will consist of approaching my transdisciplinary work from the humanities side of the gulf through literary criticism. This theoretical approaching is characteristic of a radical approach to *Through the Looking Glass Poetics*, an interpretation that relies on the reader understanding the poetry as opposed to the science in the text. In this sense, my exegesis will guide the reader out of my transdisciplinary explanation of the work by drawing on engagements and reviews of my creative work. While I acknowledge that each individual review represents a limited, material, and subjective engagement with my work, I will argue that the discipline specific perspective they offer is essential to evaluating my abnormal discourse as poetry. This is an opportunity to assess the extent to which the poetry community was able to engage with my abnormal writing in order to interpret the research question: 'what is lost without discourse between experimental poetry and philosophy of science?' The point of the reviews is that they are written by poets, some more normal and some more abnormal, but still poets being published in the contemporary UK poetry scene. These poets interpreted my work along disciplinary lines; they attend to the ways in which *Phenomenology of the Feral* demonstrates poetic craft of writing and engagement with the literary tradition. This discussion will show

how the creative component of my dissertation can be interpreted as both transdisciplinary writing and poetry.

The final section of my thesis is the creative component: *Phenomenology of the Feral* which is identical with my first full length collection published by Knives Forks Spoons Press in 2017 and takes the same title.[14] The dominant poetic or transdisciplinary form of the poems is haibun ranging in length from one haiku with accompanying prose paragraph to multiple pages of haiku and prose combinations. The first section of the collection, *Zeroing Event,* was published by Zarf Poetry in 2016 as a pamphlet under the same name.[15] My collection is organized into four sections, with four animals and four foods as the concrete and known elements of the metaphor, and so each of the four sections of the creative component translates the biology into poetry by means of a partial and necessarily incomplete appeal to the senses, by metaphor. Zeroing Event refers most extensively to grief and the absence of the white rabbit. The remaining three sections appear in order as: Phenomenology of the Feral, Breathing Underwater, Summer of the Gummy Bears. Throughout each section the metaphors build on one another, becoming more complex and capable of conveying more abstract scientific theory. Each iteration of the metaphor, however partial, is also progressive, and this incomplete realization of either the food or animal metaphors is intentional; the pattern of reader expectation for how to relate to sections of the book is set and frustrated. The collection as a whole explores the connection between consumption and companionship between humans and animals in all its complexity. *Phenomenology of the Feral* challenges established categories between animal and food, animal and human, animal and art, and

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[14] Julia Rose Lewis, *Phenomenology of the Feral*, 1st edn (Newton-le-willows, England: Knives Forks and Spoons, 2017).

[15] Julia Rose Lewis, *Zeroing Event*, 1st edn (Glasgow, Scotland: Zarf Editions, 2016).

between art and science; the poems are constantly calling into question the reader's lived experience of the world.

CHAPTER 1: AGAINST MIRRORS

In this chapter, I will attend to the extraordinary life and death of the white rabbit, with reference to Lewis Carroll's *Alice in Wonderland*; Alba, a green fluorescent rabbit, who along with Eduardo Kac inspired a conversation about art and science; the work of philosopher of science Paul Grobstein; and the utilization of collaborative poetry projects as a way into dialogue between the humanities and natural sciences. The white rabbit appears in the creative component of the dissertation as the embodiment of my intentions for the poems themselves. The white rabbit in my poetry performs an analogous function to the fox in my introduction; it is a simple mammalian vehicle for a complex metaphorical discussion of abstract philosophical theories. I use this metaphor across the entire creative component of my dissertation, and therefore, it deserves close examination. As I will explain, the repeating appearance of the white rabbit throughout *Phenomenology of the Feral* is also how death haunts the haibun in my interpretation of the tradition.

I will present the theorists whose ideas contributed to the white rabbit in my poetry in the order in which I came to their arguments, to illuminate how their philosophies sequentially influenced the development of my creative and critical writing. This first chapter will contextualize my poetry within my intellectual origins: biology, chemistry, and philosophy of science, attending to Karen Barad's 'diffractive method' for approaching abnormal discourse from expertise in the sciences. I will then discuss the philosophy-biology of Paul Grobstein and his notion of the 'crack'. I have coined two phrases, 'Alice in Wonderland Philosophy' and 'Through the Looking Glass Poetics', to characterize what a potential bidirectional exchange between scientists and poets might look like. Alice in Wonderland Philosophy represents approaching the arts and humanities from training and qualifications in the natural sciences, and symmetrically Through the Looking Glass Poetics

indicates approaching the natural sciences from training and qualifications in the arts and humanities. I will discuss how transdisciplinarity is deployed in poetry through a discussion of transdisciplinary form and collaboration in *Tractography* by SJ Fowler and *A Dialogue on Love* by Eve Kosofsky Sedgwick. This line of argument is intended to illuminate the historical and intellectual origins of my creative and critical work, in order to provide a context for my developing diffractive craft and poetics.

At the heart of this chapter is the argument that what is significant about my dissertation is not its originality, but the progressive alterations it makes to existing transdisciplinary writing.[16] Here I am telling a story about the development of my thinking regarding biology, chemistry, philosophy, writing, and transdisciplinarity in order to argue that my creative and critical work originate in Alice in Wonderland Philosophy and the philosophy-biology of Paul Grobstein. For instance, I will discuss Grobstein's intellectual turning towards transdisciplinary projects and the methodology he developed in order to pursue those ends because I was trained in his methodology and continued to pursue it throughout my early career.[17] By substituting the word process for method, in the quote below, I justify my historical perspective through Rorty, himself an intellectual ancestor of

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[16] It is important to note that by originality, I mean the act of creating something from nothing, magic, or a work that is its own origin. I aim to elaborate the origins of my work in this chapter and to show how the differences between my work and its influences constitutes a sort of local originality. This limited originality foregrounds the connections I make between difference source texts as the site of novelty. Thus original refers to a component or part of my work rather than the whole; these two elements exist in a metaphoric relationship to one another. Or more negativity, my originality lies in my failure to imitate those intellectuals I admire.

[17] This turn from neurobiology towards interdisciplinary and transdisciplinary dates back to the publication of Grobstein's essay 'From the head to the heart: Some thoughts on similarities between brain function and morphogenesis, and on their significance for research methodology and biological theory. I describe Grobstein's interests as turning, because he died before retiring from academia and research, so it is impossible to say where his thoughts may have finally rested with respect to disciplines.

Paul Grobstein, 'From the head to the heart: Some thoughts on similarities between brain function and morphogenesis, and on their significance for research methodology and biological theory.' *EXPERIENTIA* 44, (1988), p. 960-971 <https://serendipstudio.org/complexity/hth.html> [accessed 1 December 2019].

Grobstein.[18] Rorty argues that '[w]e can learn about the processes that mediated between those ancestors and ourselves only by constructing a narrative, telling a story about how their social practices gradually mutated into ours.'[19] To reiterate this point about intellectual development in his words instead of Rorty's and illustrate the convergence of their views, Grobstein writes: '[t]he basic idea here is that because of how the brain is organized all the things we experience (including perceptions, understandings, and aspirations) are inevitably "stories", i.e. one of a variety of ways to make sense of the world and ourselves that are grounded in unexamined (and hence challengeable) presumptions of which we are unaware.'[20] Rorty and Grobstein argue that lived experience summarized and analyzed in stories is what grounds the ways in which humans interpret the world, where experience is part of the origins of our intellectual work. For Rorty, Grobstein, (and for me), originality is not an absolute; rather it is relational and dependent upon published work: writing is only

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[18] Grobstein perceived Rorty as an intellectual ancestor comparable to Plato or Dewey, rather than someone of an older generation. In 'Fellow Traveling with Richard Rorty,' Grobstein describes the significant influence Rorty's philosophy of science had on himself. He writes:

> There are lots of things in Rorty's story that resonate for me. Perhaps most generally, its a story of ... inquiry, of ongoing exploration of the world, of oneself, and of the relation between the two. And hence its a story of change, and of creation. Rorty continually challenged both himself and the worlds he found yourself in, and used that challenging to conceive both for himself and for others ways of being that might not have existed but for his explorations. Lives like Rorty's are to be celebrated, taken as a model to aspire to and to encourage for others ... and valued as the wherewithal for further exploration.

Paul Grobstein, 'Paths to Story Telling as Life: Fellow Traveling with Richard Rorty,' *Serendip* (2010) <https://serendipstudio.org/exchange/rorty> [accessed 5 December 2018].

[19] Richard Rorty, *Philosophy as Poetry (Page-Barbour Lectures)*, Kindle edn (Charlottesville, VA: University of Virginia Press, 2016), Kindle locations 812-814.

[20] Paul Grobstein, *Paths to Story Telling as Life: Fellow Traveling with Richard Rorty*

original with respect to the writing that has come before it.[21] In the following chapter, I will discuss in detail J. H. Prynne's notion of originality as exemplified through his citation practice in *The Plant Time Manifold Transcripts*. The remainder of this chapter will present the origins of my work with reference to applied neurobiology, philosophy of science, and poetry, because what is original about my work is the novel connections I make between practitioners of these discourses.

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[21] I also subscribe to feminist literary critics Sandra M. Gilbert, Susan Gubar, and Elaine Showalter in particular, argument that originality need not be a primary concern for authors working alongside or outside the Romantic tradition. Nor does the contemporary anxiety of influence need effect writers. They describe the anxiety of authorship as an anxiety of identity and representation in the literary canon as legitimating the lived experience of marginalized groups belongs in intersectional feminism. The aim of my critical commentary is to allay my own anxiety of authorship, pertaining to transdisciplinary texts, as much as to contextualize my creative work for the reader.

Sandra M. Gilbert and Susan Gubar, *The Madwoman in the Attic: The Woman Writer and the Nineteenth-Century Literary Imagination (Yale Nota Bene S)* Subsequent edn (New Haven, CT: Yale University Press, 2000).

Elaine Showalter, 'Fifteen years on,' *London Review of Books* 16.20 (1994) <https://www.lrb.co.uk/the-paper/v16/n20/elaine-showalter/fifteen-years-on> [accessed 10 December 2019].

Alice in Wonderland Philosophy

I model my approach to Paul Grobstein's philosophy-biology on Karen Barad's diffractive methodology and its application to Bohr's philosophy-physics, so it is with Barad and Bohr that I will begin my discussion. Barad offers a powerful model for pursuing science, philosophy of science, and a broader engagement within intellectual disciplines; it is through her methodology that I will develop a distinction between interdisciplinary and transdisciplinary work. Before I encountered Barad's work, I was a biology and chemistry double major at an elite liberal arts college in America, where I was required to take courses in the humanities and social sciences as well as courses in my chosen fields. At the time, I understood this liberal arts approach as helping me to become a balanced intellectual; I did not yet understand that other discourses might inform or even transform my thinking about biology and chemistry. Barad's career trajectory shows a similar path to mine, beginning in the natural sciences, transitioning into philosophy of science, coming to rest, restlessly, in a post-disciplinary position at the European Graduate School and the University of California Santa Cruz. She took her doctorate in theoretical particle physics and then expanded her research to include the philosophy-physics of Niels Bohr, epistemological, and ontological problems in philosophy of science. It is through her work on Bohr's interdisciplinarity that Barad has come to develop a transdisciplinary methodology for approaching philosophy-physics.

Bohr was concerned with the implications of quantum mechanics, specifically the Copenhagen Interpretation which he co-authored, for philosophical questions; his interest in developing a philosophy that was consistent with quantum mechanics is the basis of his

philosophy-physics. Bohr's own interest in philosophy emerged from his research in the natural sciences, from the successful development of quantum physics applications, not from a personal choice to turn from the sciences to the humanities. Barad began by studying the physics of Niels Bohr, then his entire body of thought, then extending and updating his theories in line with contemporary understandings. She describes her methodology for approaching philosophy-physics as arising out of the breadth and depth of her evolving discussion of Bohr, ranging across the natural sciences, social sciences, and the humanities.

In her monograph, *Meeting the Universe Halfway*, Barad is quite explicit about her intention to transcend disciplinary boundaries in order to explore the implications of Bohr's work for the present day. She writes:

> I draw on the insights of some of our best scientific and social theories, including quantum physics, science studies, the philosophy of physics, feminist theory, critical race theory, postcolonial theory, (post)-Marxist theory, and poststructuralist theory. Based on a 'diffractive' methodological approach, I read insights from these different areas of study through one another. My aim in developing such a diffractive methodology… is to provide a transdisciplinary approach that remains rigorously attentive to important details of specialized arguments within a given field, in an effort to foster constructive engagements across (and a reworking of) disciplinary boundaries.[22]

[22] Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham, NC: Duke University Press, 2007), p. 25.

Barad's transdisciplinary approach invites specialized arguments to cross disciplinary boundaries and to land wherever they may provide insight; her arguments transgress or transcend boundaries. Her framework is distinct from the more common interdisciplinary framework because it utilizes the coming together of any number of disciplines as opposed to only two.[23] I understand Barad's position to be that disciplinary and transdisciplinary work complement each other in the same way as Rorty's normal and abnormal discourse do. Indeed, her very willingness to engage with so many disciplines and to read them in a non-reductive way signifies her esteem for knowledge produced through disciplinary structures. She specifically states that she is interested in reworking disciplinary boundaries rather than destroying them. Barad's conception of transdisciplinarity as a discussion that transcends disciplinary boundaries to focus on a query is the one that I will be utilizing throughout this dissertation to refer to her work, my work, and any theorist whose work meets the above criteria.

As mentioned above, I model my approach to Paul Grobstein's philosophy-biology off of Barad's approach to Bohr's philosophy-physics; this dissertation is intended to function as an another example of transdisciplinary work. Paul Grobstein's career and published work both exemplify this transition from discipline-specific to transdisciplinary work; his intellectual development parallels that of Niels Bohr, which is why I will here discuss his career trajectory as well as his published work. Grobstein took his PhD in developmental neurobiology from Stanford University in 1973, and published scientific papers based on his research into developmental neurobiology at various elite research institutions in America.

[23] While it is tempting to simply rename this approach as post-disciplinary (literally: after disciplines), Barad herself would reject this. She is right to reject the notion that knowledge does not ever need disciplines and she is right to reject the notion that transdisciplinary work is somehow superior to disciplinary work.

The first published evidence of Grobstein turning towards a more reflective approach to his research came with his 1988 paper, 'From the head to the heart: some thoughts on similarities between brain function and morphogenesis, and on their significance for research methodology and biological theory.' This paper employs an extended simile to compare his research topic with his research methodology, marking a step towards meta-science, but also, by using figurative language (simile) approximating to the world of 'literary' studies, thereby breaking the mold of a discipline-specific 'scientific paper.' This paper is an example of Grobstein's philosophy-biology where he considers the implications of his research results for philosophy; he was interested in how emerging knowledge about the brain affected debates in epistemology. In the following decade, Grobstein pursued this interest in transcending the boundaries of developmental neurobiology into creating dialogues with academics working outside of biology and its allied fields. Between 2003 and 2007, he co-authored five transdisciplinary papers with Anne Dalke, where they discussed biology, literature, and reflected on transdisciplinary methodologies.[24] Grobstein also co-authored papers with Elizabeth McCormack, Douglas Blank, and Kimberly Cassidy, representing physics, computer science, and psychology respectively. In addition, he published an essay

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[24] Anne Dalke, Paul Grobstein, Elizabeth McCormack, 'Theorizing Interdisciplinarity: The Evolution of New Academic and Intellectual Communities,' *Serendip* <https://serendipstudio.org/local/scisoc/theorizing.html> [accessed 5 December 2018].

Anne Dalke, Paul Grobstein, Elizabeth McCormack, 'Why and How to be Interdisciplinary,' *Academe*, 92.3 (2006), <https://www.questia.com/read/1P3-1203611521/why-and-how-to-be-interdisciplinary> [accessed June 19 2020].

Anne Dalke, Paul Grobstein, Elizabeth McCormack, 'Exploring Interdisciplinarity: The Significance of Metaphoric and Metonymic Exchange,' *Journal of Research Practice* 2.2 (2006).

Anne Dalke, Kim Cassidy, Paul Grobstein, Doug Blank, 'Emergent Pedagogy: Learning to Enjoy the Uncontrollable-and Make it Productive,' *Journal of Educational Change* 8.2 (2007), p. 111-130.

Anne Dalke, Paul Grobstein, 'Three Dimensional Story-Telling: An Exploration of Teaching Reading, Writing, and Beyond,' *Journal of Teaching Writing* 23.1 (2007), p. 91-114.

responding to the philosophy of Michael Krausz.[25] He utilized these collaborations not only as ends in themselves, but as opportunities to practice and reflect on his transdisciplinary methodology.

In 2007, Grobstein published the article, "Interdisciplinarity, Transdisciplinarity, and Beyond: The Brain, Story Sharing, and Social Organization" in which he presented a bipartite model of human cognition and turned this model into the vehicle of a metaphor for criticizing social organizations and academic structures. His analogy is itself a transdisciplinary use of metaphor theory. Grobstein writes:

> It is reasonable to think of disciplines as analogous to the components of the society of mind that are most directly in contact with the outside world, the specialized entities that are indeed often in the best position to evaluate the products and needs of their own activities in terms of their own experiences.[26]

Here he is suggesting that intellectual disciplines perform a similar role to sensory processing in the brain and that interdisciplinary or transdisciplinary work performs a similar role to the neocortex analyzing such results and incorporating them into a larger narrative. This article illustrates his commitment to employing neurobiology research in novel contexts. Alice in Wonderland Philosophy is my colorful characterization of Grobstein's transdisciplinary approach to researching neurobiology, neuroscience, and philosophy of science through

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[25] Paul Grobstein, 'Getting It Less Wrong, the Brain's Way: Science, Pragmatism, Multiplism,' in *Interpretation and Its Objects: Studies in the Philosophy of Michael Krausz*, ed. by Andreea Deciu Ritivoi (Amsterdam: Rodopi, 2003).

[26] Paul Grobstein, 'Interdisciplinarity, Transdisciplinarity, and Beyond: The Brain, Story Sharing, and Social Organization,' *Journal of Research Practice* 3.2 (2007) <http://jrp.icaap.org/index.php/jrp/article/view/98/92> [accessed 5 December 2018].

dialogue with other disciplines. In the following paragraphs, I will elaborate on the research output of his Alice in Wonderland Philosophy through his applied neurobiology, the story of science as a story, and its implications for my own work.[27]

Transdisciplinary discussions can be unsettling because they call into question methodologies and theories that are often taken for granted as a part of a biologist's training; the scientist is asked to doubt themselves, their methodology and their teachers, so that their world becomes as foreign as Wonderland. Grobstein created a transdisciplinary intellectual environment at Bryn Mawr College that extended beyond the boundaries of the biology department. He applied his transdisciplinary work to his pedagogy; he taught his own Alice in Wonderland Philosophy by offering courses that approached the arts, humanities, and social sciences from the perspective of training in the natural sciences. He utilized collaboration with artists, social scientists, and humanities researchers through co-authoring and co-teaching, in order to learn from their expertise in their respective discourses. He was committed to drawing students from the natural sciences, social sciences, and humanities into engaging with biology. He continued to teach classes that were available for credit towards the major requirements for students in Education, English Literature, Philosophy, Computer Science as well as obviously Biology.[28] These courses performed a complementary function to more traditional laboratory-based Biology courses for students pursuing a major or minor in the field.

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[27] I describe Grobstein's career in great detail in order to give a specific example of the trajectory a transdisciplinary academic might take. Grobstein did not simply produce transdisciplinary research, he taught and mentored students in this mode.

[28] He actively pursued a diverse and inclusive classroom as part of his transdisciplinary pedagogy, placing freshmen in conversation with seniors and Biology majors in conversation with English majors. The result of his unusual course policies was that Biology majors were required to engage in conversation with nonscientists in weekly seminar; they were taught how to communicate science to nonscientists, and the humanities and social sciences students in turn were able to educate the Biologists on the larger implications of their field.

Grobstein continued his transdisciplinary conversations outside academia, transcending the intellectual and cultural boundaries as an extension of his belief that science should be accessible and relevant to all members of society.[29] He was equally interested in the results of scientific research as well as how they were communicated, understood, and absorbed into general knowledge. He and Dalke reflected that:

> Through writing (among other activities), we can learn to work with—perhaps even eventually to alter—formulations of knowledge that are both explicit and implicit to interrogate explanatory frameworks we usually rely on without awareness that we are doing so.[30]

The type of writing they are referring to could be literary, scientific or transdisciplinary; they are describing writing as a way of learning. This characterization of writing as a part of doing science foregrounds the inclusion of practitioners with diverse skill sets, and it backgrounds technical training as that which can be acquired if and when required by research.[31] Grobstein taught that in order to engage people with diverse skill sets in science, the ways in which one wrote about scientific problems must be attuned to the audience, with

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[29] To this end, he served as the director of Bryn Mawr College's Center for Science in Society from 2000-2007 and continued to participate in its events until his death. Grobstein oversaw the K-12 Summer Science Institutes with funding from Howard Hughes Medical Institute and the National Science Foundation. These short workshops for continuing development of primary and secondary school science teachers were a component of Bryn Mawr / Haverford K-16 Collaborations in Science and Mathematics Education.

'Summer Institutes for K-12 Teachers 1990-2012,' *Serendip* (2018) <https://serendipstudio.org/local/suminst/> [accessed 5 December 2018].

[30] Dalke and Grobstein, p. 91.

[31] He actively encouraged students to respond to public comments and inquiries on their coursework as part of that same coursework; his pedagogy emphasized the importance of communicating research to peer, senior academics, and members of the public.

careful deployment of terminology and the use of appealing metaphors to explicate abstract theory. This is the tradition in which my own creative and critical work originates; this is my academic and intellectual history as well as my future.

I will now turn to examining Grobstein's applied neurobiology and how its implications for the brain and human behavior have influenced my creative and critical writing through practice. Neurobiology is the field of science where the object of inquiry is also the theorizing subject; the brain that studies itself. Grobstein's applied neurobiology is the result of a biologist contextualizing his research not only in his field, but within the larger intellectual community; he is transcending his own disciplinary origins. He is extending the breadth of neurobiology by extending the breath of people contributing to the field. Grobstein argues that science:

> ought not to be defined by laboratories or white coats, nor by knowing certain things (or having a skill at memorizing), nor by compulsive information gathering, the use of mathematical tools, or logical rigor. It is instead nothing more (or less) than the dynamic combination of curiosity and skepticism that fuels virtually all productive inquiry, and is inherent in all humans from the time they are born.[32]

This characterization of science foregrounds the inclusion of practitioners with diverse skill sets and backgrounds technical training as that which can be acquired if and when required by research. Grobstein advocates for great breadth, not only in the people practicing science, but also regarding the questions that science concerns itself with, answering questions about

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[32] Paul Grobstein, 'Revisiting Science in Culture: Science as Story Telling and Story Revising,' *Journal of Research Practice*, 1.1 (2005) <jrp.icaap.org/index.php/jrp/article/view/9/18> [accessed 21 September 2018].

the lived experience of the investigators. This philosophy of science aims to utilize diversity and subjectivity in the investigator as a positive feature of its methodology.

Grobstein's applied neurobiology synthesizes philosophy of science, pedagogy, and neurobiology to utilize the diversity and individual creativity of the students as much as their different intellectual interests in his courses.[33] The conversation in seminar was an opportunity for Grobstein to add to his own story of neurobiology by observing and participating in a transdisciplinary conversation. His methodology aimed at getting the description of a particular phenomenon 'progressively less wrong' rather than correct.[34] This very diversity of interpretations in conversation facilitated a more nuanced understanding of epistemology and science. Students were able to experience the contingency of knowledge for themselves. Grobstein's engagement with Rorty's *Contingency, Irony, and Solidarity* is quite clear. Rorty says that he 'shall try to show how a recognition of that contingency leads to a recognition of the contingency of conscience, and how both recognitions lead to a picture of intellectual and moral progress as a history of increasingly useful metaphors rather than of increasing understanding of how things really are.'[35] Grobstein allowed his students to determine for themselves what metaphors about neurobiology were most useful for them to communicate with others. He designed his course assessments to further encourage his

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[33] Grobstein co-founded Serendip Studio with Ann Dixon in 1994, a website which made materials on biology, science education, philosophy of science, psychology, mental health, and beyond available to the public. He maintained a blog there responding to current events, newly published research, and his reflections on his research and teaching practice; he was a prolific writer and since his death in 2011, the site has become an archive of his work and exchanges with others.

Paul Grobstein, 'Paul Grobstein,' *Serendip* (2008) <https://serendipstudio.org/local/grobstein.html> [accessed 5 December 2018].

[34] Paul Grobstein, 'Getting It Progressively Less Wrong,' *Serendip* (2006) <https://serendipstudio.org/sci_cult/lesswrong/lesswrong/> [accessed 6 December 2019].

[35] Richard Rorty, *Contingency, Irony, and Solidarity* (Cambridge: Cambridge University Press, 1989), p. 9.

students to perform acts of bridge-building between theory and themselves to help them understand why they, and others, behave the way they do.[36] Grobstein employed metaphor as pedagogy; in his classroom, the student's lived experience constituted the known and neurobiology constituted the unknown. Rather than absorbing an objective account of neurobiology, students developed partial and personal accounts that were compared and contrasted in seminar. Grobstein taught his students to think of lived experience as an opportunity to make observations about behavior, and therefore to modify their summaries of observation as needed. He conceived of teaching science as changing minds, and because he was teaching students about the brain and the mind, he consistently turned their attention to why they were behaving in a particular way. Grobstein made the study of applied neurobiology pragmatic for students by requiring them to reflect on how the scientific theories they were studying impacted their own summaries of observations of their lives, through the carefully controlled experience of the seminar.

Grobstein's philosophy of science makes explicit the role of diversity and subjectivity in the scientific method by adding an additional component – the 'crack' – to the process of performing experiments. Grobstein's 'crack' argues against scientific objectivity and creates a positive role for the lived experience of the scientist in the process of research. His modification of traditional scientific method alters the terminology of each step as well as adding a fourth step: 'hypothesis' is replaced with summary of observations; 'experiment'

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[36] Serendip is an archive of course materials from the biology, chemistry, english, computer science, philosophy, psychology, and post-baccalaureate pre-medicine program at Bryn Mawr College. Not only are course syllabuses and reading assignments available, but online discussion boards about the reading material, and student projects for course credit. Indeed, my own undergraduate thesis for the double major in biology and chemistry was published on Serendip with the rest of my senior seminar cohort for work on the role of science in society.

Julia Rose Lewis, 'Parsing Cancer Metaphors,' *Serendip* (2010) <https://serendipstudio.org/exchange/jrlewis/parsing-cancer-metaphors-0> [accessed 5 December 2018].

with new observations, and 'conclusion' with implications. The implications are either that the summary still works or that the summary needs replacement, and in the latter event, the additional step comes into play. This change in terminology most significantly replaces the hypothesis with the summary of observations, meaning that scientific practice is no longer isolated by technical language; the starting point for the scientific process is accessible to all. Indeed, Toni Weller illustrates the appeal of this alternative scientific method in her essay, 'A Continuation of Paul Grobstein's Theory of Science as Story Telling and Story Revising: A Discussion of its Relevance to History,' where she discusses the implications of the crack.[37] The crack is defined as the researcher's cultural background, personal temperament, and individual creativity, all of which influence their creation of a new replacement summary of observations for the phenomena under examination. Weller writes:

> The concept of the crack, of subjectivity, of context affecting interpretation, whether in historical or scientific method, all support the idea that there is more than one story of human culture, none of which is constrained by disciplinary boundaries or scholarly communities, which seems to be the very point Grobstein is trying to make.[38]

This crack is Grobstein's way of incorporating culture into the natural sciences at the methodological level; culture in this story of science is always part of the practice of science. That diversity enriches culture in general and the culture of science in particular is

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[37] Toni Weller, 'A Continuation of Paul Grobstein's Theory of Science as Story Telling and Story Revising: A Discussion of its Relevance to History,' *Journal of Research Practice* 2.1 (2006) <jrp.icaap.org/index.php/jrp/article/view/21/41> [accessed 21 September 2018].

[38] Ibid.

Grobstein's argument. He writes: 'The greater the diversity embraced the more meaningful and less wrong the stories become, and the more effectively science can contribute to human culture, both by its products and as a cultural nexus.'[39] This methodology explicitly seeks to transcend the culture and nature binary in favor of scientific practice that can engage humanities, natural sciences, and social sciences at all levels; this is a transdisciplinary methodology that acknowledges the subjectivity present in all human inquiry.

Grobstein's crack opens up a space for humanities-based scholars and social scientists to interface with scientists; where scientists can utilize analysis from these disciplines in the creation of new summaries of observation. The crack locates the theories of artists, neurobiologists, neurologists, philosophers of mind, writers, psychologists, and psychiatrists inside the scientific method, specifically with respect to discussions of personal temperament and individual creativity. Grobstein utilized the crack as a transdisciplinary opening for exploring the applications of his neurobiology research into 'the nature of spatial representations, and the origins, organization, regulation, and significance of unpredictability in neuronal function and behavior.'[40] He particularly delighted in introducing students to the Harvard Law of Animal Behavior: under carefully controlled experimental circumstances, an animal will behave as it damned well pleases.[41] The Harvard Law of Animal Behavior addresses behavioral variability in animals utilized for scientific experiments and functions as a concrete starting point for considering experimental design, interpretation of results, limitations of animal-based experiments, and the implications of variability beyond the

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[39] Paul Grobstein, 'Revisiting Science in Culture: Science as Story Telling and Story Revising,' *Journal of Research Practice* 1.1 (2005) <http://jrp.icaap.org/index.php/jrp/article/view/9/18> [accessed 13 July 2018].

[40] Paul Grobstein, *Paul Grobstein*

[41] Paul Grobstein, 'Variability in Brain Function and Behavior,' *Serendip* <http://serendipstudio.org/playground/EncyHumBehav.html> [accessed 21 September 2018].

laboratory.[42] Grobstein found that the conclusions he reached from his traditional laboratory research functioned as new observations with implications for the currently accepted summaries of observations with respect to mental health, education, and pragmatism.[43]

[42] Alexander Maye, Chih-hao Hsieh, George Sugihara, Bjorn Brembs, 'Order in Spontaneous Behavior,' *PLoS One* 2.5 (2007) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1865389/> [accessed 21 September 2018].

[43] Paul Grobstein, *Paul Grobstein*

Through the Looking Glass Poetics

Adopting Paul Grobstein's philosophy of science has allowed me to participate more fully in both poetry and science, and consequently I intend to follow his 'story of science as a story' down the rabbit hole that is otherwise known as my doctoral dissertation. What I have gained from Grobstein's philosophy of science is the capacity to reflect on my lived experiences utilizing a fuller range of human knowledge, without fracturing these thoughts along disciplinary lines. His applied neurobiology was his lens for viewing the world and his pedagogy was oriented towards the impact as opposed to the content of the subject. He would reject the notion that philosophy of science is a humanist inquiry into a discipline of the natural sciences, instead arguing that philosophy of science is a part of science as much as it is a part of society, or a discourse within the humanities. In order to apply Grobstein's insights about transdisciplinary work to poetry, I have created a new term, Through the Looking Glass Poetics, in order to highlight the complementary or diffractive nature of my work.[44] Through the Looking Glass Poetics is my term for approaching the natural sciences from the starting point of the arts and humanities: it is the exact opposite of Alice in Wonderland Philosophy. The origin of the thinking and the direction in which thought traverses disciplinary boundaries provides valuable context. Grobstein's crack is the domain of experience of the poet, the summation of their lived experience, and therefore the reservoir for the vehicle of the metaphors they will employ in their poetry. This is not to suggest privileging a purely biographical interpretation of poetry; rather, I am suggesting a close attention to the disciplinary domains that may have engaged the poet under discussion. I bear

[44] While reflection reveals sameness, diffraction represents patterns across differences. Interdisciplinary work seeks to accurately reflect the research of two disciplines. Transdisciplinary work seeks out different ways of organizing research to answer new queries.

Grobstein's crack in mind as I turn now to a discussion of Kosofsky Sedgwick's *A Dialogue on Love* and SJ Fowler's *Tractography*, two manifestations of Through the Looking Glass Poetics, works by poets who approach the natural sciences from a background of training and qualifications in the arts and humanities.

My decision to focus my exploration of science poetry on the haibun form in this project originated with Eve Kosofsky Sedgwick's *A Dialogue on Love*, a book length haibun exploring the psychology, psychiatry, and neurology associated with grief, mental illness, and cancer treatment. While better known as a critical theorist and for her foundational contributions to the field of queer studies, Kosofsky Sedgwick's foray into creative writing deserves further critical attention. She uses the haibun form to offer an account of her recovery from breast cancer treatment and depression through psychoanalysis. The depressive episode that incites her to seek out therapy is itself an embodied phenomenon, deriving from the trauma of the cancer diagnosis and treatment; it amplifies the ways in which the body affects the brain. As we shall see in the following chapters, J.H. Prynne utilizes experimental haibun to meditate on evolution and existence and I utilize haibun to explore depression, grief, and death from cancer. I will parse the 'regaining health as a journey' metaphor in Kosofsky Sedgwick's work to illustrate how the haibun form is deployed in transdisciplinary work.

In *A Dialogue on Love,* Kosofsky Sedgwick draws on the work of American poets John Ashbery and James Merrill and the ways in which they have repurposed the haibun form. In 1984, Viking Press published Ashbery's *A Wave,* a book that takes queerness and

homosexuality as motifs and both haiku and haibun as its form.[45] In 1988, Knopf published James Merrill's collection *The Inner Room*, containing his 'Prose of Departure,' which takes illness and travel as its themes and haibun as its form.[46] It is important to note that both poets were writing about gay identity: homosexuality, AIDS, and death. These poems therefore redirect the thematic concerns of the Anglo-American haibun from natural landscape to psychological landscape. Ashbery and Merrill also redirect their poems towards a different audience than the traditional Japanese haibun; instead of instructing students in how to write poetry, they instruct men how to live with a gay identity, AIDS, and prepare themselves for death.[47] As with cancer, an AIDS diagnosis was originally a death sentence that was specific to gay men as the original name for the disease was gay-related immunodeficiency GRID, thus sex, sexual orientation, and life expectancy became entangled into one identity.[48] The psychological journey that one must undergo after receiving a life-threatening diagnosis, for oneself, or for a loved one, is precisely what I believe drew Ashbery and Merrill to the form;

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[45] Initially, I was struck with the irony of selecting a bipartite form to define and explore the term homosexuality, a word itself derived from sameness. John Vincent argues that the 'part prose-part haiku poem suggests that difficulty is a way of preserving the constructibility of his poems for homosexuals not yet born' in Ashbery's poetry. The irony that I noted is subsumed by the very act of the reader interpreting the haibun, and therefore, homosexuality.

John Vincent, 'Reports of Looting and Insane Buggery behind Altars: John Ashbery's Queer Poetics,' *Twentieth Century Literature* 44.2 (1998), p. 155-175 <www.jstor.org/stable/441869> [accessed 3 July 2020] p. 163.

[46] [Stephanie Burt] writes of Merrill that the theme of 'AIDS, whose growing casualty list animates *The Inner Room* (1988) and especially its key sequence, "Prose of Departure," a combined travelogue and elegy cast in the Japanese sequential form *haibun*.'

[Stephanie Burt], 'Becoming Literature:On James Merrill's poetry of autobiography and social comedy,' *Boston Review*, (2001) <http://bostonreview.net/archives/BR26.3/burt.html> [accessed 8 December 2018].

[47] With reference to Ashbery again, Vincent notes 'this [his poem's power to name] does not suggest that his poetry is *only* addressed to homosexuals, it does suggest that he particular designs for serving an audience of homosexuals; he wants to aid and abet a particular use of his poetry in the midst of other uses, trying to ensure that other critical and readerly appropriations do not interfere with his transmission of the "possibility of getting along without pain, for awhile" to future gay readers.'

John Vincent, p. 164.

[48] Matthew Platt and Manu Platt, 'From GRID to Gridlock: The Relationship Between Scientific Biomedical Breakthroughs and HIV/AIDS Policy in the US Congress,' *Journal of the International AIDS Society* 16.1 (2013) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3843110/#CIT0002> [accessed 5 December 2018].

it offered them the tradition of a poetry dedicated to introspection and travel.[49] Their utilization of the form to explore an interior journey through illness and death (instead of an external journey through a landscape) is extended by Kosofsky Sedgwick's intense focus on her psychological state in her own haibun.

The fact that Ashbery and Merrill established the English-language haibun as a poetic form for homosexuality and terminal illness suggests potential resonances for Kosofsky Sedgwick's decision to utilize the form as well. In sections of *A Dialogue on Love*, Kosofsky Sedgwick as narrator describes to her therapist the pain of losing close friends to AIDS; she characterizes the process of loss as the progression of disease. The cases of AIDS being described are occurring a decade or so after those immortalized by Ashbery and Merrill; the treatment of AIDS has advanced. From the time AIDS was first reported and recorded by the Food and Drug Administration in the USA in 1981 to the time of publication of *A Dialogue on Love* in 1999, a dramatic change in the medical care available and resulting quality of life of HIV and AIDS patients occurred. On March 19th 1987, the Food and Drug Administration approved the first drug, azidothymidine for the treatment of AIDS.[50] Kosofsky Sedgwick attended to the effect of the AIDS pandemic personally as well as to the work of earlier poets writing about AIDS. It is important to note the parallel construction at play, how the queer studies scholar utilizes the form made popular by queer poets to contextualize what was at the

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[49] Nikki Skillman characterizes *The Inner Room* as 'Merrill's geographical and ruminative excursions during a trip to Japan. As a friend at home suffers through the terminal stages of AIDS, Merrill guilty in his absence and devastated by his own recent HIV diagnosis.'

Nikki Skillman, *The Lyric in the Age of the Brain* (Cambridge, Massachusetts: Harvard University Press, 2016) p. 136.

[50] U.S. Food and Drug Administration, *HIV/AIDS Historical Time Line 1981-1990* (2018) <https://www.fda.gov/ForPatients/Illness/HIVAIDS/History/ucm151074.htm> [accessed 21 September 2018].

time a queer disease; these are the decisions of a poet bearing witness to the lived experience of a marginalized group.

The poetic or haiku component of *A Dialogue on Love* innovates and experiments within both the Japanese and English language traditions of the form. Sedgwick's haiku range from the Japanese tradition to sentences that are merely broken into three lines and everything in between.

> you're a hell of a
> lot better analyzed than
> we Kosofsky's were[51]

This poem is and is not a haiku; it has the correct syllable count, a reference to the passage of time, and evokes a certain emotional state; however, this poem lacks any appeal to the senses; there is no imagery at all.[52] Kosofsky Sedgwick justifies herself by referring back to

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[51] Eve Kosofsky Sedgwick, *A Dialogue on Love* (Boston, MA: Beacon Press, 2000), p. 29.

[52] In 1904, Japanese-American poet, Yone Noguchi implored English language poets to take up the hokku (precursor to haiku) as 'a slightly-open door, where you may steal into the realm of poesy.' He defined the form as consisting of seventeen syllables and being suggestive rather than explicit or overly descriptive. The short Imagist poems and haiku of Amy Lowell in *What's O'Clock* are an example of how the haiku form intersected the with Anglo American poetry movements. The content and structure of the form have only become more specific over time. A haiku consists of one or three lines of poetry with reference to nature and / or the passage of time. There is a turn between the second and third lines. The contemporary and popular version of the form contains strict syllables counts, no more than five syllables in the first and third lines and no more than seven syllables in the second line.

Yone Noguchi, 'A Proposal to American Poets,' *Reader* 3.3 (1904) <https://terebess.hu/english/haiku/noguchi.html> [accessed 24 November 2018] p. 248.

Amy Lowell, 'Amy Lowell,' *Poetry Foundation* <https://www.poetryfoundation.org/poets/amy-lowell> [accessed 24 November 2018].

Merrill's haiku; he writes that 'it feels like, his very sentences fraying.'[53] I have followed her lead in composing my own haibun in the creative component of my dissertation.

A Dialogue on Love opens up the boundaries of a traditional travel poem and indeed all poetic discourse. The poem above, read alone and in the light of the Japanese tradition doesn't work; read within the haibun, as a passionate outburst at the end of a difficult conversation, the brevity that the haiku demands does work. The enjambment of the lines evokes a sense of immediacy and formally reinforces the speaker of the poem's frustration.

> The cars, each of us,
> bubble of the same dark, strung
> in a dark necklace.[54]

This haiku contains a sharp turn between the second and third lines, where vibrant images move the focus from the inside of the cars to the outside of the road. This haiku unpacks a fragment of a sentence in the prose component of the haibun by providing more imagery to the reader. It is one of Kosofsky Sedgwick's more traditionally poetic haiku in the collection; and therefore, this contrast to the clinical portrayal of the same information is all the more dramatic in this chapter. By writing about the same content in two forms, two discourses, Kosofsky Sedgwick is presenting the reader with a bilingual translation of poetry into medicine and medicine into poetry. The focus on a single form and topic throughout the collection means that the collection trades surprise for thoroughness. The development of the

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[53] Kosofsky Sedgwick, p. 193-4.

[54] Ibid, p. 207.

therapeutic relationship is halting and frustrating for the patient as well as the reader; the reader as much as the therapist is struggling to analyze the patient and help her out of depression. Sedgwick's collection itself marks the successful ending to her therapeutic journey. She has recovered from her depression, overcome her writer's block, and found a way to engage in meaningful dialogue with another person, her therapist.

A Dialogue on Love not only addresses the implications of the AIDS pandemic, but also seeks to contextualize it within the lived experience of the author herself recovering from breast cancer treatment and an episode of major depression. This proximity of mental and physical illness in Kosofsky Sedgwick's life show the ways in which the mental and physical are entangled and mutually influence one another. This awareness that the body influences the mind and the mind influences the body in health and illness is part of Lakoff and Johnson's embodied philosophy: 'There is no … fully autonomous faculty of reason separate from and independent of bodily capacities such as perception and movement. The evidence supports, instead, an evolutionary view, in which reason uses and grows out of such bodily capacities.'[55] The ways in which *A Dialogue on Love* dramatizes the relationship between mental reasoning and bodily capacities is complementary to cognitive science. Kosofsky Sedgwick models the therapeutic process for the reader through the content and form of her haibun; by means of poetic craft she illustrates the act of internalizing her psychoanalyst's observations. She even goes so far as to document through her therapist's notes the effect of writing *A Dialogue on Love* is making her, 'EUPHORIC/ UNCENTERED.'[56] She utilizes her therapist's notes from sessions as found poems that are

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[55] George Lakoff and Mark Johnson, *Philosophy in the Flesh: The Embodied Mind and its Challenge to Western Thought* (New York, NY: Basic Books, 1999), p. 17.

[56] Kosofsky Sedgwick, p. 195.

integrated into the prose sections of her haibun; she literally incorporates his words into her own. She writes:

> but to think of death
>
> brought me a sense of safety.
>
> rest. Of being held.[57]

> 'TALKING ABOUT HER WISH TO DIE OR NO LONGER BE, OCCASIONED BY HER FINDING A LUMP ON HER NECK WHICH IMMEDIATELY HAS HER THINKING ABOUT CANCER. SHE TOLD ONLY HUSBAND AND ONE FRIEND. WHAT SHE DOES NOT TELL IS HER EXCITEMENT AT THE POSSIBILITY OF CANCER AND DYING, WHICH SHE NURSES AND WHICH HAS NUMEROUS FACETS—GUILT OVER A "WICKED" THOUGHT, SOME RELIEF, SOME ANXIETY, ETC. WHAT STRIKES ME IS THE PASSIVITY AND THE SENSE OF BEING RESCUED BY DEATH. SHE RESONATES TO THE RESCUE—BEING SWEPT OFF BY DEATH LIKE BEING TAKEN OFF BY SOMEONE ON A WHITE HORSE. MENTIONS ASSOCIATIONS WITH LAWRENCE OF ARABIA, *AT THE BACK OF THE NORTH WIND*—IMAGE IS ONE OF LOSS OF BOUNDARIES AND A MERGING WITH SILENT FIGURE NOW MALE BUT MAYBE NOT ALWAYS. IT IS IN CONTRAST TO THE IMAGE OF HAVING TO ESTABLISH HER SELF IN INTERACTION W/AN OTHER. THESE BOTH ARE DISTINCT FROM THE IMAGE OF A WARM,

[57] Kosofsky Sedgwick, p. 16.

LOVING, CARING RELATIONSHIP W/FRIENDS—WHICH HOWEVER STILL SEEMS A MATURE EVOLUTION OF THE RESCUE FANTASIES.[58]

Here the haiku is Kosofsky Sedgwick's voice and her therapist's response is presented all in capital letters, which creates a gross imbalance between her words and his on the page; her poem is tiny and his is enormous. Superficially, this presentation reinforces the power of the straight white male doctor over the patient; however there is more to this typographical decision than meets the eye.[59] Kosofsky Sedgwick is alluding to James Merrill's poem 'The Changing Light at Sandover' in which the voice of the Ouija board is presented in capital letters; the voice of the therapist, like the capital letters, are other to the primary narrator. There is a second darker potential interpretation: that the narrator views the voice of therapist as the Ouija board, the voice of the dead; this extremely morbid perception can be attributed to the narrator's major depression at the time. She has created a difference between the author and the narrator that is rare in autobiography, because her narrator speaks and responds to her psychoanalyst, while her author edits her psychoanalyst's speech within the haibun. This act of implicitly editing the voice of the other with their permission is evidence of the intense trust, itself evidence of the therapeutic bond that Kosofsky Sedgwick portrays in the haibun. This collaborative authorship of haibun returns to traditions of the Japanese

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[58] Kosofsky Sedgwick, p.17.

[59] In the front matter to *A Dialogue on Love*, Kofosky Sedgwick explicitly references Merrill's poetry and she mentions again her reading the poems and discussing them within the text. She provides the following two citations for Merrill's work and none others.

form, in which students would learn from writing alternating sections with a master poet.[60] Indeed, Kosofsky Sedgwick has extended the ideal of autobiography beyond the author as narrator, to include the psychoanalyst as narrator, and placed them in a meaningful bidirectional exchange. *A Dialogue on Love* was mis-genred by the publisher Beacon Hill press, who identify the text memoir and psychology; however, its collaborative construction and form complicate any genre assignment.[61] Her interpretation of the haibun form shows a rare sophistication capable of operating at multiple levels of poetic craft and critical engagement.[62]

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[60] 'Haibun' in *The Princeton Encyclopedia of Poetry and Poetics*, ed. by Roland Greene, Stephen Cushman, Clare Cavanagh, Jahan Ramazani, Paul F. Rouzer (Princeton, NJ: Princeton University Press, 1965), p. 756-757.

[61] Elizabeth Stevens attempts to tease out the distinction between autobiography, memoir, poetry, and psychology as potential classifications for *A Dialogue on Love*. She writes:

> The dialogue, and the love, between Sedgwick and Shannon similarly take place in the space(s) between them, where their voices are able to speak to and be heard by one another. The first-person status of the narrator, so central to traditional autobiography, is here textually dispersed, with Sedgwick's account augmented both by Shannon's notes and the *haibun*… In this way, *A Dialogue on Love* is not the record of Sedgwick's therapy sessions so much as 'the writing of Shannon and me' (203); it is about intimacy, not identity, affective dynamics rather than the therapeutic narrative.

While I agree with Stevens characterization of the text as a memoir of intimacy as opposed to identity, I disagree with her assertion that the haibun constitute a part and not the whole of the text.

Elizabeth Stephens, 'Queer Memoir: Public Confession and/as Sexual Practice in Eve Kosofsky Sedgwick's A Dialogue on Love,' *Australian Humanities Review* 48 (2010) <http://australianhumanitiesreview.org/2010/05/01/queer-memoir-public-confession-andas-sexual-practice-in-eve-kosofsky-sedgwicks-a-dialogue-on-love/> [accessed 22 November 2018].

[62] Kosofsky Sedgwick examines herself so rigorously in *A Dialogue on Love* that the drafting of the book itself comes under scrutiny by herself and her therapist. The reader experiences references to the crafting of the book within the text as a looping backwards in time. This movement backwards and forwards in time through self-reference mimics the therapy process. References to the drafting of the book can be found on the following pages: 193-6, 198-201, 203, 205-9, 212-4, and 216.

Parsing Cancer Metaphors [63]

Kosofsky Sedgwick writes with a delicate balance of creative and critical approaches to illness and mortality; she illuminates the myriad entanglements between writing and illness with respect to the personal and professional. She is the most explicitly self-reflective practitioner of the Anglo-American haibun tradition, using her own therapy encounters as a source material, and utilizing her therapist's notes to refract her own narrative. *A Dialogue on Love* focuses on the mental anguish of a woman experiencing depression and the after-effects of breast cancer treatment. Otherwise Kosofsky Sedgwick has written about affect and feeling in other books: her first poetry collection *Fat Art, Thin Art* (Duke University Press 1994), coedited with Adam Frank *Shame & Its Sisters: A Silvan Tomkins Reader* (Duke University Press 1995), *Touching Feeling: Affect, Pedagogy, Performativity* (Series Q) (Duke University Press 2003). With her characteristic critical elegance, Kosofsky Sedgwick acknowledges the psychological and literary effect that bearing witness to the suffering and death has caused her psychological state. She notes, in particular, the effects of rereading and editing Gary Fisher's papers for publication as *Gary in Your Pocket: Stories and Notebooks of Gary Fisher* (Duke University Press 1996, coedited with Gary Fisher). She bears witness to the lesser feelings that are evoked by engaging with Fisher's work and the questions that they raise for her. She explains that:

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[63] Julia Rose Lewis, 'Parsing Cancer Metaphors' *Serendip* <https://serendipstudio.org/exchange/jrlewis/parsing-cancer-metaphors-0> [accessed 12 October 2018].

> A few hours with some of Gary's papers, which I'll be editing for publication: two-hundred-proof taste of what the coming months hold as I plunge into the vat of his unmakings. Including, intensely: abyssal, glazed over boredom.
>
> Not because his writing fails to astonish.
>
> This kind of boredom doesn't mean no cathexis: this kind, to me, means overstimulation, stimulation of wrong or dangerous kinds; hell; rape; dissolution. The kind of boring that's a penetration.[64]

The monstrous boredom which Kosofsky Sedgwick describes is partially a result of the magnifying effect of her psychotherapy and partially a result of the repetition of death and suffering during the height of the AIDS epidemic. In the former case, the multi-authored approach creates a funhouse mirror effect for the reader, some elements of the image of her psyche are made too large, brought too close to examine, while others are shrunk to the point of insignificance. In the latter, it is the familiarity with the progression of AIDS; the topography of symptoms, medications, side-effects and this repetition throughout multiple bodies, always with the predictable ending that is unbearably boring. This is a journey on which Kosofsky Sedgwick has accompanied many friends and fellow intellectuals; the terrain is familiar to her and so lacks the capacity to shock her; she is bored and tortured by the weight of the predictable. While the narrator reports feeling a combination of boredom and the sublime, the reader is experiencing the dramatic irony of knowing that the narrator will ultimately overcome her inaction because the book in question was published six years before *A Dialogue on Love*. Her processing these ugly feelings through therapy is the central conflict, the terrain that her haibun must travel through her creative-critical text. Kosofsky

[64] Kosofsky Sedgwick, p. 161.

Sedgwick's reporting on these ugly feelings also presents her reader with a map for exploring their own response to her anguish in the text, whether triggered by her breast cancer treatment or depressive episode. Here I explore my own ugly feelings in response to *A Dialogue on Love* and how it has influenced my own haibun.

My own response to *A Dialogue on Love* is quite conflicted; I am filled with awe at the double hybridization of the creative-critical and poetry prose work, and I am filled with that same mixture of boredom and the sublime as Kosofsky Sedgwick. Indeed it is again the repetition that is to blame for my sense of boredom; the psychological location after curative treatment for early stage breast cancer and before recurrence, palliation, and death is a familiar psychological state. Revisiting and writing on Kosofsky Sedgwick's response to her breast cancer treatment itself brings an ironic distance to my discussion. When reading her husband H. A. Sedgwick's account of her cancer journey on her website, there is less a sense of the overwhelming power of cancer and more a sense of repetition.[65] I would like to distinguish here between the revisiting of trauma and the more benign experience of deja vu; I feel as though this narrative is familiar to me, as though I have traveled through this land before, if with another companion woman.[66] The landmarks of the early stage breast cancer journey for a middle class American woman are as familiar to me as the houses on the corner of the street where I grew up; they are known and surprisingly comforting. Let me be clear: the familiarity of the land through which the narrative passes results in a mixture of boredom and reassurance; there is nothing new to see here. There is, however, a pleasure to recognizing a familiar landmark, to seeing it through the eyes of another, how different facets

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[65] H.A. Sedgwick, *Eve's Cancer* <http://evekosofskysedgwick.net/biography/cancer2.html> [accessed 5 December 2018].

[66] Susan Sontag, *Illness as Metaphor* (New York City, NY: Farrar, Straus and Giroux, 1978).

of the landscape emerge from the narrative. I recognize the names of the chemotherapy medications Kosofsky Sedgwick was treated with, Cyclophosphamide, Adriamycin, and Fluorouracil; I do not learn that Cyclophosphamide is derived from nitrogen mustard, nor that Adriamycin failed as an antibiotic because of the extensive heart damage it causes, and I already know how to pronounce Fluorouracil.[67] I have witnessed my housemate applying Fluorouracil cream to melanomas on his head and my mother taking the second generation, Capecitabine, pill form for advanced breast cancer. I have witnessed my mother receive Cyclophosphamide and Adriamycin for locally advanced breast cancer, and like Kosofsky Sedgwick, become cancer free for a time, before a recurrence and dying from the disease. I have witnessed, in the course of writing and revising this chapter, a dear friend receive Cyclophosphamide and Adriamycin for her locally advanced breast cancer. Cancer and other fatal diseases such as AIDS, haunt those who bear witness in person and in writing through their familiarity, through the sense of making the same journey again; it is the again that is the problem, the repetition breeds boredom. This boredom bred of intimacy ultimately creates an ironic distance between the very source of intimacy and the narration of that intimate relationship.[68]

In her 2007 monograph *Ugly Feelings,* Sianne Ngai contextualizes the experience of the difference between ugly feelings, such as boredom, and beautiful feelings in the reader's responses to literature. She writes: 'there is a sense in which ugly feelings can be described as conducive to producing ironic distance in a way that the grander and more prestigious

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[67] H.A. Sedgwick

[68] I am currently working on a manuscript of haibun aimed at extending Kosofsky Sedgwick's discussion of this boredom and grief. *Suburbiton* will explore the relationship between the dominant medial narrative for early stage breast cancer cures and the personal loss that results from recurrence.

passions, or even the moral emotions associated with sentimental literature, do not.'[69] Ngai raises the questions: to what extent does bearing witness fail to evoke grandeur, to what extent does it evoke ugly rather than moral emotions?[70] How can the feelings associated with bearing witness to the suffering of others be unpacked? If I take Ngai's thesis that ugly feelings lead to ironic distance, what does that imply about the use of irony in the creative component of my dissertation? I will discuss how I attempted to navigate my own ugly feelings and ironic distance in the creative component of my dissertation in the following section.

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[69] Sianne Ngai, *Ugly Feelings* (Cambridge, MA: Harvard University Press, 2005), p. 10.

[70] Elizabeth Bradford's haibun evoke the grandeur of Antarctica and simultaneously the failure of grand feelings in humanity's response to climate change and the potential destruction of such a place. In her collection, Towards Antarctica, is a record of what is being lost and an interpretation of how this loss is perceived. She writes:

> the primary objective is to experience a wild place through on-site explorations facilitated by a team of experts in various fields—botany, geology, history, ornithology, marine biology, and the like… Traveling with others for weeks at a time aboard a ship, working as part of a team to help connect people to ecological and cultural subtleties of a place, feeds me profoundly as a poet and a citizen of the world.

Bradfield is concerned with different kind of bearing witness than Kosofsky Sedgwick; although, both women offer an intense exploration of loss as experienced by a community.

Elizabeth Bradfield, 'The KR Conversations: Elizabeth Bradfield,' *Kenyon Review* <https://kenyonreview.org/conversation/elizabeth-bradfield/> [accessed 1 June 2020].

Elizabeth Bradfield, *Toward Antarctica* (Pasadena, CA: Boreal Books, 2019).

Against the Fluorescent Rabbit

The creative component of my dissertation employs the haibun form, because the queer Anglo-American tradition of these poems incorporates psychology, medicine, and mortality; it is already transdisciplinary. Broadening the scope of content the haibun addresses to include biology and Grobstein's philosophy-biology does not alter the transdisciplinary tradition of the form. Rather, the challenge of utilizing the haibun form for me lay in how to address my own ugly feelings and the ironic distance they generated with respect to Grobstein's death from lung cancer in the summer of 2011. I chose to foreground the distance and background the irony in my grief; therefore, Grobstein appears in the poems as himself or the white rabbit, both already dead. The repeated presence of the white rabbit throughout the *Phenomenology of the Feral* is how death haunts the haibun in my interpretation of the tradition. The appearance of the white rabbit makes death present, the overdetermined nature of the white rabbit with respect to Alice in Wonderland, Alba, and Grobstein is necessary to represent the repeated nature of death. Ngai coins the term stuplimity in order to combine the experience of the sublime and the finite. She writes: 'Stuplimity reveals the limits of our ability to comprehend a vastly extended form as a totality, as does Kant's mathematical sublime, yet not through an encounter with the infinite but with finite bits and scraps of material in repetition.'[71] She conceives of stuplimity as the finite which approaches the infinite through mind-numbing repetition of simple elements of the material world there is no possibility of transcending. Cancer as the cause of death is only indirectly present through the absence of the living white rabbit; cancer is the disease which transformed the material animal irreversibly. This highly constrained state of

[71] Ngai, p. 271.

repeating, of the absence of change or surprise – in other words of extreme boredom – is a fundamental part of grief; the person who has died has disappeared from the material world; their absence is repeated every day that follows.

Eduardo Kac's creation of the green fluorescent rabbit, Alba, is an example of stuplimity based on the creation of a novel presence in the world, and how we as a society will live with this creature.[72] The 'GFP Bunny', as Kac titled the project, is an example of stuplimity employed in a transdisciplinary context; the conversation between artists, ethicists, and scientists about transgenic animals.[73] The performance consisted of portraying the sublime and boring through every interaction between Alba and a human being outside a laboratory: the intention was to explore how a laboratory created organism could exist in greater society.[74] Alba's life, minute by minute, was the subject of the piece of art; by repeating the limited number of ways a human can engage with a pet rabbit. The purpose of the iterative documentation of Alba was to illustrate precisely how similar to a normal rabbit she is: the vast majority of ways to engage with Alba are identical to those of engaging with a normal rabbit. Kac was relying on the normalcy of Alba and associated lack of surprise she would evoke in the audience to be the surprising component of his artwork. Kac intended to

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[72]Alba is a chimera, a precious creature who embodies art and science in conversation; she contains genes from two different species, rabbits and jellyfish. Technically, she is a transgenic organism, because scientists modified her genome to include enhanced green fluorescent protein (EGFP). She was created in a laboratory using advanced scientific techniques; no animal with a similar genome exists in nature.

[73] Kac was attempting to make an artificial life form into a work of art by reflecting the experience of living with her through to a larger audience. He wanted to invert the illusion that Alba is an alien creature by letting the audience see her as normal. Kac's GFP Bunny project is a novel interpretation of Susanne Langer's notion of how an artist ought to create. She writes that the artist ought to 'produce and sustain the essential illusion, set it off clearly from the surrounding world of actuality, and articulate its form to the point where it coincides unmistakably with forms of feeling and living, is the artist's task.' It is this point where the illusion coincides with the human self that Kac is interested in exploring with Alba.

[74] Susanne K. Langer, *Feeling and Form: A theory of art developed from Philosophy in a New Key* 9th edn (New York City: New York, Scribeners, 1977), p. 68.

portray the boredom and tenderness inherent in the experience of having a pet rabbit, he intended document the stupidity inherent in the repetition.

Let me reiterate that Alba's cuteness is significant, because her very lack of power means that she is simple, helpless, and harmless. That Alba is a genetically modified organism is not immediately obvious; she appears to be an ordinary rabbit. She appeals to humanity as a diminutive prey animal; soft and furry and in need of protection. She is neither monstrous nor dangerous as many of the more fanciful representations of genetically modified organisms are, in fact, her specific modification is invisible without special equipment; therefore, she can pass as an ordinary rabbit.[75] Ngai argues that cuteness is a dynamic and complex power struggle between those who are cute and those who must protect the helpless. She writes:

> Our experience of the cute involves an intimate address that often fails to establish the other as truly other, as if due to the excessive pressure of the subject's desire for intimacy or to force of the aesthetic's mimetic compulsion. Failure like this might seem endemic to an aesthetic of powerlessness. Yet it is the very aestheticization of powerlessness that in the experience of cute that seems to give rise to a fantasy about the cute.[76]

This desire of different members of society to protect Alba created the controversy surrounding the 'GFP Bunny' project; artists, ethicists, and scientists all clamored to protect

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[75] Gareth Cook, *Cross Hare: Hop and Glow* (2000) <http://ekac.org/bostong.html> [accessed 5 December 2018].

[76] Ngai, p. 98.

Alba from the world outside the laboratory and the world outside from her. This controversy is the direct result of the failure by scientists to communicate an abstract theory of their research to a general audience, and Kac sought to remedy this deficiency.

Kac sought to remedy this lack of communication, and he succeeded too well; animal rights activists protested his use of Alba as an object in his artwork. Scientists and environmental rights activists were equally concerned about the effect of releasing a transgenic organism from a laboratory and into general society, specifically what might happen if she were to escape into the wild. There was a significant controversy for the French scientists as well as the artists involved in the project, because their laboratory received public funding.[77] Alba was born in April 2000 and died four years later; she never left the laboratory in which she was bred.[78] Her death is the finite element of the stuplime, and it represents the portion of the project that Kac succeeded in producing. Although he was not able to directly interact with Alba outside of the laboratory, he did create a significant amount of public interest in this green fluorescent rabbit.

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[77] Kristen Philipkoski, *RIP: Alba, the Glowing Bunny* <https://www.wired.com/2002/08/rip-alba-the-glowing-bunny/> [accessed 5 December 2018].

[78] Genome News Network, *Transgenic Bunny by Eduardo Kac* (2004) <http://www.genomenewsnetwork.org/articles/03_02/bunny_art.shtml> [accessed 5 December 2018].

Despite failing to execute his intentions for the project in the way in which he desired, Kac did generate a conversation about transgenic animals and their role in society.[79] He created an international spectacle that generated the dialogue about art, science, and transgenic creatures that he intended, without him being able to execute the majority of the project. The trajectory of the 'GFP Bunny' is an example of how Grobstein's alternative to the scientific method, the story of science as a story, can operate in a transdisciplinary context.[80] Kac observed the lack of meaningful exchange between artists, ethicists, and scientists with respect to transgenic organisms. Therefore, he decided to create conditions for making a new observation: artists, ethicists, and the general public engaging with the transgenic rabbit Alba through his performance art. He did not anticipate the explosive controversy that ensued and his project failed to be realized in the way in which he intended. While his summary of observations about the public response to Alba was wrong, his project did generate public interest in the impact of genetically modified organisms. His project deserves to be 'celebrated for its generativity, rather than denigrated or discouraged as

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[79] His practice based approach lies well with the more academic approaches of science studies to the role of science in society. In particular, Haraway's discussion of the cyborg, not as a cybernetic creature, but as a hybridization of a living organism and modern technology. She writes:

> cyborgs—compounds of the organic, technical, mythic, textual, economic, and political—and they call us, interpellate us, into a world in which we are reconstituted as technoscientific subjects. Inserted into the matrices of technoscientific maps, we may or may not wish to take shape there. But, literate in the reading and writing practices proper to the technicalmythic territories of the laboratory, we have little choice. We inhabit these narratives, and they inhabit us. The figures and the stories of these places haunt us, in the inscription practices in the laboratory—are future life forms and ways of life for humans and nonhumans. The genome map is about cartographies of struggle—against gene fetishism and for the livable technoscientific corporealizations.

Donna Haraway, *Modest_Witness@Second_Millennium. FemaleMan©_Meets_OncoMouse™* (New York: Routledge 1997), p. 172.

[80] Grobstein hypothesized that the 'GFP Bunny' was an example of revolutionary as opposed to normal art. This is a direct mapping of Kuhn's normal and revolutionary science criteria onto art that was part of his response to my presentation on the demarcation problem in philosophy of science for his seminar on the role of science in society.

Julia Rose Lewis, 'Is There a Distinction Between Art and Science?' *Serendip* (2010) <https://serendipstudio.org/exchange/jrlewis/there-distinction-between-art-and-science> [accessed 5 December 2018].

error.'[81] This privileging of generativity over rightness or absolute truth is part of Grobstein's characterization of science as a process of inquiry which aims to get things less wrong.[82] Grobstein writes 'each iteration of story revision requires accounting for a progressively increasing number of observations, including ones that were adequately accounted for by a previous story and new ones that weren't.'[83] Generativity is essential to the story of science as a story; the failure is essential to inspire revisions of existing stories in order to incorporate an increasing number of observations. Science is continually testing not only its understanding of material under investigation but also its own ways of investigating. The former process is about interpreting the object of observation, and the latter process is about interpreting the process itself. Kac is part of a movement of artists, ethicists, and scientists who are investigating how advances in genetics are affecting humanity and the transgenic organisms. Alba captured my imagination, and the white rabbit in *Zeroing Event* is a tribute to her formative role in my development of Alice in Wonderland Philosophy.

While it is comforting to think of the white rabbit as the character in *Alice in Wonderland* as Alba the green fluorescent hybrid as the ghost of Paul Grobstein, it is also, ironically, logical to associate it with cancer. The tumors multiplying with the rapidity associated with rabbits' breeding habits, and upon surgery being revealed to resemble those same white and blood under-developed creatures (baby rabbits). In the same manner in which the white rabbit is pregnant with her own future (her descendants), her cancer is pregnant with its own daughter cells. The interpretations of cancer biology that derive from

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[81] Grobstein, *Revisiting Science in Culture: Science as Story Telling and Story Revising*

[82] Ibid.

[83] Ibid.

developmental biology, as opposed to genetics, offer multiple opportunities to explore the irony inherent in disease and death. Developmental biology describes the unfolding of life from birth until death, and therefore is the ideal field of science for informing a narrative about cancer. In fact, it is already a narrative. While this logical entailment to the white rabbit is haunting *Phenomenology of the Feral*, the poems are haunted by cancer; it is an open question, whether or not the cancer is controlled, and one that I will leave until the conclusion of this dissertation.

Against Experimental Poetry

My discussion will now turn towards comparing and contrasting Kosofsky Sedgwick's *A Dialogue on Love* with SJ Fowler's *Tractography*, because these texts present two different examples of Through the Looking Glass Poetics, illustrating the possibilities that this type of transdisciplinary work offers to writers. While Kososfsky Sedgwick writes in a transdisciplinary form, Fowler identifies his work as avant-garde, experimental poetry, and visual poetry which raises questions about how to categorize science poetry. To reiterate, Through the Looking Glass Poetics is my own term for approaching the natural sciences from the starting point of the arts and humanities. Fowler and Kosofsky Sedgwick employ broad scientific findings in order to make more specific statements concerning the feelings and experiences of the subjects of their poems. Both approaches utilize collaboration with scientists in order to correctly reproduce the results of their research and reinterpret their interpretations: 'their' refers to the scientists as well as the writers in this instance.[84] The poems in *Tractography* are part of a larger series called the 'Neurocantos,' which originated with collaboration between Fowler and artist-scientist Rebecca Kamen; their work together was displayed in the Continuum exhibition at the Reston Arts Centre in Virginia from

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[84] I have participated in multiple collaborations with experimental poets prior to and concurrently with the writing of the creative component of my dissertation. SJ Fowler invited me to collaborate through the Enemies Project, an international series of events he curates to showcase original works created by pairs of poets. Fowler writes: 'poetry lends itself to collaboration as language does conversation, and it is in poetry we are renovating the living space of communication, and this in itself is a collaborative act.' The Enemies Project has facilitated my conversations with experimental UK poets about collaboration, science, and science poetry. I have performed commissions with Annabel Banks, Harry Man, Olga Kolesnikova, James Miller, and Tim Atkins. James Miller and I collaborated for a year to write a full-length collection of poems Stray (HVTN 2017). I have written haibun with Annabel Banks, Olga Kolesnikova, and James Miller. At the time of writing the haibun, Olga was a third-year and MA university student, while James was a lecturer, these differences in expertise are consistent with how the Japanese language tradition of the form was practiced.

Steven J. Fowler, *The Enemies Project* <http://www.theenemiesproject.com/about/> [accessed 5 December 2018].

December 2015 to February 2016.[85] Reflecting on his methodology for engaging in Through the Looking Glass Poetics, Fowler describes written exchanges with Kamen, 'taking her words, phrases, her understanding, and redeploying it, then making additions, alterations, re-orderings, so the poems began to form.'[86] This quotation gives voice to the gradual or incremental nature of Through the Looking Glass Poetics; Fowler's work is often collaborative, based on the same meaningful bidirectional exchange between two people as much as between two discourses, characteristic of the diffractive methodology Grobstein and Kosofsky Sedgwick practice. They share the belief that poetry is a useful genre for reflecting on advances in the scientific understanding of the brain and behavior; they each create a dialogue between theory and lived experience in their writing. Furthermore, they are employing a rigorous approach to interpreting scientific research by remaining critical of their own interpretations through dialogue with scientists; this is a deep approach to transdisciplinary work.

I will argue that *Tractography* is a translation of Daniel Margulies' paper, 'Visualizing the Human Connectome.' The difference between the Fowler and Margulies texts lies in the discourses used by their authors; therefore, they are related in the same way as a source text is to its translation. Fowler's pamphlet takes its epigraph from Margulies:
'maps never show us everything about a place or a space; their value is rather in the cartographer's insight to enunciate selected features over others.'[87] To paraphrase, maps are a

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[85] Continuum included framed prints of Fowler's 'Neurocantos' poems with Kamen's sculptures, Susan Alexjander's soundscape and video projections by Terry Lowenthal.

[86] Steven J Fowler, *NeuroCantos* <http://rebeccakamen.com/gallery/neurocantos/#8> [accessed 5 December 2018].

[87] Daniel S. Margulies, Joachim Bottger, Aimi Watanabe, Krysztof J. Gorgolewski, 'Visualizing the Human Connectome,' *NeuroImage*, 80.15 (2013), p. 445-461.

summary of the cartographer's observations – and the methodology of mapmaking may have a crack comparable to Grobstein's crack. Recall that Grobstein's crack argues against scientific objectivity and creates a positive role for the lived experience of the scientist in the process of research. In the story of a science as a story, lived experience is used to interpret theory and theory is used to interpret lived experience. *Tractography* takes the image of a lived experience, the fMRI mapping an individual's thoughts in real time, and puts words to it, the experience of the creation of the image itself. This bidirectional exchange between lived experience and theory is the primary characteristic of transdisciplinary work; it is capable of appealing to broader audiences through combining lived experience with discipline-specific theory.

The ease with which Fowler's Through the Looking Glass Poetics rests alongside Grobstein's Alice in Wonderland Philosophy shows that one transdisciplinary work will have more in common with another than with a work in its own original discipline. The parallels between cartography and Grobstein's transdisciplinary story of science provide evidence for the role of the interpreter as the one who selects salient details. *Tractography* utilizes the images generated by Daniel Margulies' research by interpreting the fMRIs of the human brain as works of art to be responded to with ekphrastic poems.[88] Fowler takes scans, the results of scientific experiments as works of art, and makes their beauty the subject of his poems; what is transdisciplinary in this approach is the interpretation of scientific images as art. Christoph Cox argues that the act of interpretation in music and textual analysis is contiguous with creation and translation. He writes:

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[88] Fowler and Margulies collaborated together at the Poetry of Consciousness at the Wellcome Collection in 2016, The World Without Word event in 2016, and they both spoke at the Mind & Brain School of Humboldt University Berlin in 2015.

> He or she translates the visual into the verbal and supplements descriptive with evaluative prose to produce a new text. And these "interpretations" are judged not according to how faithfully they reproduce the original but according to whether they show us something new, interesting, or important.[89]

When judged by the above criteria, *Tractography* is a successful interpretation of Margulies' paper; in part, because it translates rather than transcribes it from scientific discourse into poetry. *Tractography* as an interpretation of a neuroscience paper embodies the core of science as questioning the creation and revision of summaries of observation; it is a transdisciplinary interpretation. In the first section of the poem, Fowler writes:

> And found not much yet
> but beginnings must be made.
> "the hydro cortic cerebration
> is not friend to draw
> nor dream now[90]

The presence of terminology specific to neuroscience here indicates that Fowler is not simply deriving inspiration from the image, but seeking to enter into dialogue with the science itself; the depth of Fowler's approach lies in the pointed connections the poem makes between poetic and scientific methodology. It bears reiterating that the ease with which Fowler's

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[89] Christoph Cox, 'Versions, Dubs, and Remixes: Realism and Rightness in Aesthetic Interpretation' in *Interpretation and Its Objects: Studies in the Philosophy of Michael Krausz,* ed. by Andreea Deciu Ritivoi (Amsterdam, Netherlands: Rodopi, 2003) p. 289.

[90] Steven J Fowler, *Tractography* (London, UK: Pyramid Editions, 2016).

work rests alongside Grobstein's shows that one transdisciplinary interpretation will have more in common with another than with its corresponding source discipline. *Tractography* calls into question the limits of neuroscience, poetry, and translation through a sophisticated use of artifice; a parallel is drawn between found poetry and cartography in order to illustrate that both are selecting certain characteristics or features of an imaginary landscape – much as occurs in the mapping of the brain. Fowler addresses the demarcation problem in philosophy of science by opening up a liminal place where any number of foreign words can rub against each other; this is a space where new connections between words and concepts can be formed, bridges built between the familiar and foreign. While *Tractography* is a good example of experimental poetry, I would argue that it is a great example of transdisciplinary writing, because it engages in a bidirectional exchange with neuroscience within the poems.

Fowler and Kosofsky Sedgwick offer two examples of Through the Looking Glass Poetics. By engaging in a bidirectional exchange with science (and medicine) poetry will be able to interpret the full range of texts that exist in order to characterize the human condition. What this transdisciplinary work offers poetry is the opportunity to deploy the full range of language; both technical and everyday diction in order to discuss the lived experience. The process of collaboration proves generative for poets as well as scientists at the point of Grobstein's crack. The collaborating scientists are able to examine their research in a novel context and the poets are able to examine the implications of the results for their own practice and theory of poetry. In general, the audience of poetry is enlarged to include those readers interested in science; in particular, nonscientists who benefit from the interpretation of research. Alice in Wonderland Philosophy together with Through the Looking Glass Poetics has the potential to expand the popular audience for poetry and science, and therefore

increase both disciplines' impact. The training I received from Grobstein as a student in his classes and a member of his laboratory on how to think and write transdisciplinary work is the origin of both my creative and critical writing. Fowler is a tremendously important influence on my creative writing because his work intersects with the methodologies of Grobstein and Kosofsky Sedgwick, while identifying as an experimental poet. His broad, (read 'transdisciplinary') definition of experimental poetry allows me to locate my writing as such and has inspired me to seek out other experimental science poets. In the next chapter, I explore the experimental science poetry of *The Plant Time Manifold Transcripts* and Through the Looking Glass Poetics of J.H. Prynne.

CHAPTER 2: AGAINST CITATIONS

Against Translation

This chapter will discuss JH Prynne's *The Plant Time Manifold Transcripts* and perform a close reading of the poem from the perspective of a scientist, which I shall term the literature naive approach. The naive approach that this chapter takes is to illustrate an alternative strategy for engaging scientists with poetry, by introducing scientists to poetry that reflects their own specific research interests, and thereby situating poetry within scientific discourse. The naive approach is characterized by using history and philosophy of science as the basis for interpretation, instead of literary theory, which would be the standard academic approach. This reading is characteristic of a radical approach to Alice in Wonderland Philosophy, which I described previously as reading a humanities text through training and qualifications in the natural sciences. My analysis will begin by considering the elements of *The Plant Time Manifold Transcripts* that are most easily recognizable as scientific discourse, the citations of scientific literature and extended discussions of scientific research. The relationship between scientific and literary discourses is analogous to the relationship between foreign and domestic in the practice of translation between languages. This partial translation of science into poetry and poetry into science raises questions about the nature of authorship and authenticity in transdisciplinary works. The chapter will briefly compare and contrast translation of scientific and medical discourse in *The Plant Time Manifold Transcripts* with *A Dialogue on Love* by Eve Kosofsky Sedgwick. Ultimately, this analysis will show that both texts are examples of transdisciplinary work, and suggest that reading Prynne's text as a haibun yields a more fulfilling interpretation than as a poem.

The Plant Time Manifold Transcripts is a partial translation of science into poetry, offering the reader with scientific training many familiar elements of discourse. This is evidenced by the large number of fragments from philosophy of science and the natural sciences, present in multiple forms in this text. Prynne has included a significant number of fragments of foreign discourse, which require translation for the reader of poetry. The scientific discourse is familiar to the scientist and foreign to the poet while the reverse is true with the literary discourse. *The Plant Time Manifold Transcripts* does not fully domesticate the foreign elements for the reader; it only partially translates them. The noted translation theorist Lawrence Venuti characterizes the relationship between domestic and foreign discourse in the practice of translation. He writes:

> A translation always communicates an interpretation, a foreign text that is *partial* and altered, supplemented with features peculiar to the translating language, no longer inscrutably foreign but made comprehensible in a distinctively domestic style. Translations, in other words, inevitably perform a work of domestication. Those that work best, the most powerful in recreating cultural values and the most responsible in accounting for that power, usually engage readers in domestic terms that have been defamiliarized to some extent, made fascinating by a revisionary encounter with a foreign text.[91]

The Plant Time Manifold Transcripts uses the prose poem form to partially domesticate the foreign discourses of scientific research, primarily molecular biology and biophysical

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[91] Lawrence Venuti, *The Scandals of Translation: Towards an Ethics of Difference* (Abingdon, UK: Routledge, 1998), p. 5.

chemistry. By employing lines that reach to the far margin of the page, Prynne has incorporated citations into the body of the poem without creating typographical anomalies. This is one example of the partial translation of technical writing into creative writing.

The quotations from scientific discourse are clearly part of the foreign or undomesticated elements, that which is more immediately accessible to scientists and philosophers of science than poets or literary scholars. Each citation of a scientific journal article serves as a hook to catch the attention of the scientist reader and hold it with its familiarity, with the pleasure of identifying with the author and the research. In his writing on the anthropology and sociology of science, Bruno Latour articulates the role of referencing in scientific literature as always reaching out, connecting one laboratory to another across space and time. He writes:

> referential chains have very interesting contradictory features: they are producing our best source of objectivity and certainty, yet they are artificial, indirect, and multilayered. There is no doubt that the reference is accurate, but this accuracy is not obtained by any two things resembling each other mimetically, but through whole chains of artificial and highly skilled *transformations*.[92]

Prynne's use of scientific citations gives evidence that he understands, not only this foreign diction and syntax, but the essential role of citations in the construction of objectivity. He is showing respect for the culture as well as the language in his translation of science into poetry. The scientist reading the references in the text recognizes the history of science as an

[92] Bruno Latour, *On the Modern Cult of the Factish Gods* (Durham, NC: Duke University Press, 2010), p. 114.

institution in space and time; the gradual and steady accumulation of knowledge is made present through the references to other scientists. In Prynne's work, the pleasurable effect of recognition of a scientific journal article is all the greater, because the citations themselves are incomplete; they are meaningful only to those in the know. They create a sense of being an insider for the scientist reader of *The Plant Time Manifold Transcripts*. The scientific references resemble Chicago-date style citation superficially, however there is the absence of the bibliography to attend to in the text.[93] This practice serves to create an environment of familiarity for the scientist reading the prose poem; they may even experience a sense of flattery when identifying research related to their own. Below is a full bibliography for *The Plant Time Manifold Transcripts*. The 'in text' citations are reproduced above each full citation in the order in which they appear in the text. I offer this list of the complete citations to make the text accessible to readers who are not trained in the natural sciences. Without the complete citations, it is easy to miss the fictional citation in which the text references itself as the Proceedings of the Plant Time Manifold Conference 1972. I will discuss the discrepancy between how Prynne refers to the Conference in the title and in the references later in this chapter.

[93] *Author-Date Sample Citations* (2019) <https://www.chicagomanualofstyle.org/tools_citationguide/citation-guide-2.html> [accessed 8 March 2019].

Table 1: Against Style

References as given in the PTMT	Complete References
Sweeney, pp. 20-21	BM Sweeney, *Rhythmic Phenomena in Plants* (Cambridge, Massachusetts: ACADEMIC PRESS INC, 1969), p. 20-21.
Milne, ZS Ap., 1933, p. 14	E. A. Milne, 'World Structure and the Expansion of the Universe,' *Zeitschrift fur Astrophysik*, Springer Verlag, 6.1 (1933), p. 1-50 (p.14).
O'Brien, summarizing Empedocles	Dr. Denis O'Brien, *Empedocles Cosmic Cycle* (Cambridge: Cambridge University Press, 1969).
Branton and Deamer, 1972, p. 23	Daniel Branton and D.W. Deamer, *Protoplasmatologia: Membrane Structure* (New York: Springer-Verlag, 1972), p. 23.
Lehninger, 1971, pp. 204-5	Albert Lehninger, *Bioenergetics: The Molecular Basis of Biological Energy Transformations* (New York: Addison-Wesley Publishers, 1971), p. 204-5.
MNRAS, 1956, p. 675	Wolfgang Rindler, 'Visual Horizons in World Models,' *Royal Astronomical Society Monthly Notices* 116 (1956), p. 662-677.
Measure of the U., 419-20	John David North, *Measure of the Universe: A History of Modern Cosmology* (Oxford: Clarendon Press, 1965) p. 419-20.
Proc. PTM Conf., 1972	Proc PTM Conf 1972 is made up for the poem.
New Phytol., 1968	A. R. Sheldrake and D. H. Northcote, 'The Production of Auxin by Tobacco Internode Tissues,' *New Phytologist* 67 (1968), p. 1-13.
New Phytol., 1971, p. 524; see also J. exp. Bot., 1971, p. 738	Rupert Sheldrake, 'The Occurrence and Significance of Auxin in the Substrata of Bryophytes,' *New Phytologist* 70 (1971), p. 519-526. Rupert Sheldrake, 'Auxin in the Cambium and its Differentiating Derivatives,' *Journal of Experimental Botany* 22 (1971), p. 735-740.
Jukes, 1966, p. 187	Thomas Hughes Jukes, *Molecules and Evolution* (New York: Columbia University Press: 1966), p.187.

This absence of a complete bibliography creates a complex constellation of issues associated with interpreting a hybrid text; it creates a paradox for the reader around the citations. Are the citations the poet's attempt to flash his credentials before the reader or are they, by their incomplete and perhaps informal nature suspicious, even fictitious? By fictitious, I mean that there is no way for the reader to verify the citations within the text, they are obscure. The citations disrupt the reading of the poem by anchoring *The Plant Time Manifold Transcripts* to external texts across multiple discourses. For the scientist as reader, the citations are continuous with the body of the text; however for the poet as reader the citations are discontinuous or foreign to their field of knowledge. Veronica Forrest-Thomson describes two types of obscurity in poetry, rational and irrational. She writes:

> There are two ways in which a poem may be obscure: either it disrupts normal language completely so as to resist any meaning an interpreter may wish to give it, or it conceals its meaning in a tissue of metaphorical argument that draws on esoteric areas of knowledge so that, in order to understand it, we have to go through an elaborate process of reconstituting the background assumed by the poem; we have to re-think this background. The first type may be called 'irrational obscurity'; for it blocks any attempt to apply the usual connections between language and the world and to infer the state of the latter from the usage of the former. The second type will then be 'rational obscurity' that allows, indeed requires, the application of rational thinking.[94]

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[94] Forrest-Thomson, Veronica, 'Rational Artifice: Some Remarks on the Poetry of William Empson,' *The Yearbook of English Studies* 4 (1974), p. 225–238. <www.jstor.org/stable/3506697> [accessed 25 October 2017].

The obscurity created by the incomplete citations can be resolved through rational thinking and research through philosophical and scientific literature. The completed citations offer the reader additional background material for interpreting the poem. It is important to note, if *The Plant Time Manifold Transcripts* were submitted as a piece of critical writing in the academy, the editors would demand a full bibliography to be published. The absence, therefore, serves to remind the reader that the text is creative as well as critical, and that the citations are a compromise due to the hybrid nature of the work. This text is acting in a way that Sara Ahmed calls, in another context, 'space invaders in the academy;' she continues on to suggest that 'we can be space invaders in theory too, just by referring to the wrong texts or asking the wrong questions.'[95] *The Plant Time Manifold Transcripts* are invading the space of the academic conference transcript.

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[95] The phrase 'space invaders' is performing the function it describes, by referencing Nirmal Puwar's work, both in the body of the text and this footnote. Puwar writes:

> The sheer maleness of particular public spaces and women's experience of increasingly occupying them while still being conscious of being 'space invaders' even while they enjoy these places is vividly captured by Doreen Massey.

The phrase itself has an origin story and is connected to postmodern geography, feminism, and critical race theory among others. The notion of space invaders forces the reader to attend to how the characters in *The Plant Time Manifold Transcripts* occupy the space of the poem as much as the time. Massey writes:

> I remember all this very sharply. And I remember, too, it striking me very clearly—even as a puzzled, slightly thoughtful little girl—that all this huge stretch of the Mersey flood plain had been entirely given over to boys. I did not go to those playing fields—they seemed barred, another world (though today, with more nerve and some consciousness of being a space invader, I do stand on football terraces—and love it).

Analyzing an academic conference and its transcripts by considering how the participants occupy the physical space would yield a very different discussion of Prynne's work. Such a discussion would foreground ecological and anthropological discourse instead of evolutionary-developmental ones.

Sara Ahmed, *Living A Feminist Life* (Durham, NC: Duke University Press, 2017), p. 9.

Nirmal Puwar, *Space Invaders: Race, Gender and "Bodies out of Place"* (Oxford: Berg, 2004), p. 7.

Doreen Massey, *Space, Place, and Gender* (Oxford: Polity Press, 1996), p. 185.

In order to better understand Prynne's utilization of citations within a creative text, let us turn our attention to a close reading of a citation and the surrounding poem; this will elucidate the hybrid nature of *The Plant Time Manifold Transcripts*. The transcripts begin with the introduction to Professor Quondam Lichen, the protagonist who is the once and former lichen or once and former professor depending on how his name is interpreted. According to the Oxford English dictionary, the word quondam means formerly, therefore Professor Quondam Lichen is professor formerly lichen and formerly professor lichen. This irony will only become clear to the reader as the poem unfolds. His paper itself begins by summarizing the work of the real-life Beatrice March Sweeney, who was a prominent research biologist at University of California Santa Barbara and author of *Rhythmic Phenomena in Plants*. She specialized in answering questions about how biological clocks (circadian rhythms) controlled plant processes, with particular attention given to the effect of light pulses.[96] Notice in the following how Prynne's deployment of scientific terminology makes his own words continuous with those excerpted from Sweeney's biological text.[97]

> Sleep movements in the common bean seedling (leaf folding) are in phase with diurnal light-dark rhythms and are triggered by photoreaction; but the "in phase" is not exact and the diurnal periodicity is not causal with respect to bean sleep: "Beans which have been grown since germination in constant white light do not show any leaf movement rhythm until some change in the environment sets it in motion. All that is required is a single 9-10 hour exposure to darkness. Once set in motion, this

[96] University of California Academic Senate, *University of California: In Memoriam, 1989* (2011) <http://content.cdlib.org/view?docId=hb4p30063r&chunk.id=div00063&brand=calisphere&doc.view=entire_text> [accessed 8 March 2019].

[97] BM Sweeney, *Rhythmic Phenomena in Plants*, (Cambridge, Massachusetts: ACADEMIC PRESS INC, 1969).

> rhythm will persist in constant light or darkness for at least 6-8 days, with a period of about 28 hours" (Sweeney, pp. 20-21) The timing mechanism for this behavior cycle and others like it is intracellular, and it correlates with no identifiable flux rhythms in the external environment.[98]

Prynne's deployment of scientific terminology incorporates his own diction into those excerpted from the above biological text. He makes use of scientific syntax as well, with its high frequency use of the verb to be, especially in passive verb constructions. His assimilation of the discourse surrounding the biological investigation of circadian rhythms yields a fluent discussion of the relationship between plant development, white light, and time.

Veronica Forrest-Thomson's poetics present a theory of science poetry that acknowledges the distance between the two disciplines, without despairing of their potential for bidirectional exchange. She published research on contemporary British science poetry and poetics from the time of her doctoral dissertation to her death. She was supervised by J.H. Prynne initially and then Graham Hough and took her doctorate from Girton College Cambridge in 1971. Forrest-Thomson's doctoral dissertation: *Poetry as Knowledge: The Use of Science by Twentieth-Century Poets* is a clear and polished example of *Through the Looking Glass Poetics* because it begins with a writer trained in English Literature and undertaking an English Literature Doctorate examining how to incorporate science into poetry. Prynne has reproduced the diction and style of natural sciences literature within a poem, which satisfies Forrest-Thomson's criteria for transdisciplinary work. She writes that:

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[98] J.H. Prynne, *Poems*, 3rd edn (Northumberland, UK: Bloodaxe Books, 2015), p. 234.

> continuity is provided by the way in which formal and conventional devices take up and assimilate various kinds of discourse, weaving them together into a poem whose movement is the movement from one moment or kind of discourse to another. Discontinuity derives from our awareness that by being cited, as it were, the various kinds of language are no longer what they would be in isolation and are subjected to a different form of organization.[99]

Forrest-Thomson maps out how to incorporate multiple discourses into a poem, and how such work transforms the discourses themselves. The summary of Sweeney's research within the summary of the conference in Prynne creates a discontinuity within the poem because it removes the reader from the author, not once but twice; it creates a condition of uncertainty where a fictional agent is quoting a nonfictional scientist. This discontinuity reminds the reader that *The Plant Time Manifold Transcripts* are a work of science fiction, in the most literal sense that fiction can utilize science within its narrative. It is through this series of frames and frames within frames that allow the scientific discourse to be incorporated into the narrative without losing the markers of its discourse as belonging to the natural sciences. The natural sciences themselves are attempting to construct a narrative about the world, and the way in which science progresses is by testing its own narrative to determine what is fact and what is fiction. Prynne is inviting the reader to engage is this same practice, in testing the progress of science against time through the use of narrative; he is inviting the scientist to reflect on their practice and engage with philosophy of science. *The Plant Time Manifold*

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[99] Veronica Forrest-Thomson, *Poetic Artifice: A Theory of Twentieth Century Poetry*, ed by Gareth Farmer, 1978 edn (Bristol, England: Shearsman Books, 1978), p. 76.

Transcripts require the scientist-reader to engage with Alice in Wonderland Philosophy in order to interpret the text.

The Plant Time Manifold Transcripts are behaving as an invasive species of plant with respect to the intellectual ecosystem. Taking the text itself as a plant, this metaphor then facilitates the understanding of the citations; they are simply the roots of the text. As with most plants' roots, the citations are only partially visible when viewing the body of the plant because they are a conduit that draws elements of the sources up into the body of the text as nourishment. To the casual observer, the plant's roots are mostly obscured, just as the incompleteness and inconsistency of the citations has the effect of concealing as much as revealing information to the reader. The root system of *The Plant Time Manifold Transcripts* is of particular interest because it is metabolizing multiple district nutrients; it is synthesizing those simple molecules into more complex molecules that make up the plant or text as a whole. To be specific, these nutrients are not merely mixed, rather they undergo nonreversible chemical reactions mediated by the plant itself to become a part of the plant as text. *The Plant Time Manifold Transcripts* performs a true synthesis of facts and theory drawing up nutrients from the diverse discourses of literary theory, philosophy of science, poetry, and philosophy of science. The plant as the text of *The Plant Time Manifold Transcripts* exists and thrives in a transition area between two or more biomes, an ecotone, a transdisciplinary discourse.[100] Prynne has taken the tension of the local ecology and grown a healthy plant out of it and by doing so, proven that the soil is rich enough to support plant growth and intellectual growth through transdisciplinary work.

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[100] Susan Walker, and others, 'Properties of ecotones: Evidence from five ecotones objectively determined from a coastal vegetation gradient,' *Journal of Vegetation Science* 14.4 (2003), p. 579–90. doi:10.1111/j.1654-1103.2003.tb02185.x. [accessed 30 June 2017].

The Plant Time Manifold Transcripts is a liminal text, existing at an area of transition between poetry and science as reflected in its citations which draw on work from both discourses. This meeting of two communities and two discourses is a major theme of Prynne's poetry, and sometimes coincides with his use of citations; although his use of citations is quite infrequent. Despite their relative rarity, citations have appeared in Prynne's poetry from his early to late works, from 'Aristeas, in Seven Years' to KAZZOO DREAMBOATS or, on What There Is,' indicating his fields of knowledge to inform and influence his own texts. Two lineated poems with references are 'The Glacial Question, Unsolved' and 'Aristeas, in Seven Years'.[101] Unlike *The Plant Time Manifold Transcripts*, The Glacial Question, Unsolved' and 'Aristeas, in Seven Years' utilize end references instead of in-text references. In this way, the references perform a pedagogic function of directing the less knowledgeable reader toward relevant texts, and yet requiring the reader to engage with these texts themselves, to read widely outside the fields of poetry, literary and critical theory. The presence of references makes explicit the content of the areas of knowledge that the poem utilizes; the bibliography signposts the sources of the poem for the reader most explicitly by listing the references in the order in which they appear in the text instead of alphabetical or chronological order. There is no explicit connection between the works referenced and the body of the text; so the references encourage an active reading as researching the connection between the lines in the poem and the sources provided. Prynne's use of citation practice in the body of his poetry as opposed to practice of end-noting gives an immediacy to the citations that is largely absent from the practice of other poets, it gives an openness to each poem and requires an open-mindedness on the part of the reader.

[101] Prynne, p. 65-67 and p. 90-96 respectively.

Against the Central Dogma of Molecular Biology

The word transcript and its role in the title of *The Plant Time Manifold Transcripts* has been largely neglected in discussions of the text, precisely because it was literary scholars and poets who were discussing the work instead of scientists. In the humanities, transcript merely refers to a written record of an event, and suggests that the poem is a frame within a frame; it gives the phrase, as the title, a greater meaning than a mere reference to Prynne's earlier formulation of his plant-time hypothesis '& Hoc Genus Omne.' Additionally, the typography of the text as seen in the most recent collection of Prynne's *Poems* supports the literary scholars' dismissal of the word, because unlike the words 'plant', 'time', and 'manifold' it is not italicized (Bloodaxe 2015).[102] Note, the word 'the' is also not italicized, this indicating an equivalence between the transcripts, since both words serve as a frame for the central phrase, the content, the title. However, *The Plant Time Manifold Transcripts* is a text that makes use of multiple frames, most clearly the italicized section headings which specify the time frame in which the action of the text takes place. The transcript of the events is obviously already out of time with the events themselves, and so the transcript as unitized words does not denote a lack of importance, only a difference in time. Prynne's utilization of multiple frames, multiple points of view and multiple discourses is generally part of his poetic practice, and explicitly part of the poetic artifice of *The Plant Time Manifold Transcripts.* Only giving consideration to the general definition of transcription neglects the role of the title in locating the reader in the unique transdisciplinary world of the poem. The Oxford English Dictionary defines transcript as a 'written or printed version of material

[102] Ryan Dobran, and others, *Glossator: Practice and Theory of the Commentary: On the Poems of J.H. Prynne*, ed by Ryan Dobran (Scotts Valley, CA: CreateSpace, 2010).

originally presented in another medium or (from Biochemistry) a 'length of ribonucleic acid or deoxyribonucleic acid that has been transcribed respectively from a deoxyribonucleic acid or ribonucleic acid template or an official record of a student's work, showing courses taken and grades achieved.' The word transcript functions as a triple entendre in the title of *The Plant Time Manifold Transcripts*; it carries nodal weight by suggesting three possible situations, all of which come to pass inside the world of the poem.

The role of the word transcript in *The Plant Time Manifold Transcripts* exemplifies one of Prynne's strategies for crafting transdisciplinary work; his attention to incorporating multiple discourses even in the choice of a single word. Michael Tencer describes Prynne's composition practice, specifically his turning towards the dictionary after the initial draft is written. Tencer highlights the significant role the etymological dictionary plays in the process of composition and revision; this supports my argument for attending closely to Prynne's use of the word transcript. It is not a great stretch to imagine Prynne consulting the dictionary for the multiple meanings of the word transcript while writing the initial draft and then revising *The Plant Time Manifold Transcripts*. Tencer writes:

> This practice would again be consistent with Prynne's occasional public statements on poetic composition… after 'the poem is written', [it] undergoes 'a certain amount of small adjustment', and is put 'into some form of print', is the poem then reread 'to see which words are really carrying the nodal weight': 'My most valuable aids are the etymological dictionaries, and this is perhaps a kind of minor vice. Once a poem gets written and I have located a word which this poem has given to me, I've won out of

> the English language another word for my small vocabulary of words that really mean and matter to me. [Then I go] back to the etymological dictionary.[103]

Transcript is one such word that Prynne has made important and material through its use in *The Plant Time Manifold Transcripts*, where it signifies three distinct meanings. While presenting the reader with multiple academic discourses as a partial translation, Prynne also partially translates these same discourses into the lived human experience in order to avoid completely alienating the reader.

The distinction between transcription and translation is significant for *The Plant Time Manifold Transcripts* with its inclusion of scientific terminology and figures; it fails as a translation of molecular biology into poetry. The text fails to translate one discourse fully into another, instead, it places poetic and scientific discourse together, interspersing concepts and terminology, thereby encouraging the reader to engage with multiple discourses. *The Plant Time Manifold Transcripts* succeeds as a transcription of molecular biology into poetry, because it copies the discourse directly into the poetry. Transcription, unlike translation, does not require interpretation, only replication. The biological process of transcription consists of copying the coded information contained in one length of nucleic acid into an exact duplicate or into the other nucleic acid. The two types of nucleic acids, ribonucleic and deoxyribonucleic acid, consist of four bases; there is a one-to-one relationship between a given ribonucleic acid base and corresponding deoxyribonucleic base. Information coded into ribonucleic acid can be transcribed into deoxyribonucleic acid without interpretation,

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[103] Michael Tencer, 'Notes on 'Es Lebe Der Konig,'' *For the Future: Poems and Essays in Honour of J.H. Prynne on His 80th Birthday*, ed by Ian Brinton (Bristol, UK: Shearsman Books, 2016) p. 154-155.

because of the similarity of diction and syntax between these two types of biological information storing molecules. Prynne is employing the two-step process of the Central Dogma of Molecular Biology as a metaphor for literature. He has assigned himself the role of enzyme performing the transcription of thoughts into text, and the reader is granted the role of enzymes performing the translation of text into interpretation. The way in which Prynne conflates interpretation with translation is quite similar to the way that Lawrence Venuti characterizes the field in his text, *The Scandals of Translation: Towards an Ethics of Difference*. Venuti writes of good translation that:

> The sort of interpretation it demands continues to be philosophical, engaged on conceptual analysis, but now made more literary, concerned with the formal properties of language, and more historical, concerned with various domestic traditions, linguistic, literary, philosophical.[104]

The list of criteria that Venuti gives for a good translation maps perfectly onto the requirements for a rigorous reading of *The Plant Time Manifold Transcripts*. This overlap between Prynne and Venuti suggests the possibility that a good translation is a transdisciplinary work because it transgresses and interprets at least two languages into one text. *The Plant Time Manifold Transcripts* require a transdisciplinary reader as well as a translator.

The transdisciplinary reading I am developing cannot proceed without attending to the citation and sentence fragments within *The Plant Time Manifold Transcripts,* because they

[104] Venuti, p. 114.

appear to be inconsistent with the biological concept of a transcript. According to our current understanding of molecular biology, the transcript, the messenger ribonucleic acid, must present as a single strand for translation.[105] This strand of ribonucleic acid must be without branches, breaks or fragments; it must exist as a single strand. There are two potential strategies for transforming *The Plant Time Manifold Transcripts* into a text that meets the molecular biology criteria for translation. The first strategy is splicing, an additional processing step that occurs between transcription and translation; the messenger ribonucleic acid is edited. This method simply calls on the interpreter of the text to ignore the breaks and fragments within the text, to excise these elements as the enzymes excise the introns and join together the exons.[106] The resulting, single and continuous, strand of messenger ribonucleic acid that is comprised solely of exons is ready for translation. The second strategy is to redefine *The Plant Time Manifold Transcripts* as a haibun in order to incorporate the fragments of citations and sentences into the text as formal elements. The haibun is comprised of prose poem elements and haiku; these two different forms complement each other. The prose poem form gives the text an appearance that is not so very different from an opinion piece or an essay in the philosophy of science; it is not superficially so different from those texts that research scientists read regularly. The prose poem is often understood itself as a hybrid, so the form for this particular experiment is appropriate to establish a parallel between the content and the form of the text; they are both hybrid in nature. This hybridity is continued in the citations; there are both literary and scientific citations present in order to give continuity to the hybridity of *The Plant Time Manifold Transcripts*. Identifying the incomplete citations and sentences as haiku, rather than fragments, makes them into complete

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[105] David L Nelson, *Lehninger Principles of Biochemistry*, 6th edn (London, UK: W.H. Freeman and Company, 2012), p. 187-89.

[106] Lehninger, p. 147-55.

parts of the haibun as a whole. The haibun itself would then be an acceptable single linear body of text to be translated. In the following section, I will discuss the relative merits and concerns raised by these two approaches. I will consider how to reconcile my interpretation of the text as a transcript with the fragments of citations and sentences.

A formal reading of *The Plant Time Manifold Transcripts* reveals its similarity to a haibun; this interpretation will illuminate possibilities for experiments with the form with respect to conventions of scientific discourse not common to poetry. I am moderating my radical approach to Alice in Wonderland Philosophy by expanding my discussion to include Through the Looking Glass Poetics and transdisciplinary work. Recall that Alice in Wonderland and Through the Looking Glass Poetics are both examples of transdisciplinary work; they describe the complementary intellectual trajectories of their practitioners. As we have seen in Chapter 1, Eve Kosofsky Sedgwick's haibun are transdisciplinary, and in this chapter, I will argue that *The Plant Time Manifold Transcripts* are both haibun and transdisciplinary. I will compare and contrast Prynne's use of scientific and medical discourse in *The Plant Time Manifold Transcripts* with the scientific and medical discourse usage in *A Dialogue on Love* by Eve Kosofsky Sedgwick in the prose poem form. Ultimately, this chapter will show that both texts are examples of transdisciplinary work, and suggests that reading Prynne's text as a haibun yields a more fulfilling interpretation.

In this section, I will evaluate the results from applying the splicing process to *The Plant Time Manifold Transcripts* in order to prepare the text for translation. My discussion will extend the Central Dogma of Molecular Biology as a metaphor for the interpretation of texts. Splicing occurs between the processes of transcription and translation; it is analogous

to the editing or revising of a written text through the removal of fragments, tangents, and incomplete thoughts. After splicing, the text conveys a single message with great clarity. If *The Plant Time Manifold Transcripts* were to undergo splicing, then the partial citations and sentence fragments would be lost; they would be removed from consideration in the interpretation of the text. Although these results might not appear significant to the literary scholar, they would have a dramatic effect on the scientist reading the prose poem. The text would appear more literary and less familiar to the scientist; it would become foreign. Prynne would simultaneously lose his credentials to write in scientific discourse in the eyes of the scientist reader. *The Plant Time Manifold Transcripts* would come to appear to be a superficial attempt at science poetry, instead of the meaningful bidirectional exchange that it is (before splicing). The results of splicing for the scientist and transdisciplinary reader are the loss of significant material from the text; however, the results for the literary scholar and reader of poetry may be positive. Let me reiterate the results of the splicing process: the text will convey a single message with great clarity. This is the ideal state for messenger ribonucleic acid which will instruct the ribosome how to synthesize a single, specific protein during translation. In biological translation, there is only one correct interpretation and one correct resulting protein. This is where the metaphor begins to break down; the messenger ribonucleic acid is not identical to *The Plant Time Manifold Transcripts*. The differences between the vehicle and tenor of my metaphor for the process of reading and interpreting a text are emerging here, and will, ultimately, aid in the development of a more nuanced understanding of Prynne's work through comparing and contrasting biological and literary transcripts.

The role of 'interpreter of biological and literary transcripts' must also be elucidated here, in order to develop a meaningful discussion of the translation of messenger ribonucleic acid and *The Plant Time Manifold Transcripts*. As we have seen, a messenger ribonucleic acid must be spliced to clarify the message it conveys to its interpreter, the ribosome, and now we must consider whether the same is true for the prose poem and the literary scholar. The question that this discussion must now answer is: should a poem ideally instruct the reader in how to craft a single correct interpretation and should the interpreter aim to create a single interpretation? Philosopher Michael Krausz characterizes such a question as relating to interpretative ideals; he argues that one must choose between embracing *singularism* and *multiplism*. Singularists admit only one interpretation of any object such as a literary text, and multiplists admit many interpretations. Krausz's multiplism differs from pluralism in that it requires interpretations satisfy certain criteria of admissibility; note that both singularism and multiplism deploy criteria for evaluating interpretations. Krausz writes:

> While singularists think of *opposition* between contending interpretations in exclusive terms, multiplists hold that opposition between contending interpretations need not be understood in exclusive terms. A multiplist allows that there may be opposition between between some contending interpretations, but that would be an opposition without exclusivity. In other words, multiplists allow that incongruent interpretations may be jointly defended.[107]

[107] Michael Krausz, 'Ideals and Aims of Interpretation,' in *Interpretation and Its Objects: Studies in the Philosophy of Michael Krausz*,' ed by Christine M. Koggel and Andreea Deciu Ritivoi (Leiden, NL: Rodopi, 2003), p. 35.

My discussion aligns with Michael Krausz's multiplism, I hold that there may be more than one admissible interpretation of *The Plant Time Manifold Transcripts*. The splicing strategy and the redefining strategy are admissible interpretations of the text, and they both remove the fragments and tangents from the text. They are opposing interpretations, meaning that they cannot be reconciled with one another and neither interpretation can subsume the other.[108] I am employing multiplism here to clarify my aims of interpreting *The Plant Time Manifold Transcripts*, which includes attending to the multiple interpretations that illuminate the text and are consistent with my Alice in Wonderland Philosophy approach.[109]

[108] Krausz, p. 35.

[109] Note that my preference for incorporating multiple interpretations into my discussion is another example of fox-like behavior. It is also a vestige of my education; I studied with Michael Krausz at Bryn Mawr College, and Michael Krausz studied with Isaiah Berlin at Oxford University.

Against the Haiku Tradition

My discussion will now turn towards evaluating the interpretation of *The Plant Time Manifold Transcripts* that results from redefining the text as a haibun, instead of a prose poem. Reading the citation and sentence fragments of the text as haiku makes them continuous with the prose poem elements; the text becomes continuous, in the Forrest-Thomason sense, as required for translation. Attending to the citations and sentence fragments as part of the body of the text, instead of consigning them to the margins, foregrounds the most transdisciplinary elements. The complementary relationship between the haiku and the prose illustrates formally the way in which multiple discourses can function together in a transdisciplinary text. I, personally, find the strategy of redefining *The Plant Time Manifold Transcripts* as a haibun, instead of a prose poem, more fulfilling, perhaps because I am already exploring the form critically and creatively. However, I fully acknowledge that this interpretation of the citation and sentence fragments as haiku is my own creation; there is no basis for arguing that Prynne intended this reading. Prynne most certainly was not writing in the Anglo-American haibun tradition of Ashbery, Merrill, and Kosofsky Sedgwick because his text was published a decade earlier. *The Plant Time Manifold Transcripts* itself already presents the reader with plenty of interesting material to analyze, as this chapter attests. The reason that I am exploring this alternative reading of the text is because it furthers my project of connecting the haibun form to transdisciplinary writing. More specifically, reading *The Plant Time Manifold Transcripts* as a haibun presents me with a relatively contemporary example of haibun that takes biology and physics as the

subject, rather than psychology and oncology.[110] I am partially employing this reading to craft a template for myself for evaluating my own biology and chemistry infused haibun in the following chapter.

Redefining the sentence fragments as haiku locates them in the tradition of writing about landscape and time which are closely allied with the biological references in content to developing organisms unfolding through time. The diminutive size of the fragments as haiku in comparison to the prose elements of the text creates a context for considering growth. The growing and unfolding organism is placed in tension with the already grown; this juxtaposition of haiku and prose makes a mockery of the empirical reliance on measurement. The haiku are not diminutive or immature version of prose poems, they are a different and complementary part of the poetic ecosystem formed by the haibun. What is remarkable here is that the irony is transdisciplinary in nature; it is commenting on scientific discourse by means of a poetic form. I suspect that Prynne would delight in this ironic reading of his use of form based on his extensive employment of satire throughout *The Plant Time Manifold Transcripts*. This transgression of disciplinary boundaries in the text makes use of the differences between the discourses to illuminate themselves. Barad writes of her strategy for attending to difference instead of hierarchy:

> So unlike the all-too-common approaches that are anxious to explore unilaterally the lessons of physics for social and political theories, exploiting what is seen as the greater epistemological value of the natural sciences over the human sciences, or to

[110] In the previous chapter, I discussed how Kosofsky Sedgwick incorporated hematology, oncology, and psychology into her book length haibun. Her use of form is more closely aligned with my own creative practice, while Prynne's choice of scientific discourse is more closely aligned with my preferred field of inquiry.

> take a contrary instance, attempts by scholars who would counter the overblown authority of science by suffusing a reversal whereby the social sciences would be a model for the natural sciences, my approach is to place understandings that are generated from different (inter)disciplinary practices in conversation with one another. That is, my method is to engage aspects of each in *dynamic* relationality to the other, being attentive to the iterative production of boundaries, the material discursive nature of boundary-drawing practices, the constitutive exclusions that are enacted, and questions of accountability and responsibility for the reconfiguring of which we are a part.[111]

It is only by attending to these boundaries and by redrawing the boundary around translation to include the literal, natural, and social methods of translation, that the difference between the methods and their underlying theories can be appreciated. *The Plant Time Manifold Transcripts* employs dialogue, form, and discipline-specific terminology in order to translate science and poetry through each other. Therefore, in order to avoid paradoxes, it is necessary to attend to disciplinary and even interdisciplinary boundaries when deploying a novel metaphor.

The relationship between the sentence fragments in *The Plant Time Manifold Transcripts* and haiku, in both the English and Japanese language traditions, is essential to redefining the text as a haibun. Bashō, the master haiku writer, is credited by the Princeton Encyclopedia of Poetry and Poetics with creating the haibun form, when he introduced

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[111] Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham, NC: Duke University Press, 2007), p. 93.

elements of meter and other poetic craft into his prose writing.[112] He utilized this new hybrid form for keeping diaries of his travel throughout Japan during his lifetime from 1644-1694.[113] Bashō was experimenting with his journaling practice and in doing so he created a hybrid form meant to bridge poetry and more personal journal practice by placing the two forms of writing in dialogue with one another. The entry on haibun in the Princeton Encyclopedia of Poetry explains: 'One rhetorical feature linking med. poetic travel diaries to each other as well as to earlier and later diaries is the trad. of *utamakura* (poetic toponyms) that informs many of them.'[114] Prynne employs a scientific, as opposed to poetic toponym, marking the end of *The Plant Time Manifold Transcripts* with a chemical representation of lichenoic acid. This reduction of one of the main characters to a residue, a part of the character, appears to mark the death of the character, an event which occurs in time and space, in the ecosystem of the text. Indeed, the chemical image as a haiku is witnessed and reported by the author/ transcriber, so that the presence of lichenoic acid marks the passage of time and the precise location in space. The deployment of an image is deceptively simple, as it contains more information to a botanist or chemist than any combination words totaling seventeen syllables could in the English language. The moment that Prynne gives the reader is one of mathematical clarity of expression, as opposed to the complex, double entendre-laden language of the speakers of the poem. Prynne gives the reader an image that is part picture and part language, the images and equations require a reader trained in mathematics as well as literature to connect their meaning to the rest of *The Plant Time Manifold Transcripts*. Prynne has found a way to represent this difference without recourse to the complicated

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[112] 'Haibun' in *The Princeton Encyclopedia of Poetry and Poetics*, ed by Roland Greene, Stephen Cushman, Clare Cavanagh, Jahan Ramazani, Paul F. Rouzer (Princeton, NJ: Princeton University Press, 1965), p.756-757.

[113] Ibid, p. 757.

[114] Ibid, p. 757.

relationship between Anglo-American syllabic poetry and the traditional Japanese haiku.[115] His images satisfy the haiku's requirement for attention to season and time, whether by including time as an axis in the graph or a variable in the equation. Prynne's experimental haibun utilizes mathematical language to engage with a poetic form from another language, rather than simply deploying an English language appropriation; this is an example of how the practice of translation as interpretation can manifest as experimental poetry. The Princeton Encyclopedia of Poetry defines a haiku as 'concision, perception and awareness—not a set number of syllables.' This emphasis on engagement with the natural world, of a bidirectional exchange between human and nonhuman, is what distinguishes haiku from senryu, which focus on human to human and cultural moments instead. The haiku is a compelling form for experiment because it seeks to transcend boundaries between nature and culture (with regard to content), just as *The Plant Time Manifold Transcripts* does in terms of form and content. The equations are images given to the reader in a form other than prose, and yet, written within the same language; it is this tension within language, with the variation possible in language, that makes the haibun a transdisciplinary mode of writing.

While the majority of *The Plant Time Manifold Transcripts* superficially appears to be a long prose poem or a short story, a deeper consideration of the outlying elements of the text, —those that are not complete sentences — reveals them to be performing a function analogous to the haiku. There are no incomplete sentences in the text; there are only

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[115] Richard Gilbert and Judy Yoneoka provide a thorough analysis of the relationship between English and Japanese language haiku.

Richard Gilbert and Judy Yoneoka, 'From 5-7-5 to 8-8-8: Haiku Metrics and Issues of Emulation—New Paradigms for Japanese and English Haiku Form,' *Language Issues: Journal of the Foreign Language Education Center* 1 (2000) <https://www.gendaihaiku.com/research/metrics/haikumet.html> [accessed 30 July 2020].

experimental haiku present. These equations, images, and lines, lack the formal elements that Anglo-American readers traditionally associate with the haiku; they are not three lines long, they do not contain the prescribed seventeen syllables. They do, however, exist in complementary relationship to the prose, in tension with the complete and grammatically correct English sentences of the majority of the text. Attending to the components of *The Plant Time Manifold Transcripts* that cannot be read as prose, and reading them as haiku instead, facilitates a more comprehensive interpretation of the text as a whole. As we observed earlier with Eve Kosofsky Sedgwick's haibun, these haiku are a part of the whole poem and cannot be completely assessed without their prose counterpart. The movement from prose poem, imitating scientific discourse, while simultaneously undermining the very same through sustained punning, stands in contrast to the simplicity of the short lyric fragments that follow.

> Time-averaged protein tubes comprise the meshwork of willbean functioning, held in semirigid array by double reverse backflow or "dream membrane. CRU realtime process models emphasized these memory-dream bilayers and associated gradients, as (for example):
>
> *Thermal dreams to the face of*
>
> to
>
> *will vary to the face that past dream*[116]

[116] Prynne, p. 238.

These short line fragments address the transience of dreams, just as more traditional haiku take the transience of the seasons as their subject. When the preceding prose elements are taken into account, the haiku here are representing the internal state of the sentient plants that are the subject of the experiment being reported upon in the prose body of the text, where they are objectified. In this section, Prynne is exploring ways in which scientific experiments on living organisms come into tension with our sympathy; he has given the plants a voice through haiku. By italicizing these haiku, Prynne has clearly marked them as the speech of others within a poem, others here referring not to the speech of the transcriber or the plant scientists conducting the experiments (who are given quotation marks to identify their speech). In a text that has already conflated the notions of author and transcriber by showing itself to be entangled with bearing witness to event, this subject-object reversal is the most daring use of poetic artifice yet. The reader is tasked with sympathizing with the subjects of the experiment, where subject can mean principle investigator or object of investigation in scientific discourse. The voices of the plants as investigators are heard through the haiku, making them essential to interpreting *The Plant Time Manifold Transcripts* as a whole.

Comparing and contrasting *The Plant Time Manifold Transcript's* utilization of the haibun form with Kosofsky Sedgwick's *A Dialogue on Love*, permits a fuller exploration of writing with scientific discourse in this form. I will explore the different ways in which these two poets engage with haibun, thus creating a broader discussion of the transdisciplinary possibilities of this form. Kosofsky Sedgwick and Prynne both employ the discontinuous nature of the haibun form in order to portray narratives where their protagonists are, if not in direct conflict with, are at least in tension with time. The tension between the haiku and the prose elements of the haibun lend themselves to turns of meaning and association; the form

illustrates the movement of thought. Prynne employs the haiku to create images of time, where he represents the passage of time by means of mathematical equations.[117]

Figure 1: Against Equations

$$c(t) = \frac{c_2 - c_1}{t_2 - t_1} [c_2 t_2 - \exp(-t)]$$

This is a recreation using iMathEQ of one line of the equation refereed to above, Prynne p.240

The equation given could be plotted with graphing software to yield a visual representation, a true image in which time is the horizontal axis of the graph. Here the letter as variable *c* takes the vertical axis on the graph, because Prynne is utilizing *c* as the physical constant for the speed of light in a vacuum. *The Plant Time Manifold Transcripts* is exploring the experience of the discontinuity of time through physics and physical chemistry. *A Dialogue on Love* explores the experience of the discontinuity of time through medicine, specifically focusing on talk therapy and oncology; this complementary approach illustrates the discontinuity reflected in the treatment of mental and physical illnesses. Medical intervention, in the form of modern Western treatments for cancer, can either extend the overall survival or cure the patient; together, these options forestall the death of the patient. The cancer

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[117] Ghazal Mosadeq employs mathematics in her pamphlet, *Supernatural Remedies for Fatal Seasickness; Highly indivisible but nevertheless in nineteen sections*, which I read as an experimental haibun. Like Prynne, she has interspersed images, summations symbols, and shorter lines, and foreign languages within the longer prose poem. This tension between two different components with attention to the passage of time and changing geography is characteristic of the haibun. Taken together, Mosadeq and Prynne's haibun suggest the possibility that British experimental poets are beginning to adopt the form to explore transdisciplinary work.

Ghazal Mosadeq, *Supernatural Remedies for Fatal Seasickness; Highly indivisible but nevertheless in nineteen sections* (London: Gang Press, 2018).

diagnosis means that the patient's life expectancy is immediately shorter than previously predicted/assumed, although a cancer diagnosis is no longer synonymous with a death sentence. This 'time' that the treatment 'gives' to the patient is not a simple gift; indeed it is often fraught with a question about how much time there is left for the patient, the likelihood of recurrence or progression. The calculation of survival time is further complicated by the measurement of the quantity of time versus the quality of time, which comes into play with the option of palliative care versus aggressive treatment. Time ceases to be linear for the cancer patient, it becomes more recursive, resulting in the problem of how to narrate cancer time, or rather the lifetime of the once and future cancer patient. Eve Kosofsky Sedgwick discusses with quiet poignancy her experience seeking help from a therapist in order to construct a new, post cancer diagnosis narrative for herself. She writes:

> "What kind of narrative," I want to know, "are we trying to construct—or do we think we need to construct—about Eve's history? I mean, what's the purpose of it, what do we want from it?
>
> As opposed (I don't say) to the transferential thing, which seems to grow like a weed from one day to the next.
>
> "Well," he says, "when I think about how I want you to *turn out* different, the thing about blaming yourself at the time is near the top of the list."
>
> I'm not surprised at that—it's pretty obvious—but am a bit surprised he'll admit to keeping a list of how he wants me different.
>
> But he also says

he wants me to have

a more continuous sense

of moving through time,

"Less spastic" is his gracious description. "to see yourself being more the same person."

Not identical

not grappled tight to myself,

just floating onward.[118]

In this exchange with her therapist, Kosofsky Sedgwick dramatizes the differences between a pathological and healthy sense of the passage of time in a singular human experience. She illustrates the ways in which mental illness can lead to anxiety and over-reacting to the passage of time as opposed to a more coherent experience of growth through time that her therapist is suggesting. The notion of psychological growth as a function of time is a positive experience for the self, whereas cancerous tumors grow through time and threaten the self. Kosofsky Sedgwick presents the reader with what at first appears to be a paradoxical relationship between the mental and physical; the passage of time being positive and negative. This conflict can be resolved by developmental biology, the science of the unfolding of the organism through space and time; this field of biology attends to the entire

[118] Eve Kosofsky Sedgwick, *A Dialogue On Love* (Boston, MA: Beacon Press, 2000), p. 60.

lifetime of the organism.[119] Developmental biology explores how time transforms the organism, how the material of the organism is translated through time from young to old.

The Plant Time Manifold Transcripts gives the further elaboration of how plants can exist through time, with attention to how organic life arises from inorganic components. These inorganic components are small simple organic molecules such as water, nitrates, and phosphates, the latter two are growth limiting factors for plants. As the narrator describes:

> In the transport of plant nutrients the support loop of the root system creates suction gradients from the inorganic system having existed (negative values) through the exponential increments post G(t) = 0 and into the positive finite velocities of plant life.[120]

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[119] John Dewey gives a complementary account of the role of time in *Art as Experience*. He considers the relationship between the development of art and the artist as mediated by time. He writes:

> Time as organization in change is growth, and growth signifies that a varied series of change enters upon intervals of pause and rest; of completions that become the initial points of new processes of development. Like the soil, mind is fertilized while it lies fallow, until a new burst of bloom ensues.

Indeed, for Dewey, the mind of the artist is comparable to a perennial plant, requiring periods of rest between growth. There is no textual evidence that this metaphor influenced *The Plant Time Manifold Transcripts*, so this appears to be a case of convergent evolution of metaphors for creativity. The philosopher appears to have anticipated the thinking of both the poet and biologist, Prynne and Sweeney respectively.

John Dewey, *Art as Experience* (New York: Tarcher Perigee Books, 2005), p. 24.

[120] Prynne, p. 235.

Here it is revealed that the y axis of the graph is growth; therefore the equation reads that growth is a function of time, and when the time is zero, so is the growth.[121] The coordinates described above (0,0) in the Cartesian system have a special name: the origin. Prynne appears to be graphing the process of plant growth in Cartesian coordinates in order to make a point about the word 'origin' itself, specifically its association with evolutionary biology and Charles Darwin's seminal text, *The Origin of Species*.[122] Prynne is employing the word origin as another nodal word in *The Plant Time Manifold Transcripts:* it is bearing a mathematical and biological significance as well as the common denotation. This extensive definition of the word 'origin' is important front-loading of information for the reader; it foreshadows the significance the origin will play in the unfolding drama of the poem, indeed connecting evolutionary and developmental biology. This entanglement of matter and time, where matter as the rate of growth is a function of time, aligns with the way in which Prynne utilizes the mathematical equations set against the speed of light in a vacuum as a function of time. The role of light in plant growth is discussed earlier in *The Plant Time Manifold*

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[121] Susan Langer argues that flat and declarative statements, more common to science than poetry, serve a similar function in both discourses. They facilitate world building through communicating important facts to reader; they operate at a different level of poetic artifice than syntax. She states that 'if direct statements occur in a good poem, their directness is a means of creating a virtual experience, a non-discursive form expressing a special sort of emotion or sensibility; that is to say, their *use* is poetic even if they are bald assertions of fact.' Prynne creates a virtual experience through using a mathematical equation as a metaphor for the reader; it is a statement about the identities of things inside the world of the poem.

Susanne K Langer, *Feeling and Form: A theory of art developed from Philosophy in a New Key* 9th edn. (New York City: New York, Scribeners, 1977), p. 228.

[122] In the conclusion to the first edition of the *Origin of Species*, Darwin describes with awe the infinite diversity that emerges from the point of origin. He writes:

> There is grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.

The view of life, both its development and evolution, is grounded in notion that life is always traveling further from its origin. The process is as important in poetry as biology.

Charles Darwin, *On the Origin of Species* in Project Gutenburg (London, UK: John Murray, 1859), p. 490 <https://www.gutenberg.org/files/1228/1228-h/1228-h.htm> [accessed 15 March 2019].

Transcripts as well as cited with respect to the research by Beatrice Sweeney, who is herself working in developmental biology. This resonance between Kosofsky Sedgwick and Prynne illustrates the commonality of the questions they are exploring, and this is not only synchronicity. Instead, this is evidence of the very generality of such questions about translation and time across poetry and science; what *A Dialogue on Love* and *The Plant Time Manifold Transcripts* show is that such concerns cannot be adequately discussed through one discourse.

Against the Evolution of Metaphors

The Plant Time Manifold Transcripts presents the reader with a sophisticated discussion of the evolution of intellectual thoughts and the specialization of fields of research. Prynne deploys a multifaceted approach to the notion of the origin of intellectual thought. Throughout the text he makes direct and indirect reference to both the connotations and denotation of the word 'origin'; indeed, the entire poem might be summarized as a discussion of origin. The origin of the content of the poem is clearly demonstrated through the presence of partial citations of philosophical and scientific texts; these references show the reader the literal origins of the text; they present evidence for the intellectual foundation as well as relevant sources to consult. These citations make explicit the conditional nature of knowledge by including detailed information about the sources of information in the poem. Relatedly, Richard Rorty discusses the importance of attending to the conditional nature of knowledge in order to gain a greater breadth of knowledge as opposed to depth. He writes:

> Once one gives up on unconditionality, one will cease to use metaphors of getting down to the hard facts as well as metaphors of looking up toward grand overarching structures… This shift substitutes horizontal for vertical metaphors of intellectual progress, and thereby abandons the notion that mind or language are things that can be got right once and for all.[123]

It is the inclusion of more information, the ever-increasing breadth of the discourses included in the poem that is evidence of horizontal metaphors for intellectual progress supplanting

[123] Richard Rorty, *Philosophy as Poetry (Page-Barbour Lectures)*, Kindle edn (Charlottesville, VA: University of Virginia Press, 2016), p. 868-869.

vertical ones in *The Plant Time Manifold Transcripts*.[124] Prynne foregrounds the breadth of discourses included in the text by incorporating the references into the body of the text rather than backgrounding them in footnotes or endnotes. The partial citations may be read as a defense of the poet's research or as guidance to the direction of the fields to which the fictional characters draw their arguments, with either interpretation; they are clearly asserting the authority of the statements in the poem. The citations are incomplete as well as partial, each citation provides the minimum amount of information necessary to determine the unique text referenced: none are complete. The citations are scattered throughout and embedded in the text as opposed to footnotes or endnotes; therefore, they interrupt the texture of the prose poem and the text takes on the appearance of being in transition.

The direction of transition of the text from poem to journal article, or the reverse, from journal article to poem is ambiguous, one of many examples of bidirectional travel littered throughout the text. *The Plant Time Manifold Transcripts* also moves from above ground to below, from genotype to phenotype, from present to past, from professor to graduate student, from poetry to science. The dialogue of the characters moves forwards and

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[124] There are many derogatory sayings meant to warn students against favoring intellectual breadth over depth. The most commonly recognized is: Jack of all trades, master of none. One saying local to the state of Pennsylvania is particularly apt to Rorty: the Susquehanna is a mile wide and an inch deep. Archeologist and historian Robin Van Auken explains the inspiration for this saying:

> The ancient river is possibly the oldest major system in the world, far older than the mountains through which it flows. Geologists believe that the mighty Susquehanna cut through the mountains even as they were forming nearly 300 million years ago. If so, the river predates the Atlantic Ocean. Time, however, has reduced the river to a shallow waterway. Early settlers lamented that the Susquehanna was "a mile wide, a foot deep." The West Branch of the Susquehanna River, when navigable, afforded an economical and ready means of transporting articles down river, but to push a large boat or even a canoe against the rapid current, or over the shoals and rifts, was a formidable undertaking… The second attempt, however, ended in disaster. The "Susquehanna," at 80-feet with a beam of 14 feet, carried nearly 200 people. On May 3, 1826, the ship attempted to pass Nescopeck Falls (also called Nescopeck rapids). There, the river's high ridge and shallow water forces the water into a narrow channel, creating a whirlpool. Navigation there is normally impossible, but the captain thought that the high water would permit it. The steamboat went aground on the rocks near the shore.

Robin Van Auken, *Mighty Susquehanna* (2019) <https://handsonheritage.com/mighty-susquehanna/> [accessed 8 March 2019].

backwards as a spirited exchange, where the direction of the conversation only sometimes aligns with the direction of movement of the text through other categories. The nature of the conversation moves from academic to personal, from polite to rude, and from sober to increasingly inebriated. Of the characters who speak within the poem, Professor Quondam Lichen is given the most lines, although he becomes increasingly incoherent over the course of the conference. He begins relatively early on, already slurring his speech (while) criticizing the dominant metaphor deployed in the study of plant evolution.

> The metaphor of relative elevation in the hierarchy of morphogenetic sophistication is all too crudely suggestive. And though of course I respect your own scr-r-ruptulous objectivity there are too many today who confuse height above ground with innate developmental superiority.[125]

Here Professor Quondam Lichen is modeling the same reading strategy as this discussion has deployed; he is making explicit the metaphor that scientists utilize as an interpretative lens in order to challenge these researchers' interpretation of the data. This implicitly accepted metaphor for the literary theorist is a paradigm to the historians and philosophers of science, therefore, the professor is modeling a strategy by which literary theorists might contribute to and collaborate with scientists. That the humanities and natural sciences overlap should not come as a surprise when these fields are asking the same questions; they differ in the methodologies they employ to generate answers. It is precisely this difference in methodologies that makes interdisciplinary work so valuable; the differences in skills and training facilities a multifaceted approach to collaboration. The literary theorist's training in

[125] Prynne, p. 236.

parsing metaphors complements the scientist's training in synthesizing the results of their research because the scientists are unconsciously employing conceptual metaphors.

Prynne deploys metaphor and multiple and non-reducible levels in the text; there is the metaphor of vertical height being equivalent to evolutionary sophistication, and there is the metaphorical relationship between the characters and their research on evolutionary sophistication. Here the text is preempting Rorty's argument that it is important to consider the breadth as well as depth of knowledge. The text also refers to itself, its discussion, and the passages of time in complex and overlapping and looping ways; it contains multiple levels of artifice and inquiry. The time-line as well as the vertical growth serve as the axis of the coordinate system of *The Plant Time Manifold Transcripts.* The text has created within itself a partial translation into mathematics by means of algebraic equations and graphical representation. In this way, Prynne is able to deploy terms such as 'origin' as having multiple meanings derived from the source and target languages of the translation. OED defines origin (also origins) as the point or place where something begins, arises, or is derived. It is early 16th century: from French origine, from Latin origo, origin-, from oriri 'to rise'. To begin to rise is evidence of the development of many plants, to grow out of the ground and towards the sun as well as growing roots deeper in the ground below. Carrots or Daucus carota are the ideal example of this vertical growth pattern; the plants appear almost as lines in the garden, as the vertical axis of Cartesian coordinates. Lichens, on the other hand, appear to grow horizontally despite obeying a similar developmental pattern. Indeed, the only way in which lichens might gain a height greater than their width, is by settling on a tall substrate, and being taken as a part of that substrate; the lichen would be metaphorically standing on the shoulders of a giant. The horizontal growth pattern of lichens can be

interpreted as the horizontal axis of the graph, which would implicate any points on the graph as points in the conversation between Professor Quondam Lichen and Professor Daucus Carota. The equations interspersed throughout *The Plant Time Manifold Transcripts* would, therefore, represent the trajectory of the argument between the two. Quite simply, the carrots and the lichens are talking at cross purposes; their comments intersect only briefly at specific points in the Cartesian coordinate system, and this relationship suggests a metaphor for poetry and science; that they too intersect at very specific points in their respective discourses.

The notion of plant growth operates metonymically, standing for changes in physical size, development, evolution, increasing stature of the researcher working on the plants, and the community's evaluation of the researcher's work on the plant. This idea that growth can be measured in the rise and height of the plants is a gross oversimplification, as Professor Quondam Lichen points out at the beginning of the argument. However, the professor, by this time suspiciously slurring his words, also commits a major oversimplification. He conflates developmental biology with evolutionary biology, in a similar fashion to that by which Ernst Haeckel's Law stated that ontogeny recapitulates phylogeny.[126] The pattern of development of a species does not necessary display the whole pattern of evolution of complex life. The question of the extent to which development and evolution are entangled is one which has been keeping biologists busy to the present day. Time cuts through this content between developmental and evolutionary biology, and for this reason it makes an equally compelling claim on the horizontal axis of graph. The role of time in the text

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[126] Ernst Haeckel, *Generelle Morphologie der Organismen. Allgemeine Grundzüge der Organischen Formen-wissenschaft, Mechanisch Begründet Durch die von Charles Darwin Reformirte Descendenztheorie* (Berlin: G. Reimer, 1866).

becomes increasingly clear the further into the transcripts one reads; in the latter half of the text, there are equations explicitly giving values for *t* (time) with respect to the conference. The relative height of the plant biologist researcher is in reference to Sir Isaac Newton's famous quotation: 'If I have seen a little further it is by standing on the shoulders of Giants.'[127] This quote is not original to Newton, it is a modification of a saying from the Middle Ages, a diminutive reference to the work of medieval catholic scholars; that although they were dwarves in comparison to the giants of the ancient world, they might yet see a little further by standing on their shoulders.[128] This metaphor highlights the importance of scholarship and research over individual genius and originality; it emphasizes the collaborative nature of the scientific process. Newton's characterization of his success maps onto Thomas Kuhn's characterization of normal science, which he defines to mean 'research firmly based upon one or more past scientific achievements, achievements that some particular scientific community acknowledges for a time as supplying the foundation for its further practice.'[129] Time is acknowledged as entangled, if not proportional to scientific progress, just as it is in *The Plant Time Manifold Transcripts*. The use of the word foundation reveals a conceptual metaphor, in which accepted past scientific research is the foundation for future research, just as the concrete poured into the hole in the ground is the foundation for building a house. It is important to note that vertical height as distance from the origin has reappeared in the historian of science's account of scientific progress. History of science is

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[127] Jamie L. Vernon explains that Isaac Newton used this phrase in a letter, dated 1676, to Robert Hooke discussing the advancement of scholarship in general and optics in particular.

Jamie L. Vernon, 'On the Shoulders of Giants,' *American Scientist* 105.4 (2017), p. 194 <https://www.americanscientist.org/article/on-the-shoulders-of-giants> [accessed 6 March 2019].

[128] John of Salisbury, *The Metalogicon of John of Salisbury: A Twelfth-Century Defense Of The Verbal And Logical Arts Of The Trivium*, trans. by Daniel D. McGarry (Berkeley: University of California Press, 1955).

[129] Thomas S Kuhn, *The Structure of Scientific Revolutions*, 50th anniversary edn (Chicago, IL: University of Chicago Press, 2012), p. 10.

itself a revolutionary field, to utilize Kuhn's own terminology, because it discusses paradigms alternative to the current one deployed by normal science, and it is analogous to Prynne's project to transcend poetry and science by means of metaphor. Kuhn's description of normal science aligns with the 'academic plants' discussion at the conference in *The Plant Time Manifold Transcripts*.

Prynne's dramatization of how research addressing a specific question in a specific scientific discourse progresses is applicable to the way in which science in general progresses; it raises a question about the ways in which it might be applicable to the progression of all knowledge. To what extent are *The Plant Time Manifold Transcripts* making universal claims about the advancement of human knowledge or to what extent is philosophy of science applicable to all knowledge accumulation? Where does this leave other academic and intellectual types of knowledge?[130] These are transdisciplinary questions because they require answers that transcend disciplinary boundaries. This action of creating new connections is precisely what Prynne, the mysterious transcriber, and Professor Quondam Lichen are doing in the text; these diverse entities are embodying the theory at the content and formal level. When Professor Quondam Lichen believes that he has completed his translation of the conference, he concludes by removing himself from further action.

> But this again was before the more sane label, the negative flower of the Cosmos, itself after the recognition of polynucleotides streaming out from the epoch such as shine in our speech like the glorious stars in Firmament. There is a set of loops

[130] Although these questions appear to be leading towards a grand unification theory of all branches of knowledge, they are not and my thesis is not advocating of the removal of boundaries between disciplines. I am quite simply arguing that attending to these boundaries through a bidirectional exchange will reveal insights that a disciplinary approach will not. Therefore, I have neglected Edward O. Wilson's *Consilience* because his thesis reduces the humanities and social sciences to the natural sciences in order to unify all fields of knowledge.

somewhere in this great & forcible flood like the aurora and in this total purge of the horizon both ways I stop before I do.[131]

With this conclusion, the partial literary translation and biological translation are also concluded, giving a temporal continuity to the three different types of translation presented in the text. Prynne's transcending of the boundaries of multiple discourses by means of partial translation from one discourse into another demonstrates the potential for academic progress to occur across disciplinary boundaries.

The Plant Time Manifold Transcripts suggest that a bidirectional exchange between poetry and science can prove beneficial to the advancement of both discourses. This stands in contradiction to those philosophers of science who have demarcated science from other discourses, whether for the benefit of science or other fields of inquiry. The logic underlying the demarcation problem (as it is known in philosophy of science) is that there is a potential for conflict between science and other discourses and that it is better to avoid this conflict because it is unproductive.[132] Stephen Jay Gould's characterization of the relationship between science and religion holds some interesting analysis that is relevant to the relationship between science and poetry as well. In his essay, 'Non-Overlapping Magisteria' first published in the Natural History Magazine 1997, and subsequently included in his 1999 book, 'Rock of Ages,' Gould discusses the demarcation problem: how to differentiate

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[131] Prynne, p. 242.

[132] Latour argues in his essay, "Thou Shall Not Freeze-Frame," Or How Not to Misunderstand the Science and Religion Debate, that the two systems of understanding do not share any salient features in common. He writes: 'neither science nor religion is much interested in the visible: it is science that grasps the far and distant; as to religion, it does not even try to *grasp* anything.' While this argument is utterly dependent upon his own interpretation of Catholicism and contemporary science, it does complement Gould's argument.

Latour, p. 110.

between science and religion, arguing for a clear division between the two fields. Gould writes that:

> Science tries to document the factual character of the natural world, and to develop theories that coordinate and explain these facts. Religion, on the other hand, operates in the equally important, but utterly different, realm of human purposes, meanings, and values—subjects that the factual domain of science might illuminate, but can never resolve.[133]

Gould is arguing that science and religion are pursuing two separate questions, that their fields of inquiry, their respective magisteria do not overlap and therefore, do not come into any conflict. The non-overlapping magisteria argument has been extended to science's relationship to all other discourses, including literature. The discussion in this chapter suggests the opposite, however; that although scientists and humanists may sometimes talk at cross purposes, there is also a tension, which I will characterize as a friction between the two. Alice in Wonderland Philosophy and Through the Looking Glass Poetics attend to this friction. The tension, rather than leading to a long unresolved conflict, can lead to a productive cross-examination of methodology and results, yielding a more rigorous approach to contemporary research questions. In the following chapter, I will discuss how my creative work attends to the boundaries between the natural sciences, social sciences, and humanities.

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[133] Stephen Jay Gould, *Rocks of Ages: Science and Religion in the Fullness of Life* (New York City, NY: Ballantine Books, 1999), p. 241.

CHAPTER 3: AGAINST EXEGESIS

Against Reviewers

This chapter is intended to lead the reader out of a discussion of work by more established poets and into a discussion of my own work with reference to the creative component of my thesis. I categorize my own work as an example of what I have termed Alice in Wonderland Philosophy, approaching the arts and humanities from the perspective of an individual trained in the natural sciences. In this chapter, I will explore how my work might be meaningfully interpreted by analyzing the reviews of my first pamphlet and first full-length collection. The creative component of my thesis is titled *Phenomenology of the Feral* and has been published as a collection of poetry by Knives Forks Spoons Press (2017) under the same title. The first section of *Phenomenology of the Feral*, 'Zeroing Event,' was published by Zarf Poetry in 2016 as a pamphlet under the same name. In essence, I am employing the same methodology to discuss the creative component of my dissertation as I did to discuss *The Plant Time Manifold Transcripts*, by assessing the extent to which practitioners in the humanities can engage with my partial translation of science into poetry. I make this assessment in part by looking at reviews of the work in the creative component of my dissertation, as a means to explore poets' response to my transdisciplinary work.

In the first section of this chapter, I will utilize Emily Hasler and Alice Tarbuck's reviews of my work to explore how my transdisciplinary creative writing is understood by some readers of poetry. In the second section, I will discuss the reviews of Katy Lewis Hood and Eileen Tabios to show how my work functions as a boundary object within science studies and poetry. Finally, I will consider how the work makes novel connections between poetry and science, using Jazmine Linklater and Anthony John's reviews.

C.P. Snow in his infamous *Two Cultures* thesis argued that there is a distance between the humanities and natural sciences that prevents meaningful exchange between the two.[134] Snow writes: '[l]iterary intellectuals at one pole—at the other scientists, and as the most representative, the physical scientists. Between the two a gulf of mutual incomprehension—sometimes (particularly among the young) hostility and dislike, but most of all lack of understanding.'[135] While I have drawn on the natural sciences, medicine, philosophy, and sociology in my dissertation, my research seeks to engage with the gulf between poetry and science. The gulf between the humanities and the natural sciences continues to have implications for all intellectual work. As Paul Grobstein writes:

> Fifty years later, that gap not only remains troublesome and in need of bridging (Gould, 2003; Grobstein, 2005a), but has taken on a still broader significance. It is not only, or even primarily, scientists and humanists who are reluctant to engage in meaningful exchange. Such reluctance is present as well within disciplinary communities and between a wide range of larger groupings, such as the academic and the non-academic worlds, and different ethnic and political cultures. In the contemporary context, it is particularly important not only to find ways to bridge such gaps, but to encourage, and model for others, effective ways of doing so. Recognizing the productive value of the reciprocal exchanges between metaphoric and metonymic

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[134] C. P. Snow's thesis provoked an immediate and vehement rebuttal from the prominent literary critic F.R. Leavis in his 1962 Richmond Lecture. This clash between two high profile academics brought the issue of a gulf between the humanities and natural sciences to the foreground. See Lisa Jardine. 'Lecture I. The Sorcerer's Apprentice: C. P. Snow and J. Bronowski', 'Lecture II. Science and Government: C. P. Snow and the Corridors of Power.' 11–12 April 2012. The Tanner Lectures on Human Values delivered at Yale University.

[135] C. P. Snow, *The Two Cultures*, reissue edn (Cambridge, England: Cambridge University Press, 1959), p. 4.

> understandings of people with different areas of expertise and experience seems to us a promising step in that direction.[136]

I will employ this gulf described by Grobstein as a metaphor in order to help the reader visualize the relative geography of academic discourses. To put it most simply, I see my work as a path through the gulf, one that becomes increasingly easy to traverse the more people travel it. Like college students creating desire lines or cow paths on the college campuses in order to be able to move from one building to another more easily, so I am one of many treading a path through the gulf between the poetry and the natural sciences.[137]

My exegesis will guide the reader out of my transdisciplinary explanation of the work by drawing on others' engagement with and reviews of my creative work. While I acknowledge that each individual review represents a limited, material, and subjective engagement with my work, I have argued that the discipline-specific perspective they offer is useful in evaluating my writing as poetry. Richard Rorty defines this sort of complex reflective practice as edifying philosophy; when we engage with our knowledge in partial and metaphorical ways in order to make connections with the unfamiliar or unknown. He writes:

> The attempt to edify (ourselves or others) may consist of the hermeneutic activity of making connections between our own culture and some exotic culture or historical

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[136] Anne Dalke, Paul Grobstein, and Elizabeth McCormack. 'Exploring Interdisciplinarity: The Significance of Metaphoric and Metonymic Exchange,' *Journal of Research Practice* 2.2 (2006) <http://jrp.icaap.org/index.php/jrp/article/view/43/54> [accessed 13 April 2019].

[137] My work traverses parallel paths between poetry and science as the writing of SJ Fowler (discussed in chapter 1) and Mei Mei Berssenbrugge (discussed in section 3 of this chapter) as well as the poetry and literary criticism of Veronica Forrest-Thomson (as discussed in chapter 2). Among my contemporary fellow-travelers, I count Harry Man, Holly Corfield Carr, and Eleanor Perry.

> period, or between our own discipline and another which seems to pursue incommensurable aims in an incommensurable vocabulary. But it may instead consist of "poetic" activity of thinking up such new aims, new words, or new disciplines, followed by, so to speak, the inverse of hermeneutics: the attempt to reinterpret our familiar surroundings in the unfamiliar terms of our new inventions… For edifying discourse is *supposed* to be abnormal, to take us out of our old selves by the power of strangeness, to aid us in becoming new beings.[138]

Answering Rorty's notion of 'edification,' I have created new connections between poetry and philosophy of science. The point of my engaging with reviews is that they are written by poets, some more normal and some more abnormal, but still poets being published in the contemporary UK poetry scene. These poets interpret my work along disciplinary lines; they attend to the ways in which *Phenomenology of the Feral* demonstrates poetic craft and engagement with the literary tradition.

[138] Richard Rorty, *Philosophy and the Mirror of Nature* (New Jersey: Princeton University Press, 1981), p. 360.

Against the Gulf between Poetry and Science

Alice Tarbuck wrote the first review of my poetry pamphlet *Zeroing Event* for *Sabotage Reviews*; she considers the significance that my transdisciplinary writing holds for poetry readers.[139] She discusses the ways I employ poetic craft to bring the abstract together with the intimate, to incorporate the scientific discourse into a casual conversation.[140] Her discussion of metaphor and interdisciplinarity helps me to assess the extent to which my work succeeds as Alice in Wonderland Philosophy and Through the Looking Glass Poetics. I want to share my familiarity, my intimacy with scientific discourse with poetry readers. Tarbuck's review discusses how I employ metaphors to make scientific reference more familiar, as follows:

> Ascribing material qualities to poetry, whilst also testing its metaphoric ageless longevity, reveals a characteristic inter-disciplinary dialogue in Lewis' work. Speaking of poetry using scientific vocabulary allows it to be seen anew, freed of certain types of allusion and imbued with others. Lewis' work moves seamlessly between frames of reference.[141]

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[139] Sabotage Reviews is dedicated to commentary on the poetry pamphlets and short stories.

'About,' *Sabotage Reviews* (2019) <http://sabotagereviews.com/about/> [accessed 2 November 2019].

[140] Tarbuck read at the joint launch for my pamphlet and Peter Manson's pamphlet, *Factitious Airs* (2017). She reviewed the first three Zarf Editions pamphlets for *Sabotage Reviews*: mine, Manson's, and Vicky Sparrow's *Notes to Selves* (2017).

Alice Tarbuck, 'Zeroing Event by Julia Rose Lewis,' *Sabotage Reviews* (2017) <http://sabotagereviews.com/2017/03/06/zeroing-event-by-julia-rose-lewis/> [accessed 6 April 2019].
Alice Tarbuck, 'Notes to Selves by Vicky Sparrow,' *Sabotage Reviews*(2017) <http://sabotagereviews.com/2017/06/01/notes-to-selves-by-vicky-sparrow/ > [accessed 6 April 2019].
Alice Tarbuck, 'Factitious Airs by Peter Manson,' *Sabotage Reviews*(2017) < http://sabotagereviews.com/2017/03/06/factitious-airs-by-peter-manson/> [accessed 6 April 2019].

[141] Alice Tarbuck, *Zeroing Event by Julia Rose Lewis*

Tarbuck here attends to the ways in which I use metaphor to attempt to bring the abstract and unfamiliar elements of the natural sciences into an intimate relationship with poetry.[142] The poems in the pamphlet attempt to inform the reader about the abstract or unknown, by a process of reiteration of metaphors.[143] For instance, I use repeated references to the white rabbit throughout the pamphlet to make this creature familiar to the reader; with each mention, the rabbit is revealed in a slightly different context, which blurs the categories of identity in the reader's mind. The reader is able to identify the rabbit with the beloved character in Lewis Carroll's books; Alba, Paul Grobstein; an example of the Flemish Giant breed; and its own ghost.[144] Each iteration of the metaphor, however partial, is also additive, and this incomplete realization of metaphors from literature and science is intentional; the pattern of reader expectation for how to relate to each poem is both set in place and frustrated.

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[142] My writing incorporates unfamiliar elements of the natural sciences into criticism and poetry through the use of metaphor. In order to locate my own creative writing in the gulf between the humanities and the natural sciences, I will discuss the distance between the inception of the creative component of my dissertation and its realization through an engagement with the reception of my poetry by reviews. I am measuring the distance twice and cutting once as I cut a path through the gulf. I have employed several metaphors for constructing ways out of the gulf between the two cultures: bridges, footpaths, roads, because I do not believe that a single path or type of path will be sufficient. I am advocating for multiple approaches to making the gulf between the humanities and sciences easier to traverse.

[143] Anne Dalke, Paul Grobstein, Elizabeth McCormack, 'Exploring Interdisciplinarity: The Significance of Metaphoric and Metonymic Exchange,' *Journal of Research Practice* 2.2 (2006) <http://jrp.icaap.org/index.php/jrp/article/view/43/54> [accessed 13 April 2019].

[144] The gold rabbit, by its superficial difference in color and its ontological difference in being alive, evokes another kind of longing in the narrator, and the journey to and from encounters with the gold rabbit appears throughout *Zeroing Event.* The identity of the gold rabbit can be guessed, through a close reading of my dissertation in general and the poem 'So Just Fault' in particular. What is important to note about the gold rabbit is that it is alive and therefore a less consistent presence in the text than the ghost of the white rabbit. The black rabbit exists as the exact opposite of the white rabbit, invisible as the white rabbit is visible, and alive while the white rabbit is dead. The black rabbit appears rarely, functioning as a shadow for the white and gold rabbits; it is presently absent for most of the book. This shadow functions as a foil for the ghost and indeed the haibun itself as the black rabbit performs the role of the mundane, the same, the contentment of routine, and the delay of sympathy for another day. The white rabbit is the only rabbit to appear in all four sections of *Phenomenology of the Feral*, makings its presence more consistent than the other rabbits.

Tarbuck considers the effect I create through juxtaposing intimate and distancing diction within my poems and the extent to which my intimate tone moderates this effect. She notes how the familiar tone of the narrator creates a consistently casual mode of discussing scientific discuss that contrasts with the more common formal tone. Although she finds this effect uncanny, I wonder if a reader trained as a scientist would as well. I suspect a scientist might find the tone quite consistent with popular science writing, as in the works of Stephen Jay Gould; however the movement between different fields might disconcert. Tarbuck does not suggest that the casual use of scientific discourse in the poems detracts from her reading experience. She writes:

> Alongside these beautiful chains of reference and allusion, Lewis maintains an intimate diction. These parallel forces create an uncannily intimate tone through which distant, abstract concepts are brought into conversation.[145]

I use this uncanny intimacy of abstract concepts in my poetry to carry meaning and knowledge across a distance, where the distance lies not in physical separation, but rather in

[145] Alice Tarbuck, *Zeroing Event by Julia Rose Lewis*

the categories within our own minds.[146] Metaphors always seek to extend our knowledge, by illustrating the similar elements between a known and an unknown; they create partial connections between the known and unknown. In other words, metaphors can be employed to make the world more familiar. In *Women, Fire, Dangerous Things: What Categories Reveal about the Mind*, Lakoff argues that metaphor translates that which we have not experienced into that which is familiar; it makes learning through reasoning possible by carrying the characteristics of a known experience over to an unknown one. He writes:

> Metaphor provides us with a means for comprehending domains of experience that do not have a preconceptual structure of their own. A great many of our domains of experience are like this. Comprehending experience via metaphor is one of the great triumphs of the human mind. Much of rational thought involves using metaphoric models. Any adequate account of rationality must account for the use of imagination and much of imagination consists of metaphorical reasoning.[147]

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[146] The parallel forces that Tarbuck identifies in my poetry are vestiges of my experience working in chemistry and biology laboratories earlier in my career. From Susan White's laboratory at Bryn Mawr College, I recall the uncanny experience of cradling a rack of test-tubes containing E. Coli bacteria on their way to the incubator. The sense of tucking them into the machine and wishing them to grow or reproduce in order to reproduce the plasmid inside their cells that I wanted to study. The parallel forces of tenderness towards these organisms, and, simultaneously, my detachment towards destroying them to harvest the plasmid DNA. Haraway describes this same ambivalence towards life in the laboratory; she writes:

> the laboratory repeatedly figures as an uncanny place, where entities that do not fit, do not belong, cannot be normal—that transgress previously important categories—come into being. I am drawn to the laboratory for this essential narrative of epistemological and material power. How could feminists and antiracists in this culture do without the power of the laboratory to make the normal dubious? Raking ambivalence and strong visitations from culturally specific unconscious, however, are the price of this alliance with the creatures of technoscience. Reproduction is afoot here, with all its power to reconfigure kinship. In the proliferating zones of the undead, the kin categories of species are undone and redone, all too often by force.

The laboratory is a site where the abnormal and uncanny intersect within creatures. The common bacteria carrying the foreign plasmid sequence is its own metaphor.

Donna Haraway, *Modest_Witness@Second_Millennium.FemaleMan_Meets_OncoMouse: Feminism and Technoscience* (New York: Routledge, 1997), p. 354.

[147] George Lakoff, *Women, Fire, Dangerous Things: What Categories Reveal about the Mind* (Chicago: University of Chicago Press, 1990), p. 303.

I use figurative language in my writing to make it possible for the reader to imagine scientific concepts through the use of metaphorical reasoning. I have employed metaphor to categorize and interpret; I have crafted metaphors for depression, grief, love, lust, science, and most importantly translation. One of the things that metaphors do is create an identity for an unknown; metaphors operate by identifying an unknown by its similitude with a known. Metaphors are mirrors that reflect the properties of the known onto the unknown; they cannot accommodate difference. I am using metaphors to make the abstract and theoretical elements of scientific discourse more familiar to readers of poetry. The uncanniness that Tarbuck experiences originates with the scientific discourse, which is often quite removed or distant from the reader, in order to present a sense of detachment and appeal to the notion of a universal truth. However, my poetry is not gesturing towards a universal truth, rather it is concerned with reflecting our lived experience of the world. The tone is intimate so as to foreground the individual and subjective experience being presented. I am interested in showing how science can be incorporated into our lived experience in the most intimate and specific ways.

I employ repeated or sequential reference to deaden the original metaphors I use and to make them into 'platforms,' in Rorty's terminology. He characterizes dead metaphors as platforms and foils for new metaphors; they are a necessary structural element within the evolution and development of human thought. He writes:

> Old metaphors are constantly dying off into literalness, and then serving as a platform and foil for new metaphors. This analogy lets us think of 'our language' —that is, the

> science and culture of twentieth-century Europe — as something that took shape as the result of a great number of sheer contingencies. Our language and our culture are as much a contingency, as much a result of thousands of small mutations finding niches (and millions of others finding no niches), as are the orchids and the anthropoids.[148]

The language Rorty uses to describe the lifecycle of metaphors is itself infused with reference to biological evolution. He is comparing metaphors to a species subject to natural selection, which is quite distinct from Lakoff and Johnson's characterization of dead metaphors as transformed into cliché or idiom. To extend the biological language in order to illustrate the distinction more clearly, dead metaphors would become the fungus that feeds off detritus. In my poetry, I employ repeated and sequential metaphors to create an intense sense of familiarity in the reader, and thereby kill these metaphors. When the abstract or the unknown becomes familiar in common parlance, then the metaphor ceases to move human thought. The dead metaphor is an equation without any variables or unknowns. The death of a metaphor is evidence of successful acts of re-categorization, first at the individual level, then at the societal level. Metaphors are bridges underneath interstate highways; they have become essential to the movement of our thoughts.

I use listing within my poems to make the new categories explicit to the reader. A list functions as a metaphor because it creates a category with a single identifying trait; all of the things listed can be identified and organized together. The simplest example of the poet directing the movement of the reader's thought is through listing; the words in the list are

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[148] Richard Rorty, *Philosophy and the Mirror of Nature* (Princeton: Princeton University Press, 1979), p. 16.

linked by association, by proximity on the page, by grammar, and in the following example, by sound.

> **My favorite word that rhymes with warm**
>
> is tacoform.
> Yellow corn, welsh rarebit, of course,
>
> my ticket tells me the spanish term for eating for taste,
> not choreography.
> Brace to let the safety out.
>
> Before clasping with charm my six and a half inch wrist,
> read the golden rabbit- he is cool and I am furry.[149]

The list functions as a metaphor because it creates a category in which corn, welsh rarebit, and a paper ticket [to an event] share a single identifying trait; they can all be identified and organized together. Lakoff and Johnson write;

> Though we learn new categories regularly, we cannot make massive changes in our category system through conscious acts of recategorization (though, through our experience in the world, our categories are subject to unconscious reshaping and partial change). We do not, and cannot, have full conscious control over how we categorize.[150]

This creation and recreation of unconscious categories demonstrates a movement not only of the subject of thought, but the thoughts themselves; this is evidence of learning. I am trying

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[149] Lewis, *Phenomenology of the Feral*.

[150] George Lakoff, *Philosophy in the Flesh: The Embodied Mind and Its Challenge to Western Thought* (New York: Basic Books, 1999), p. 18-19.

to alter the unconscious categories of my reader's mind through my use of repeated metaphor. Throughout each poem the metaphors build on one another, becoming more complex and capable of conveying more abstract scientific theory. Tarbuck writes of how this complexity is built into the structure of the pamphlet:

> The collection is intricately connected, its recurrent images and moments of repetition necessitating careful reading: it loops back, pulls your attention to overlooked moments in previous poems, and rewards reading in every direction.

This use of recurrent images and repetition creates a series of self-references within the pamphlet; later poems reference earlier poems. The structure of the pamphlet loops upon itself to suggest the lifecycle of the white rabbit. This self-reference was influenced by a similar practice in *The Plant Time Manifold Transcripts*, where Prynne employs the loops to illustrate the lifecycle of plants. He uses the repetition to explore non-linear notions of time through growth and death. The white rabbit is the force *reminding* us to attend to boundaries, because it is dead – as in, absent – and yet it is present, and continues to re-present itself to the reader throughout the collection; the very continuity of its existence is juxtaposed with the destabilizing effect of a ghost. The white rabbit transcends boundaries by being everywhere and every time simultaneously: it is a phantom; it is the embodiment of transdisciplinarity. Tarbuck's review thoughtfully discusses the ways in which I employ the white rabbit as the vehicle in my own metaphor for transdisciplinary work. The transdisciplinary nature of my work is significant because it broadens the impact of poetry by engaging with the natural sciences and vice versa.

Like Tarbuck, Hasler finds my use of metaphor effective for making scientific discourse significant to the reader of my poems. She is the reviewer of *Zeroing Event* most explicitly concerned with the extent to which my methodology and Through the Looking Glass Poetics can resonate with poetry readers.[151] Hasler uses the review to explore how I incorporate scientific discourse into my poetry, with attention to diction, metaphor, and the creations of new worlds within the poems. She writes that:

> There are no gimme images here; she uses the language and metaphor of various disciplines more subtly. Her style is founded on a more rigorous methodology and an intricate web of imagery and ideas.[152]

In particular the repeated use of the white rabbit image is meant to function as both metaphor and metonym, to be identified with Paul Grobstein and associated with Alice's *Adventures in Wonderland*. I intend for this image to pique the curiosity of the reader and inspire them to travel down through the rabbit hole. This rabbit hole drops the reader into the gulf between the humanities and natural sciences, itself a wonderland. Hasler's review considers the extent to which poetry readers may negotiate their way through the gulf.

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[151] Hasler reviewed Zeroing Event along with Mark Blayney's *Loud music makes you drive faster* (Parthian 2016) and Nathalie Ann Holborow's *And Suddenly You Find Yourself* (Parthian 2017).

She was completely unknown to me at the time of her review being published; we had not met in person or connected with one another on social media. However, perhaps I was not unknown to her as two of poems in *Zeroing Event* ('if number, then name' and 'the whole movement is executed without pause') were published in *Poetry Wales* Summer Issue 2016. It is also quite possible that the editor of P*oetry Wales*, Nia Davies, asked Hasler to write a review of my pamphlet on account of having published some of the poems. I had recently written a review of Nia Davies' pamphlet, *Çekoslovakyalılaştıramadıklarımızdanmısınız or Long Words* (Boiled String, 2016) for the Zarf Poetry Summer 2016 issue. This entanglement of authors, editors, and reviewers is endemic to the small experimental poetry scene in Wales.

[152] Emily Hasler, 'Emily Hasler on Mark Blayney, Natalie Ann Holborow and Julia Rose Lewis', *Poetry Wales* 53.1 (Summer 2017), p. 86-87 (p. 86).

Through the Looking Glass Poetics, by its very name, signifies that a journey is underway, a journey that rejects appearances and superficial observations a journey that is less about traversing physical distance and more about traversing the boundaries of what is known to the narrator as well as the reader. Here Hasler describes the ways in which the poems make use of craft to encourage the reader to continue reading, or traveling through the pamphlet, despite the challenges of interpreting transdisciplinary work:

> The use of scientific terminology will mean many readers will come across some terms and concepts that require elucidation. Lewis's strength is to lure us in with wordplay, music, personality and glimpses of confession so that the act of excavation in enjoyable.[153]

My poem, 'If Number, Then Name,' demonstrates the strategy Hasler is describing. This excavation as poetic narrative takes the reader on a journey through time and scientific progress by following the history of the name of the 85th element of the periodic table.[154] It begins with listing all the names that scientists have historically given to element 85 and plays with the history of the element. The poem is performing the history of chemistry for the reader through recourse to sound-play, lineation, and layout; it was crafted to resemble the rectangular shape of entries in the periodic table.

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[153] Hasler, p. 86.

[154] Chemists use the number of protons in the nucleus of an element as a unique identifier of its physical properties; these patterns of behavior are organized by the periodic table of elements.

If Number, Then Name

Begin alabamine, dakin, dorine (from longing),
helvetium, anglohelvetium, astatine (unstable).

Down the metalloid diagonal, one under iodine
the heaviest of halogens known to science, "the
only interesting story in chemistry is reactions,"
Paul Grobstein said.
Astatine hydride is metal-
like. Unlike the lighter halogens, it vaporizes so
readily by means of radioactive heating, the goal
is finding sufficient cooling for experimentation.
This element has part of actium, neptunium, and
uranium decay chains.
Dressage was performed,
the first day (three-day event), meaning training.[155]

The meaning of the words lies in the foreign languages that were proposed as names, such as longing and instability to describe astatine's high reactivity. The poem then moves on towards more modern knowledge about the element's behavior. The poem is presenting an interpretation of the history of science to the reader that is neither linear, nor straightforward but aligned with Michel Foucault's argument for 'several pasts, several forms of connexion, several hierarchies of importance, several networks of determination, several teleologies, for one and the same science, as its present undergoes change: thus historical descriptions are necessarily ordered by the present state of knowledge, they increase with every transformation and never cease, in turn, to break with themselves.'[156] If Number, Then Name was intended to present the reader with a context for element 85, its chemical behavior, and for chemists' knowledge of it; to perform the same role as the small rectangle in the periodic table. The process of unpacking the information within the rectangle of the periodic table is

[155] Lewis, *Phenomenology of the Feral*.

[156] Michel Foucault, *Archaeology of Knowledge* (Paris, France: Editions Gallimard, 1969), p. 5.

impervious to excavation by those who are untrained in chemistry; it is a metaphor for action.[157]

The haibun form has been a significant influence on the development of my poetry and Through the Looking Glass Poetics. I chose to employ the haibun as the primary form of the creative component of my thesis because it is itself a combination of haiku and prose; it portrays difference in conversation at the formal level as well as the content level. The haibun makes the phenomenology underlying the dialogue between science and poetry explicit to the reader at the formal level.[158] Testing the limits of a reader's willingness to co-create meaning is part of the collaborative and dialogic history of the traditional Japanese haibun form, as well as in the contemporary English versions of the form. Ken Jones, writing as editor of the magazine 'Haibun Today' considers the contemporary English manifestation of this form to be: 'a prose of concrete imagery, with wording which carries readers beyond the conventional and expected, inviting their full imaginative participation.'[159] Collaboration between poetry and the natural sciences is another facet of my poetics; the scientist reading my poetry must extend their thoughts to encompass language play and the poet reading my poetry must extend their thoughts towards parts of the world that are very small and very

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[157] The process consists of learning by engaging with the unknown in a text as a starting point for analyzing the text itself more deeply as well as moving outside of the text to research the unknown in other contexts. The phenomenon of intertextuality does not need to be confined simply to literary texts, or even humanities texts; scientific texts are just as available for such excavation. J.H. Prynne's *The Plant Time Manifold Transcripts* is a model for this expanded intertextuality, which reassured me that the risks my pamphlet were taking only extend this already-existing practice.

[158] The form of the reading follows from the entanglement of content and form in the poem; the interpretation is dialogic. The reader is a co-creator of meaning in these poems; they demand a response from the reader as part of their open-ended inquiry; indeed, these poems often address themselves to their ideal reader. Whether referring directly to the reader or indirectly through questions, the majority of the poem reaches out towards the reader inviting participation in making sense of the world. The beginning that is referred to in the title, and title poem, *Zeroing Event* might be understood to be the creation of this ideal reader, who will collaborate with the poet to fully realize the poems.

[159] Ken Jones, 'Haibun: Some Concerns,' *Haibun Today* 9.2 (2015) <http://haibuntoday.com/ht92/A_Jones_Haibun.html> [accessed 21 September 2018].

large, very old and very new. The interplay between what is absent and what is present in *Zeroing Event* is most clearly embodied in the white rabbit imagery.[160] The haibun form also requires the reader to enter into an emotional relationship with the images presented in the poem. Drawing on Bashō's guidelines to haibun, written when Bashō first popularized the form, Aimee Nezhukumatathil introduces us to the notion of 'aware', pronounced 'ah-WAR-ay'. She writes that one 'important feature of the haibun is not simply to provide a writer a shape in which to jot mundane musings of landscape and travel but also to evoke that sense of *aware*—the quality of certain objects to evoke longing, sadness, or immediate sympathy.'[161] The poems in *Zeroing Event* illustrate the complex interplay between knowledge and grief; they show a narrative struggling to make sense of lived experience of the world. For me, the white rabbit primarily represents Paul Grobstein's continuing influence on my understanding of the world by showing him as an absent presence, a constant. Alice repeatedly revises her internal narrative; she seeks to understand why she behaves the way she does, and in doing so, becomes a kind of applied neurobiologist. The reader of the pamphlet must become Alice in Wonderland to collaborate on a narrative of journey through the gulf between the humanities and natural sciences, where the poems are merely souvenirs.

The overwhelming nature of what is unfamiliar or unknown to the reader, and yet present in the poems, raises concerns about the extreme limits of transdisciplinarity. Hasler is

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[160] The white rabbit is commonly recognized as a reference to the character in Lewis Carroll's *Alice in Wonderland*; it is the creature that disturbs Alice's boredom and provokes her burning curiosity, her desire to explore, and her desire to travel beyond the familiar boundaries of her life. The white rabbit inspires transgressive acts that require the protagonist to transform herself physically and internally. Unlike Lewis Carroll's white rabbit, my white rabbit is dead (because Alba and Grobstein are dead) and yet continues to function as part image and part character, recurring throughout the poems.

[161] Aimee Nezhukumatathil, 'More than the Birds, Bees, and Trees: A Closer Look at Writing Haibun,' *Poets.org* <https://poets.org/text/more-birds-bees-and-trees-closer-look-writing-haibun> [accessed 7 June 2019].

concerned about the extent to which my writing demands that the reader co-create the significance of the scientific elements in the poems for themselves. These demands on the reader to make sense of science through poetry and poetry through science are intense. Hasler responds to these demands of transdisciplinary work with wariness, writing that:

> Lewis's words do not so much describe as incise; they are continuously setting off reactions and the reader can only try and keep up - reading these poems is not a passive experience. The effect is almost overwhelming; we feel pushed, taken advantage of, tricked.[162]

How much meaning it is reasonable to ask a reader of poetry to create out of science is an open-ended inquiry in itself. Hasler ultimately comes to a conclusion that refutes her initial concern about the demands made on the reader, and finds herself up to the task – perhaps even finding the journey edifying. She writes that:

> Lewis is well aware of the dynamics and unequal relationship with her audience… [hers] is the most demanding of these three very different debut offerings, but it is also the most rewarding.[163]

The demands that *Zeroing Event* make on the reader are those of activity: the reader must engage in dialogue with the poetry and the science. The pamphlet is asking the reader to engage in a transdisciplinary approach to interpretation. This is a journey through the gulf

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[162] Hasler, p. 87.

[163] Hasler, p. 87.

between the natural sciences and poetry. The end of the journey is the realization that a dialogue between poetry and science can yield a significantly greater reflection of all our lived experience than either can alone.

Against Boundary Objects

To illustrate how my work is relevant to creative writing research, I will explore the metaphor of the gulf of incomprehension between literature and science. The gulf between these two communities of practice is not entirely empty; as we have seen in previous sections, it is littered with Alice in Wonderland Philosophy and Through the Looking Glass Poetics. These works, as well as my own, constitute what Susan Leigh Star and James Griesemer characterize as 'boundary objects.' These are transdisciplinary works, objects, or organizations that exist at the boundary of multiple disciplines, including poetry and science. Star is a social scientist whose research extends across neuroscience, information sciences, computer system development, artificial intelligence, natural history, feminism, medicine, and health. Her career taken as a whole could be described as a boundary object. She has written about boundary objects on her own and in collaboration, first with Griesemer and then with Geoffrey Bowker. Griesemer and Star write:

> Boundary objects are those objects that both inhabit several communities of practice and satisfy the informational requirements of each of them. Boundary objects are thus both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use and become strongly structured in individual-site use. These objects may be abstract or concrete.[164]

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[164] Susan Leigh Star and James R Griesemer, ''Institutional Ecology, `Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology,' 1907-39,' *Social Studies of Science* 19.3 (1989), p. 387-420 (p. 393).

Phenomenology of the Feral is a boundary object, because it exists between the worlds of poetry, philosophy of science, and science. In the following section, I will employ Tabios' review to show that my work is plastic enough to maintain a common identity across different poetry sites. I will also refer to Lewis Hood's review in order to suggest that the work is strongly structured enough to be meaningful to the literary and scientific communities. *Phenomenology of the Feral* is relevant to creative writing research, through its performance of the function of a boundary object with respect to contemporary poetry, philosophy of science, and science.

Tabios' review shows that my work is plastic enough to maintain a common identity across different communities of readers and to function as a boundary object with respect to phenomenology and pragmatism. She is the only reviewer to identify my work with a specific tradition, phenomenologist poetry in the US, while simultaneously asserting this is merely a means to the end of incorporating scientific discourse into poetry.[165] Tabios refers to the title of the collection and the second section to support her claim that I am a

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[165] Tabios created Galatea Resurrects in 2006 and is the only permanent editor among a group of guest editors. Galatea Resurrects publishes reviews and the briefer more informal engagements with English language poetry collections since 2006. She has published two poetry collections with Alec Newman and Knives Forks and Spoons Press: *HIRAETH: Tercets From the Last Archipelago* (2018) and *THE OPPOSITE OF CLAUSTROPHOBIA: Prime's Anti-Autobiography* (2017)*;* Knives Forks and Spoons Press also brought out *Phenomenology of the Feral*. She is the inventor of the hay(na)ku form; this three line poem is a variation on the haiku, where the first line is one word, the second line is two words, and the third line is three words. There are now variations on hay(na)ku form; the lines can be reversed, the tercets can be chained together, and it can be combined with prose to make haybun. Tabios is the author of a collection of haybun, 147 MILLION ORPHANS (MMXI-MML) (gradient books, Finland, 2014). The haybun is the closest form the haibun, and so Tabios expertise here makes her an ideal reviewer of my own haibun. Tabios is without a doubt the most widely published poet and critic to date to engage with my own writing.

Eileen R. Tabios, *Eileen Verbs Books* (2019) <http://eileenverbsbooks.blogspot.com> [accessed 8 April 2019].
Eileen R. Tabios, *Hiraeth: Tercets From the Last Archipelago* (Newton-Le-Willows, UK: Knives, Forks and Spoons Press, 2018).
Eileen R. Tabios, *The Opposite of Claustrophobia*: *Prime's Anti-Autobiography* (Newton-Le-Willows, UK: Knives, Forks and Spoons Press, 2017).
Eileen R. Tabios, *Hay(na)ku* (2019) <https://eileenrtabios.com/haynaku/> [accessed 8 April 2019].
Eileen R. Tabios, 'Eileen R. Tabios,' *Poetry Foundation* (2019) <https://www.poetryfoundation.org/poets/eileen-r-tabios> [accessed 7 April 2019].
Eileen R. Tabios, *Eileen R. Tabios* (2019) <https://eileenrtabios.com> [accessed 8 April 2019].

phenomenologist poet. In her engagement with *Phenomenology of the Feral*, for her online publication 'Galatea Resurrects,' Tabios writes about her impressions of my first collection and compares it with the work of Mei-Mei Berssenbrugge, whom she also characterizes as a phenomenologist poet. Perhaps this is an artifact of the differences in contemporary poetry across the Atlantic. I will counter this characterization with the argument that my poetry is influenced primarily by pragmatist, not phenomenologist philosophy. Let me be clear that I do not object to this designation if it proves useful for critics to engage with my work as a boundary object. However, the philosophical influence that defines my work is pragmatism, not phenomenology, *via* Grobstein, Rorty, Dewey, and James. In *Art as Experience*, Dewey sets out a pragmatist aesthetics, in which he characterizes art, not as the reflection of lived experience, but as its elucidation. As we have seen in the discussion of the 'GFP Bunny,' the art of science and the science of art can be reflected in the lived experience. Dewey writes:

> Through art, meanings of objects that are otherwise dumb, inchoate, restricted, and resisted are clarified and concentrated, and not by thought working laboriously upon them, nor by escape into a world of mere sense, but by creation of a new experience. Sometimes the expansion and intensification is effected…sometimes it is brought about by a journey to far places. But whatever path the work of art pursues, it, just because it is a full and intense experience, keeps alive the power to experience the common world in its fullness. It does so by reducing the raw materials of experience to matter ordered through form.[166]

[166] Dewey, p. 138.

Pragmatist poetry is the recipe for an experience to be undertaken by the reader, and as a recipe it guides the reader through the ordering of matter into a specific form.[167] *Phenomenology of the Feral* employs the haibun form to interpret the experience of grieving over a long period of time; it elucidates the experience through a metaphorical journey.[168]

Tabios begins her engagement with my writing by considering the significance of the title itself, specifically how it operates in the first and second sections of the collection. The Oxford English Dictionary defines phenomenology as the 'science of phenomena as distinct from that of the nature of being.' This beautifully vague definition of philosophical thought suits *Phenomenology of the Feral*, because the collection is intentionally backgrounding the nature of being and hermeneutic philosophy, in favor of foregrounding the interaction between lived experience, philosophy, and poetry.[169] Tabios praises 'the deft making-of-solidity from the theoretical ("transparency versus opacity in therapy and poetry and butter"),' which she identifies as an example of phenomenology.[170] With regard to the collection, she posits that grounding the abstract elements through specificity as well as sound play give rise to a distinct phenomenon that merges butter fat and therapy into one matter. In this example, she is identifying my work as lyric poetry and poetry influenced by

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[167] Julia Rose Lewis, 'Philosophy and Recipes: House of Wits,' *Serendip* <https://serendipstudio.org/exchange/jrlewis/philosophy-and-recipes> [accessed 20 February 2018].

[168] William James' influence on Gertrude Stein parallels my own experience with Grobstein in which the philosopher-scientist mentor contributes to the development of the poet. Although it is beyond the scope of this dissertation, the philosophy-psychology of William James is comparable to philosophy-biology of Paul Grobstein and the philosophy-physics of Neils Bohr. Rather than continue to generalize about philosophical influences, my discussion will turn towards a close reading of my own work and comparison with the poetry of Berssenbrugge.

[169] Each poem might itself be considered a phenomenon to be studied, instead of the object of study; phenomena are dynamic, unstable, agents as opposed to objects. Each poem is meant to engage the reader and be engaged with by the reader, in order to build not only a language-scape, but a narrative of life after the time of the white rabbit.

[170] Eileen R. Tabios, 'Phenomenology of the Feral by Julia Rose Lewis,' *Galatea Resurrects* <http://galatearesurrects2018.blogspot.com/2018/02/phenomenology-of-feral-by-julia-rose.html> [accessed 8 April 2019].

phenomenology as opposed to say experimental personal essay. Tabios writes that my poetry 'hearkens, for me, that poet-master of phenomenology, Mei-mei Berssenbrugge (its swerves, that is, not (all of its) diction).'[171]

Berssenbrugge uses figurative language to move her poetry in cascades of meaning by blurring the distinction between the known and unknown elements of metaphor. She complicates the equation between the known and unknown through the use of lists, similes, and other linguistic sleights of hand. In her poem 'Permanent Home' she uses metaphor and simile to move the narrative of the poem instead of verbs. Berssenbrugge writes, 'the panorama is true figuratively as space, and literally in a glass wall, where clouds appear like flowers, and the back-lit silhouette of a horse passes by.'[172] The relationship between the nouns in the poem is established by the use of prepositions rather than verbs, which has the effect of reducing the subject / object nature of action to almost nothing. She uses the diction of metaphor within the poem, while varying the syntax to call the very nature of metaphor into question. Her poem is not knowing so much as investigating the nature of knowledge; it is concerned with epistemology in much the same way as the second section of *Phenomenology of the Feral*. While I agree with Tabios that there are important similarities between the poetry of Berssenbrugge and my own, these are not sufficient grounds to label me as a phenomenologist poet. Only a significant engagement with phenomenologist philosophy and accompanying literary theory would do so.

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[171] Tabios, *Phenomenology of the Feral by Julia Rose Lewis*

[172] Mei-mei Berssenbrugge, 'Permanent Home,' *Poetry Foundation* <https://www.poetryfoundation.org/poems/53711/permanent-home> [accessed 17 June 2019].

Tabios focuses on the movement of my writing through 'its swerves' between high and low register. These very swerves are as much an artifact of pragmatist as of phenomenologist poetry. Dewey characterizes art through a metaphor of reduction of the matter of lived experience as it is translated into form. He suggests a concentration, evaporation, and eventual crystallization of experience into an organized and regular structure; it becomes an artwork, just as sea salt loses water. Therefore, the difference between the experience that inspires the work of art and the experience of the artwork itself is the feeling of the ocean inside one's mouth and the sea salt. This ordering of experience through form is precisely the challenge I have undertaken in portraying the female orgasm in the poem. The poem employs the movement of a car on a wet road at night, complete with the possibility of sliding and hydroplaning, as a metaphor for the loss of control associated with sexual climax. This swerve lends the poem 'a mixture of play and investigativeness' that imitates the movements of Rae Armantrout's poetry as described by Hank Lazer.[173] Perhaps nowhere is this wild movement, this serious play, that Dewey and Tabios separately describe more clearly portrayed than in my poem 'Too White to Photograph'[174]

> An orgasm is like a refrigerator found on the side of the road,
> the water on white blinds.
>
> This is my refraction,
> my change in direction of propagation a wave.
>
> I am due to change its medium of transmission.
> My sport utility vehicle has a continuously varying transmission.
>
> Mean then while the rain colors,
> dark things should just be black and not blue.

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[173] Hank Lazer, 'The Lyricism of the Swerve: The Poetry of Rae Armantrout,' *American Women Poets in the 21st Century: Where Lyric Meets Language* eds Claudia Rankine and Juliana Spahr (Middleton: Connecticut: Wesleyan University Press, 2002), p. 32.

[174] Lewis, *Phenomenology of the Feral*.

Kind of you to conserve the energy
to conserve the momentum kneeling.

To bind, the ribonucleic acid forms a kink-turn motif. Recognition is thus biting. This is reflection: Susan White,

"our goal is to understand how some of these irregular structural features contribute to the thermodynamic stability of the RNA molecule and function as sites for protein recognition."[175]

The poem swerves between biochemical and sexual languages, where the narrative relies on double entendres. These double entendres function as boundary objects within the poems themselves; they are phrases that are meaningful in different ways to different communities of readers. This example leads towards an architecture of boundary objects, which are built upwards from small parts to more complex wholes. In the case of my creative writing, the boundary infrastructure arises from the parts of the poems to the poems to the sections to the collection to this dissertation. The boundary objects in my dissertation are building a bridge across the gulf.

Donna Haraway provides an alternative interpretation, to Tabios, of the role of swerves in language and in worlds, one that is grounded in technoscience. As my dissertation is exploring the discourse between poetry and science, Haraway provides a complementary perspective by approaching swerves from the direction of science studies. She makes explicit the connection between metaphors and swerves or turns of thought. She writes:

[175] Susan A. White, *Susan A. White* (2019) <https://www.brynmawr.edu/people/susan-white> [accessed 8 October 2016].

> in Greek, trópos is a turn or swerve; tropes mark the nonliteral quality of being and of language. Metaphors are tropes, but there are many more kinds of swerves in language and in worlds. Fundamentally, models are more interesting in technoscience than metaphors. Models, whether conceptual or physical, are tropes in the sense of instruments built to be engaged, inhabited, lived.[176]

Her distinction between metaphors and models suggests an interesting tension in the communications between poetry and technoscience. Metaphors are bridges carrying the traits of the known over to the unknown. They function as a type of infrastructure within a larger argument or narrative. Models represent the world as it would be if the entire argument or narrative were true. With respect to *Phenomenology of the Feral*, the entire collection is a model of a world in which poetry and science engage in meaningful bidirectional exchange. The metaphors employed within serve to elucidate specific similarities between elements of technoscience and poetry. This very difference of interpretation constitutes the plasticity of my creative writing as a boundary object. The swerving employed in *Phenomenology of the Feral* is recognizable for its use of metaphor, phenomenology, and models.

In an interview with Mark Zachary, Susan Leigh Star reflects on the ways in which boundary objects have been developed. It is not enough that a boundary object exists, but how it is used by members of different communities needs to be elucidated. She expresses a certain disappointment with the lack of attention paid to the fact that 'the actual nature or shape or genre of a boundary object is very different depending on the work or informational

[176] Donna Haraway, *Modest_Witness@Second_Millennium.FemaleMan_Meets_OncoMouse*, p. 135.

needs of the different social groups that are participating.'[177] The very labeling of my work as poetry serves to limit its readership through genre. The word 'feral' in the title of the collection was meant as both warning and beckoning to the reader; that this collection of poems is wild – outside of the tradition of poetry; it is, therefore, unfamiliar, unknown, and potentially inaccessible. 'Feral' is signaling to the reader that this text is a boundary object; it is and is not only poetry. The Oxford English Dictionary defines 'feral' (especially of an animal) as being in a wild state, particularly after escape from captivity or domestication; therefore, 'feral' implies a crossing over boundaries or a transgression against boundaries.[178] Let us take a feral cat as an example of a boundary object; it will show how a concrete living organism functions as a boundary object. In this example, the domesticated house cat that escapes from its human home and thrives outside by hiding and hunting. The phrase 'phenomenology of the feral' refers to a specific interpretative practice for living boundary objects, one in which the subject position of the boundary objects themselves is not dismissed. Tabios shares with the reader her first response to this usage of feral and the feelings it engenders:

> FERAL (my notes say):

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[177] Mark Zachary, 'An Interview with Susan Leigh Star', *Technical Communication Quarterly* 17.4 (2008), p. 435-454.

[178] This particular type of transdisciplinary work has been essential to my poetry since my first creative writing workshop at the summer program at the University of Iowa Writers' Workshop. The professor, Mark Levine, set us the task of writing the wildest poem we could imagine, I wrote a three word haiku, titled 'I Love You', and using anatomy language for the human heart. The way in which the clichéd phrase of the title acted as a translation of the obscure diction; title carried over the meaning into the body of the poem. This possibility, that a poem might use two discourses, might speak one language through another [for the reader] became the starting point for this thesis.

> "the edge, over which darkness. nervousness. Nerve. Anxiety. It's being attuned to the nerves—nerve endings—but why the darkness/discomfort? Specifically because of (its) multiplicity. There is a lot in categories of nothing."

The feral is the edge of the body; where the outside, the wilds of the external environment come into contact with the highly organized inside of the body. The nerve endings are where the body begins to experience and process the outside and to make it internal; this is where I would locate the feral within the human or animal.[179] The feelings Tabios is reporting here can be understood as a response to engaging with a poetry collection that exists at the very boundary of the genre.[180] *Phenomenology of the Feral* is a translation of poetry into science and science into poetry that is not fully domesticated in either direction. Or recalling Lawrence Venuti 'in the case of translation, of cross-cultural exchange, the peripheries are multiple, domestic and foreign at once.'[181] With respect to both pets and translations, domestic is always one end of the continuum and foreign or wild the other. In the case of *Phenomenology of the Feral*, the collection is a feral translation of poetry into science and science into poetry.[182]

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[179] The experience of the feral is essential to any poetry that is embodied as Lakoff and Johnson's philosophy is embodied specifically in the nerve endings. An embodied poetics as much as an embodied philosophy must be attuned to the nerves and to the science of the nervous system, neurobiology.

[180] By attending to the nervous system, the loss, the death of Paul Grobstein, a neurobiologist and philosopher of science is felt more acutely. Or, reading Tabios' notes more literally as referring to the grief portrayed in the first section, the very tangible loss of and subsequent haunting by the white rabbit. This never-ending narrative of bereavement is the source of the darkness and discomfort in the poems and the multiplicity that Tabios identifies.

[181] Lawrence Venuti, *The Scandals of Translation: Towards an Ethics of Difference* (New York: Routledge, 1998), p. 4.

[182] The Oxford English Dictionary gives the origin of the word feral as 'early 17th century: from Latin fera 'wild animal' (from ferus 'wild') + -al.' The word feral indicates a movement from the state of domesticity towards wilderness; it implies transgression of socially constructed divisions.

Phenomenology of the Feral constitutes an artificial — as opposed to natural or serendipitous — boundary object. Bowker and Star identify two potential issues with engineered as opposed to natural boundary objects. The first is that artificial boundary objects fail to 'maintain the delicate balance between being simultaneously concrete enough and abstract enough to be useful to members of multiple communities of practice.'[183] The extensive use of metaphor and its discussion in the previous section answers this requirement. The second is that engineered boundary objects can re-inscribe essentialism by not attending to the formation of the very communities they seek to engage. Berssenbrugge and I are concerned with extending poetry outwards towards new audiences and new discourses; these aims are consistent with the construction of boundary objects. My poetics are neither domesticated nor wildly experimental, rather seeking to occupy all of the places. I consider my poetics as ferally resisting a single location, instead, inviting and seeking out multiple communities to engage with our writing as boundary objects.

Lewis Hood's discussion of my creative writing shows — by exploring the role of inquiry in my work — how the work is strongly enough structured as to be meaningful to both the literary and scientific communities. She focuses on the ways in which I incorporate philosophy of science and the natural sciences into my poetry in her review of *Phenomenology of the Feral* for Zarf Winter 2018 issue. (Without explicitly stating so, she gestures towards boundary objects.) Let me be explicit here and say that her poetics are quite closely aligned with my own and she knows me personally; this emotional and intellectual proximity means that she can read my poetry through the lens of mutually shared

[183] Sveta Stoytcheva, *Boundary Objects: A Field Guide* (2019) <http://scalar.usc.edu/works/boundary-objects-guide/boundary-objects-that-learn?path=index> [accessed 2 July 2019].

assumptions.[184] She finds references to feminism and science studies in my work that would not be discernible to the larger poetry-reading community.[185] *Phenomenology of the Feral* and Lewis Hood's review, taken together, create a boundary object that is useful for poets, feminists, and philosophers of science. Star and Griesemer have written that, 'as groups from different worlds work together, they create various sorts of boundary objects.'[186] I will use Lewis Hood's review to show how my work structures the concept of inquiry in such a way that it is relevant to literary and scientific communities.[187]

Lewis Hood foregrounds the role of inquiry in my poetics, where I begin writing with a question in mind and follow my research wherever it may lead. My poetry does indeed begin with an inquiry situated in language, but not situated in a specific discourse; the pleasure of writing is, for me, the opportunity for my thoughts to move freely between different discourses in order to satisfy my curiosity. Lewis Hood writes:

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[184] As a poetry editor at the *Missing Slate* Magazine, Lewis Hood selected my poem 'Assembly of the Head' for publication and for me to be featured as the Poet of the Month, July 2016. Lewis Hood and I have discussed my thesis research as well as *Zeroing Event* in the interview, and she attended the launch of the pamphlet (along with Alice Tarbuck) in Glasgow. She has heard me read from these poems on multiple occasions. Continuing in her role as a *Missing Slate* magazine editor, she commissioned work from me for the special issue: Poems Against Borders and invited me to perform for the magazine launch in Edinburgh. I consider Lewis Hood to be a friend as well as a poet and critic; therefore, she has a significantly greater personal knowledge of my work and my intentions than any other reviewers.

Katy Lewis Hood, 'Assembly of the Head,' *The Missing Slate* (2018) <http://journal.themissingslate.com/2016/06/08/the-assembly-of-the-head/> [accessed 21 September 2018].
Katy Lewis Hood, 'Poet of the Month: Julia Rose Lewis,' *The Missing Slate* (2018) <http://themissingslate.com/2016/07/28/poet-month-julia-rose-lewis/> [accessed 21 September 2018].
Katy Lewis Hood, 'Poems Against Borders,' *The Missing Slate* (2019) <https://themissingslate.com/2017/02/23/poems-against-borders/> [accessed 21 September 2018].

[185] Lewis Hood herself is interested in transdisciplinarity and engaging multiple communities of practitioners in her research and writing.

[186] Star and Griesemer, p. 408.

[187] I have historically been a member of different academic and nonacademic groups, so, my own creative writing yields various sorts of boundary objects.

> Lewis practises poetry as what Lyn Hejinian calls a 'language of inquiry', mobilising its capacity for unusual connections and resistance to discursive boundaries. Significantly, she also considers ways that knowledge(s) might be constituted and domesticated with and by the nonhuman.[188]

My writing is pedagogy, a way of learning about a topic or question; it is a way of learning and note-taking, and consequently much of my writing process is itself research.[189] As such, the early drafts of my writing consist of more metonyms than metaphors, because I am processing new information and organizing it into the world of a poem. Lyn Hejinian discusses the relationship between metonymy and context, or in the case of my writing process, texts. She writes;

> Metonymic thinking moves more rapidly and less predictably that metaphors permit —but the metonym is not metaphor's opposite. Metonymy moves restlessly, through an associative network, in which associations are compressed rather than elaborated. Metonymy is intervalic, incremental—it exists within a measure. A metonym is a condensation of its context.[190]

As I move through drafts and the poem approaches completion, the metonyms are often revised into metaphors, where the relationship between the two components is based on

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[188] Katy Lewis Hood, 'Katy Lewis Hood Reviews Julia Rose Lewis,' *Zarf* 11, Spring 2018, p. 22.

[189] My earliest poems emerged while I was studying Chemistry and Biology; they were fully embedded within my course notes; they were indistinguishable and fully integrated with the scientific facts and theories. The early drafts of my poems might be more easily read as research notes on a topic, and the later drafts as found poems emerging from those same notes; therefore, my poems are artifacts of the process of inquiry.

[190] Lyn Hejinian, *The Language of Inquiry* (Berkeley and Los Angeles: University of California Press, 2000), p. 149.

argument and logic, not association. The change from metonym to metaphor signifies that I have absorbed the research and mastered the material enough to create a coherent narrative within the poem. I learned to guide my own research in the natural sciences, through the study of philosophy of science and taking transdisciplinary courses in the biology department. Grobstein acknowledges this very point regarding self-directed learning in an exhibit on Serendip Studio that he wrote with Wilfred Franklin as part of the K-12 Bryn Mawr College Summer Science Institute 2008. They argue that the 'underpinnings of science have implications not only for science education but for thinking about learning in general.' They suggest that what is of primary importance is to encourage and help students to develop their skills and sophistication in inquiry as an ongoing process, rather than primarily to teach them either particular content or particular skills.[191] The ongoing nature of my inquiry includes the willingness to transgress disciplinary boundaries as well as the cultural and natural boundary. Lewis Hood writes that my work 'considers ways that knowledge(s) might be constituted and domesticated with and by the nonhuman.'[192] This transgression of boundaries parallels the transgression of categories that Tarbuck identified in her review of the first section of the collection. My poems ask open-ended questions; these questions are inquiries into the state of the world of humans, animals, and all things living or otherwise.

Lewis Hood recognizes the primary role that open-ended inquiry into the lived experience of myself and others plays in my poetry. Open-ended inquiry is how I make my work ambiguous, by not defining an endpoint or even the sort of point that might constitute

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[191] Paul Grobstein and Wil Franklin, *Open-ended Inquiry in Science Education (and Education in General?)* (2018) <http://serendipstudio.org/exchange/franklingrobstein08> [accessed 21 September 2018].

[192] Katy Lewis Hood, *Katy Lewis Hood Reviews Julia Rose Lewis*, p. 22.

the end. It is how the breadth gets into my work; it arises as a part of my poetic process. She notes the sincerity with which these questions are asked and the responses considered, that these poems might be better understood as reflecting on multiple accounts of truth. This truth is the limit of knowledge, an asymptote, that which we can approach only. She writes:

> What is most refreshing about this work – especially in an era of post-truth politics and skeptical critique – is Lewis' steadfast commitment to truth as a value, only one that is vitally mythic and dialogically practiced. 'Trust me,' she repeats, 'I'm telling you stories'.

These multiple voices from multiple locations in literature, time, and the animal kingdom create a kind of situated objectivity when the collection is read as a whole. Donna Haraway writes of 'situated objectivity:'

> We need to learn in our bodies, endowed with primate color and stereoscopic vision, how to attach the objective to our theoretical and political scanners in order to name where we are and are not, in dimensions of mental and physical space we hardly know how to name. So, not perversely, objectivity turns out to be about particular and specific embodiment and definitely not about the false vision promising transcendence of all limits and responsibility. The moral is simple: only partial perspective promises objective vision… Feminist objectivity is about limited location

> and situated knowledge, not about transcendence and splitting of subject and object.[193]

I employ multiple voices in order to present a broader story of lived experience that is consistent with a post-truth conception of objectivity that is not general, but multiple and specific. The multiple subject positions that my poems take are thought experiments that simulate Haraway's situated objectivity by drawing on research in the natural sciences. Situated objectivity allows the multiple partial perspectives in my poems to contribute to an ongoing objective project. The poems in *Phenomenology of the Feral* are representations of limits and responsibilities from one creature to another that comprise lived experience of companion species.[194]

Open-ended inquiry is essential to my poetic process and by its very abstract nature suggests that my poetry fits into one of the original four subcategories of boundary objects. Star and Griesemer describe four subcategories of boundary objects, although they are careful

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[193] Donna Haraway, 'Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective,' *Feminist Studies* 14.3 (1988), p. 582.

[194] Although I initially intended to use the term 'post-human' in parallel with post-truth and post-disciplinary, I decided to follow Haraway's lead and adopt the phrase 'companion species' instead. She describes her concerns about how the term post-human has been used since the publication of 'A Cyborg Manifesto' in 1985. She writes:

> human/posthuman is much too easily appropriated by the blissed-out, 'Let's all be posthumanists and find our next teleological evolutionary stage in some kind of transhumanist techno- enhancement.' Posthumanism is too easily appropriated to those kinds of projects for my taste. Lots of people doing posthumanist thinking, though, don't do it that way. The reason I go to companion species is to get away from posthumanism.

For the purposes of my discussion as well, it is important to foreground the mutual interdependence of humans and nonhuman living beings, not merely all mammals, but all creatures from brewer's yeast to octopuses.

Nicholas Gane, 'When We Have Never Been Human, What Is to Be Done? Interview with Donna Haraway,' *Theory, Culture & Society* 23 (2006), p. 7-8 doi.org/10.1177/0263276406069228 <https://journals.sagepub.com/doi/pdf/10.1177/0263276406069228> [accessed 10 November 2019].

to note that there may be more: repositories, ideal type, coincident boundaries, and standardized forms. Star and Griesemer define ideal type boundary objects as:

> an object such as a diagram, atlas or other description which in fact does not accurately describe the details of any one locality or thing. It is abstracted from all domains, and may be fairly vague. However, it is adaptable to a local site precisely because it is fairly vague; it serves as a means of communicating and cooperating symbolically — a 'good enough' road map for all parties. An example of the ideal type is the species. This is a concept which in fact described no specimen, which incorporated both concrete and theoretical data and which served as a means of communicating across both worlds.[195]

Ideal type boundary objects are a kind of epistemological ambiguous figure; they are interpreted according to the gestalt, the world view, of the interpreter without themselves ever changing. *Phenomenology of the Feral* is an ideal type boundary object, because it has the potential to function as a means of communication between poets, scientists, and philosophers of science.

My description of the mental states of octopuses and depressed persons in 'Breathing Underwater' does not describe any specific person or creature; instead it is an abstraction. The poems create an association between these two different types of mental states that can adapt to interpretative practices and research programs across literature, the natural sciences, and philosophy of science. I am seeking to broaden the range of experiences reflected in

[195] Star and Griesemer, p. 410.

contemporary poetry to reflect the unfolding of new knowledges and novel experiences without end.

Phenomenology of the Feral is intended to be adaptable to literary and scientific communities' different interpretative needs. In the 'Breathing Underwater' series of haibun, I use the numbering of the poems to suggest a pair of octopuses interacting throughout the sixteen sections, one per tentacle. For me, the layout of the poems in this series gestures towards the act of closing up the distance. The negative space on each of the sixteen pages can represent the space between the tentacles, between the efforts to make a connection.

> **Breathing Underwater XV**
>
> Notes towards an epistemology of octopuses, yes, plural. First is the way in which fantasizing about an octopus might be anything but lesbian. Remember that octopuses are mistresses of escape. From green on green to gray against gray, I liked the taste of seaweed gin, but the bottle was clear. To catch an octopus, put out the darkest glass bottle you can find. I find myself trying to catch your eye. Let us hold heads. How many heads of lettuce could an octopus carry and still travel? Tentacles out, let us count. Last, in the lee of the harbor, try to see the eel grass and cross your eyes instead.[196]

This section of the poem moves rapidly from the point of view of a human reflecting on their lived experience to reflecting on how to know an octopus to reflecting on how octopuses know one another. The question of how humans and animal are to live together is both cultural and natural, to be explored by the humanities and the sciences together. Lewis Hood acknowledges my desire to close up the distance between animals and humans, most significantly the octopus as species that is considered more distant for not being a mammal. She writes:

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[196] Lewis, *Phenomenology of the Feral*.

> Played out in syllables and sentences, processes of thinking and knowing in *Phenomenology* are inquisitive, affective, synaesthetic, even – to cite Haraway again – 'tentacular'. 'I remember', Haraway writes, 'that *tentacle* comes from the Latin *tentaculum*, meaning "feeler," and *tentare*, meaning "to feel" and "to try"'. Working '[f]rom the string to the tentacle bridge thing from the tentacle to the string again, Lewis' poetry tries and feels its way towards '[g]enius of an odd kind indeed.'

The octopuses function as a broader expression of the lived experience of post-human phenomena, an inquiry into how animals might feel. This section is attempting to extend human sympathy beyond the human species, to other bodies that have previously been excluded, and to touch upon their own experience.[197] *Phenomenology of the Feral* is a serious inquiry into the embodiment of humans and animals; it asks over and over again what the phenomenology of the unknown is and will continue to expand as the known unknowns of post-humans continue to expand. Ideal type boundary objects are perfectly poised to facilitate exploration of the unknown, and because they are abstract and vague they can adapt to new phenomenologies. As Star and Griesemer write: 'in addition to the translation work of creating abstract objects (lists of species, lists of factors) from concrete, conventionalized ones (locations, specimens, field notes), a series of increasingly abstract maps must be

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[197] Lakoff and Johnson argue that attending to the body as the material element of reason will blur the boundary between human and animal behavior. Their discussion favors a continuum of animal and human behavior and thought as opposed to strictly differentiated categories. They write:

> If reason were not autonomous, that is, not independent of perception, motion, emotion, and other bodily capacities, then the philosophical demarcation between us and animals would be less clearly drawn.

George Lakoff, Mark Johnson, *Philosophy in the Flesh: The Embodied Mind and its Challenge to Western Thought* (New York, NY: Basic Books, 1999), p. 17.

created which link these objects together.'[198] *Phenomenology of the Feral* moves from the concrete to the abstract in an attempt to function as an ideal type boundary object.[199] The critical commentary performs this latter and complementary function to the translation work within the creative writing.

[198] Star and Griesemer, p. 406.

[199] Are the poems boundary objects or perhaps second order boundary objects, because they themselves contain boundary objects? This is not a trivial question, but one that gestures towards the boundary infrastructure and the construction of a bridge across the gulf.

Against Originality

The disciplinary origins of the words I employ in my poetry reflect my intellectual history as I refuse to waste the discourses in which I was originally trained: biology, chemistry, philosophy of science.[200] At the heart of my dissertation lies the question: what is lost without discourse between philosophy of science and poetry? The wording of my research question evolved from Anne Carson's 2002 collection of essays reading Simonides of Keos with Paul Celan, *Economy of the Unlost*.[201] The first sense of the verb to waste asks: what is lost when terminology is used without care or thought or meaningful purpose? The second sense of the verb asks: what is lost when words become weaker and less present to us? Scientific discourse ought to be present in poetry in order to reflect the many ways in which this research has affected our experience of the world. So to answer the question: our lived experience of the world is liable to be wasted when scientific terminology is wasted. Practitioners of Alice Wonderland Philosophy and Through the Looking Glass Poetics create a discourse between philosophy of science and poetry. This is a place where scientific terminology and figurative language are gathered together into transdisciplinary research. In

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[200] Donna Haraway offers similar sentiments regarding her early academic training. She writes:

> Biology is a political discourse, one in which we should engage at every level of the practice—technically, semiotically, morally, economically, institutionally. And besides all that, biology is a source of intense intellectual, emotional, social, and physical pleasure. Nothing like that should be given up lightly.

She claims that engaging with biology is edifying and elucidating for communities beyond biologists themselves.

Donna Haraway, *Modest_Witness@Second_Millennium.FemaleMan_Meets_OncoMouse: Feminism and Technoscience* (New York: Routledge, 1997), p. 105.

[201] She asks the reader, to consider with her, repeating variations of the question: what is lost to us when words are wasted?

Anne Carson, *Economy of the Unlost (Reading Simonides of Keos with Paul Celan)* (Princeton, NJ: Princeton University Press, 2002).

the prologue and the epilogue, Carson poses a second question immediately after the first. She writes:

> What exactly is lost to us when words are wasted? And where is the human store to which such goods are gathered?[202]

Transdisciplinary research is what is lost when words are wasted, when their infinite potential combinations and the implications of those combinations are not explored. These wasted words are gathered in the human cognitive unconscious, in memory for a time, and in the old literature of all disciplines. It is the nature of compost piles to bring together unlike elements and, with time, energy and oxygen, to turn them into a rich nutritious starting material for growing something new. I can think of no better metaphor for transdisciplinary work than this gathering together of disparate intellectual goods; indeed, I believe that it is the human store of which Carson writes. In the first poem in *Zeroing Event* and *Phenomenology of the Feral*, I briefly allude to the compost metaphor for transdisciplinary work.

So Just Fault

Out of the pewter, I handed over my bottle of pills.
Longing is pyriform.
Eyes light blue, no gray, but the lines appeared clearly like the winter coat for horses are cold.
Please sing again putting on our coats: chaos, cognitive unconscious, compost pile.
Depression surprises with boredom the long hours of orange light.
Tell me what you would say about transparency versus opacity in therapy and poetry and butter.
You age gain, the paring knife is beautiful.
Food being the opposite of sex if you say so, then the recipe.
There is hot narrative here.

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[202] Carson, p. 3.

Purr with hair like my eleventh grade english teacher.
I want to feed you a pear, slice by slice, you see a peer really?[203]

My conception of transdisciplinarity is alluded to through the list of 'chaos, cognitive unconscious, compost pile.' The compost pile is referred to again, five lines later, as 'hot narrative' in order to draw it together with the lines about the food and sex.[204] Transdisciplinarity, like compost, is high-energy, heat-emitting research for me, because this research transgresses so many boundaries.

In her review of *Phenomenology of the Feral* for Poetry Wales, Jazmine Linklater considers the relationship between creativity, magic, and originality in my work.[205] She is particularly attentive to my reinterpretation of the Medieval Welsh language text, the *Mabinogion*, specifically the 'Fourth Branch' which takes up the entire second section of my collection. My interpretation of the Mabinogion is indebted to Gwyneth Lewis, Joan Roughgarden, and Eve Kosofsky Sedgwick. Gwyneth Lewis's retelling of the 'Fourth

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[203] Lewis, *Phenomenology of the Feral*.

[204] The following line about my eleventh grade English teacher at the Agnes Irwin School (Rosemont PA, USA) is an example of tendentious obscurity in reference to Ellen Wayland-Smith and the book she published shortly before I wrote 'So Just Fault.' Her book, *Oneida: From Free Love Utopia to the Well-Set Table* is a hybrid work of historical nonfiction and biography that describes the Oneida Colony from its founding until the present day. Ellen Wayland-Smith and her parents were involved with the community and historic house museum at the time of her writing the book. The phrase 'hot narrative' is doubly referring to the sex-cult history of the early Oneida commune. This is one example of my eclectic or transdisciplinary usage of source texts for *Phenomenology of the Feral*. When I read the poem, I always preface it with an explicit acknowledgment to Ellen Wayland-Smith. This is a departure from my usual refusal to give context or introductions to my poetry in readings or performances; however, the intertextuality in this case is too delicious to let lie. My poetry emerges out of a transdisciplinary tradition, meaning that my research draws on both poetry and transdisciplinary works.

[205] Jazmine Linklater, *Jazmine Linklater* (2019) < https://jazminelinklater.wordpress.com> [accessed 7 April 2019]

Linklater and I both published our first pamphlets with Zarf Editions (Toward Passion According 2017). Our publisher, Callie Gardner, is curating a series of (mostly) emerging British experimental poets, by publishing our first pamphlets; we are categorized together. She authored a second pamphlet Découper, Coller (Dock Road Press, 2018). Linklater's review of my full length collection followed Emily Hasler's review of my pamphlet, which is also the first section of *Phenomenology of the Feral*. This overlapping of pamphlet with collection and review with review likely created some restriction on what poems Linklater could discuss in her review in order to avoid duplication.

Branch' of the *Mabinogion* is an example of Through the Looking Glass poetics because she reads the story through the evolutionary biology research of Joan Roughgarden. I have drawn on the works of these three women in order to make novel connections between humanities and the natural sciences through Alice in Wonderland Philosophy and Through the Looking Glass Poetics. The very heart of my work is looking at the ways in which stories generate further stories whether in Grobstein's philosophy of science or intertextuality.

Linklater is primarily interested in the ways in which the juxtapositions of domestic and wild / domestic and foreign / domestic and scientific are significant for understanding my poetics. She writes:

> Our domestic and desiring world is lit by the scientific, and Lewis juxtaposes the everyday, the theoretical and art at every turn…Mythological Welsh names and places give rise to the ideal scientific experiment, through magic:
>
> metaphor of were
> wolves tamed to I lick when he
> noses me on the hearth
>
> In writing, the scientist can become the animal: observation can switch to the subjective viewpoint. The written experiment allows the scientific experiment to broaden its scope: hypotheses can augment or specify. Anything can happen in stories.[206]

[206] Jazmine Linklater, 'Jazmine Linklater on Scott Thurston, Lee Duggan and Julia Rose Lewis,' *Poetry Wales* 54.1 (2018), p. 89-90 (p. 89).

As Linklater notes, the subject-object positions can be reversed and the human can become the object of the experiment as much as the subject; the human can be seen as the animal. The line break between were and wolves was intended to suggest that past tense of being wolves; they characters are not human-animal hybrids or werewolves here. They are either humans or domesticated wolves living with their human friends. *Phenomenology of the Feral* is an account of animal and human kinship; in some places it is factual, in others a thought experiment. Experiments, either in the laboratory or in the mind, build on the results of previous experiments which build on the results of lived experience without origin.

The thought experiments in *Phenomenology of the Feral* are built upon the thought experiments in Gwyneth Lewis's novel, *The Meat Tree;* itself built upon the *Mabinogion* and Joan Roughgarden's book *Evolution's Rainbow*.[207] *The Meat Tree* is Lewis's synthesis of 'The Fourth Branch' of the *Mabinogion* and Roughgarden's research on sex and gender across the animal kingdoms.[208] In the notes following the body of the novel, Lewis identifies the American biologist and transgender rights activist Joan Roughgarden as a major influence

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[207] Lewis, Gwyneth, *The Meat Tree: New Stories from the Mabinogion* (Bridgend: Seren, 2013)

Joan Roughgarden, *Evolution's Rainbow: Diversity, Gender, and Sexuality in Nature and People* (Berkeley, CA: University of California Press, 2004).

[208] Matthieu Boyd, 'The Four Branches Flowering: New Tales from the "Mabinogion,"' *Proceedings of the Harvard Celtic Colloquium* 35 (2015), p. 57-87.

for her interpretation of the *Mabinogion*.[209] Lewis cites Roughgarden's observation that, 'the most common body form among plants and in perhaps half the animal kingdom is for an individual to be both male and female at the same, or different times in its life.'[210] In *Evolution's Rainbow*, Roughgarden approaches the argument that homosexuality and non-binary manifestations of gender are not natural, and therefore ought not to exist in human society, from the opposite position.[211] She presents an extraordinarily thorough catalogue of variations in gender and sexuality of species; this is the rainbow referred to in the title, and evolution is of course the natural and sexual selection. Lewis employs both Roughgarden's approach and the results of her research when crafting her retelling of the fourth branch of the *Mabinogion*. The social implications of *Evolution's Rainbow* provide a novel theoretical framework for imagining this traditional Welsh narrative.

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[209] Joan Roughgarden took her PhD from Harvard University in 1971 in biology and is currently an Emerita Professor of biology at Stanford University and an adjunct professor at the Hawaii Institute of Marine Biology. Roughgarden characterizes her ongoing research interests in two parts:

'One of the two defining features of the social-selection project is to understand social behavior by beginning with offspring production and working back in the life cycle to the mating period. In contrast, the classic sexual-selection approach begins with mating and works forward in the life cycle.'

This is an example of the elegance of Roughgarden's thinking. In order to develop an alternative to Darwin's sexual selection theory, she is approaching the research problem from the opposite direction; she is reverse engineering by beginning with successful mating couples and offspring.

'The second defining feature is to model social behavior as a two-tier process with the dynamics of learning and development at the lower tier and the dynamics of ordinary individual natural selection at the higher tier. This framing of the theory allows solution concepts such as the Nash Bargaining Solution to be used in the behavioral tier in addition to the more familiar Nash (Competitive) Equilibrium.'

This second part to Roughgarden's research takes into account behavioral and sociological theories in order to complement existing biological theories of evolution, both her own and others. Her research is an example of Alice in Wonderland philosophy practiced through laboratory research. Taken together, Roughgarden and Lewis demonstrate a synergy between complementary types of transdisciplinary writing.

[210] Lewis, *The Meat Tree,* p. 252.

[211] In 2004, the University of California Press published her book *Evolution's Rainbow: Diversity, Gender, and Sexuality in Nature and People*, which was awarded 2005 Stonewall Prize for nonfiction from American Library Association and was translated into Portuguese and Korean.

In the *Mabinogion*, there are two characters that undergo a series of transformations from human to animal. This juxtaposition of domestic with transgressive is original to the source text and not my retelling. These men and their mating as alternating pairs of male and female animals contain a significant homosexual element. Huw Osborne writes:

> In this, the 'queerest' of all stories, the boundaries of gender, family and even species are broken down as the brothers criss-cross from male to female and back again. Here we have incest, homosexuality, transgender and temporary heterosexual fertility, with both brothers experiencing being female and giving birth… [T]he episode seems to suggest the amorphous potential of the bodies, genders and sexualities.[212]

Lewis deploys the process of transformation from human to animal and man to woman and woman to man through the punishment of the magician king to teach her protagonists about the entanglement of nature and culture. Her interpretation replaces the male homosexual element of the narrative with a transgender one and completely removes the incest element, transforming the text into a positive representation of queer acts and identity.[213] Of course, it

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[212] Mihangel Morgan, 'From Huw Arwystli to Siôn Eirian: Representative Examples of Cadi/Queer Life from Medieval to Twentieth-century Welsh Literature,' *Queer Wales: The History, Culture and Politics of Queer Life in Wales*, ed by Huw Osborne (Cardiff, Wales: University of Wales Press, 2016), p. 69.

[213] In the centuries between the writing of the Mabinogion and The Meat Tree, the way in which Western society interprets gender and sexuality has changed dramatically. Kosofsky Sedgwick writes:

> 'The (relatively new) emphasis on the "homo-," on the dimension of sameness, built into modern understandings of relations of sexual desire within a given gender has had a sustained and active power to expose that factitiousness, to show how close may be the slippage or even the melding between identification and desire. Thus, an entire social region of the vicarious becomes peculiarly charged in association with the homo/heterosexual definition.'

Lewis' reinterpretation of the gender and sexuality of the original characters is grounded as much in contemporary queer theory as developmental biology.

Eve Kosofsky Sedgwick, *Epistemology of the Closet* 2nd edn (Berkeley and Los Angeles: University of California Press, 2008), p. 62.

is possible to maintain the homosexual element and remove the incest by means of making the pair of punished characters the same sex and not biologically related to one another. There is a queer presence in the source texts that underlies the content and form of the second section of the creative component of my dissertation; however, my own retelling of the fourth branch of the *Mabinogion* is more explicitly concerned with human-animal kinship.[214] My retelling of the fourth branch of the Mabinogion is one of many possible transdisciplinary syntheses of Kosofsky Sedgwick, Lewis, and Roughgarden's work.

The way in which Lewis elucidates the narrative of the fourth branch of the *Mabinogion* simultaneously elucidates *Evolution's Rainbow*; therefore, the *Meat Tree* is an example of Looking Glass Poetics or reading fiction through science and science through fiction. This entanglement between science and fiction, this retelling of myth as science fiction, demonstrates how advances in scientific research and theories can be employed to reinterpret canonical literary texts. Lewis allows her characters themselves to reinterpret the myth through participation in the virtual reality simulation of the myth and reflecting upon this experience; in this way, her characters experience archeology as an embodied social science. Boyd writes:

> In effect the book is a medieval-style gloss on the Fourth Branch within futuristic frame. Campion and Nona use their twenty-third-century awareness to comment on the story and on how it feels to stand in for the characters.[215]

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[214] Kinship relations in my work were explored more fully in the following section, 'Breathing Underwater,' of the collection as discussed in Lewis Hood's review.

[215] Boyd, p. 72.

This framing and reframing of the Welsh myth makes it possible for reader and literary critic of the *Meat Tree* to engage with archeological thinking across great distances of culture, nature and time. Lewis has created an interpretation of the fourth branch of the *Mabinogion* that engages with theories from the natural and social sciences; it is an example of transdisciplinary writing that inspired me to dedicate a section of my thesis to imitation. The fact that this intertextual relationship is not important to Linklater's reading of *Phenomenology of the Feral* evidences the fact that knowledge is always partial and never complete, whether within a discipline such as literature or across disciplines in a transdisciplinary project such as my thesis.

Encountering Roughgarden's research presented Lewis with an alternative interpretation of a canonical Welsh text, because it gave her access to a narrative of lived experience very different from her own. Lewis allows her characters themselves to reinterpret the myth through participation in the virtual reality simulation of the myth and reflecting upon this lived experience. *The Meat Tree* cannot be completely understood without reference to *Evolution's Rainbow* and *Phenomenology of the Feral* cannot be understood without reference to both those preceding texts. It is precisely Linklater's partiality that interests me in the review; that it ultimately judges my work positively as poetry without making connections to the sources beyond one discipline. Linklater has discussed my work productively with reference only to poetry, which suggests that my writing is legible within a disciplinary context.

In his review of *Phenomenology of the Feral* and *Miscellaneous* for *Tentacular*, Anthony John considers Grobstein's presence in my poetry in particular and the

transdisciplinary influences on my work in general.[216] He discusses how my poetry is relevant to philosophy of science and how philosophy of science is relevant to poetry.[217] John's discussion is unusual because it is a hybrid interview-review. He attended my reading with Noel Macken at 'Capital Letters: Poetry in Dialogue' (CapLet) at the National Maritime Museum on March 2nd, 2019. CapLet has an unusual format that foregrounds audience involvement; it is part poetry reading and part seminar, meaning that John was able to listen to me speak about my work and ask questions of me directly. He used my responses to his questions at the event as quoted material within his review (with my permission). John's review bears the most similarity to Lewis Hood's review, because both were written after an extended conversation with me about my poetics; John and Lewis Hood have a better understanding of my intentions than other reviewers.[218]

John is the only reviewer to draw explicit attention to the way Grobstein's philosophy of science continues to influence my creative writing; indeed he brings our names closer together than they have been since my time at Bryn Mawr College. In referring to the poem, 'When in Doubt, Throw Grobstein on the Table,' he notes that the last line is more than a

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[216] Antony John, 'Feral Miscellanies,' *Tentacular* (2019) <https://www.tentacularmag.com/elsewhere-blog/feral-miscellanies> [accessed 2 July 2019].

Miscellaneous was published in 2019 by Sampson Low as part of the Writers' Centre Kingston Series. This pamphlet differs significantly in form and content from the poetry in my dissertation, and therefore, will not be discussed further here.

[217] Anthony John and I were both published in the first issue of *Tentacular*. My contribution was a brief close reading of a poem, 'Oncology in J.H. Prynne's Word Order', and his was a poem, 'Untitled.' The 'elsewhere' section of *Tentacular* is published on a rolling basis and includes both reviews and reports on conferences, exhibitions, and performances.

Antony John, 'Antony John,' *Tentacular* (2019) <https://www.tentacularmag.com/issue-1-pic/antony-john > [accessed 7 May 2019].

Julia Rose Lewis, 'Oncology in J.H. Prynne's Word Order,' *Tentacular* (2019) <https://www.tentacularmag.com/issue-1-text-2/julia-rose-lewis> [accessed 7 May 2019].

[218] Anthony John authored *now than it used to be, but in the past* (2009) and co-authored with Wayne Clements and Johan De Wit *Kenya (2016)* both collections of poetry were published by Veer Books.

simple statement about amphibian anatomy, although Grobstein did spend a significant amount of his career researching frog neuroanatomy.

When in doubt, throw Grobstein on the table.

I found some toads on the farm in the shade of the boxes filled with fake flowers to scare the horses. The toads scared the horses more, movement is sharper in black and white. Some were crushed to death when the horses shopped dirty and toppled the jumps. Charlie was the first toad I rescued who

turned into a Charlotte
was gravid and was released
nearby a river.

This was fair play for toads.

- 12/2008

I saw some toads in the wash stall, looking for a bath in moist stone and concrete enclosure. We say that we bathe horses, but with a hose, it more closely resembles a shower. We shower together when the water pressure is good.

Prozac code-named Zach
mascot of the slippery
brain sodality

he was not ever
slippery but leaping all
about the table

never to leave he
was ever the perfect pet
he stopped peeing me

he chased flies crickets
on computer screen and we
flipped him upside down

he let us perch him
on model horses on a
gentle rat also

Interpretative fallacy: what is sex a metaphor for?

- 9/2009

I wonder sometimes, what did he do to make himself so big? He who was so anxious.

Mack the Big Mac sized
the terrified defensive
or depressed captive

My horse was on daily dewormer pellets and empty Strongid C buckets piled up in my living room. These were the green plastic buckets I used for storing and transporting the toads to their new home. The sides to steep and slippery there was no need for a lid or fear of carbon dioxide build up inside. They always survived my driving.

-11/2009

I braked for some toads (not goats) who hoped the driveway at night.

Chipotle also
Chip for tortillas salsa
cheese burritos

be good depression
food light-headed lingerer
he dried up, and died

Paul Grobstein was the man who taught me how to tell the difference between a frog and a toad. Toads have a parotid gland, most frogs do not have this third bump behind the ears behind the eyes. Frogs will not pee on you when you kiss them. Toads are cuter, more mammalian.

3/21/1946 - 6/28/2011[219]

When I describe my former thesis supervisor as 'the man who taught me how to tell the difference between a frog and a toad,' I am referring to what he taught me about transdisciplinary work in his seminar on the role of science in society. The frog, for me, refers to philosophy of science and the toad refers to poetry, by way of an allusion to Marianne Moore's 'Poetry' in which she crafts the image of 'imaginary gardens with real

[219] Lewis, *Phenomenology of the Feral*.

toads in them'.[220] I understand Moore to be advocating for the presence of the abstract, theoretical, or unfamiliar elements as well as the concrete, familiar, and particular belong within poetry. Moore is arguing that there is a tension between the gardens and the toads, and furthermore that this tension is what constitutes poetry. She is foregrounding the notion of traversing a gap in her definition of poetry; my thesis simply explores one particular type of gap between poetry and other discourses. I learned how to write poetry through studying philosophy of science and will continue to read and write one through the other.

In *Phenomenology of the Feral*, I have sought to create a field of discourse where no words are wasted. John states that even my use of repetition is not merely reusing the same diction; rather it is creating a series of different meanings and associations with the same animals at different locations throughout the collection. I repeatedly introduce the reader to the white rabbit, dogs, and octopuses, among others, in order to show these creatures in multiple contexts. These animals are neither images, nor sidekicks to the humans; they are intended to exist throughout the poems as subjects in their own right. John states:

> The more you read Julia Rose Lewis's enigmatic poems, the more complex they become. The relations between the words change as the words are repeated or are ordered differently, and new meanings are brought forth. But each meaning is accompanied by a new ambiguity as well as clarity. You find yourself falling a vertiginous distance.

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[220] Marianne Moore, 'Poetry,' *Poets.org* (2019) <https://www.poets.org/poetsorg/poem/poetry> [accessed 21 April 2019].

He exactly hits upon my intention for my poetry to act on the reader as the white rabbit from *Alice's Adventures in Wonderland* acted upon Alice. I want my work to lead them to fall down the rabbit hole. I consider my poetry to be an example of Alice in Wonderland Philosophy; it is the work of someone with training in the natural sciences entering into a bidirectional exchange with the humanities. Alice in Wonderland Philosophy and Through the Looking Glass Poetics are what is lost to us when the words of philosophy of science in poetry and the words of poetry in philosophy of science are wasted.

Phenomenology of the Feral makes novel connections between poetry and science to more fully reflect the lived experience of the reader. I employ Alice in Wonderland philosophy and Through the Looking Glass poetics to present philosophy of science and poetry in dialogue. I began this dissertation with the question: what is lost without discourse between poetry and philosophy of science? Rephrasing the question again to ask *who* is lost to us when words are wasted implies a return to the English language tradition of the haibun being associated with death. The 'who' in this formulation of the query refers to the authors of philosophy of science or poetry; they are the authors of the words. In this sense, the loss of Grobstein is what I am trying not to waste in *Phenomenology of the Feral;* it is a meditation on grief that continues for years afterward. I intend for the collection to express an ongoing sense of loss and to use that sense of loss to create by means of writing towards the dead and refusing to relinquish the student-teacher relationship.[221] The haibun form, through its Japanese language history as a collaborative process between student and teacher, facilitates my continued meaningful exchange of ideas with the body of Grobstein's

[221] By writing towards the dead, I mean to highlight the collaborative and epistolary nature of my haibun. The poems are addressed to the deceased as part of the grieving process. Grobstein often occupies the position of the ideal reader with respect to the poems in *Phenomenology of the Feral*.

intellectual work. The process of grieving, for me, is metaphorical in structure; I am trying to carry over the person that I lost, not to waste their experience of the world or their words. By continuing to think through Grobstein's applied neurobiology and philosophy of science, I am carrying his ideas beyond his own lived experience. My creative writing demonstrates the relevance of philosophy of science for contemporary poetry and its readers.

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