'Presences of the Infinite':

J. M. Coetzee and Mathematics

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Declaration of Authorship

I, Peter Johnston, hereby declare that this thesis and the work presented in it is entirely my own. Where I have consulted the work of others, this is always clearly stated.

Signed:

Dated:

Abstract

This thesis articulates the resonances between J. M. Coetzee's lifelong engagement with mathematics and his practice as a novelist, critic, and poet. Though the critical discourse surrounding Coetzee's literary work continues to flourish, and though the basic details of his background in mathematics are now widely acknowledged, his inheritance from that background has not yet been the subject of a comprehensive and mathematically-literate account. In providing such an account, I propose that these two strands of his intellectual trajectory not only developed in parallel, but together engendered several of the characteristic qualities of his finest work.

The structure of the thesis is essentially thematic, but is also broadly chronological. Chapter 1 focuses on Coetzee's poetry, charting the increasing involvement of mathematical concepts and methods in his practice and poetics between 1958 and 1979. Chapter 2 situates his master's thesis alongside archival materials from the early stages of his academic career, and thus traces the development of his philosophical interest in the migration of quantificatory metaphors into other conceptual domains. Concentrating on his doctoral thesis and a series of contemporaneous reviews, essays, and lecture notes, Chapter 3 details the calculated ambivalence with which he therein articulates, adopts, and challenges various statistical methods designed to disclose objective truth. Chapter 4 explores the thematisation of several mathematical concepts in *Dusklands* and *In the Heart of the Country*. Chapter Five considers *Waiting for the Barbarians* and *Foe* in the context provided by Coetzee's interest in the attempts of Isaac Newton to bridge the gap between natural language and the supposedly transparent language of mathematics. Finally, Chapter 6 locates in *Elizabeth Costello* and *Diary of a Bad Year* a cognitive approach to the use of mathematical concepts in ethics, politics, and aesthetics, and, by analogy, a central aspect of the challenge Coetzee's late fiction poses to the contemporary literary landscape.

Contents

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INTRODUCTION

Presences of the Infinite, he calls us, and says we make him shudder; and indeed I have felt those shudders, in the throes of my raptures I have felt them, so much that whether they were his or mine I could no longer say.

J. M. Coetzee, *Elizabeth Costello*[1]

The universe (which others call the Library) is composed of an indefinite and perhaps infinite number of hexagonal galleries, with vast air shafts between, surrounded by very low railings. From any of the hexagons one can see, interminably, the upper and lower floors. […] In the hallway there is a mirror which faithfully duplicates all appearances. Men usually infer from this mirror that the Library is not infinite (if it were, why this illusory duplication?); I prefer to dream that its polished surfaces represent and promise the infinite. […] Light is provided by some spherical fruit which bear the name of lamps. There are two, transversally placed, in each hexagon. The light they emit is insufficient, incessant.

Jorge Luis Borges, 'The Library of Babel'[2]

In J. M. Coetzee's ninth work of extended prose fiction, *Elizabeth Costello* (2003), his eponymous protagonist begins a lecture on the subject of literary realism by imagining a negative vision of Borges's 'Library of Babel': "Not a library in which all conceivable books, past, present and future, coexist," she elaborates, "but a library from which books that were really conceived, written and published are absent, absent even from the memory of librarians".[3] Where Borges puzzles out the paradoxes of infinite presence, then, Elizabeth Costello's vision ponders the curious ontological status of that which has been lost, the absolutely absent.

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1   J. M. Coetzee, *Elizabeth Costello*, (London: Vintage, 2003), 230.
2   Jorge Luis Borges, "The Library of Babel," in *Labyrinths*, by Jorge Luis Borges, 78-86, edited by Donald A. Yates and James E. Irby. New ed. (London: Penguin, 2000), 78.
3   Coetzee, *Elizabeth Costello*, 17-18.

In the finite human conception of space and time, though, the historical security of a writer's work must fall somewhere along the continuum between these two poles: to persevere for as long as the currents of culture shall permit, approaching asymptotically the infinite limits of conceivable time, or to fade into the distant past, a memory tending ever more to the infinitesimal. Two major events of the past decade suggest that Coetzee's future is more secure than most. First, on 2 October 2003, the Permanent Secretary of the Swedish Academy in Stockholm announced that the South African novelist was to be awarded the Nobel Prize for Literature for that year, joining such intellectual ancestors as T. S. Eliot and Samuel Beckett at literature's highest table. Almost exactly eight years later, on 10 October 2011, the University of Texas at Austin (UTA) published a press release announcing the acquisition of more than fifty years' worth of archival materials relating to Coetzee's life and work. Reported to have cost $1.5 million in private grants and university funds,[4] the acquisition meant that his material legacy – including around 155 boxes of documents, five filing cabinet drawers, and a further eight storage boxes containing journals, manuscripts, correspondence, and business papers – would be housed in the University's Harry Ransom Center alongside those not only of Eliot and Beckett, but also such other fellow Nobel laureates as Yeats, Steinbeck, Shaw, Lessing, and Hemingway.[5]

Thanks in no small part to his first two works of 'fictionalised autobiography' – *Boyhood* (1997) and *Youth* (2002) – the basic facts of Coetzee's early years are now widely known. Born in Cape Town in 1940, he spent much of his childhood in the more rural Cape Province town of Worcester. After graduating from the University of Cape

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4 Jim Vertuno, "Texan university holds JM Coetzee's past to Ransom." *Mail and Guardian*, 11 Oct. 2011. Web. 7 July 2012.

5 The research upon which much of this thesis is predicated was carried out at the National English Literary Museum (NELM), in Grahamstown, South Africa. The relevant materials form part of the acquisition by UTA, alongside a further wealth of manuscripts and other materials previously deposited at the Houghton Library at Harvard University. At the time of writing, these materials are still being catalogued at the Harry Ransom Center; as such, all references are to the cataloguing system in place at NELM.

Town (UCT) with honours degrees in both English literature and mathematics, he travelled to England, where he put his mathematical skills to work as a computer programmer; his literary ambitions manifested themselves at this time in a master's dissertation on Ford Madox Ford and the search within himself for an authentic poetic voice. Coetzee's fictionalised account of his younger self reveals in some detail the mathematical inclinations of the adolescent who, to adapt Wordsworth's dictum, would be father to the novelist: he is "studying mathematics";[6] he "assists with first-year tutorials in the mathematics department";[7] he sees himself as "a mathematician to be";[8] he desires "to study pure mathematics to the exclusion of everything else",[9] believing that "pure mathematics appears to be the closest approach the academy affords to the realm of the forms";[10] he is convinced that literature is not "as noble as mathematics"[11] and wonders whether he will "become like those scientists whose brains solve problems while they sleep".[12] Later, as a genuine self-awareness finally begins to dawn upon him, he begins to worry that the Atlas computer that is by now his most frequent companion, as well as his partner in the production of poetry, might "burn *either-or* paths in the brain of its users and thus lock them irreversibly into its binary logic".[13] This prospect, combined with his desire to find "the moment in history when *either-or* is chosen and *and/or* is discarded"[14] contributes to an epiphany of anti-rationalism that would be voiced in one form or another throughout his body of fiction: "Death to reason, death to talk! All that matters is doing the right thing, whether for the right reason or the wrong reason or for no reason at all".[15]

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6   J. M. Coetzee, *Youth,* (London: Vintage, 2003), 4.
7   Ibid., 2.
8   Ibid., 20.
9   Ibid., 22.
10 Ibid.
11 Ibid., 53.
12 Ibid., 144.
13 Ibid., 160
14 Ibid.
15 Ibid., 164.

While the evidence provided by Coetzee's fictionalised autobiographies is of course rather compromised by its pointed generic instability, it remains somewhat surprising how little detailed attention the critical discourse surrounding his work has paid to his clear and profound inheritance from his engagement with mathematics. As each year passes, though, an increasing majority of critics and interviewers has begun to recognise the necessity of at least informing readers of the biographical facts of his earliest mathematical leanings: this usually includes mention of his undergraduate studies, his work as a computer programmer, and in some cases his postgraduate work in stylostatistics. While certainly still in the minority, there exist some critical responses that go slightly further, and treat this engagement with mathematics not just as mere biographical happenstance, but rather as in some sense a contributing factor in the origins of certain aspects of his literary work. All the same, not one of these critics takes the relationship between Coetzee's literary and mathematical interests as his or her principal subject.

With a strong focus on archival research and textual exposition, the present thesis seeks to amend this long-standing oversight by providing a documentary account of the development of Coetzee's thoughts regarding mathematics alongside the trajectory of his literary practice. Rather than constituting a rival to the existing discourse, then, the thesis strives to enrich an already flourishing body of critical work with a sound and comprehensive account of the points of intersection between the concerns explored within his literary work and his equally scrupulous and far-reaching engagement with both the philosophy and practice of mathematics. As such, the first half of the thesis in large part constitutes a narrative documentation of the mathematical aspects of the series of letters, lecture notes, and other archival materials that, until their acquisition by UTA, were stored at the National English Literary Museum in Grahamstown, South Africa.

Subsequently, the second half of the study extrapolates the findings of this research to provide mathematically-literate commentaries on the thematic concerns of several of his key novels, offering links to existing criticism and making suggestions as to the potential for extending, developing, or reconstructing certain traditions within the critical discourse.

From a methodological standpoint, the notion of attempting to provide an objective and quasi-biographical narrative account of an author so notoriously sceptical regarding claims to objectivity as Coetzee might seem somewhat misguided. With this in mind, the approach adopted in this thesis takes its lead from Coetzee's own biographical practice. In his third work of fictionalised autobiography, *Summertime* (2009), he structures a collage of dialogues and narratives around the efforts of a young British academic to reconstruct a period from the life of a now deceased 'John Coetzee'. Having looked into Coetzee's letters and diaries, this Mr. Vincent has decided that such archival materials "*cannot be trusted*":

> *not as a factual record – not because he was a liar but because he was a fictioneer. In his letters he is making up a fiction of himself for his correspondents; in his diaries he is doing much the same for his own eyes, or perhaps for posterity.*[16]

Indeed, it is not just the fictionality of such materials that ought to give pause: since the process of documenting a particular aspect of an archive necessarily involves the selection and orchestration of otherwise heterogenous and discrete materials, it inevitably imposes upon those materials selected for representation both a subjective, partial interpretative frame and a covertly autocratic narrative structure. Readers are therefore reminded that the present work tells just one story among the many that might with equal or perhaps even greater legitimacy have been wrought from the materials under review. In a general sense, then, and to quote *Summertime*'s Vincent once more,

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16 J. M. Coetzee, *Summertime*, (London: Harvill Secker, 2009), 225.

> *I am not interested in coming to a final judgment on Coetzee. I leave that to history. What I am doing is telling the story of a stage in his life, or if we can't have a single story then several stories from several perspectives.[17]*

In this spirit, and as a matter of methodological principle, the thesis seeks to prioritise documentation over argument to as great a degree as possible: as such, where the ambition and the reliability of a given claim appear to vary in inverse proportion with respect to each other, the less speculative claim will invariably be made.

This principle of favouring documentation over critical analysis is useful for another, quite different reason: on the basis of his poetry and his earliest criticism, it would be difficult to maintain too strong an argument against Coetzee's personal judgement that he "wrote nothing of substance before [he] was thirty."[18] Nevertheless, it is perhaps also true to say that the path towards this later substance was negotiated through the apparently less substantial works which preceded them, and that a full understanding of the patterns of thinking that condition those later works requires an awareness of their genesis. It is on this assumption that the thesis approaches its central research questions. First of all, it will be necessary to establish which areas of mathematics have most interested Coetzee at various points in his life, and therefore to chart the ways in which his interest in mathematics has developed in the years since his undergraduate studies. Once this loose narrative has been assembled it will be possible to provide an account of how his background in mathematics has influenced his outlook in other ostensibly non-mathematical fields, and to reflect upon how this influence has manifested itself in his writing. Indeed, looking more closely at his own reflections on the subject, such as they appear in the various sources under review, will help to develop an understanding of Coetzee's personal conception of the connection between his mathematical interests and his work as a teacher and writer of poetry, fiction, essays,

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17 Ibid., 217.

18 J. M. Coetzee and David Attwell, *Doubling the Point: Essays and Interviews*, (Cambridge, MA; London: Harvard U.P., 1992), 19.

and criticism. On the basis of whatever conclusions can be drawn from these research questions, the thesis ultimately seeks to establish the extent to which an understanding of mathematics is necessary for a full appreciation of Coetzee's literary work, and to suggest certain ways in which existing fields of Coetzee criticism might benefit from adopting a mathematically-literate approach.

In a more general sense, it is necessary to point out that each of the chapters presented here fulfils a dual function: in the first place, individual chapters ought to be considered as independent, unitary, thematic narratives that disclose the often contradictory and internally antagonistic currents in Coetzee's thinking on the given subject over the given period; secondly, each chapter stands in a similar relation to the essentially narrative structure of the thesis as a whole, in the sense that the necessarily overlapping and at times divergent individual chapters together contribute to a vision of Coetzee as a quintessentially multifaceted, elusive, and mercurial figure. Again, to quote *Summertime*'s Vincent, "*we are all fictioneers*":

> *But which would you rather have: a set of independent reports from a range of independent perspectives, from which you can then try to synthesize a whole; or the massive, unitary self-projection comprised by his oeuvre? I know which I would prefer.*[19]

The first such independent report, in Chapter One, documents the shifting influence of Coetzee's interest in mathematics on his work as both a practitioner and a critic of poetry. Following a discussion of his review of *Strange Attractors: Poems of Love and Mathematics* (2009), the chapter looks back an entire half-century in order to redirect the light cast by that review upon Coetzee's own poems. Where pieces such as the 'Trivial Verses' and 'Truth Lies Sunken' enlist mathematics on a primarily metaphoric or thematic basis, his subsequent work as a computer programmer soon laid the foundations for his employment of mathematical methods at the level of formal

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19 Coetzee, *Summertime*, 226.

composition. Later, as a graduate student in Texas, he redeployed the computational and statistical methods he had developed in the preceding years in his critical response to such poets as Thomas Wyatt, Robert Browning, T. S. Eliot, Rainer Maria Rilke, Pablo Neruda, and Robert Creeley. Finally, and following a second attempt at computer-generated poetry in the form of 'Hero and Bad Mother in Epic, a poem' (1978), his 'Surreal Metaphors and Random Processes' (1979) reconsiders the underlying mathematical principles of the practice in the context of the surrealist tradition inaugurated by André Breton.

Chapter Two traces the development in Coetzee's early academic career of an awareness of the potential for conceptual metaphors drawn from mathematics to migrate into broader conceptual discourses. Beginning with an itemisation of the mathematical elements of his master's dissertation on Ford Madox Ford, the chapter goes on to chart and assess Coetzee's ambivalent response to Ford's avowed preference for the 'impression' over the 'statistic' as a means of representing truth; from here it compares the two writers' thoughts regarding the potential for the novelist to act as a direct rival to the statistician in such matters. This ambivalence develops in the context of Coetzee's employment of notions from the philosophy of mathematics within his work as a lecturer on language and literature: in particular, classes on such figures as Simeon Potter, Alfred North Whitehead, and Cassius Jackson Keyser enabled him to enrich his developing literary and ethical sensibilities with an understanding of the mathematical forms of structuralism, realism, and idealism. These developments make themselves further apparent in a number of contexts: a letter he wrote to the *Daily Texan* in 1967 on the subject of the Vietnam war; his academic interpretation of such intellectual antecedents as Jorge Luis Borges and Zeno of Elea; and the introduction into his literary teaching of the epochal mathematical work of G. W. Leibniz, Pierre-Simon Laplace,

Ludwig Boltzmann, and Hans Reichenbach. The chapter ends by considering all of this in the light of his career-long critical engagement with that fellow mathematician-turned-novelist, Robert Musil.

Chapter Three concerns itself with Coetzee's interlacing preoccupations with statistical analysis and the work of Samuel Beckett. Opening with a summary of a 1969 essay in which he addresses the uneasy complementarity of quantitative and qualitative ascriptions of value, the chapter subsequently provides a comprehensive account of those aspects of his doctoral thesis – on Beckett's English-language fiction – that ramify beyond the thesis itself, and thus help to augment our understanding of his eventual rejection of stylostatistical analysis as a valid academic discipline. Using a variety of contemporaneous archival materials, the chapter moves on to contextualise Coetzee's enforced return to South Africa alongside the classes he taught on Beckett at the State University of New York, Buffalo, in 1970-71. Finally, it is in a pair of essays published during the period in which he wrote *Dusklands* that we witness the true culmination of his dual interest in Beckett and stylostatistical analysis, and, in Coetzee himself, the emergence of a writer now capable of expressing a uniquely mathematically-literate interpretation of the modern condition.

Chapter Four retains the documentary focus of the preceding chapters by incorporating a comprehensive exposition of several mathematical metaphors into its commentary on certain of the themes and structural effects of Coetzee's first two novels. Drawing not only on explicit references to mathematics, but also on the many less obvious allusions that occur in the two narratives that together constitute *Dusklands* (1974), the first major section of the chapter attributes the existential disquiet experienced by the novel's two protagonists in large part to their overtly mathematical conceptualisations of the worlds over which they seek dominion. Similarly, by

examining the development of several mathematical conceptual metaphors across the length of *In the Heart of the Country* (1977), the chapter's second section details the role played by Coetzee's mathematical background in his extension of a decidedly Beckettian 'art of zero'.

Chapter Five examines two of Coetzee's most widely respected novels of the 1980s in the context provided by his interest in the attempts of Isaac Newton to bridge the gap between natural language and the supposedly transparent language of mathematics. It begins with an account of three essays in stylistics that Coetzee conceived at the outset of the decade. Focusing in particular on 'Isaac Newton and the Ideal of a Transparent Scientific Language' (1982), the chapter outlines Coetzee's scepticism regarding this supposed transparency, and situates his conclusions in the context of his still-developing philosophy of mathematics. Following an exposition of Newton's development of the differential calculus, this leads to critical accounts of the connections between Coetzee's nascent constructivism, his engagement with information theory, and the thematic concerns of both *Waiting for the Barbarians* (1980) and *Foe* (1986).

Chapter Six develops an argument in three parts: firstly, it demonstrates how the principal characters of both *Elizabeth Costello* (2003) and *Diary of a Bad Year* (2007) might be said to subscribe to what is known as a 'cognitive' philosophy of mathematics; secondly, it provides an exposition of how the multivocal and transgeneric structures of the two novels enable Coetzee to explore the consequences of extrapolating this cognitive account to wider issues of ethics, aesthetics, and politics; and, finally, it locates an analogy between, on the one hand, the mathematical concepts of vectors, matrices, and probabilistic space, each of which appears in one or both of the novels, and, on the other, the synthetic, self-contradictory form those novels take.

To summarise, we might return to the quotation with which this introduction began. Amidst the rapturous critical reception with which so much of Coetzee's fiction has been met since the publication of his first novel nearly forty years ago, it has gradually become apparent that insufficient attention has been paid to the shudders caused by the constant yet obscure presence in those works of his inheritance from mathematics. In documenting the instances of this inheritance, this thesis intends to amplify those shudders, to quicken that rapture, and to reveal in minute and lucid detail the precise nature of those most profound and resonant 'Presences of the Infinite'.

Chapter 1

MATHEMATICS AND POETRY

Over the course of the half-century that has since passed, it has become something of a rite of passage for academics with interdisciplinary ambitions to distance themselves from C. P. Snow's notoriously despondent diagnosis of the state of communication between, on the one hand, the natural scientists and, on the other, a loosely sketched group he referred to as the 'literary intellectuals'. First articulated on 7 May 1959 at Cambridge University's Senate House, Snow's Rede Lecture on the so-called 'two cultures' ultimately constituted a scathing condemnation of the self-defeating attitudes of those members of each 'culture' best placed to benefit from any potential commerce in ideas and practices:

> The clashing point of two subjects, two disciplines, two cultures – of two galaxies, so far as that goes – ought to produce creative chances. In the history of mental activity that has been where some of the break-throughs came. The chances are there now. But they are there, as it were, in a vacuum, because those in the two cultures can't talk to each other.[20]

On that same May morning, some six thousand miles south of Senate House, a then nineteen-year-old J. M. Coetzee was half way through his second year as a student of both English and mathematics at the University of Cape Town (UCT); he would eventually graduate with honours degrees in both, in 1960 and 1961 respectively.

Whereas Snow had seen this era as one in which the two cultures could not talk to each other, then, Coetzee can reflect back upon this time as the beginning of a lifelong personal conversation. Writing in the September 2009 edition of the journal *Notes of the American Mathematical Society*, for instance, he contemplates the special case of the

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20 C. P. Snow, *The Two Cultures* (Cambridge: Cambridge University Press 2000 printing, 2000), 16.

'two cultures' debate represented by the two fields of literary and scientific endeavour with which he had been most deeply and personally concerned those fifty years prior; in his review of a poetry anthology entitled *Strange Attractors: Poems of Love and Mathematics* he compares various accounts of the ways in which one might conceive of the disciplines of poetry and mathematics as being in some sense commensurate:

> The spark of true poetry – according to one influential school of poets – flashes when ideas are juxtaposed that no one has yet thought of bringing together. Scientific discoveries often start with a hunch that there is some connection between apparently unrelated phenomena. So there are a priori grounds for thinking of poetry and mathematics together, as two rarefied forms of symbolic activity based on the power of the human mind to detect hidden analogies.[21]

Beyond this practical similarity, he continues, each of the two traditions has a history of claiming for itself a special kinship with 'truth': on the one hand,

> [a]mong poets there are some who believe that, the mind being part of nature, certain operations of the mind – not necessarily the most rational operations – allow us insights into nature that are essentially true[22]

while on the other,

> in Western science there is a tradition going back at least two and a half millennia that sees mathematics (Number) as inhering in the universe: when we speak mathematics, we speak the universal language.[23]

Having summarised the means through which the poets assembled in the volume address some of the many and varied points of convergence they discern as operative between the discourses of poetry and mathematics, Coetzee goes on to lament the underrepresentation in *Strange Attractors* of a particularly significant "Zeitgeist", the ascendancy of which he locates "in the years around 1960".[24] He describes this Zeitgeist as having reached its zenith in

> the plays of Beckett and Ionesco, with their formulaic patter; in the poetry of the early John Ashbery, with its loopy, dreamlike logic; in the general enthusiasm among intellectuals for structuralism, that is, for systems of thought that seemed

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21 J. M. Coetzee, "Review of 'Strange Attractors'," *Notices of the American Mathematical Society* 56, no. 8 (September 2009): 944.
22 Ibid.
23 Ibid.
24 Ibid., 946.

to run themselves without need for intervention, we can detect an underlying scepticism and even despair about what human agency can achieve.[25]

This was, moreover, "a phase in the history of poetry […] in which mathematical models had real prestige",[26] and in which poets, musicians, and playwrights alike were commonly to be found exploring the ways in which one might "exploit mathematical procedures and the new cybernetic technology"[27] in their art. As it is, the anthology's relative paucity of poems from this particular tradition constitutes Coetzee's main negative criticism of *Strange Attractors*. His advocacy for its "sole substantial representative"[28] in the anthology gives some indication of his preferred type of formal practice, while Glaz and Growney's editorial note to the poem in question explains in detail its procedural strategy:

> The lines of Carl Andre's poem "On the Sadness" follow a pattern for the factorization of integers from 47 (which corresponds to the first line of the poem) counting downward to 2. Each of the primes between 47 and 2 corresponds to a poet-chosen phrase; for example, 2 corresponds to 'We are going to die.' To construct each composite line, its corresponding number is expressed, according to the Fundamental Theorem of Arithmetic, as a product of powers of distinct primes in increasing order. Multiplication corresponds to the conjunction 'if' and exponentiation to 'then.'[29]

Two of Coetzee's own poems stand out as being particularly symptomatic of his contemporaneous response to the Zeitgeist of which 'On the Sadness' is exemplary: both 'Computer Poem' (1963) and 'Hero and Bad Mother in Epic, a poem' (1978) were generated from experiments undertaken during this period.[30] It is interesting to note, then, that in the *Strange Attractors* review Coetzee laments that it remained the case in 2009 that "[t]he question of how exactly poetic thinking diverges from mathematical

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25 Ibid.
26 Ibid.
27 Ibid.
28 Ibid.
29 Sarah Glaz and JoAnne Growney, *Strange Attractors: Poems of Love and Mathematics*, illustrated ed. (Wellesley, MA: A K Peters/CRC Press, 2008), 78.
30 While 'Computer Poem' was published alongside its statement of poetics in 1963, 'Hero and Bad Mother in Epic, a poem', did not appear in print until its pointed placement in the politically dissident magazine *Staffrider* in 1978; its partner piece, 'Surreal Metaphors and Random Processes' (1979), followed the next year.

thinking has seldom been attacked by poets in their poetic work".[31] In this chapter it shall become clear that it was in gradual response to such a question that he strove beyond the largely derivative modernist poems of his youth, past the simple thematisation of mathematical concepts in a piece entitled 'Truth Lies Sunken', and began to develop an increasingly sophisticated understanding of what it might mean to summon poetry from the Delphic depths of a creative spirit to which the resources of literature and mathematics are available in equal measure.

1.1 Early Poetry

1.1.1 *A Literary Miscellany Volume I* (1958)

Coetzee's first published poems appeared in 1958, in the inaugural edition of a compendium assembled by members of the staff and students of the UCT 'Imaginative Writing' class. Alongside Coetzee's pieces the first volume of *A Literary Miscellany* contains essays by notable faculty members such as John R. Doyle and Guy Howarth and early works by two fellow students who would eventually go on to become important figures in the world of South African poetry, Geoffrey Haresnape and C. J. Driver. Demonstrably the work of a precocious and ambitious apprentice rather than the more convincing product of a singular, fully-focused sensibility, the three pieces from these classes that were published in the first volume of *A Literary Miscellany* are perhaps best viewed as mere experiments in style and tradition. As such, though they ought ultimately to be considered as juvenilia, they do nevertheless begin to give a sense of the loosely convergent field of influence within which the young Coetzee chose to take his first literary steps.

In the first instance, 'The Love Song...' is self-evidently both inspired by and in conversation with T. S. Eliot's 'The Love Song of J. Alfred Prufrock', while the second

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31 Coetzee, "Review of 'Strange Attractors'," 944.

piece, 'Procula to Pilate', presents its lamenting statement of distressed faith in the form

of a Petrarchan sonnet. Though its aspirations are by no means fully realised, the most

ambitious of the three is 'Attic': ultimately rather derivative, and drawing somewhat

brazenly from the style employed by Eliot in his more languid moments, this extended

lyric poem nevertheless indicates that Coetzee had by this point digested a range of

other influences, from Pound's imagism and the wry social comedy of Alexander Pope,

to the wistful tones of C. P. Cavafy's urbanite neoclassicism.

Despite the variety of influences evident across the breadth of these pieces,

Coetzee's primary poetic touchstone during his undergraduate career was

unquestionably, and as the – albeit fictionalised – testimony of *Youth* repeatedly avows,

Ezra Pound. Equally, while the works in the first volume of *A Literary Miscellany*

betray little of Coetzee's engagement with mathematics it seems significant that, in

Youth, he begins to consider this predilection for Pound at least in part a consequence of

the mathematical ambitions upon which he staked his proud aloofness from the usual

literary crowd:

> It strikes him as interesting that Norbert, an engineer to be, and he, a
> mathematician to be, should be disciples of Ezra Pound, while the other student
> poets he knows, those studying literature and running the university's literary
> magazine, follow Gerard Manley Hopkins.[32]

That Pound was a strong early influence on Coetzee's own creative practice is apparent

from his own published reflections.[33] Indeed, that the poetry he produced during this

period bore such an influence was soon to be recognised by the celebrated South

African cultural figure Uys Krige, who in a 1960 edition of *Groote Schuur* points out

that, while "John Coetzee's *Returning from Carthage* […] is altogether charming", his

poems tend to "have more than an ounce of Pound to them".[34] Perhaps the more

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32 Coetzee, *Youth*, 20.
33 See, for instance, ibid., 19-26, and Coetzee and Attwell, *Doubling the Point*, 393.
34 Uys Krige, "Introduction," in *Groote Schuur* (Cape Town: University of Cape Town, 1960), 10.

revealing implication from the lines quoted above from *Youth*, however, is Coetzee's attribution to his fictionalised younger self of an awareness that the characteristics of Pound's poetry that most interested him may have done so because, on some level, they appealed to the more mathematically-oriented elements of his sensibility: revealing, not least, since an observer unfamiliar with the particular terms of Coetzee's intricate and often antagonistic relationships with Pound and with mathematical philosophy might not immediately agree that Pound's poetry should be considered more amenable to a mathematical temperament than Hopkins's.[35]

Since the evidence presented in the fictionalised narrative of *Youth* ought to be approached with the appropriate level of scepticism, this observation should be viewed as circumstantial to the evidence of the poems themselves. The following is therefore presented alongside an at best provisional postulation that this connection in the young Coetzee's mind between his chosen poetic lineage and his interest in mathematics justifies our approaching the poems he wrote in the late 1950s and early 1960s receptive to the possibility that at least some of his creative practice at this time was closely connected with his mathematical studies and, moreover, that the mutual creative influence between these two endeavours was plausibly to some degree deliberate.

1.1.2 *A Literary Miscellany Volume II* (1959)

By 1959 Coetzee was assured enough in his own sensibility to stage a kind of *coup d'état* against those very disciples of Hopkins. This is evidenced by his ascension to a leading role in the production of a second volume of *A Literary Miscellany*, for which

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35 It is beyond the remit of the present thesis to analyse in any significant detail the importance of Pound to Coetzee's early writings. His most extended published discussion of Pound can be found in his 1973 review of Hugh Kenner's *The Pound Era*, J. M. Coetzee, "The Vortex and After: Hugh Kenner and Ezra Pound," *UCT Studies in English* 4 (1973): 57–64. Equally, the archive at the National English Literary Museum in Grahamstown contains further detailed reflections from various points throughout his subsequent academic career, in the form of his seminar notes to courses he taught at UCT under the following titles: 'Literature and Culture in the 20th Century' (1974); 'Pound' (1980); 'Pound and Eliot' (1981); and 'Joyce and Pound' (1990).

he also provided a critical foreword. Ultimately, after recognising a debt owed to "the direction of men of widely differing tastes and methods",[36] a list of teachers including Howarth, Doyle, A. G. Woodward, Robert F. Haugh, and, interestingly, Louis MacNeice, he demurs tactfully – and particularly so in the light of his somewhat condescending account of the majority of his co-contributors earlier in the introduction – that while this band of poets had from some unnamed quarters "been criticized for being aimless[,] it is perhaps fortunate that the diversity of approach gained from the diversity of viewpoint has saved it from the rigour of any absolute 'programme'."[37]

In this spirit, it is perhaps unsurprising that though his style was now beginning to converge upon a more singular aesthetic vision of his own, the so-called 'Trivial Verses' that constitute the greater part of his contribution are nevertheless heavily indebted on a formal level to the short, pithy, and sharply satirical neo-classical epigrams of Guy Howarth, a UCT faculty member who stands out, according to *Youth*, as one of the few in the English Department to earn the young Coetzee's admiration.[38] Nevertheless, despite the increased confidence suggested by their often droll, succinct phrasing and their playfully contrary syllogistics, the 'Trivial Verses' are perhaps too conspicuously calculated in their clutching after aphoristic poignancy to be wholly successful. The following example gives a flavour of their tone and content:

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36 J. M. Coetzee, *A Literary Miscellany: Volume II*, ed. Robert Guy Howarth, vol. 1 (Rondebosch: University of Cape Town, 1958), 1.

37 Ibid.

38 For evidence of the similarities between Coetzee's 'Trivial Verses' and Howarth's contemporaneous work, see, for instance, the collection Howarth published in that very year of 1959, Robert Guy Howarth, *Nardoo and Pituri. Versicles* (Cremorne: Talkarra Press, 1959). See also Coetzee, *Youth*, 27–28, for the perspective on Howarth attributed there to 'John'. Certain connections between the two can moreover be discerned at a number of later junctures. According to *Youth*, Coetzee spent much of his time during his early years in London carrying out research for Howarth at the British Library. In the years following this – between 1963 and 1969, to be precise – Howarth largely worked, as Coetzee did during the latter part of this period, on Samuel Beckett. Howarth's papers pertaining to this work are now kept in the Beckett archive at the University of Texas at Austin (UTA), having been gradually relocated there, from the time of his death, in 1974, up to 1983. Coetzee moved to UTA in 1965, worked on Beckett up to the mid 1970s, and was back in Cape Town during the time when Howarth's papers were being sent from there to Texas. Since their purchase from a number of archives in 2011, Coetzee's own papers are now also largely held by the Harry Ransom Center at UTA.

> If Philolaus' poem of praise is twice as long as mine,
> You must remember, lady, that poets are liars,
> And his lie therefore twice as great as mine.[39]

Even if the ultimately minor literary value of the 'Trivial Verses' may discourage a detailed analysis of their form and content, these primary sources nevertheless function as valuable indicators of Coetzee's contemporaneous interests, and so both lend a tangible core to our overall picture of his intellectual development and complement the more detailed mathematically-oriented readings that certain of his other poems – 'Truth Lies Sunken' and 'Computer Poem' in particular – actively urge.

In the first instance, the collective identity of the cast of characters alongside whom he positions his first-person narrator throughout the 'Trivial Verses' seems to corroborate the assertion in *Youth* that "Greek and pure mathematics [were] in his eyes the noblest subjects one can study at a university"[40]: they appear to be drawn not only from the popular mythology and the intellectual history of classical Greece, but are in several cases so synonymous with particular traditions within the philosophy of mathematics as to require brief enumeration here, even if the evidence they provide is ultimately rather less directly indicative of the convergence of Coetzee's interests in poetry and mathematics than that provided by the other poems he produced during this period.

While several of the characters named in the 'Trivial Verses' – in particular Nicomachus and Lysis – might admit of identification with certain significant figures within the tradition of Pythagorean mathematical philosophy, there is one in particular that merits a degree of close attention here. The character named 'Philolaus' figures within Coetzee's contribution to the second volume of *A Literary Miscellany* more prominently than any other; namely, in the first and eighth of the 'Trivial Verses', and the

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39 Coetzee, 'Trivial Verses,' *A Literary Miscellany*, Vol II, 30.
40 Coetzee, *Youth*, 23.

first of the 'Three Poems from a Cold Climate'.[41] Coetzee's Philolaus might most

logically be identified with the prominent Pythagorean, Philolaus of Croton, known

principally for his association with an epistemological model according to which "[a]ll

things, at least those we know, contain Number; for it is evident that nothing whatever

can be either thought or known, without Number."[42]

The discourse surrounding Philolaus's philosophy that has been developed by

scholars such as Barnes[43] and, in particular, Huffman,[44] has now firmly established

Philolaus as deserving of, in Huffman's words, "a prominent place in the history of

Greek philosophy as the first thinker self-consciously and thematically to employ

mathematical ideas to solve philosophical problems".[45] As such, to the extent that the

present thesis is a document of Coetzee's journey from the young student of

mathematics responsible for the 'Trivial Verses' to the author of a novel, nearly half a

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41 See Appendix I for the full text of each of the poems analysed in this chapter.

42 David Fideler, *The Pythagorean Sourcebook and Library: An Anthology of Ancient Writings Which Relate to Pythagoras and Pythagorean Philosophy*, trans. Kenneth Sylvan Guthrie (Phanes Press, 1987), 168.

The translation given here is of Fragment DK4, and is due to Kenneth Sylvan Guthrie. Whether or not one is to provisionally accept that this apparent interest in Philolaus of Croton can be taken to mean anything significant with regard to Coetzee's philosophical concerns in 1959, one ought to begin by acknowledging that at this time in the wider discourse on the Presocratics, the fragments of Philolaus's *On Nature* – though themselves still subject to serious reservation as to their authenticity – had already been long established as the most important among the very few plausible primary sources available to scholars of early Pythagoreanism. In the light of the residual doubt regarding their origins, though, the fragments were chiefly used in order to corroborate by way of hermeneutic reciprocity the more comprehensive secondary account given by Aristotle, particularly in his *Metaphysics*.

Nevertheless, in 1959, Philolaus's eminence as a thinker in his own right was only just beginning to be recognised: indeed, even as late as the first edition of Kirk and Raven's *The Presocratic Philosophers*, published in 1957, the authors of that seminal volume felt compelled to conclude that "the fragments attributed to Philolaus can be dismissed, with regret but little hesitation, as part of a post-Aristotelian forgery, based, not without skill, on Aristotle's own accounts of the Pythagorean system" (Geoffrey Stephen Kirk, John Earle Raven, and Malcolm Schofield, *The Presocratic Philosophers: A Critical History with a Selection of Texts* (Cambridge University Press, 1957), 311). The key text in shifting the balance away from the general consensus summarised by Kirk and Raven, and towards a growing acceptance of the authenticity of Philolaus's fragments was Walter Burkert's *Weisheit und Wissenschaft: Studien zu Pythagoras, Philolaos und Platon*: published in German in 1962, but not translated into English until 1972, Burkert's work sought, *inter alia*, to reclaim for Philolaus what he saw as his rightful status as a distinct and significant contributor to Pythagorean number theory.

43 Jonathan Barnes, *The Presocratic Philosophers*, Rev. ed., *The Arguments of the Philosophers* (London: Routledge & Kegan Paul, 1982).

44 Carl Huffman, *Philolaus of Croton: Pythagorean and Presocratic: A Commentary on the Fragments and Testimonia with Interpretive Essays* (Cambridge: Cambridge University Press, 1993).

45 Carl Huffman, "The Role of Number in Philolaus' Philosophy," *Phronesis* 33, no. 1 (1988): 2.

century later, in which a protagonist based in large part on the author himself is compelled to claim that "certain everyday mathematical concepts might help clarify moral theory",[46] his potential early interest in a figure whose main philosophical enterprise was predicated upon just such a belief seems extraordinarily pertinent to our purposes. Even so, and despite the serendipity of this convergence of philosophies, it is not the 'Trivial Verses' that provide the best indication of Coetzee's early poetic engagement with the philosophy of mathematics, but another poem from 1959 in which that engagement is explicit.

1.1.3 'Truth Lies Sunken' (1959)

Appearing in a 1959 edition of *Groote Schuur* – a more subversive literary magazine produced exclusively by the students of UCT – 'Truth Lies Sunken' constitutes the young Coetzee's most accomplished extended poem. Though occasionally rather tortured in its articulation, and blighted by an incongruous and somewhat juvenile acrostic in its second stanza, the poem nevertheless unfurls a forceful metaphysical conceit of mathematical paradox and epistemological scepticism that exceeds in its ambition and scope any of his contributions to the two volumes of *A Literary Miscellany*.

The poem's opening stanzas introduce its principal theme – the elusiveness of the deeper 'truths' of both love and objective reality from the subjective perspective of human experience – through the image of two lovers together seeking to excavate some deeper 'truth' that "lies sunken in a well".[47] In the first stanza, the lovers' attempts to commune with this obscure, and in a sense Platonic, form are met with diffuse and

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46 J. M. Coetzee, *Diary of a Bad Year* (London: Harvill Secker, 2007), 204. The provisionality of the terms through which one might sensibly attribute this proposition to Coetzee himself are negotiated in Chapter Six, below.
47 J. M. Coetzee, "Truth Lies Sunken," in *Groote Schuur* (Cape Town, 1959), line 1. The full text of the poem is included in the Appendix.

plural responses. Reflected images "shiver" on the surface of the water; single calls are returned as pairs of fugitive echoes; but 'truth' itself remains inaccessible.

Following the relatively free gait of its predecessor, the second stanza briefly resolves into a more regular underlying stress pattern, wherein alternating couplets of trochaic tetrameter and trochaic tetrameter catalectic collaborate with strong end-rhymes to point the reader towards a series of resonances between the search for 'truth' and the perception of love: just as the narrator asks his lover to "Mark the greyness of the evening / As it passes into night",[48] then, the metre and rhyme converge to indicate that, likewise, though his lover may be "Robed in grey",[49] it nevertheless remains the case that "that shade supposes white".[50]

The greys of both evening and robe, though transmitting a hue of their own, feel to the lovers like provisional intermediaries between the fixed markers of a deeper reality, merely transient traces of the binarily opposed categories from whose perceptual resources they are apparently composed. In each case, however, and as the third stanza laments, the lovers' attempts are nothing more than gestures towards "a harder truth, hinted at only / By the first echo".[51] In the same way that the continuous shades of the evening's greyness eventually tend towards the verifiable, singular blackness of night, so the "[o]dours of the grey shades"[52] that attend of the lovers' union continue to call them "[u]nder the waters of the silent well"[53] in a continuing search for the 'white' that those shades suppose; in other words, in search of the 'truth' of their love.

Following this romantically themed prologue, it is in the fourth stanza that the mathematical metaphorics of 'Truth Lies Sunken' gradually begin to become apparent. Alluding to the act of bifurcation that, according to the Book of Genesis, separated

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48 Ibid., lines 15–16.
49 Ibid., line 17.
50 Ibid., line 18.
51 Ibid., lines 34–35.
52 Ibid., line 25.
53 Ibid., line 26.

humankind from the divine – the conceptual division between the "hand and utmost apple",[54] respectively avatars of innocence and sin – the narrator registers his fears that the "oppression of duality will drive us anywhere / Away from the I and thou".[55] Attempts to orient oneself to the world through the oppositional structures upon which language is predicated, then, will render merely "two echoes of truth",[56] while any supposed deeper truth will remain intrinsically obscured:

> The oppression of duality will drive us anywhere,
> Away from the I and thou,
> The hand and utmost apple
> (Nay, could I not reach it?),
> The two echoes of truth.
> In the flickering of these symbols,
> In the cold reflection on the water,
> Whether clad in grey, as now,
> And meditating,
> Or whether no longer clad,
> And no longer meditating,
> We are marked as two,
> The unholy number.
> To shouted catechisms
> The well will answer only words
> And wait the donning of the grey,
> The second selves.[57]

As the poem develops, it becomes clear that the narrator believes it to be upon this originary act of binary division, this marking as two, that the superstructure of our perceptual world and the language we use to engage with it is intrinsically, delusorily, predicated. Though not immediately obvious, it is through an analogy between the generative power of our most fundamental categories of both natural language and the language of mathematics that Coetzee constructs his definition of love. As his 1977 essay on the Dutch poet Gerrit Achterberg suggests, Coetzee's thinking here echoes that of the Austrian-born Israeli philosopher Martin Buber: in that essay, quoting from

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54 Ibid., line 39.
55 Ibid., lines 37–38.
56 Ibid., 41.
57 Ibid., lines 37–53.

Buber's *I and Thou*, the English translation of which was first published in the same year as 'Truth Lies Sunken', he explains that

> the existential incompleteness of the I is at the root of Martin Buber's myth of a primal I-Thou relation. The "primary word," says Buber, is not I but "I-Thou," the word of "natural combination" denoting a relation between I and You antedating the objectification of You into It and the isolation off into a being "at times more ghostly than the dead and the moon." This primal relation is, however, lost: "This is the exalted melancholy of our fate, that every Thou in our world must become an It." Intimations of the lost relation, "moments of the Thou ... strange lyric and dramatic episodes, seductive and magical ... tearing us away to dangerous extremes ... shattering security," inspire our efforts to reconstitute again and again the "between" of the primal I-Thou.[58]

Coetzee clarifies by way of an endnote that this myth, precisely speaking, is "an 'in the beginning' myth, both ontogenetic and phylogenetic, a myth of the fall into the quotidian from an original state of relation".[59] Faced by a situation in which the search for truth yields "only words",[60] the narrator of 'Truth Lies Sunken' urges a celebration of Buber's "intimations of lost relation" and "efforts to reconstitute again and again the 'between' ": by enacting a "donning of the grey",[61] a "shattering of the image",[62] and a "subsumption of the simple echo",[63] one may mark experiential phenomena as provisional, and reality not as nominal but instead relational. From this position, the narrator concludes, one will no longer feel a compulsion towards a rigid demarcation of singular, discrete, nominalised truths: one's language is configured instead as "nothings" in which the "old distinctions vanish" and certainties regarding the fundamental concepts 'one' and 'zero' no longer hold true.

> See, the eve is set about us,
> Comfort, comfort calls,
> See, I move to you in stillness
> As the grey shade falls.
> Time is gone beneath the waters,
> Now is day and night,

58 Coetzee and Attwell, *Doubling the Point*, 72.
59 Ibid., 401n.
60 Coetzee, "Truth Lies Sunken," line 51.
61 Ibid., line 52.
62 Ibid., line 54.
63 Ibid., line 55.

> Faded is the cold reflection,
> Lady, burning bright.
> Now the old distinctions vanish,
> Naught that is is none,
> All is present, now and ever,
> One and one is one.[64]

In order to question the ontological validity of "the old distinctions", then, the narrator draws attention to two fundamentally problematic aspects of foundational mathematics: firstly, the fact that the affirmation of a 'naught' is not the same as the affirmation of nothingness ("Naught that is, is none"), but is, rather, generative; and secondly that the term 'one' can be used to denote both the first ordinal number and a state of unity ("One and one is one").

As an undergraduate student of mathematics in the late 1950s, Coetzee would by this time have been more than familiar with the contingency and the generative power of the apparently foundational concepts of the 'zero' and the 'one'. Two later pieces of evidence suggest that a discipline almost entirely founded on questioning these concepts – namely set theory – was to stay very much in his thoughts for some years to come. Firstly, the description in *Youth* of his disappointment on arrival at IBM that computer programming was not, as he had hoped, "about ways of translating symbolic logic and set theory into digital codes"[65] suggests, albeit in that same problematically fictionalised context, that these were two fields in which he was both educated and interested prior to his arrival in England. Moreover, he gives the subject a more substantial treatment in his essay on 'Samuel Beckett and the Temptations of Style', which, though published in 1973, was largely extracted from the doctoral thesis he had completed four years earlier. One of the few additions to his original thesis submission is a reference to the work of a mathematician widely regarded as one of the founding fathers of both set theory and, equally as revealingly, mathematical constructivism:

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64 Ibid., lines 54–74.
65 Coetzee, *Youth*, 46.

> If we can justify an initial segmentation of a set into classes X and not-X, said the mathematician Richard Dedekind, the whole structure of mathematics will follow as a gigantic footnote. Beckett is mathematician enough to appreciate this lesson: make a single sure affirmation, and from it the whole contingent world of bicycles and greatcoats can, with a little patience, a little diligence, be deduced.[66]

Perhaps the most profound consequence of the principle Coetzee attributes to Dedekind here is that, just as with natural language, and as the development of set theory in the nineteenth century demonstrated to the wider mathematical community of the time, even the most apparently innocuous of mathematical entities is predicated upon a hidden nest of assumptions that, once unfolded, offers a remarkable propensity for generating other, more complex and seemingly contingent notions. Before considering the specifically mathematical content of the remainder of 'Truth Lies Sunken', then, it will be appropriate to demarcate some of the context in which its mathematical explorations take place.

1.1.4 Zeros and Ones

Following the development of the various non-Euclidean geometries in the early part of the nineteenth century,[67] it was apparent to contemporary mathematicians that, faced with a given geometrical problem, one would need to choose which of the available geometric models, and hence which set of fundamental axioms, would provide the most expeditious route to a solution, and therefore which other models and axioms would need to be provisionally ignored. As this process of so-called 'mathematical modelling' spread to other disciplines within mathematics, it became conventional to accept that, as long as one were not attempting to make any claim as to a deeper reality beyond the limits of the axiomatic system in which one was working, much could be achieved by treating particular mathematical problems as limiting cases. The most significant result

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66 J. M. Coetzee, "Samuel Beckett and the Temptations of Style (1973)," in *Doubling the Point: Essays and Interviews*, by J. M. Coetzee and David Attwell (London: Harvard University Press, 1992), 43.

67 A non-Euclidean geometrical system is one in which one or more of the principles of Euclid – and especially the fifth postulate, according to which parallel lines shall never meet – are not universally observed.

of this liberating shift in attitude was the development of a vast array of specialist

mathematical disciplines, including group theory, measure theory, and topology. While

the progress of these disciplines was now free to accelerate as never before, and thereby

to generate ever more detailed and precise descriptions of the phenomena with which

they are individually concerned, the essentially constructivist aesthetic of mathematical

modelling served gradually to erode the sense that our mathematics might correspond

with any underlying truth as to the nature of reality. As such, the status of even the most

apparently foundational mathematical concepts – including the notions of the 'zero' and

the 'one' – would need to be reassessed in the light of the seemingly more plausible

explanation that they are, in fact, no more than contingent, constructed elements whose

'truth' is limited to the confines of the limiting case to which they belong.

To choose just one example, from the discipline of group theory, it is not

incumbent upon any particular mathematical model to contain a 'zero', at least not in the

sense with which most non-mathematicians will largely be familiar. Any such model

does, however, require what is known as an 'identity element'; that is, one element

within the model that, when combined with another element under any of the

transformations allowed within the model, leaves that other element in its original –

'identical' – state. In the system of natural numbers, under the transformation of

addition, the identity element is indeed 0, in the sense that adding 0 to any other natural

number returns that same natural number: for instance, in the conventional terminology,

the operation $2 + 0 = 2$ is a 'null operation'. Nevertheless, one only need consider the

equally familiar mathematical model of the rational fractions under the multiplication

transformation to recognise that not only does the identity element not have to be 0 – in

this case it is 1, since, for example, $\frac{1}{4} \times 1 = \frac{1}{4}$ – but that some mathematical models,

including this one, do not even contain 0 as a member. In the conventional terminology,

the 'additive identity' is usually denoted with the symbol, 0, while the 'multiplicative identity', also known as the 'unit', is usually denoted with the symbol, 1.

A second way in which the 'zero' fails to correspond with the popular image of its analogy with 'nothingness' – another way in which "Naught that is, is none" – is in its capacity for generation. Here, elementary set theory is instructive. Following George Boole's introduction of the concept of the 'set' in his *Laws of Thought* (1854), the early pioneers of set theory demonstrated that it is in fact possible to generate the entirety of our natural number system with no concepts other than those of 'set', 'element', and 'membership'. Conventionally, then, an 'element' may be considered to be a 'member' of a given 'set' if it conforms to the rules for membership: the set of prime numbers less than twenty, for instance is {2,3,5,7,11,13,17,19}; each of the individual integers denoted therein are known as its 'members'. One may define the 'empty set' or 'null set' as any proposed collection with no members: for instance, the set of even prime numbers greater than 2, the set of feline dogs, or the set of living Kings of France. The empty set is conventionally denoted by the symbol, $\varnothing$. Defining $\varnothing$ as our identity element – nominally our 'zero-element' – one can then begin to construct any and all of the natural numbers in order. The empty set itself, while empty, is nevertheless self-evidently an element amenable to inclusion within a set. The set that contains $\varnothing$ as its only member, then, can be said to have one member; acceptance of this locution results in a conception of 'one', corresponding to {$\varnothing$}. One may then imagine another set, containing both the empty set, $\varnothing$, and the set that contains the empty set, {$\varnothing$}. This set – {$\varnothing(\varnothing)$} or {0,1} – contains two members, and hence furnishes us with the concept of 'two'. Using this process, following the single affirmation of the concept of the 'empty set', one can systematically produce the entire set of natural numbers.

1.1.5 'Truth Lies Sunken' (1959) - Continued

A further way of looking at this situation, which brings the poem back into focus, is

offered by the following quotation from L. E. J. Brouwer, perhaps the most influential

thinker in the intuitionist/constructivist tradition:

> Mathematics arises when the subject of two-ness, which results from the passage
> of time, is abstracted from all special occurrences. The remaining empty form [the
> relation of *n* to *n*+1] of the common content of all these two-nesses becomes the
> original intuition of mathematics and repeated unlimitedly creates new
> mathematical subjects.[68]

The narrator of 'Truth Lies Sunken', then, rejects the primacy of this 'two-ness', in part

out of fidelity to 'truth', in part out of a desire to become unified – 'as one' – with his

lover. From this starting position, the speaker attempts to reveal the essence of his

would-be lover, of whom he has as of yet been "too little conscious":[69]

> We have forgotten, or I have forgotten,
> Something that urges now, as we meet,
> In the mouthings of the well behind us –
> The obvious duality of serpent and seduced,
> The ineluctable break between beloved and beloved,
> The one and one that are not one,
> Even in Arcady.
> I have been too little conscious of the calling of the well,
> And also of you, my love,
> Too often only a second dancer
> Moving to music suggested by the spheres.
> To illumine you with symbols is only to watch again
> An image silent on the water; words are nothing;
> You are the melancholy of all men of all times,
> An overflux of quintessential humour,
> But that is not the name the echo gives.
> Call again into the darkness. Beneath the noise,
> The sound of the thunder taunting our vanity,
> Strain to the foetal movement of the water
> Heaving up a word, the one word,
> Meaning nothing, nothing beyond meaning,
> A lesson of negation if at all a lesson,
> But less negation of anything than abnegation,
> Demanding prostration, but prostration in a void, alone.[70]

68 L. E. J. Brouwer, quoted in Morris Kline, *Mathematical Thought from Ancient to Modern Times* (New
    York: Oxford University Press, 1972), 1199–200.
69 Coetzee, "Truth Lies Sunken," line 82.
70 Ibid., lines 78–98.

In this context, neither language nor number seems to constitute a plausible framework through which to gain access to 'truth': the narrator's conclusion at this stage would appear to be a retreat into "abnegation" and "prostration", and to some species of epistemological nihilism.

The final stanza, however, provides an alternative, and represents the most sustained instance of explicit mathematical philosophy in any of Coetzee's published poems. In a sudden monologic sweep that lends a certain unity to what had been to this point a somewhat cryptic piece, the thematic heart of the poem is at last revealed: now that the "old distinctions" have vanished, the narrator urges, we should reject the seemingly rational, but ultimately illusory 'truths' that we have predicated upon "all our base arithmetic":[71]

> For dullness of understanding, forgive me.
> Forgive me also for neglect
> Of a certain subtile white geometry,
> A most holy dimension beside me
> Exceeding all our base arithmetic
> By a measure of infinity.
> As I am slow to understand
> This universal illustration
> Of one and nothing yielding always one,
> So I confess emptiness of virtue.
> To come to the O of the meaningful well,
> Poverty of heart
> To plumb the depth where truth lies sunken.
> Little am I, in truth, my lady –
> A systematic nought
> Pointing the infinity of lines
> Figured through the dark now,
> A passing entelechy
> Of the deeper echo.
> Little in truth am I, my lady,
> Save you succour me,
> An you succour me.[72]

Having previously suffered a "poverty of heart", and being too weak "to plumb the depths where truth lies sunken", the narrator now sees himself as "Little […] in truth"

71 Ibid., line 103.
72 Ibid., lines 99–120.

but a "systematic nought / Pointing the infinity of lines". Given the ostensibly romantic subject matter of the poem, it seems reasonable on a first reading to assume that the "most holy dimension beside me / Exceeding all our base arithmetic / By a measure of infinity" corresponds on a metaphorical level to either love, or perhaps unconditional faith in another, unencumbered by apparently rational doubts. Nevertheless, the semantic field of this stanza is unquestionably mathematical; its prominent position as the poem's conclusive gesture therefore seems to justify an overall reading in which mathematical considerations are to the fore. In the first instance, then, the narrator's denunciation of "all our base arithmetic" as a "dimension" responsible for obscuring that "subtile white geometry" reads most naturally as a reflection upon the categorical distinction between arithmetic and geometry as descriptive and analytical frameworks for mathematical reasoning: the former, being strictly numerical, lacks the visual "dimension" of the latter and therefore fails to provide the means necessary to construct a "universal illustration / Of one and nothing yielding always one". The narrator, begging forgiveness for his "dullness of understanding", appears to recognise the flaws in relying upon a single system of reason in order to explicate the "most holy dimension" of his love, and therefore "confess[es] emptiness of virtue". This "emptiness of virtue", however, prompts another mathematically-oriented reading, towards which our earlier discussion of the generative power of the zero is instructive. The narrator, declaring himself to be "[l]ittle in truth", decides to "come to the O of the meaningful well"; a place where, as he has described, "words are nothing", where "your answers are as nothings", and which heaves "up a word, the one word, / Meaning nothing, nothing beyond meaning". The "O of the meaningful well", then, is both the identity element and the unit of the system within which it occurs; both symbolic of emptiness, and the originary element from which the whole "meaningful" system is constructed. Just as

Dedekind's empty set, ∅, is capable of being the "single, sure affirmation" from which "the whole structure of mathematics will follow as a gigantic footnote", then, the narrator can now see himself as a "systematic nought / Pointing the infinity of lines": his own nothingness may merely be a "passing entelechy / Of the deeper echo", the unknowable truth of love that remains sunken in the well, but, "figured through the dark" by his lover, he has access to that "most holy dimension".

In the sense that similar issues regarding the inability of an existing representational framework to account for the entirety of predicted or experienced phenomena are prominent within 'Truth Lies Sunken', the wording of the metaphor of the "certain subtile white geometry" seems beyond coincidence. Prior to Descartes's introduction of the ultimately enduring term, 'imaginaire', in his 1637 work *La Geometrie*, the square roots of negative numbers were more commonly referred to as 'subtle' or 'subtile'.[73] As such, and given our earlier discussion of the way in which the poem engages with mathematical ideas, it is no large step to conclude that Coetzee's allusion to a "certain subtile white geometry / A most holy dimension beside me" may be intended to refer to the geometry of the complex plane. In the context of 'Truth Lies Sunken', then, the narrator sees love as standing in a similar relation to rationality as do the imaginary numbers to the reals; parallel, seemingly incommensurate, but plausibly in some sense just as 'real', and often conflated to apparently meaningful effect.

In summary, then, the ways in which Coetzee employs metaphors drawn from his mathematical training lends 'Truth Lies Sunken' a distinctive and original perspective through which to explore the elusiveness of 'truth' in matters both of love and perception. In so doing, the poem also demonstrates an unmistakeable affinity on

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73 An 'imaginary number' is any multiple of the imaginary unit, *i*, which is equal to the square root of -1. For a more detailed discussion of Coetzee's later interest in the metaphorics of the imaginary number system, see Chapter Two, below. For a more general discussion of the history of the imaginary numbers, see Paul J. Nahin, *An Imaginary Tale: The Story of "i"* (Princeton: Princeton University Press, 1998).

Coetzee's part with the epistemological questions that arise at the most fundamental

levels of the philosophy of mathematics. Armed with this detailed understanding of the

problematic nature of meaning construction in both natural language and the language

of mathematics, it would not be long before he would begin to incorporate these

questions right at the heart of his creative process.

1.1.6 Poems from *Groote Schuur* (1960 - 1961)

Coetzee's decision to depart from traditional methods and to begin to involve aleatoric,

permutative techniques in his process emerged not only from his employment as a

computer programmer, but apparently also as a consequence of his growing uncertainty

regarding his own innate capacities for creativity. Though the timeline is somewhat

truncated and rearranged, the depiction in *Youth* of the period leading up to his

employment at IBM and International Computers offers a fascinating insight into

certain of the poems he published during the early 1960s, and therefore deserves

mention here. Referring to the unpublished precursors to 'Truth Lies Sunken', and with

the combination of self-romanticism and self-loathing that characterises much of

Coetzee's portrayal of his younger self in his fictionalised autobiographies, 'John' looks

back with wistfulness at the boldness that now he seems to find lacking:

> He no longer seems to have it in him to write poetry of the kind he wrote at the
> age of seventeen or eighteen, pieces sometimes pages long, rambling, clumsy in
> parts, but daring nevertheless, full of novelties. Those poems, or most of them,
> came out of a state of anguished being-in-love, as well as out of the torrents of
> reading he was doing.[74]

From the evidence of *Youth*, it is clear that among the poems that 'John' considers so

inferior are those that, in his real life, Coetzee published in the 1960 edition of the Cape

Town literary journal, *Groote Schuur*. It is in that volume, and after a short comic

dialogue on the subject of poetics, that the Pound-esque piece that impressed Uys Krige

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74 Coetzee, *Youth*, 58.

appears:

> Returning from Carthage with an empty hold,
> Phocas the trader was lost at sea.
> Now, freed of chancery,
> He floats on the gay waves:
> The dye is run from his cloak.

This is followed by is a five-line epigram entitled 'The wives of the rock-lobster

fishermen':

> The wives of the rock lobster fisherman
> Have grown accustomed to waking alone,
> Their husbands having for centuries fished at dawn;
> Nor is their sleep as troubled as mine.
> If you have gone, go then to the Portuguese rock lobster fishermen.

According to 'John', the last of these was the only poem he had written during the

preceding year that he liked, "even if the poem itself, looked at closely, makes less and

less sense".[75] In the context of the discussion of 'Truth Lies Sunken' above, indeed, one

might go so far as to suggest that it was just this surreal impenetrability that Coetzee

admired in this piece, making as it does so meagre a claim to reality. Indeed, the same

might equally be said for the seven short epigrammatic pieces that appeared in *Groote*

Schuur the following year. Like miniature fables in futility, the 'Five Night-Thoughts of

a Loving Sleepless; to which are Appended Two Poems' (1961) conjure with elusive,

dreamlike images to unmistakably surreal effect. They remain, perhaps consequently,

rather hollow, so it is maybe not surprising that the next of Coetzee's poems to be

published did not appear for a further two years, and was the product not of immersion

in the literary community he imagined he would find in London, but of his involvement

in the highly mathematical world of computer programming.

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75 Ibid., 60–61.

1.2 Computer Poetry

If 'Truth Lies Sunken' represents Coetzee's most sustained attempt to counteract the fact that the "question of how exactly poetic thinking diverges from mathematical thinking has seldom been attacked by poets in their poetic work",[76] it is nevertheless the critical apparatus he produced in consort with his own 'computer poetry' that provides the most direct account of his personal explorations into this seeming divergence. Coetzee's consideration of this issue, then, emerges from the simple aim, in 'Computer Poem', of describing and exemplifying a methodology for generating poetry through the use of a "computer programme that could be run by a hack",[77] to the serious consideration, in 'Surreal Metaphors and Random Processes,' a full sixteen years later, of the relationship between the "revolt against system"[78] represented by the Surrealist André Breton's experiments in aleatorism and automatism, and the computer poet's attempts to generate original metaphors with the assistance of mathematical functions predicated on certain notions of chance, probability, and indeterminacy.

1.2.1 'Computer Poem' (1963)

In 1963, employed by IBM at 58 Newman Street, London, Coetzee had access to greater computational power than almost any other working contemporary poet.[79] Consequently, once he discovered that his paid work would not involve, as the fictionalised testimony of *Youth* suggests he had hoped, "ways of translating symbolic

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76 Coetzee, "Review of 'Strange Attractors'," 944.
77 J. M. Coetzee, "Computer Poem," *The Lion and the Impala* 2, no. 1 (April 1963): 12.
78 J. M. Coetzee, "Surreal Metaphors and Random Processes," *Journal of Literary Semantics* 8, no. 1 (February 22, 2011): 28.
79 Other poets working in the field of computer-generated poetry at this time, but without access to the computational power afforded to Coetzee at IBM, included Nanni Balestrini, Jean Baudot, Brion Gysin, Emmett Williams, and Theo Lutz, whose 'Stochastiche Text' (1959) has been described as the first random or probabilistic text. For a narrative account of this period in the development of computer-generated poetry, see Lori Emerson, "Materiality, Intentionality, and the Computer-Generated Poem: Reading Walter Benn Michaels with Erin Mouré's Pillage Laud," *ESC: English Studies in Canada* 34, no. 4 (December 2008): 45–69.

logic and set theory into digital codes",[80] but instead trivial and prosaic talk "about inventories and outflows, about Customer A and Customer B",[81] he began to put his 1401 computer to what he considered a more interesting use.

The process through which he constructed 'Computer Poem' was tripartite. First, the 'editor' establishes the poem's overall structure by delimiting an 'elementary paradigm' consisting of different syntactic categories such as 'Action-present', 'Action-past', 'Place', and 'Manner', with pronominal qualifications and statements of 'Nature-description' to be inserted at random by the computer. The editor then selects an 'area of life' from which the initial vocabulary is selected: those familiar with the account in *Youth* of Coetzee's time at IBM will not be surprised that the "area of life chosen here was personal estrangement".[82] Using Roget's Thesaurus, the editor then provides the computer with four vocabularies – corresponding to the four syntactic categories specified by the structure – and thereby furnishes the computer with a lexicon of approximately 800 words. Finally, the computer permutes all possible combinations and, with a little judicious human editing, the 'Computer Poem' is complete. Coetzee's final version – in both unedited and edited form – appears as follows:

Poem (ex computer)

	Dawn Birds Stream
	Calm-Morning
You)	Stand-Among
	Forest
	Alone Tense
You)	Cry
You)	Spend-The-Nights
I)	Away-From
	Terrified Rapt
	Owls Blackmen
You)	Hope Violence

80 Coetzee, *Youth*, 46.
81 Ibid.
82 Coetzee, "Computer Poem," 13.

Poem (edited)

Dawn, birds, a stream, a calm morning.
You stand among the trees alone and tense.
You have cried.
You spend the nights away from me,
Terrified, rapt,
Among owls and black men.
Hoping for violence.

While the poem's startlingly historically resonant content raises certain questions as to the degree to which one might legitimately consider 'Computer Poem' random, it is necessary to note that Coetzee's attraction to the impersonal automatism of computer-generated poetry at this time is also reflected in what might be considered a first published statement of his overall literary mantra: in a 1963 essay on some of his contemporary poets at UCT, he argues in relation to his praise therein of C. J. Driver that "one of the burdens of genius is to keep it chaste".[83] For a young man determined to earn such a label for himself – and, moreover, whose fictionalised version of himself at this time declares, in reference to Howarth's "reputation for being dry, pedantic", that he "has nothing against pedants. He prefers them to showmen"[84] – an attraction to processes shorn of ostentation seems inevitable. Likewise, in the light of the economy of style characteristic of his later fiction, the sentiment seems to have endured.

In 'Computer Poem', the 'words' Coetzee permutes are divested of their semantic, connotative qualities, leaving mere grammatical tokens, the only 'meaning' of which is a function of their conformity to a strict set of axioms governing their possible arrangement. The overall structure therefore corresponds to the closed formal structure known in mathematics as a 'Formalised Axiomatic System' (FAS). Nevertheless, unlike those in the mathematical tradition that had given birth to the professional discipline within which he now found himself working, Coetzee's focus was not in this instance

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83 J. M. Coetzee, "Haresnape, Coque, Driver - Retrospect," *Groote Schuur* (1963): 4.
84 Coetzee, *Youth*, 27.

practical; instead, he was now concerned with the ways in which a FAS can construct beauty from within its ultimately tautologous workings.

Coetzee's work in computer poetry emerges from the tradition outlined by Samuel R. Levin in his essay, 'On Automatic Production of Poetic Sequences', published earlier in 1963; his particular engagement with Levin's essay is exemplified by his use of it as a classroom text throughout his 'Linguistics and Literature' classes at the University of Texas at Austin from 1965 onwards. Moreover, his lasting respect for Levin's essay is evident in his explicit acknowledgement of its continuing influence, a full sixteen years after its publication, in the context of 'Surreal Metaphors and Random Processes'.[85] At this rather pre-self-critical time in the life of the discourse of computer-generated poetry, its association with the practice of 'generative grammar', from which Levin's work arose, seemed to enable the linguist to account for the hitherto elusive qualities of poetic language – and natural language in general – in a rationalisable manner, and through reliable, repeatable, quantifiable, and practice-based methods. Levin, for instance, uses examples from Wallace Stevens, Hart Crane, and Dylan Thomas to try "to show that certain sequences, which one would characterize in some presystematic way as being poetic, can be rationalized as violations of grammatical rules".[86] As Levin himself makes clear, however, such practice as Coetzee's was now relatively widespread among those working at the cutting edge of linguistics following the work of Chomsky; indeed, as Coetzee confesses, the programme he developed to generate 'Computer Poem' was, "comparatively speaking, primitive".[87]

Ultimately, then, 'Computer Poem' is perhaps of more enduring interest for the biographical insight it provides, rather than its intrinsic poetic qualities: in particular, it

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85 Coetzee, "Surreal Metaphors and Random Processes," 29n.
86 Samuel R. Levin, "On Automatic Production of Poetic Sequences," *Texas Studies in Literature and Language* 5 (1963): 143.
87 Coetzee, "Computer Poem," 12.

represents a definitive starting point for the prolonged period of working at the

intersection of mathematics and poetry that would come to a neatly symmetrical ending

with the publication of 'Surreal Metaphors and Random Processes' in 1979. By that

time, he had become an established novelist as result of the relative success of

Dusklands (1974) and *In the Heart of the Country* (1977), and – as shall become clear in

the chapters to come – had developed a scepticism, sometimes bordering on morbidly

fascinated contempt, at the infiltration of quantificatory methods into the arts and

humanities. This sixteen-year period is also intriguing in that its origins coincide with

Coetzee's employment not only at IBM, but also at International Computers in

Bracknell, England. Recognising the effects of the scientistic approach to human issues

represented by a colleague, Ganapathy, *Youth*'s 'John' begins to establish one of the

poles of an internal critical debate that would last Coetzee's whole career:

> Is this indifference to the world a consequence of too much intercourse with
> machines that give the appearance of thinking? How would he [Ganapathy] fare if
> one day he were to quit the computer industry and rejoin civilized society? After
> spending his best energies for so long on games with machines, would he be able
> to hold his own in conversation? Is there anything he would have gained from
> years with computers? Would he not at least have learned to think logically?
> Would logic not by then have become his second nature? He would like to believe
> so, but he cannot. Finally he has no respect for any version of thinking that can be
> embodied in a computer's circuitry.[88]

Rather than merely accepting that a theory of mind based solely on a computational

model is inaccurate, however, 'John' begins to question whether

> logic is human invention, not part of the fabric of being, and therefore (there are
> many intermediate steps, but he can fill them in later) that computers are simply
> toys invented by boys (led by Charles Babbage) for the amusement of other
> boys.[89]

Such a line of thinking leads him to wonder not just about the impact of his own

mathematical studies on his capacity for logic per se, but whether the particular brand of

logic that underpins human rationality is anything more than a chance consequence of

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88 Coetzee, *Youth*, 149.
89 Ibid., 159–160.

other cultural and historical forces:

> There are many alternative logics, he is convinced (but how many?), each just as good as the logic of either-or. The threat of the toy by which he earns his living, the threat that makes it more than just a toy, is that it will burn either-or paths in the brain of its users and thus lock them irreversibly into its binary logic. […] He pores over Aristotle, over Peter Ramus, over Rudolf Carnap. Most of what he reads he does not understand, but he is used to not understanding. All he is searching for at present is the moment in history when either-or is chosen and and/or is discarded.[90]

In 1963, and as a former student of mathematics now working in computer programming, one reason why Coetzee would have been likely to share 'John's' critical attitude towards the claims of an 'either-or' logic was the renewed prominence at this time in the work of Kurt Gödel. In direct response to those mathematicians such as Hilbert, Russell, and Whitehead who had attempted to formalise the foundations of mathematics through logic and set theory, Gödel had demonstrated in a 1931 paper that the axiomatic method was inherently flawed.[91] It was not until 1963, however, that Paul Cohen's 1963 demonstration of the undecidability of Gödel's so-called Continuum Hypothesis rendered the Austrian mathematician's conclusions truly inescapable; amidst the acclaim and controversy Cohen's paper provoked within the worldwide mathematical community, it would have taken an individual far less inquisitive than Coetzee to be working in the various fields he had chosen as his own and to somehow remain unstirred.[92]

To elaborate, Gödel's 'first incompleteness theorem' proved that no Formal Axiomatic System will ever be complete, for – in the words of the classic exposition on Gödel, an immediately and enduringly popular classroom text that had first been published in 1958 – "there is an endless number of true arithmetical statements which

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90 Ibid.

91 Kurt Gödel, 'On Formally Undecidable Propositions in Principia Mathematica and Related Systems I', in J. van Heijenoort, *From Frege to Gödel: A Source Book in Mathematical Logic (1879–1931)*, (Cambridge, MA: Harvard University Press, 1967), 596–616.

92 For a full and detailed account of the ways in which Cohen's work finalised widespread acceptance of Gödel's theories, see Akihiro Kanamori, "Cohen and Set Theory," *Bulletin of Symbolic Logic* 14, no. 3 (2008): 351–378.

cannot be formally deduced from any given set of axioms by a closed set of rules of inference".[93] Building on the premise that it is possible to construct statements that are both true and 'undecidable' – meaning that neither the statement itself, *G*, nor its formal negation, *~G*, is derivable from the axioms of the FAS – Gödel was able to go further and demonstrate that all formal arithmetical systems must be incomplete, since, however one might alter the FAS, and whatever axioms one may amend or add, it would always be possible to construct another such true yet formally undecidable statement. Taking this point to an even further extreme, Gödel demonstrated that it was logically impossible to demonstrate the consistency of a FAS by way of an argument that is amenable to representation in the language of that same FAS, since this entails self-reference and therefore the possibility of paradox.[94]

1.2.2 'Linguistics and Literature' (1968-69)

Though Coetzee does not seem to have named Gödel's theorem explicitly in any of his published works, or in any of his lecture notes prior to a 1993 class on Vladimir Nabokov and Thomas Pynchon,[95] its broad spirit pervades several phases of his transformation from the twenty-three-year-old programmer based in England and responsible for 'Computer Poem' to the thirty-nine-year-old Cape Town-based novelist and lecturer who contributed 'Surreal Metaphors and Random Processes' to *Staffrider*. Not least among the detours he took along the way was the time he spent in the United States of America pursuing the early stages of his career as a literary academic.

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93 Ernest Nagel, James R. Newman, and Douglas R. Hofstadter, *Gödel's Proof*, Revised. (New York: NYU Press, 2001), 98.

94 A simple, non-mathematical example of such self-reference is the Cretan liar paradox: Epimenides the Cretan states that "All Cretans are liars"; because of its logical self-reference, it is undecidable whether Epimenides' statement is true or false.

95 J. M. Coetzee, "Postmodernism," Seminar Notes, 1993, National English Literary Museum, Grahamstown. The brief notes to this course also include a quotation from Descartes's *Meditations on First Philosophy* to the effect that the "only sciences that give certain knowledge are arithmetic and geometry", and reference to a class on Jean-Luc Godard's film, *Alphaville*, in which Godard depicts a dystopian city-state governed by an intelligent, authoritarian computer, Alpha 60, whose dialogue is largely adapted from the works of Borges.

Alongside his own studies, his chief intellectual outlet during his time at the University of Texas at Austin was his teaching; in particular, as a consequence of his own work in stylistics, he had become conversant with a variety of statistical methodologies that, by virtue of both their role in his ongoing intellectual development and their wider philosophical implications, merit some elucidation here.

As the notes to Coetzee's Fall 1968-69 class in 'Linguistics and Literature' demonstrate, he had by this point developed a wide range of techniques designed to reveal and explicate certain features of literary texts that the non-mathematical linguistic tools of traditional criticism remained insufficiently able to articulate. The diverse list of poets he elected to analyse at this time included Thomas Wyatt, Dylan Thomas, T. S. Eliot, Robert Creeley, Robert Browning, Rainer Maria Rilke, and, most significantly for his own work in computer poetry, Pablo Neruda. It was for students on this course, moreover, that he first produced copies of Levin's 'On Automatic Production of Poetic Sequences', which seems to a significant degree to have informed his own work in computer-generated poetry.

In the case of Wyatt, Coetzee demonstrated for his class a means of analysing metre by dismantling 'They Flee From Me That Sometime Did Me Seek' into analogical, lexical, suprasegmental, and syntactic units. Having collated each and every alternative semantic reading that one might reasonably extrapolate from each of these independent units, the analyst then compares and contrasts his or her findings against a variety of plausible metrical analyses of the poem. Having exemplified this process of collation for his students, Coetzee's notes pose a series of questions aimed at "reducing" the ambiguity of the piece generated by its amenability to alternative and potentially contradictory overall readings. Answering "in terms of probability" he considers whether any remaining

ambiguities fall into interrelated subsets, as distinct from sets whose interrelations can be comprehended only once the meaning of the poem has been synthesized as a whole.[96]

In other words, the method attributes values to each potential reading of each putative 'unit' of meaning or structure according to the probability of its contributing to a coherent overall reading, and then reconstructs a series of potential readings that, at the very least, are semantically unambiguous. Coetzee then uses "a process of elimination" to specify the few variant coherent and "non-trivial" readings, each of which could be shown to correspond to the same validated, unequivocal, unambiguous logical-propositional form. By attributing alphanumeric labels to each unit, he then finalises in content-neutral algebraic form each of the plausible readings one might champion in one's analysis of the poem. 'They Flee From Me That Sometime Did Me Seek', then, might be rendered as '4A1 + 4B2 + 4C1 + 3A2+ 4D1, 2+5B', where each alphanumerical algebraic element corresponds to a proposition, or compound of propositions, explicitly defined alongside the given analysis. Extending this practice in the classes to come, Coetzee demonstrated a comparison of the frequency ranking of phonemes in Dylan Thomas's 'The force that through the green fuse...' as against the averages calculated by Hultzen, Allen, and Miron in their comprehensive study of a vast array of texts, *Tables of Transitional Frequencies of English Phonemes*.[97]

Developing this method of statistical analysis – which was again predicated on a probabilistic conception of the distribution of linguistic entities in a subject text – he challenged his students to imitate Eliot's style in *The Waste Land* by responding to the statistical distributions of certain specified linguistic, grammatical, and stylistic

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96 J. M. Coetzee, "Linguistics and Literature," Seminar Notes. Fall 1968-1969, National English Literary Museum, Grahamstown.

97 In this instance, Coetzee adopts Hultzen, Allen, and Miron's rankings as the most suitable norm against which the deviations of Thomas's phoneme distribution might be measured. As with all such studies, since the texts used to develop these rankings of practical necessity only represent a limited sample of the sum of all English language usage, any statements made in reference to the norm are limited in their meaningfulness to a degree stipulated by the distance between the sample and its idealised equivalent.

categories. In practice, then, where a particular phonemic element, syntactic structure, metrical pattern, or other such feature appears in *The Waste Land* a given percentage of the time, this percentage must be matched in the students' imitations. On completing their pieces, Coetzee's students were next tasked to determine whether there was "a general underlying pattern which the original and your imitation both follow"[98] and to "[s]pecify it as accurately as you can".[99] With the answers to these questions in hand, he finally charged them with the more thought-provoking task of deciding whether they were "able to enunciate any general principles of parody."[100]

While the techniques Coetzee adopted in relation to the poetry of Wyatt, Thomas, and Eliot may in the final analysis seem rather functional, prosaic, and perhaps even brutishly reductive, his immediately subsequent analyses of Creeley's 'Mad put upon mud...' and Browning's 'My Last Duchess' suggest a growing awareness of the inherent limitations of this kind of work. His handwritten plenary notes to the classes on Creeley and Browning, for instance, contain a list of 'assumptions' that underpin his attempt to determine accurate and comprehensive close readings of the semantics of the two pieces that also incorporate analyses of their nominally non-semantic elements. Firstly, he points out that his analysis of the Creeley poem assumes that there is "a limited range of ~~spheres~~ kinds of action that can be imitated by patterns of sound and meter – here repetitive action, disjunctive effort, lengthened effort".[101] In other words, attempts by the poet to suggest – or, indeed, by the critic to discover – by means of sound and metre, activities either congruent with or counter to those explicitly given at a semantic level, will radically reduce and conservatively demarcate the limits of what and how the poem communicates. Secondly, and with analogous consequences, Coetzee's analysis argues

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98 Coetzee, "Linguistics and Literature."
99 Ibid.
100 Ibid.
101 Ibid. The strikethrough of the word 'spheres' has been retained from the original notes.

that there is

> a limited range of emotions (kinaesthetic effects) which can be imitated by patterns of sound (including pitch), meter, and syntax – here expansion (confidence), contraction (loss of confidence), the emotion of logic.[102]

Here, and in the remaining assumptions Coetzee details, we again get the sense that he is prepared to at least provisionally entertain, albeit with certain reservations regarding scope, the possibility that emotions and actions can be codified along the lines of a structured classificatory system, and thereby be reduced to a form more readily amenable to quantitative analysis. Nevertheless, it is apparent that the caveats outlined in his list of assumptions are ultimately fatal, and it seems probable that the positions he appears to adopt at various points throughout the notes are rather more provisional and exploratory than fixed and axiomatic.

Indeed, what follows in the subsequent classes in the 1968 'Critical Reading' course seems to corroborate the impression that during this period, as in much of his fiction, Coetzee's route to understanding was characterised not by the search for certainties, but by a deliberate and continual vacillation between conflicting beliefs, affirmations, and methodologies. Primarily focused on the concept and functioning of metaphor, the notes to these classes begin with a list of introductory examples, alongside some handwritten annotations that, later in his notebook, he refers to as 'laws':

1) It is bad writing to put metaphors with different referents and analogies against each other.

1) If R and A have a common quality } metaphor

2) If A is a class, it is not necessary to specify which member is visualized.

3) Don't multiply metaphors.

5) Comparison based on a [sic] "superficial" appearances are ikonic.

6) Structure of context determines degree of particularization in breakdown of metaphor.

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102 Ibid.

> 7) All objects comprise a hierarchy of qualities, and we move serially through the hierarchy in analyzing the metaphor.[103]

Coetzee points out that these 'laws' can at times be seen to conflict, and ought not therefore to be considered as constituting a fixed, consistent axiomatic system. Nevertheless, each law approaches the concept of metaphor from an intriguingly formalistic perspective and, especially in the case of Laws 2, 3, and 7, the laws repeatedly employ terminology with undeniable mathematical resonances: metaphors, he suggests, emerge in part from the quasi-quantificatory concepts of 'class' and 'hierarchy', and while they ought not to be 'multiplied', whatever that might entail, the hierarchy of their qualities may be analysed 'serially'. With this in mind, it seems especially striking that his return to computer-generated poetry in the late 1970s not only enabled a further exegesis on metaphor, but did so in the context of his most sustained response to the question of exactly how poetic and mathematical thinking might be said to converge.

1.2.3 'Hero and Bad Mother in Epic, a poem' (1978)

Though not published until 1978, 'Hero and Bad Mother in Epic, a poem' appears to be the product of work Coetzee first undertook during his time in London in the early- to mid-1960s and to which he returned at this later stage as part of the flurry of intellectual activity that led to 'Surreal Metaphors and Random Processes'. Indeed, in *Doubling the Point*, Coetzee confirms David Attwell's suspicion that the poem was a 'spin-off' of the work described in both *Youth* and 'Surreal Metaphors and Random Processes'; he goes on to describe himself as being "quite fond of [it], although there is a big hole in it toward the end".[104] In the fictionalised account of this earlier work that appears towards

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103 J. M. Coetzee, "Critical Reading," Seminar Notes, 1968, National English Literary Museum, Grahamstown. The unusual numbering system employed in these bullet points has been retained from Coetzee's original notes.

104 Coetzee and Attwell, *Doubling the Point*, 22.

the end of *Youth*, the narrative voice tells us that 'John' had taken to spending his evenings inputting into his Atlas computer "a list of the most powerful words in *The Heights of Macchu Picchu*, in Nathaniel Tarn's translation".[105] Unable to summon poetic inspiration of his own, he comforts himself by comparing the resulting permutations of Pablo Neruda's words with the experimental music he has heard on the BBC radio's 'Third Programme': "might it not be argued", he proposes, "that the invention of computers has changed the nature of art, by making the author and the condition of the author's heart irrelevant?"[106] Merely by looking at the poem's first two stanzas, quoted below, one can observe the way in which Coetzee's permutative process generated an opaque and essentially impersonal surrealism:

> dusk seeps up the entrail of the seaborn nude
>
> the vegetable sleeps in its circle
>
> the bedroom drowses
>
> the casino is swathed in tidal melancholia
>
> the nude awaits the hero
>
>
> mounting the entrail of the seaborn nude
>
> toward the sleeping vegetable
>
> toward the poisoned goose with its melancholy aftertaste
>
> comes the naked philatelist of fiction
>
> the philatelist climbs the entrail of the poisoned nude
>
> who rules over the luck-swathed fiction
>
> of castaway matriarch
>
> punctual chimera
>
> spider of solitude
>
> the philatelist climbs the entrail of the nude

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105 Coetzee, *Youth*, 160.
106 Ibid., 161.

toward a bedroom where a sword drowses[107]

Beyond Coetzee's fictionalisation of the circumstances of its origin in *Youth* and his brief discussion of it with Attwell in *Doubling the Point*, little of note has been written about this surprising return to computer-generated poetry more than a decade and a half after the publication of 'Computer Poem'. One recent exception is Reuben Message's essay in a 2010 issue of the Serbian journal *Synthesis*, which references the work of Jacques Derrida in an attempt to answer the question of how one might respond ethically to computer-generated poetry. How, Message wonders, can one

> engage ethically with a literary text that is *so* mediated and so obviously repeatable, a product of an absolutely binary machine? How do we respond to the singularity and inventiveness of such a text, stripped of autobiographical traits, when its singularity and inventiveness lie exactly in the fact of its repeatability or programmatic deployment of binary statements that are *in principle* possible to critically reconstruct in their entirety?[108]

Though its Derridean argument ultimately veers beyond the scope of the present thesis, Message's argument provides an interesting counterpoint to the discussion of 'Surreal Metaphors and Random Processes' below, and its perspective regarding the potential opposition between autobiography and computer-generated poetry is commended to the reader. With this in mind, the following is intended to complement Message's discussion by focussing on a contextualisation of the poem alongside the mathematical elements of Coetzee's elaboration of its processual poetics in 'Surreal Metaphors and Random Processes'.

1.2.4 'Surreal Metaphors and Random Processes' (1979)

Whatever the qualities of 'Hero and Bad Mother in Epic, a poem' in its own right, it is

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107 J. M. Coetzee, "Hero and Bad Mother in Epic, a poem," *Staffrider*, (March 1978): 36. The two stanzas here comprise lines 1-16 from a total of 75. Again, the whole poem is included in the Appendix.

108 Reuben Message, "Reading, Deconstruction and Technological Excess: Some Thoughts on J. M. Coetzee's 'Hero and Bad Mother in Epic, a Poem'," *Synthesis, Journal of Humanities and Social Affairs* 2, no. 1 (2010): 93.

once again Coetzee's own analysis of the process through which it was created that

provides the clearest insight into his developing sense of the relationship between poetic

and mathematical thinking. Published in *Journal of Literary Semantics* in 1979, 'Surreal

Metaphors and Random Processes' nevertheless again refers back to the work he

describes in *Youth* as a product of using "the dead hours of night to get [the Atlas] to

print out thousands of lines in the style of Pablo Neruda".[109] Filtering his description of

that period through his fictionalised autobiography, Coetzee depicts 'John's' curiosity as

to the nature of the process in which he is engaging:

> The Surrealists [...] William Burroughs [...]. Is he not doing the same kind of
> thing? Or do his huge resources – what other poet in England, in the world, has a
> machine of this size at his command – turn quantity into quality?[110]

'Surreal Metaphors and Random Processes' revisits these same questions, in the sense

that it constitutes a direct comparison of the methodologies undertaken by the

Surrealists in their various strategies for producing aleatory and automatic poetry, and

Coetzee's own generation of surreal pieces, including 'Hero and Bad Mother in Epic, a

poem', by means of a pseudo-Random Number Generator, the translated lexicon of

Pablo Neruda, and a "fairly rudimentary" program for "controlling their generation".[111]

The essay begins by contrasting two instances of what, superficially, appear to be

fairly typical instances of Surrealist poetry. The first ("the exceptional peril of a body

made to make love / Whose belly calls with the sighing plucked from bushes draped

with veils") originates from André Breton's poem 'Les Ecrits s'en vont', and hence

manifests certain of those qualities that one might associate with the kind of work

typical, in Coetzee's words, of Surrealism's "chief theorist and its most considerable

writer".[112] These qualities, then, include "the character of a hallucination (bushes draped

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109 Coetzee, *Youth*, 170.
110 Ibid., 161.
111 Coetzee, "Surreal Metaphors and Random Processes," 22.
112 Ibid., 25.

with veils",[113] and the contradiction of "an elementary physical property (singing

bushes)".[114] The second of Coetzee's examples ("The nude with the haggard fingernail

disdains the schoolboy of splendor"), he states, might also be called surreal, "or at least

quasi-surreal"[115] in the sense that its image of the "haggard fingernail" violates the

physical property according to which only animate objects can legitimately be called

"haggard". That this second example was produced by a computer program, the essay

contends, raises questions about originality of metaphor, the nature of randomness and

determinacy, and "the topic of chance",[116] each of which requires closer analysis.

Coetzee describes Breton's motivation for developing his specific procedures for

producing surreal metaphors – including aleatoric 'word-games' played by a group of

poets blind to the contributions of their fellow players, and 'automatic writing' ("writing

carried out with the mind in a 'passive, receptive' state, and with the minimum of

conscious control"[117]) – as being predicated on a belief that such practices may serve to

"liberate" an individual from the psychologically deterministic influence of his or her

investment in his or her limited, subjective perception of reality. In other words, Coetzee

suggests, "the poetry of Surrealism aspires to be (in Freudian terms) a language of

desire unmediated by the constraints of the reality principle, a primal language, a

'vehicle ... of revelation' which transforms the world rather than reflecting it."[118] Indeed,

he continues, one might profitably

> think of Surrealism as elaborating a Utopian myth which included, like so much
> of high Modernism, the renovation of language (think of the efforts of Pound and
> Eliot, in their different ways, to 'purify the dialect of the tribe', or of the universal
> language of Joyce's *Finnegans Wake*).[119]

The attempt to return to this "primal language", then, highlights once again the

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113 Ibid., 22.
114 Ibid.
115 Ibid.
116 Ibid., 23.
117 Ibid., 24.
118 Ibid., 25.
119 Ibid.

problematically deterministic role played by language and its structures in mediating

perception. More specifically, in 'Surreal Metaphors and Random Processes', Coetzee

considers the complexity of the notion of a 'grammar': "A grammar of a language", he

initially suggests, "is an explanatory hypothesis for that language as *langue*, that is to

say, as the shared linguistic capacity of a community of speakers".[120] By choosing to

"identify the core area of language with its most communicative, least creative use",[121]

he nevertheless points out, the majority of contemporary linguists, particularly those

following in Noam Chomsky's footsteps, may unwittingly be colluding in the

perpetuation of a convenient but reductive fallacy:

> Is it not possible that the notion of a synchronic state of language is a falsifying
> fiction […]? How can grammatical theory deal with the phenomenon claimed by
> Breton […] – the utterance which is literally meaningless at the instance it is
> uttered, yet becomes meaningful a moment later?[122]

This issue cuts to the heart of the question of how exactly poetic thinking diverges from

mathematical thinking, as indicated in the quotation Coetzee chooses to excerpt from

George Steiner's *After Babel*:

> The 'messiness' of language, its fundamental difference from the ordered, closed
> systematization of mathematics or formal logic, the polysemy of individual words,
> are neither a defect nor a surface feature which can be cleared up by the analysis
> of deep structures. The fundamental 'looseness' of natural language is crucial to
> the creative functions of internalized and outward speech. A 'closed' syntax, a
> formally exhaustible semantics, would be a closed world.[123]

While Coetzee does not entirely agree with Steiner's characterisation of the issue – "It is

not difficult to pick holes in Steiner's case," he demurs – he recognises that "it cannot be

dismissed",[124] and that Breton's ability to produce a "far-flung metaphoric collocation

like no other sentence, ungrammatical, unacceptable, meaningless even to its speaker,

yet, a moment later, meaningful"[125] is indicative of the deeper truth that any attempt to

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120 Ibid., 26.
121 Ibid., 27.
122 Ibid.
123 Ibid. For the original source, see George Steiner, *After Babel*, (London: Oxford U.P., 1975), 228.
124 Ibid.
125 Ibid., 28.

produce a "formally exhaustible semantics" analogous to the Formal Axiomatic

Systems of mathematics – and therefore the algorithms of computer-generated poetry –

is doomed to remain incomplete. "We must never lose sight of the fact", he summarises,

"that, since language is always changing, a synchronic grammar is an artificial

construct"[126] and that there "is inevitably conflict between a systematizing theory of

language and a literary practice (like that of Surrealism) with philosophical objections to

system".[127] Ultimately, then, the Surrealists were more interested in the epistemological

implications of their practices than the expression of any particular poetic ideal: as

Coetzee explains, "Breton does not regard the various forms of aleatorism and

automatism the Surrealists practised as mere heuristic procedures for the production of

better, more striking verbal images":

> By in some sense committing itself to chance, Surrealist poetry distinguishes itself
> from poetry which incorporates chance phenomena if they please it (as one might
> set up a striking *objet trouvé* in one's living room) but whose conception of what
> poetry might be remains unmodified. Confronting the images created by word-
> games one experiences "a quite novel sensation, of a particularly disquieting and
> complex nature". They have a power to unsettle and disturb because they are, so
> to speak, utterances of no one, utterances of objective chance.[128]

If the involvement of "objective chance" constitutes the principal virtue of these word-

games, though, might not a computer program with no recourse whatsoever to the

expectations or semantic and perceptual structures of its programmer be capable of

producing poetry with an even greater power of the unsettling kind Coetzee describes?

Initial responses to such a question are not especially promising, not least because, as

Coetzee points out, "no computer can be truly without system":

> The best substitute we can provide for lack of system is a randomizing process
> based on a random number generator (hereafter called RNG). An acceptable RNG
> might be defined by the property that, given the nth output integer i_n , the
> probability that output integer i_{n+1} will equal any given integer j in the range from
> 1 to N is 1/N. A master routine with a RNG like this would jump around the

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126 Ibid.
127 Ibid.
128 Ibid., 25.

> lexicon with an appearance of unpredictability. An appearance of unpredictability, that is to say, to the observer. To the programmer who knows the mathematical principle on which the RNG is based, i_n Predicts i_{n+1} with total determinacy. In a machine like a computer which proceeds through a determinate sequence of states, nothing indeterminate can occur. No amount of programming ingenuity can bend this principle. That is why pedantic mathematicians call RNGs pseudo-random number generators.
>
> From a philosophical point of view, therefore, there is nothing random in the output I have been describing. The voice speaking the poetry is not that of Fortuna, goddess of chance, but of the function defining the RNG.[129]

This is not, however, the end of the story. As Coetzee indicates in an endnote to 'Surreal Metaphors and Random Processes', a "more realistic model of indeterminacy is provided by a RNG with an interface with the outside world (e.g., an input device)".[130] "It is worth noting", he continues, "that, in practice, RNG's put out a single feeler when they perform such steps as picking up rubbish from core storage to define their initial state".[131] The degree to which either of these two methodologies might actually produce indeterminate results is questionable, though, and our personal opinion on the subject will depend to a significant degree on our philosophical convictions regarding the determinacy of human behaviour. Even so, one can easily imagine an argument following on from Gödel's first incompleteness theorem to the effect that, by using an algorithm constructed using a mathematical model of sufficient complexity to include arithmetic, a programmer could in fact construct a program capable of producing poetry at the heart of which is a genuinely indeterminate – read *undecidable* – creative process.

Summary

Between the years of 1958 and 1979 Coetzee's attitude towards the potential for interplay between the disciplines of mathematics and poetry underwent a series of dramatic shifts: at times these shifts coincided with serendipitous changes in his

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129 Ibid., 24.
130 Ibid., 29n.
131 Ibid.

personal circumstances; on other occasions they represented a deliberate reaction against the popular trends of the time. His earliest poems, then, indicate a deference to such modernist masters as Pound that his fictionalised alter-ego, *Youth*'s 'John', attributes to his mathematical training; this confluence is manifest most clearly in a series of poems in which mathematics emerges as a common thematic concern. Subsequently, having been present during the rise of an early-sixties Zeitgeist wherein the literary community became fascinated as to the role computers might play in both the creation and criticism of literary art, he was soon to be a prime witness to its gradual inward collapse. But as the armies of descendants to Gödel's work on incompleteness and undecidability increasingly laid siege to the mathematical foundations of stylostatistics and computer-generated poetry, Coetzee stayed around just long enough to watch the sacking of his very own Troy. In the process, though, and as time would tell, he had learned just enough to fuel a literary-mathematical odyssey that would last an entire career.

Chapter 2

MATHEMATICS AND CONCEPTUAL METAPHOR

In an article for *The New York Times Book Review* published on 15 April 1984 – and writing as the recently-crowned recipient of his first Booker Prize, for his fourth novel, *Life and Times of Michael K* (1983) – Coetzee looks back upon the formative influence of a period of his life from some two decades earlier. Having received a "conventional undergraduate training in English studies"[132] at the University of Cape Town, his move to England in 1962 precipitated something of an awakening: the "patchy imitation of Oxford 'English' "[133] he had experienced as an undergraduate, he recalls, "had proved a dull mistress from whom [he] had been thankful to turn to the embrace of mathematics".[134] Following the completion of his degrees in both mathematics and English literature, he retained this dual focus in the form of, on the one hand, his professional work as a computer programmer and, on the other, a master's thesis on Ford Madox Ford. By the mid-sixties, however, his "four years in the computer industry"[135] had impacted upon his patterns of thinking so greatly that even his "sleeping hours had been invaded by picayune problems in logic";[136] having at one point thought that 'The Work of Ford Madox Ford' might represent the culmination of his literary-academic work, then, he "was ready to have another try".[137]

Beginning with a commentary on the Ford thesis, this chapter details Coetzee's growing awareness of the invasion of those 'problems in logic' into his wider

132 J. M. Coetzee, "How I Learned About America – And Africa – in Texas," , New York Times Book Review, April 15, 1984, 9.
133 Ibid.
134 Ibid.
135 Ibid.
136 Ibid.
137 Ibid.

engagement with the world; in other words, it itemises his attempts to map the migration of conceptual metaphors with their origins in mathematics into other conceptual domains, and thereby delineates his often ambivalent conclusions. In charting the development of this awareness, then, it expounds the mathematical content of his master's thesis, documents a wealth of archival materials pertaining to the mathematical aspects of his early academic career, and concludes with an outline of his enduring engagement with the mathematically-focused "master metaphor"[138] of an author, Robert Musil, in whose work he has retained a strong critical interest throughout his life in literature.

2.1 London (1962-1965)

2.1.1 'The Work of Ford Madox Ford' (1963)

According to the fictionalised account given in *Youth*, Coetzee's original plan on leaving Cape Town had been "to qualify as a mathematician, then go abroad and devote himself to art".[139] With these two vocations beginning to converge in productive ways in his computer poetry, his other major academic occupation of the time – his master's thesis on Ford Madox Ford – now seemed to this ambitious and pioneering twenty-three-year-old rather passé: however enticing he was finding the potential for mutual advancement in his studies in computer programming and the history of alternative logics, he was beginning to realise that the "thesis he [was] writing [would] have nothing new to say about Ford", and that, while "Pound promoted Ford as the sole heir in England of Henry James and Flaubert", he had himself come to believe that much of Ford's sprawling corpus was, in fact, "rubbish".[140] Recognising that the "time [was] nigh for him to

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138 J. M. Coetzee, "Introduction," in *The Confusions of Young Törless*, by Robert Musil (London: Penguin, 2001), 37.
139 Coetzee, *Youth*, 22.
140 Ibid., 136.

deliver his judgement",[141] he began to ponder the differences between his two parallel academic fields: "What will he say? In the sciences one is permitted to report negative results, failures to confirm hypotheses. How about the arts?"[142]

In reality, the work that Coetzee produced in response to these questions rather hedges its wager. 'The Work of Ford Madox Ford', submitted in 1963, extends over more than three hundred pages and constitutes a painstaking, chronological account of Ford's life and work. Despite his own reservations as to the quality and consistency of Ford's corpus, much of Coetzee's analysis suggests a tentative deference to Pound's advocacy; as such he adopts exposition rather than critical pronouncement as his default *modus operandi*, and generally chooses to complement rather than reassess the existing discourse on Ford. In summarising the ultimate findings of his research, however, his introduction gives an indication of something altogether more distinctive and original operating beneath the essentially rather conventional surface of the thesis:

> The conclusion of this study is that *The Good Soldier*, probably the finest example of literary pure mathematics in English, is, as Ford considered it, his best achievement; but it attempts to trace in earlier novels experiments without which *The Good Soldier* would have been impossible.[143]

Given that it arose from such a long and committed period of research, Coetzee's rather uninspiring conclusion that *The Good Soldier* is Ford's "best achievement" might seem to offer disappointingly little to the advancement of our understanding of the author and his work. Nevertheless, that evocative parenthetical statement – "probably the finest example of literary pure mathematics in English" – seems to suggest, however obliquely, that the chapters ahead might somehow elucidate 'positive' terms in which to render his ultimately 'negative' conclusions productively meaningful. At no point in the remainder of the thesis, however, does Coetzee articulate or define these terms. As such,

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141 Ibid., 112.
142 Ibid.
143 J. M. Coetzee, "The Work of Ford Madox Ford" (MA, University of Cape Town, 1963), x.

one might be tempted to surmise that he intended the phrase merely as a broad metaphorical foregrounding of some of the novel's more commendable literary qualities, such as its measured prose, its internal coherence, and its logical elegance, and to consequently refrain from attributing to the Coetzee of 1963 too well-defined a concept of "literary pure mathematics". In saying this, however, it should be noted that it is not only the exact chronological coincidence of the conclusion of this project with the publication of 'Computer Poem' – ostensibly an archetype of 'literary applied mathematics' – and its attendant poetics that ought to give pause. Though undoubtedly few and far between, there appear within the pages of 'The Work of Ford Madox Ford' a number of digressions on the connection between mathematics and literature that seem singularly worthy of attention, not least by virtue of both their incongruity within this otherwise linear and traditionally literary-critical piece, and in the light of the fact that his next steps as a literary critic would lead him towards the discipline of stylostatistics.

One such instance occurs during an exposition and discussion of the generally critically neglected works Ford published between 1905 and 1908. These included a novel entitled, tantalisingly, *The Heart of the Country*, and its direct chronological successor, a study in social criticism entitled *The Soul of London*, in which Ford advances his preference for "Impressions rather than Statistics".[144] In order to clarify the terms of this opposition, Coetzee begins by quoting Ford's own rationale:

> A really ideal book of [*The Soul of London*'s] kind would not contain "writing about" a town: it would throw a personal image of the place on to the paper. It would not contain a sentence such as: "There are in the city of – 720 firms of hat manufacturers employing 19,000 operatives." Instead there would be a picture of one, or two, or three hat factories, peopled with human beings, where slow and clinging veils of steam waver over vats and over the warm felt on cutters' slabs. And there would be conveyed the idea that all these human beings melt, as it were, into the tide of humanity as all those vapours melt into the overcast skies.[145]

In essence, Ford's distinction between the impression and the statistic offers an

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144 Ibid., 3.02.
145 Ibid., 3.02–3.03.

illuminating conceptual opposition to the field of epistemology: on the one hand, the 'impression' imposes upon the impressed no fixed, discrete boundaries, but nevertheless implies sufficient semantic limits as to render itself coherent; the 'statistic,' by contrast, asserts absolute discreteness, but nevertheless requires a continuous context out of which it is to be abstracted so as to maintain the structure of ordered relations upon which its individual, quantificatory meaning depends.

From the prominence he gave to its exposition in the thesis, it is clear that Coetzee was greatly exercised by Ford's particular conception of Impressionism: it offers, in Coetzee's words, a "means of approaching to the heart of things"[146] and enables the novelist, according to Ford, to "reveal the substance of [a moment's] truth".[147] Moreover, in his assertion that, for the Impressionist, "selection was to be the keynote everywhere – selection of impressions, selection of instances, and, in the province of style, selection of *le mot juste*",[148] Coetzee juxtaposes the methods of Impressionism with the aleatory methods of his own work in computer poetry, and thereby constructs two opposing poles of a serious inquiry into the nature of art itself: how might he reconcile the notion – apparently sanctioned by his chief literary light of the time, Pound – that 'selection' is the principal virtue of the imaginative writer and the most justifiable approach to "the heart of things", with the intuition underpinning his own most recent poetry, namely that there is no inherent and insurmountable logical impediment to the largely stochastic assembly of a genuinely worthwhile piece of poetry by a nonhuman machine programmed with nothing more than a series of axioms and a clearly-defined data set?

Reading further into 'The Work of Ford Madox Ford', it is apparent that Coetzee had already recognised by this point in 1963 that these issues ramify within our

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146 Ibid., 2.27.
147 Ibid.
148 Ibid., 2.30.

conceptions of ethics – particularly as they pertain to the literary artist – just as much as our conceptions of aesthetics. Nearly thirty years later, in *Doubling the Point*, he discusses the terms of his initial interest in Ford and his work, and comes to reflect upon his suspicions that "what attracted [him] to Ford was as much the ethics of [Ford's hero, Christopher] Tietjens as the aesthetics of *le mot juste*".[149] In a general sense, this form of ethics was "a kind of gruff stoicism", born of Ford's own desire, as "an outsider, and as a somewhat yearning outsider at that", to become "in many ways *plus anglais que les anglaises*".[150] More specifically, though, Ford's predilection for stoicism in his ethics and spareness in his prose coalesced into a philosophy of the moral responsibility incumbent upon the literary artist that contained an anti-mathematical component that Coetzee felt the necessity to outline in his thesis. Immediately following the discussion of *The Soul of London*, then, he quotes a long passage from Paul L. Wiley's *Novelist of Three Worlds*, in which the critic describes in detail "Ford's definition of the role of the imaginative writer in modern society":

> in ascribing broad powers to the novelist, Ford gave proof of his intent to defend imaginative literature against the weakening of traditional values perceptible at the turn of the century. To blame for this were not only the cheap newspaper, dating from the South African War, but also the rise of the specialist and the statistician, whose reflections of experience to abstract data deprived the ordinary man of a hold on social continuities forming a consistent picture of the life of the day. Ford's slogan of the "the Impression over the Statistic" made a case for the vital function of the novelist who alone, through his gift of direct and imaginative apprehension, could present a unified vision of the world at large and as fictional historian close the breach between the divided areas of factual and statistical information.[151]

Wiley's Ford, then, identifies the "imaginative writer" as engaged in an historic battle against "the specialist and the statistician," whose attempts to reduce the world of events to "abstract data" – and so to provide an account that is 'true' in the sense of being objective and impartially verifiable – threaten to tear apart at the seams those

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149 Coetzee and Attwell, *Doubling the Point*, 20.
150 Ibid.
151 Coetzee, "The Work of Ford Madox Ford," 3.03 – 3.04.

"social continuities" that enable us to share a "unified vision of the world at large".

From a philosophical point of view, Coetzee's choice of this quotation demonstrates an early engagement with the epistemological dispute – if not perhaps its ontological counterpart – between atomism and monism: in other words, the question as to whether our descriptions of the world should depict it as an arrangement of discrete, atomised particles, or as a single, unified substance. According to the distinction Coetzee cites here, the discipline of statistics might profitably be considered as a development from the thinking of Philolaus, Democritus, and Leucippus, in that it privileges an atomised, discontinuous representation of reality; Impressionist literature, by contrast, corresponds more closely to the epistemology extending from Parmenides and Zeno, in that it denies the reality of such an atomistic picture, preferring instead to prioritise unity and continuity.

It is at this point that we first encounter Coetzee engaging with a conceptual framework wherein our view of the adequacy or otherwise of mathematics to represent 'truth' necessarily conditions our approach to the intersection between epistemology and ethics. In particular, Wiley's model of "the role of the imaginative writer" – which Coetzee does not contest or even explicitly comment upon in the thesis – affirms without hesitation that it is the responsibility of the "fictional historian" to intercept the indivisible, continuous phenomena of the world before they can be chiselled into the brute, quantised data of "statistical information." The quoted passage continues by asserting that this fictional historian, uniquely possessed of an ability to "present the mind beset by accumulations of fact with some idea of pattern," has an important ethical role "in an age of the crowd and of metropolitan breakdown in understanding by the individual of the lives of his fellows":

> Because statistics bring no insight into the nature of private life and its passions, the novelist alone can record such experience of other men as the increasingly

isolated reader lacks, the writer not moralizing but simply "rendering" or accurately projecting selected instances so as to place the reader at a height where he can better observe himself and his neighbors and stimulate his dormant powers of reflection.[152]

Such a sharp division between the impressionistic and the statistical – and, by tentative extension, the literary and the mathematical – seems immediately problematic for a variety of reasons. Though Coetzee omits to explore these issues directly in the Ford thesis, it was precisely such an interrogation of how poetic thinking diverges from mathematical thinking that would underpin the majority of his academic work for the next decade. If the Coetzee of 'The Work of Ford Madox Ford' had any doubts as to the validity of Ford's model for the role of the imaginative writer as antithetical to that of the statistician – which, given that he was himself about to embark upon a career in which statistics would be central, appears unquestionably to have been the case – then he chose in this instance to subordinate them to the overall principle of exposition, and not criticism, that characterises the thesis.

The years immediately following the Ford thesis constituted a serious period of development in Coetzee's thinking, of which his consideration of "literary pure mathematics" was only one of a number of convergent lines. That said, the importance of this particular line to Coetzee, and especially between the years of 1965 and 1969, ought not to be understated: the documentary evidence pertaining to his academic work as both teacher and researcher during this period makes it perfectly clear that, among his many concerns as an early career academic, the question of whether impressions or statistics might provide the most authentic "means of approaching to the heart of things" coloured almost every aspect of his literary, linguistic, and, ultimately, ethical enquiry.

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152 Ibid., 3.04.

2.2 The University of Texas at Austin (1965-1967)

Following the completion of 'The Work of Ford Madox Ford', it was a full two years before Coetzee returned to the academic world. Nevertheless, the path he was to take demonstrated in no uncertain terms that the question of the relationship between aesthetics and statistics, though buried relatively deeply within the narrative of his master's thesis, had, in a variety of forms, become one of the most important among his literary concerns. Upon leaving his job at International Computers, he set sail in the September of 1965, via a retired Italian warship,[153] for America, and for the University of Texas at Austin (UTA). It was here that he began his research for the Ph. D. thesis on stylostatistics and the English fiction of Samuel Beckett that, following a further period of teaching at the State University of New York, Buffalo, he would complete in 1969. While this four-year period saw him teaching extensively in subject areas that he might more easily have approached in a traditional, literary-critical manner, the meticulously constructed and logically ordered notes he produced for these classes – and which he bequeathed to the National English Literary Museum in Grahamstown (NELM) before his 2002 departure for Adelaide – demonstrate time and again the ways in which his methods of instruction were guided by his own contemporaneous explorations into "literary pure mathematics".

During his time at UTA, Coetzee's teaching was limited to a series of task-based and modishly scientistic courses in 'Critical Reading'. The texts prescribed at a departmental level for analysis on these courses give a clear indication of the terms of contemporary campus debate at this point in the history of liberal American thought. They included, for instance, a consideration of the University's refusal to teach Communism as an academic discourse;[154] a defence of a student editor's right to

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153 Coetzee, "How I Learned About America – And Africa – in Texas," 9.
154 J. M. Coetzee, "Should Communism Be Studied in Our Schools?," Seminar Materials, Fall 1965, Critical Reading, National English Literary Museum, Grahamstown.

withhold from the University administration the names of his sources in an article exposing the drug culture at UTA;[155] a polemic arguing for the removal of a "statement of non-Communism" from the University's 'Loyalty Oath';[156] a discussion as to the validity of conscientious objection to the Vietnam War;[157] and Henry David Thoreau's 'On the Duty of Civil Disobedience'. The notes and handouts Coetzee designed to supplement these readings are decidedly revealing – especially given the role that American activities in Vietnam would come to play in *Dusklands* – containing as they do several pages of detailed references to contemporary coverage of the war that provide a testament to the impressive extent and diversity of Coetzee's own reading in the subject.

That a teaching assistant in his mid-twenties in Texas in the mid-1960s should have found himself both interested in the subject of Communism and opposed to the war in Vietnam is in itself, of course, not especially noteworthy; that Coetzee used this opportunity to explore the strengths and limitations of mathematical language as a means of understanding the ethics and rhetoric of conflict is undoubtedly more so. Though on the basis of the titles given to each of the classes that constituted the second semester of this course – Language, Meaning and Diction; The Language of Politics; Reading for Logic; Reading for Structure; Style, Tone, and the Sentence; How to Read a Book; and Reading Imaginative Expression[158] – one might build the impression of a fairly prosaic and traditional programme in critical reading, Coetzee's approach to the additional reading material lent the classes a distinctively mathematical hue. Alongside the readings in contemporary political affairs, then, several of the texts he chose to

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155 J. M. Coetzee, "Why Pick on Student Editor?," Seminar Materials, Fall 1965, Critical Reading, National English Literary Museum, Grahamstown.

156 J. M. Coetzee, "Should the Loyalty Oath for the Faculty of the University of Texas Be Abolished?," Seminar Materials, Fall 1965, Critical Reading, National English Literary Museum, Grahamstown.

157 J. M. Coetzee, "What Should We Do About Draft Card Burners?," Seminar Materials, Fall 1965, Critical Reading, National English Literary Museum, Grahamstown.

158 J. M. Coetzee, "English 601b," Seminar Notes, Spring 1966, National English Literary Museum, Grahamstown.

prescribe from the course textbook – *Language, Style, Ideas: The Writer's Challenge*,
edited by Sumner Ives and Stephen O. Mitchell – enabled his students to consider in
detail the complex relationship between the logic of argument in the humanities and the
fundamental structures of mathematics and the scientific method.

2.2.1 Structuralist Mathematics: Simeon Potter

His notes to the first class in the series, for instance, reveal how he chose to orient his
students' reading of the linguist Simeon Potter's 1960 text, *Language in the Modern*
World: tellingly, Potter begins his wide-ranging survey of the scope and history of his
discipline by highlighting his own predilection for the scientistic, structural approach he
recognised as symptomatic of the time:

> Structure, not grammar, is the key word to the new linguistics, just as, in a
> different way, it is the key word to modern mathematics and to nuclear physics.
> The scientific revolution of our time, in relativity, in quantum physics, and in
> biological statistics, has led to the reorganization of the logical structure of
> thought itself.[159]

Framing his discussion in this way, Potter conforms to Coetzee's account of the
pervasive mood of the period surrounding 1960: his work is undoubtedly marked by a
"general enthusiasm […] for structuralism, that is, for systems of thought that seemed to
run themselves without need for intervention".[160] Coetzee's approach to Potter's work,
however, reveals the beginnings of an exploration of the covert effects of allowing too
free a rein to this enthusiasm, and marks the origins of a deeply felt ambivalence
regarding the validity of extending a specifically mathematical sensibility to other
disciplines.

In the early stages of *Language in the Modern World*, Potter ventures little
modesty in the scope of his ambition, claiming that the developments in the study of
language that took place during the twentieth century – principally in the wake of

159 Simeon Potter, *Language in the Modern World* (Baltimore, MD: Penguin Books, 1960), 9.
160 Coetzee, "Review of 'Strange Attractors'," 946.

Ferdinand de Saussure's *Cours de linguistique generale* – constituted an advancement equivalent in import to the "scientific revolution of our time in avionics, astrophysics, biochemistry, endocrinology, genetics, electronic microscopy and computational science".[161] Following this postulate, the overarching purpose of the book is to provide a historical outline of those developments, an elucidation of the various ways in which a greater understanding of the nature of language might prove beneficial in a variety of disciplines, and, ultimately, a detailed account of attempts to systematise natural language according to the precepts of the scientific method in general, and logico-mathematical frameworks in particular.

Coetzee's having taught from this text so early in his academic career is immediately striking for two key reasons. Firstly, the text describes with precision the grounds upon which two academic discourses central to Coetzee's development during this period – namely structuralist linguistics and mathematics – might be considered convergent with or at least proximal to one another; perhaps most vividly illustrative of this is Potter's account of the significance of the contributions of such mathematicians as Giuseppe Peano, one of the founders of mathematical logic and set theory, and Lancelot Hogben to the development of those artificial languages – Latino Sine Flexione and Interglossa respectively, both precursors to the more widely known Esperanto – that sought to rid society of the ambiguities of natural language and, especially in the case of Hogben, to arm humanity against any political corruption and social injustice consequent upon the exploitation of such ambiguities. In his 1936 work, *Mathematics for the Million*, for instance, Hogben writes:

> Maybe the Western world is about to be plunged irrevocably into barbarism. If it escapes this fate, the men and women of the leisure state which is now within our grasp will regard the democratization of mathematics as a decisive step in the advance of civilization […]. Without a knowledge of mathematics, the grammar of size and order, we cannot plan the rational society in which there will be leisure

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161 Potter, *Language in the Modern World*, 11.

> for all and poverty for none […]. Neither as children nor as adults are we told how the knowledge of this grammar has been used again and again throughout history to assist in the liberation of mankind from superstition.[162]

Secondly, Potter's work gives us an insight into Coetzee's early encounters with two figures central to the mathematically-engaged strand of his intellectual trajectory that would eventually culminate in one of his most compelling later essays: it is in 'Isaac Newton and the Ideal of a Transparent Scientific Language' (1981), then, that the lasting influence of the thought of Edward Sapir and Benjamin Lee Whorf makes itself most clearly known.

While Potter's structuralist affiliations are evident from the reverence he shows throughout the text for key figures in the development of that field as such Nikolai Trubetzkoy, Antoine Meillet, and Otto Jespersen, the model of structuralist linguistics to which he most frequently and analytically returns is that exemplified by Leonard Bloomfield's seminal 1926 article, 'A Set of Postulates for the Science of Language'. Incorporating direct quotation from that text, Potter describes Bloomfield's early essay as a

> daring attempt to apply mathematical principles to human speech on the assumption that 'the postulational method can further the study of language, because it forces us to state explicitly whatever we assume, to define our terms, and to decide what things may exist independently and what things are interdependent'. [163]

Later, as a means of indicating the motivation for developing such a method, Potter describes how contemporary developments in physics had revealed some of the pernicious effects of the historical tendency to mistake the "simple clarity" with which one might be able to conceptualise the concepts of physics for evidence of their status as ontologically distinct:

> The modern physicist no longer speaks with that simple clarity which his predecessor displayed only three centuries ago. Newton believed in four

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162 Lancelot Hogben, *Mathematics for the Million: How to Master the Magic of Numbers*, Reissue. (New York: W. W. Norton & Company, 1993), 20–21.

163 Potter, *Language in the Modern World*, 17.

fundamental concepts: space, time, matter, and force. For him space and time were solid and independent entities. They have now been replaced by space-time which is not substantial but only a system of relations. Matter has now come to be associated not with Newtonian force but with a new concept called energy, which is not one thing any more, but comprises a whole range of entities – kinetic, electric, thermal, chemical, atomic, and radiant.[164]

In the sense that it is constructed in such a way as to produce meanings that are "not substantial but only a system of relations", then, the language of mathematics appeared to Potter uniquely appropriate to the task of representing the concepts of physics. Building on this belief – in a chapter, 'Language and Thought', that Coetzee would later set for class discussion – Potter proceeds to outline the sceptical counterargument to Bloomfield's programme of attempting to provide an axiomatic, purely relational meta-language through which to analyse language:

> It might well be argued that all expressions are emotive to some extent. As Henri Delacroix once observed (in *Le Langage et la pensee*), 'All language has an emotive value (*Tout langage a une valeur affective*). If what I say were indifferent to me, I shouldn't say it.' But a man may surely make a purely scientific statement about the velocity of a sound or the structure of the atom and in doing so his feelings may be almost unaffected. Almost, perhaps, but never fully one hundred per cent. That is why the philosopher may prefer the colourless signs of symbolic logic and why the mathematician may be more at home with his formulas and equations. The mathematician's symbols are semantically tautologous and his constructions signify in terms of relationship, not of substance.[165]

In short, all efforts to refine a natural language system into a quasi-mathematical network of insubstantial relations will remain "surprisingly incomplete"[166] owing to the connotative semantic quality of the individual terms involved. If one is to accept Potter's conclusion, one must also accept his underlying assumption that while the symbols of natural language generate meaning through the accumulation of 'substance', mathematics is disinterestedly relational, and hence free from the arbitrary attribution of ontologically and epistemologically transformative semantic qualities. It is clear from Coetzee's notes to Potter's essay, however, that he had already begun at this early stage

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164 Ibid., 168.
165 Ibid., 168–169.
166 Ibid., 162.

to recognise that the terms of any supposed opposition between natural language and the language of mathematics, and therefore any distinction between the relational and the substantive, will require more rigorous definition than Potter's text offers: "What", he asks his students, "does Potter mean by calling mathematics 'semantically tautologous'?"[167] Though it is difficult to assess the extent to which Coetzee and his students may have delved into this issue in this particular class, we can nevertheless discern here a dedication to explore at every opportunity the questions that would later form the philosophical core of his doctoral thesis. Where 'The English Fiction of Samuel Beckett' maps out its argumentative territory in large part in opposition to David Hilbert's claim that "[e]verything that can be an object of scientific thought at all, as soon as it is ripe for the formation of a theory, falls into the lap of the axiomatic method and thereby indirectly of mathematics",[168] though, the 1966 course on Critical Reading granted Coetzee's students access to the debate by incorporating close analysis of two enduringly controversial texts, written by two of Hilbert's closest contemporary interlocutors; namely Alfred North Whitehead and Cassius Jackson Keyser.[169]

2.2.2 Realist Mathematics: Alfred North Whitehead

The first of these classes took place in the spring of 1966 and was intended to teach the attending students how to recognise the validity or otherwise of syllogistic arguments in the humanities. With this subject matter in mind, Coetzee's choice of the first of Whitehead's 1925 Lowell lectures, 'The Origins of Modern Science', as object text was delightfully self-referential: in this essay – and, notably, in the carefully selected quotations that Coetzee includes in his class notes – Whitehead attempts "to place

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167 Coetzee, "English 601b."

168 J. M. Coetzee, "The English Fiction of Samuel Beckett: An Essay in Stylistic Analysis" (Ph.D., University of Texas at Austin, 1969), 1.

169 Their respective dates of birth and death are: Whitehead (1861-1947); Keyser (1862-1947); Hilbert (1862-1943).

Western science in the context of history and to point out its limitations as a 'mode of thought'."[170] Following his general observation that "[e]very philosophy is tinged with the colouring of some secret imaginative background, which never emerges explicitly into its trains of reasoning",[171] Whitehead places at the centre of his essay the assertion that

> [s]cience has never shaken off the impress of its origin in the historical revolt of the later Renaissance. It has remained predominantly an anti-rationalistic movement, based upon a naïve faith. What reasoning it has wanted, has been borrowed from mathematics which is a surviving relic of Greek rationalism, following the deductive method. Science repudiates philosophy. In other words, it has never cared to justify its faith or to explain its meanings; and has remained blandly indifferent to its refutation by Hume.[172]

This quite remarkable claim sets up the two major oppositions about which the argument turns. In the first instance, Whitehead opposes the tradition he associates with modem science, which descends from Galileo and bases its inductive hypotheses and theorems on the "stubborn and irreducible facts"[173] of observation, with the "inflexible rationality of medieval thought"[174] that he traces back to Simplicius, the sixth-century CE Neo-Platonist and critic of Aristotle. Whitehead's second distinction is to highlight the imperfect rationality of the "naïve faith"[175] of post-Galilean empirical science by placing it in contrast to mathematics. Mathematics, he claims in the second of his Lowell lectures, 'Mathematics as an Element in the History of Thought', is "the science of the most complete abstractions to which the human mind can attain"[176] and constitutes "a resolute attempt to go the whole way in the direction of complete analysis, so as to separate the elements of mere matter of fact from the purely abstract conditions which they exemplify".[177] Broadly speaking, Whitehead's aim is to establish

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170 Coetzee, "English 601b."
171 Alfred North Whitehead, *Science and the Modern World* (New York: Free Press, 1997), 7.
172 Ibid., 16.
173 Ibid., 8.
174 Ibid.
175 Ibid., 16.
176 Ibid., 34.
177 Ibid., 24.

the conditions according to which one might consider a strictly abstracted mathematics as the only pure scientific method: corrupted by both their reliance upon observation of the world and their methods of inductive inference, he maintains, the natural sciences and the humanities are equally unlike pure mathematics, in the sense that in their prevailing contemporary forms they are categorically unable to make any indisputably unqualified claims as to the truthfulness of their conclusions.

In an effort to demarcate without ambiguity the position of mathematics as pre-eminent among the sciences, Whitehead is keen to clarify the necessary limitations of its language, the duty incumbent upon the mathematician to avoid inferences from abstract mathematical generalities to concrete worldly particularities, and the dangers of attempts to apply this abstract language beyond its original scope:

> For example, it is habitually thought that the certainty of mathematics is a reason for the certainty of our geometrical knowledge of the space of the physical universe. This is a delusion which has vitiated much philosophy in the past, and some philosophy in the present. […] The certainty of mathematics depends upon its complete abstract generality. But we can have no *a priori* certainty that we are right in believing that the observed entities in the concrete universe form a particular instance of what falls under our general reasoning.[178]

One may recognise the 'delusion' Whitehead describes here as one of the central features of Pythagoreanism, in the sense that even this earliest of philosophies was "vitiated" by a belief that the apparent consistency of mathematics corresponds in some fundamental way to the proposed underlying 'harmony' of the elements of the physical world. The Pythagorean notion of the 'certainty of mathematics' was later formalised by Euclid in his *Elements*, wherein he defines in painstaking detail a series of axioms for geometry. A near-universal belief in the efficacy and accuracy of Euclid's axioms would survive without serious challenge for centuries, seeming to provide generation after generation of mathematicians and physicists with an indisputable basis for the development of a single, unified language in which to express their empirical observations. During the

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178 Ibid., 21–22.

Renaissance and beyond, for instance, overwhelming support for the universality of this language would continue to emerge as each new 'truth' of nature was 'discovered': from the astronomical predictions of Copernicus and Kepler to Newton's inverse square law of gravitational force and Boyle's Law, which describes the relationship between the absolute pressure and volume of a gas, each successful prediction made using Euclidean geometry conferred greater and greater authority not only on the certainty of mathematical reasoning, but also on the scope of its potential application to the physical world.

Such hubris could not last: with the development in the nineteenth century of the so-called non-Euclidean geometries of János Bolyai, Nikolai Lobachevsky, Carl Friedrich Gauss, and Bernhard Riemann, the unchallenged supremacy of Euclidean geometry came to an abrupt end.[179] Beginning by rejecting the necessity for Euclid's fifth postulate – according to which parallel lines shall never meet – each of these mathematicians demonstrated that it is possible to produce alternative geometries in which the tenets of Euclidean geometry, so long held to be the only 'true' geometry, do not hold. In particular, they each proved that while Euclidean geometry is suitable for flat surfaces, the geometry of curved spaces – including, at the most basic level, the geometry of 'spherical' or 'hyperbolic' spaces, such as the outer and inner surfaces of a sphere, respectively – must be modelled by more complex axiomatic systems according to the specific characteristics of the topography of their terrain. As such, no geometric system could any longer pretend to the status of absolute truth, and the idea that the universe must correspond to a single, unified, absolute mathematics was dealt a significant blow.

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179 In much the same way as Newton and Leibniz had disputed primacy over the invention of the differential calculus, it remains open to debate as to which of these men ought to be recognised as the father of non-Euclidean geometry. For a detailed account of the development of this debate, see Roberto Bonola and H. C. Carslaw, *Non-Euclidean Geometry* (New York: Cosimo, 2007).

By upholding their dedication to contesting the validity of their most deeply rooted principles, the progenitors of the non-Euclidean geometries generated the basis for the language in which many of the great achievements of twentieth-century physics would be expressed.[180] Recognising both the generative and prophylactic potential of this self-critical attitude, Whitehead chose to end 'The Origins of Modern Science' with the cautionary, though moderate, conclusion that "if science is not to degenerate into a medley of ad hoc hypotheses, it must become philosophical and must enter upon a thorough criticism of its own foundations".[181] Science must, Whitehead implores, follow the example of his own treatise in the foundations of mathematics, the *Principia Mathematica* – which he had completed alongside Bertrand Russell some twelve years earlier, in 1913 – by, in the words of the introduction to that hugely influential work, "diminishing to the utmost the number of undefined ideas and undemonstrated propositions […] from which it starts" and framing it "with a view to the perfectly precise expression, in its symbols"[182] of all its propositions.

To judge from his notes, it would appear that Coetzee was keen for his students to apply just such stringent terms of critique to Whitehead's own grand narrative. In the handouts he prepared for his students, he first summarises each of the essay's forty-five paragraphs for individual analysis. Looked at as a series of individuated propositional statements, 'The Origins of Modern Science' is revealed to be little more than a series of partially justified elements contributing to an overall argument, the force of which is principally maintained by its seeming internal coherence. Coetzee's presentation of the

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180 The most compelling example must be Einstein's use of various non-Euclidean geometries to develop his 'field equations' and 'equations of motion', which together both describe the curvature of a region of space-time under the influence of any given distribution of mass and energy, and predict the movement of particles of all kinds through any such region. For a detailed introduction to the subject, see James B. Hartle, *Gravity: An Introduction to Einstein's General Relativity* (Reading, MA: Addison-Wesley, 2003).

181 Whitehead, *Science and the Modern World*, 17.

182 Alfred North Whitehead and Bertrand Russell, *Principia Mathematica* (Cambridge: Cambridge U.P., 1910), 1.

text in this way must have enabled his class to discern for themselves the means through which Whitehead had assumed without due challenge the truth of several fundamental and, moreover, controversial claims upon which he would later elaborate in 'Mathematics as an Element in the History of Thought': these include the principle that "so long as you are dealing with pure mathematics, you are in the realm of complete and absolute abstraction",[183] the claim that "[t]he certainty of mathematics depends upon its complete abstract generality",[184] and an epistemology in accordance with the "Platonic world of ideas[:] the refined, revised form of the Pythagorean doctrine that number lies at the base of the real world".[185] Ultimately, then, Whitehead's conception of mathematics was predicated on two fundamental beliefs: firstly, the Platonist or 'mathematical realist' conviction that there are certain eternal, immutable mathematical truths that exist independently of the human mind or brain; and, secondly, the belief that these truths may be discovered and codified within an entirely abstracted formal axiomatic system, through which mathematics is able to both claim and prove both its certainty and its consistency.

That Coetzee should have been engaging with the mathematical realist tradition in 1966 enables us to locate at this point in his intellectual trajectory an awareness of the wider philosophical issues at stake in his later, more specialised studies in fields related to mathematics. The general context provided by his master's thesis and the rest of the Critical Reading course, moreover, places in striking relief his engagement with the tendency – represented here by Whitehead and critiqued in Coetzee's own doctoral thesis – to separate the language of mathematics from all other language systems on the basis of its ultimately questionable claim to absolute abstractness, absolute certainty, and absolute impartiality to the phenomena it describes.

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183 Whitehead, *Science and the Modern World*, 21.
184 Ibid., 22.
185 Ibid., 28.

2.2.3 Realist Mathematics and the Humanities: Cassius Jackson Keyser

Given that this early refinement of what would ultimately be an enduring critical

practice was taking place in what ought to have been a straightforward 'Critical Reading'

class, Coetzee's selection of Cassius Jackson Keyser's 'The Humanity of Mathematics'

as a counterweight to Whitehead's 'The Origins of Modern Science' seems an equally

inspired, and equally idiosyncratic, move. In his notes to the class on Keyser, given on 4

March 1966, Coetzee describes Keyser's essay as claiming that

> because of the importance of the bearings it has had on other branches of
> humanistic learning and because it gives us leads in our Quest for the Infinite,
> mathematics is the first of the humanities.[186]

Whereas Whitehead had been keen to define the limitations of mathematics as a

descriptor beyond its delimited axiomatic framework, but nevertheless retained his faith

in its value in such limited terms, Keyser's work, though steeped in the mathematical

philosophy of the early twentieth century and repeatedly engaging in dialogue with the

thought of Hilbert, Russell, Hermann Lotze and others, was far more strident as to the

role mathematical analysis might play within other disciplines. In his *Pastures of*

Wonder, for instance, Keyser would go so far as to claim that "[t]here never has been

nor is nor ever can be an actual world containing a kind of subject-matter admitting of

no application thereto of sheer mathematical thinking",[187] while simultaneously echoing

his fellow mathematical realists by claiming that "mathematical propositions, if true, are

eternal verities".[188]

   It should be no surprise that Coetzee might have found the opportunity to engage

with such a staunch supporter of the scope of mathematics – and of mathematical

realism in particular – attractive: after all, though his work on Ford seems to indicate a

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186 Coetzee, "English 601b."
187 Cassius Jackson Keyser, *The Pastures of Wonder: The Realm of Mathematics and the Realm of
   Science* (New York: Columbia U.P., 1929), 100.
188 Ibid., 99.

nascent allegiance to the cause of impressions over statistics as a means of representing truth, his later adoption of statistical methods in his literary criticism represents strong evidence of the residual influence of the mathematically-oriented hinterland he had nurtured both as a mathematics student at UCT and a computer programmer in London. It is in this context of ambivalence, then, that he confronts an issue of mathematical origin to which he would return on a number of occasions in his later work: the concept of the limit. Among Keyser's most original – and most controversial – beliefs was that "[i]n the mathematical concept of the limit […] we have the clear-shining pattern to which any ideal, if it be a genuine one, conforms":

> No matter whether an ideal be one of justice or injustice, of freedom or of tyranny, of beauty or of ugliness, of happiness or of misery, of wisdom or of unwisdom, of moral good or of moral evil, of power or of impotence, of clarity or of obscurity, of skill or of unskill, of piety or of impiety, or of any other distinction, it will be a genuine ideal, if and only like a mathematical limit, it admits of being approached through an endless sequence of closer and closer approximations, and is, again like a mathematical limit, incapable of being actually attained.[189]

Coetzee's notes for the class for which this text had been set seem to demonstrate a degree of scepticism, if not quite incredulity, as to the validity of Keyser's claims: one such note reminds him to highlight for his students, as Whitehead and Hilbert no doubt would have done, "the use of connotative language"[190] within Keyser's argument; another asks whether "Keyser's ideal [is] defined only by loose analogy with a mathematical limit, or [if he has] produced a workable definition?";[191] finally, he questions Keyser's claims to have demonstrated the position of mathematics as pre-eminent among the humanities: "Hubris? The mark of the amateur philosopher?"[192]

Amateur philosopher or not – and Coetzee's notes neither confirm nor deny the charge – Keyser's question of whether the mathematical concept of the limit can

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189 Cassius Jackson Keyser, *Mathematics and the Question of the Cosmic Mind with Other Essays* (New York: Columbia U.P., 1935), 33–34.
190 "English 601b."
191 Ibid.
192 Ibid.

genuinely be applied to issues within the humanities resonates throughout Coetzee's work; as such, the concept requires elaboration here. Though there are many complex applications of the concept of the 'limit' in mathematics, its origins in the discipline known as 'real analysis' – the study of infinite processes such as infinite series, differentiation, and integration – are perfectly straightforward. Consider, in the first instance, the following general series of terms, where each term, a, is a real number,[193] and n signifies the position of the term in the series:

$$a_1 + a_2 + a_3 + a_4 + \ldots + a_n$$

By evaluating the sum, b, at each stage of the series, we produce the following:

$$b_1 = a_1$$
$$b_2 = a_1 + a_2$$
$$b_3 = a_1 + a_2 + a_3$$
$$b_4 = a_1 + a_2 + a_3 + a_4$$
$$b_n = a_1 + a_2 + a_3 + a_4 + \ldots + a_n$$

In the case of a *finite series* – a series with a specified number of terms, n – it is possible to calculate precisely the sum of the entire series. The sum of the series of prime numbers less than 20, for instance, is as follows:

$$b_1 = 2$$
$$b_2 = 2 + 3 = 5$$
$$b_3 = 2 + 3 + 5 = 10$$
$$b_4 = 2 + 3 + 5 + 7 = 17$$
$$b_5 = 2 + 3 + 5 + 7 + 11 = 28$$
$$b_6 = 2 + 3 + 5 + 7 + 11 + 13 = 41$$
$$b_7 = 2 + 3 + 5 + 7 + 11 + 13 + 17 = 58$$
$$b_8 = 2 + 3 + 5 + 7 + 11 + 13 + 17 + 19 = 77$$

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193 The set of 'real numbers' corresponds to the 'number line' or 'continuum', in the sense that it contains all non-imaginary numbers, rational and irrational, positive and negative.

The total sum of the series of prime numbers less than 20 is therefore equal to 77. It is possible, however, to define certain series – so-called infinite series – that evade such summation; it is in the analysis of such series that the concept of the limit arises. Consider, then, the 'geometric series' of rational numbers, starting with 1/1, such that each successive denominator in the series is double its predecessor:

1/1 + 1/2 +1/4 + 1/8 + 1/16 + 1/32 + …

By virtue of the means of constructing each successive term – the successor function – we could theoretically continue adding terms to this series forever: no matter how many terms we have already written down, we will always be able to double the denominator and thereby construct a successor to the previous term. Just as with the finite series outlined above, it is possible to calculate the sum of the terms up to n when n is specified: in the example above, the sum after two terms, i.e. when $n = 2$, is equal to 1.5; the sum after six terms, when $n = 6$, is equal to 1.96875; and with sixteen terms, when $n = 16$ and by which time the expansion has reached the term, 1/65792, the sum is 1.9999810007 (to ten decimal places). We can, in fact, generalise the sum of the terms up to n, under the following expression:

$$b_n = 2 - \left(\frac{1}{2^{n-1}} \right)$$

It quickly becomes apparent that, no matter how high our value for n gets, and no matter how many more terms we add, the sum will always be less than 2. In other words, though we can approximate the value of the sum of the series to as many decimal places as suits our needs, simply by increasing the value of n accordingly, it is not quite correct to say that this value is equal to 2. Instead, we say that: as n tends to infinity, b_n tends to (or converges on) a limit of 2.

2.2.4 'Misconception' (1967)

Coetzee returned in 1967 to the concept of the limit, alongside some other related mathematical notions, in a curiously mathematically-minded contribution to the public discourse on the war in Vietnam. On the surface, 'Misconception' – published in the letters page of the UTA college newspaper, *The Daily Texan* – appears to be nothing other than a pro-war rejoinder to a previous correspondent, who had characterised the war as a "blunder".[194] Reading the letter with the benefit of hindsight, however, one can immediately recognise beneath that surface the workings of a finely balanced and near-affectless irony that, while it on the one hand brings to mind both Coetzee's deconstruction of Whitehead's 'The Origins of Modern Science' and his doubts regarding Keyser's veneration of the concept of the limit, most closely resembles the insane, rationalised sincerity of Eugene Dawn in 'The Vietnam Project', the first of the two stories that together constitute his first novel, *Dusklands*.

Replicating the form and register of a piece of rationalised pro-war rhetoric, the assumed correspondent behind 'Misconception' – in other words, the situated voice Coetzee adopts – claims to "hope to show that, both in the terms of world strategy and in the more limited terms of strategy within Vietnam, US policy had been the work of intelligent men."[195] Given these parameters, Coetzee delineates in deliberate, numbered steps of logical deduction the rational justification – "signs of clear and systematic thinking"[196] – for what he terms the "carefully calculated strategy"[197] of the American administration. This logic is repeatedly defined in quantitative terms – again prefiguring the rationalising process of Eugene Dawn – as the argument asserts that "an army with an unlimited air support can never be beaten by an army with none [and] that the white

194 J. M. Coetzee to *The Daily Texan*, "Misconception", 1967, National English Literary Museum, Grahamstown.
195 Ibid.
196 Ibid.
197 Ibid.

man can always arrange matters so that he sells his life for the lives of 10 yellow men."[198] By the final paragraph, once the terms of the rationalisation have been exhaustively detailed, Coetzee coyly raises his head above the parapet of affect to articulate, in a bitterly parodic voice, the absurdity of such bald calculations in the complex ethical context of warfare:

> Why this carefully calculated strategy should be thought a "blunder" eludes me. History may well show the presidency of Lyndon B. Johnson as marking the beginning of the consolidation and perhaps even expansion of US world interests following the setbacks of the years following World War II. As for "crimes" in Vietnam, doesn't an arrow in the stomach kill just as dead as a face full of napalm?[199]

The grim lesson at the heart of Coetzee's parody originates in his oblique reference to the subversive and pernicious conflation of the qualitative and the quantitative for propagandist purposes. More than any other aspect of war – indeed, of our experience of existence in general – the transition from life to death provides a sharp dividing line between two seemingly indisputably binary states about which, Elysian speculations aside, most human cultures tend to agree. As such, the enumeration of the dead in a given conflict – assuming sufficient evidence is available – constitutes a fairly straightforward transition from ephemeral worldly phenomena to strictly rationalisable quantification. By contrast, where the act of enumeration involves the negotiation of certain abstract notions about the boundaries of which different observers may disagree, quantitative definition becomes a rather more politicised activity. In the context of a war, the ordinary language concept of a 'crime', to use Coetzee's example, is for the necessity of legal comparison located on a qualitative and culturally relative continuum of 'criminality': where one act of killing may be defined as a legitimate consequence of conflict, another may be deemed – according to necessarily qualitative cultural standards – to transgress the legally defined limit of what is acceptable. In this sense,

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198 Ibid.
199 Ibid.

only such acts as transgress this limit 'count' as crimes, and thereby transcend mere

qualitative description to become part of a quantised, quantitative reckoning of the

degree of 'criminality' attributable to a given participant in the war. From this example

alone, we can begin to see how the quantificatory procedures related to the statistical

description of warfare, far from providing an objective narrative of events, epitomise the

fundamentally fraught process through which ordinary language definitions can be

mobilised in such a way as to attain covertly the authority and apparent objectivity of

their specified numerical or statistical counterparts.

2.3 The State University of New York, Buffalo (1967-1971)

Shortly after the appearance of 'Misconception' Coetzee relocated to the State

University of New York, Buffalo. Though research for his stylostatistical analysis of the

English fiction of Samuel Beckett was by now well underway, this move also

precipitated further teaching responsibilities, and consequently the opportunity to both

deepen his familiarity with the works of several of his most significant stylistic and

aesthetic precursors, and to further his interest in the connections between mathematics

and the humanities. Though his contemporaneous lecture and seminar notes indicate

that the ostensible subject matter of his classes was generally literary, they nevertheless

confirm the presence of a nascent recognition of the metaphorical resonances of

mathematical models within wider socio-cultural contexts.

From the summer semester of 1968 onwards, Coetzee resumed his teaching of

classes in Critical Reading, which, by the time of his departure for Cape Town two years

later, had taken in a number of authors that would remain influential upon his own work

throughout his career These included Jorge Luis Borges (Summer 1968); Constantine

Cavafy (Summer 1969); Franz Kafka (Summer 1969); Fyodor Dostoyevsky (Summer

1969); and Samuel Beckett (Summer 1969).

2.3.1 Idealist Mathematics: Jorge Luis Borges and Zeno's Paradoxes

Judging by his choices of quotation for his handouts at this time, the series of classes on Borges's *Labyrinths* appear to have particularly resonated with his earlier considerations of the relationship between number and ethics. One such piece from which he quotes is 'A New Refutation of Time', in which Borges's primary concern is to extend to the concept of time the idealist rejection of the continuity of both physical and mental space: "Once matter and spirit, which are continuities, are negated, once space too has been negated," he states, "I do not know what right we have to that continuity which is time".[200] In light of his recognition that he has not fully examined the ethical ramifications of this proposition, Borges quotes a line from George Bernard Shaw, which Coetzee in turn included in his class handout: "Do not let yourself be overcome by the horrible sum of human sufferings; such a sum does not exist. Neither pain nor poverty are cumulative."[201] Overall, then, the thesis Borges proposes goes beyond the essay's titular 'refutation of time' to suggest that our perceptions of many aspects of our lives – from our foundational experiential categories to the superstructural systems of knowledge and belief we build upon them – are mediated through conceptual metaphors of an illusorily quantificatory nature.

On a similar note, Coetzee also quotes liberally from Borges's 'Avatars of the Tortoise' in his notes to this course, in particular choosing excerpts that elaborate on the Argentinian author's concern with the complex relationships that obtain between number, ethics, reason, and reality. Borges introduces his motivation in typically aphoristic style: "There is a concept which corrupts and upsets all others", he writes; "I

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200 Jorge Luis Borges, "A New Refutation of Time," in *Labyrinths*, by Jorge Luis Borges, ed. Donald A. Yates and James E. Irby, New ed. (London: Penguin, 2000), 256–257.
201 Ibid., 260.

refer not to Evil, whose limited realm is that of Ethics; I refer to the infinite".[202] Coetzee

would return to 'Avatars of the Tortoise' in a course on 'The Modern Short Story' in

1974, and to its main subject, the paradoxes of Zeno, in both the novel he published that

same year and one that appeared nearly forty years after the 'Critical Reading' course at

Buffalo; namely *Dusklands* and *Diary of a Bad Year*. That the mathematical elements of

the paradoxes continue to recur in this way makes clear how enduringly important these

brief brushes with mathematical responses to literature and ethical issues have been to

Coetzee; as such, they demand explication here.

An image from Coetzee's first fictionalised autobiography, *Boyhood*, provides a

basic introduction to the essential structure of Zeno's paradoxes, while also giving some

indication of the long-standing influence of their implications on his thinking:

> The fielders settle into position. He must concentrate, but there is something
> irritating he cannot put out of his mind: Zeno's paradox. Before the arrow can
> reach its target it must reach half-way; before it can reach half-way it must reach a
> quarter of the way. […] Desperately he tries to stop thinking about it; but the very
> fact that he is trying not to think about it agitates him further.[203]

Another version of the paradox imagines a race between Achilles, the fastest man in all

of Athens, and a tortoise, who, in the interests of competition, is given a head start. Zeno

demonstrates that, regardless of his far superior speed, Achilles can never catch up, even

if they were to run to infinity. The logic operates as follows: by the time Achilles is

allowed to start, the tortoise will have moved on, however slowly, from the starting

point (A) and reached a certain point (B) further down the track; consequently, by the

time Achilles reaches (B), the tortoise will have moved on to a further point (C); but by

the time Achilles has reached (C), despite having drawn ever closer to the tortoise, his

competitor will yet again have inched his way further along the track, to (D). As such,

no matter how much faster than the tortoise Achilles is able to move, whenever he

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202 Borges, "Avatars of the Tortoise," 237.
203 J. M. Coetzee, *Boyhood* (London: Vintage, 1998), 53.

reaches a point through which the tortoise has already passed, the tortoise will have moved further along, through an infinite number of ever-decreasing distances, *quanta* of separation that are ever less perceptible, to another point beyond the Athenian's reach.

At the heart of the paradox lie a series of conceptual metaphors that, being implicit in the statement of the paradox, indicate the surreptitious migration of mathematical metaphor into our fundamental engagement with reality. Firstly, we should note that each point of comparison between the positions of the two competitors is treated discretely, as if the race were not a continuous process. Secondly, the race is conceptualised as linear, and consequently subject to a principle of 'orderedness' that may or may not be appropriate. Thirdly, this linear narrative is constructed according to an unquestioned acceptance of the transparency of the foundational operation of addition. Fourthly, the number line that these first three metaphors together produce is not subject to defined boundaries or limits. Finally, the paradox calls upon the concept of infinity in two forms: the potentially infinitesimal distance travelled by the tortoise in his steps, and the potentially infinite number of steps Achilles may take in order to catch the tortoise. Taken together, these conceptual metaphors parallel the construction of the mathematical continuum, and begin to suggest some of the issues that this apparently innocuous mainstay of mathematical discourse is inherently bound to cause.

Moving forward, a number of additional texts from *Labyrinths* – including 'The Wall and the Books' and 'The Library of Babel' – endowed Coetzee's classes with further cause to consider the nature of number, and of infinity in particular. However, it is perhaps from his citations from 'The Mirror of Enigmas' that one can discern the clearest influence upon Coetzee's own contemporaneous work as a stylostatistician, in the sense that this piece of archetypal Borgesian esoterica placed elements of Coetzee's practice in conversation with a grandiose and profound tradition of the analysis of the

'exalted' text:

> [Léon] Bloy (I repeat) did no more than apply to the whole of Creation the method which the Jewish Cabalists applied to the Scriptures. They thought that a work dictated by the Holy Spirit was an absolute text: in other words, a text in which the collaboration of chance was calculable as zero. This portentous premise of a book impenetrable to contingency, of a book which is the mechanism of infinite purposes, moved them to permute the scriptural words, add up the numerical value of the letters, consider their form, observe the letters and capitals, seek acrostics and anagrams and perform other exegetical rigours which it is not difficult to ridicule. Their excuse is that nothing can be contingent in the work of an infinite mind.[204]

The question arises as to whether the language we adopt to explain the text of the world can ever tend to this infinity; in other words, can the process of scientific development correctly be described as a progression – perhaps a quantifiable progression – towards, but never reaching, the limit of perfect and complete truth about the universe, as might be contained within an infinite mind? As Borges points out in the longer passage from which this excerpt is taken – and which Coetzee reproduced in its entirety for his students – Bloy was primarily concerned with exploring, though not calculating, the unified grammar and syntax of the world's hidden symbolic and numerical values, and thereby considering whether our experiences and perceptions are anything other than fragmented reflections of a complete and immutable set of symbols that exist in God and, as a consequence, within us: "If we see the Milky Way," Bloy proposes, "it is because it actually exists in our souls".[205]

For someone trained in mathematics in the early 1960s, it would be immediately apparent that Bloy's conjecture touches on the dispute between the mathematical philosophy of realism and its many opposing theories. To briefly recall, mathematical realists maintain that mathematical entities are objective realities that exist independently of their manifestation in the human mind or brain and are therefore the

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204 Jorge Luis Borges, "The Mirror of Enigmas," in *Labyrinths*, by Jorge Luis Borges, ed. Donald A. Yates and James E. Irby, New ed. (London: Penguin, 2002), 246–247. For Coetzee's quotation of this passage, see J. M. Coetzee, "English 290," Seminar Materials, Summer 1968, Critical Reading, National English Literary Museum, Grahamstown.
205 Ibid., 245.

subject of *discovery*.[206] Conversely, there are several other loosely 'idealist'

philosophical stances in which mathematical entities are seen as the subject of

construction or *invention*: among the most enduring such theories are logicism,

according to which mathematics is reducible to logic; formalism, according to which

mathematics is a heightened form of symbolic manipulation; and intuitionism –

including various forms of so-called constructivism – according to which each

mathematical entity is conceived of as a merely provisional element of an internally

coherent structure, constructed in complete awareness of the fact there may be many

contradictory alternative structures of equal or greater validity. While Coetzee's own

perspectives on the philosophy of mathematics could scarcely be said to have become

fixed by this point, the notes to one of the last courses he taught at SUNY indicate in

some detail the territory upon which his reflections on the subject took place.

2.3.2 Stylistics, Probability Theory, and Physics (1970-71)

Much as his earlier course in Critical Reading had taken on a markedly mathematical

quality as a result of the inclusion of texts by Whitehead and Keyser, Coetzee's 1970-71

course in Stylistics was closely aligned with his own contemporaneous stylostatistical

work by virtue of the presence as required reading of works by Wilhelm Fucks, Udny

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206 Much of the history of the philosophy of mathematics might reasonably be characterised as an ongoing dialectic between the refutation of mathematical realism and its reconstitution in a new form. General introductions to this history are numerous: see, for instance, Paul Benacerraf and Hilary Putnam, eds., *Philosophy of Mathematics: Selected Readings*, 2nd ed. (Cambridge: Cambridge U.P., 1984); James Brown, *Philosophy of Mathematics: An Introduction to a World of Proofs and Pictures* (London: Routledge, 1999); and Alexander L. George and Daniel Velleman, *Philosophies of Mathematics* (Oxford: Wiley-Blackwell, 2002).

For more detailed explanations of the particular theories named here, though, readers are directed to the following single sources. For a solid introduction to mathematical realism and its opponents, see Mark Balaguer, "Realism and Anti-Realism in Mathematics," in *Philosophy of Mathematics*, ed. A. D. Irvine (Amsterdam: North Holland, 2009), 35–102. The best-known statement of logicism is undoubtedly Whitehead and Russell's *Principia Mathematica*, though, as discussed above, Whitehead in particular retained a strong Platonist belief in the external reality of the principles of logico-mathematics. For a classic text on formalism, see Haskell Brooks Curry, *Outlines of a Formalist Philosophy of Mathematics* (Amsterdam: North Holland, 1951). For an outline of the form of constructivism pioneered by its most renowned figure, see W. P. van Stigt, *Brouwer's Intuitionism* (Amsterdam: North Holland, 1990).

Yule, and Gustav Herdan.[207] More interestingly for the context of the present chapter,

however, it also incorporated a number of more broadly philosophical texts that both

give an impression of Coetzee's wider interests at the time and offer a singular insight

into the origins of several ideas that would endure long into his career as a writer of

fiction. Approaching the works of Hans Reichenbach, Roger Brown, and Michael

Polanyi, Coetzee begins here to draw his concerns with the concept of the limit together

with the growing sense suggested by his contemporaneous doctoral studies that

epistemology ought to become more conversant with its increasingly reciprocal

conceptual relationship with probability theory.

Beginning with a reading of Brown's *Words and Things* (1968),[208] Coetzee' s notes

start by questioning how one might define the concept, "Probability of event".[209] The

first suggestion offers what appears to be a reasonably uncontroversial mathematical

expression of the nature of probability as observed from an empirical and pragmatic

perspective, rather than one which seeks to explore any underlying truths of the system

under observation:

$$P(E) = N \xrightarrow{\lim} \frac{O}{N}$$

(Where O = observed occurrences of E, N = no. of trials)

In ordinary language, this formula states that the probability of an event, E, occurring in

a future trial tends to a limit equal to the number of occurrences of E, O, that are

observed in a given number of trials, divided by the number of trials. The probability of

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207 Wilhelm Fucks would later be the subject of two of Coetzee's essays in stylistics; these are
   considered in detail in Chapter Three. Udny Yule is best known for his widely used statistics textbook:
   see George Udny Yule, *An Introduction to the Theory of Statistics* (London: C. Griffin, 1911). He also
   contributed greatly to pioneering the statistics of evolutionary theory: in particular, see George Udny
   Yule, "A Mathematical Theory of Evolution, Based on the Conclusions of Dr. J. C. Willis, F.R.S.,"
   Philosophical Transactions of the Royal Society B: Biological Sciences 213 (1925): 21–87. A prolific
   writer, Gustav Herdan's long-term project concerned providing a quantitative account of linguistics.
208 *Words and Things*, incidentally, also contains a section devoted to the experiments of Wolfgang
   Köhler, to whose work on the linguistic and psychological capacities of apes Coetzee would later
   return in *The Lives of Animals*.
209 J. M. Coetzee, "Stylistics," Seminar Notes, 1970-1971, National English Literary Museum,
   Grahamstown.

an event occurring can never be equal to 1 – the event can never be 'certain' – since even if an event were to occur in every trial, and no matter how vast a sample we were to take, Brown's equation proposes that P(*E*) merely tends to a limit of 1.

By virtue of its generality, this formula ought in principle to be applicable to any statistical population of a sufficiently large sample size, from the behaviour of subatomic particles to fluctuations on the stock market, and from the linguistic choices made by a particular writer to the individual brush strokes made by members of a given school of painters. In the sense that each of these phenomena can be represented as a statistical population, they correspond to an atomistic conception of behaviour as reducible, without deficit, to quantitative description.

The inherently positivistic nature of this notion of probability theory – according to which the question of how poetic thinking diverges from mathematical thinking is given rather short shrift – occupies the centre ground of Coetzee's stylistics course; to be precise, the classes from this point onwards are largely structured around a critique of the philosophical tradition of logical positivism. Against this, and alongside what he refers to in the notes as "formal definitions of probability",[210] Coetzee also considers the alternative of "psychological interpretations".[211] Predicated in the first instance on a reading of the psychologist Michael Polanyi's *Personal Knowledge* – a discourse on the nature and justification of scientific knowledge adapted from Polanyi's series of Gifford Lectures from 1951-52 – this critique moves on to include the study of texts by several mathematician-philosophers central to the development of this tradition including Hans Reichenbach, Pierre-Simon Laplace, G. W. Leibniz, and Werner Heisenberg.

Polanyi's primary concern in *Personal Knowledge* is to demonstrate that scientific objectivity is radically unattainable, because both perception and analysis alike are

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210 Ibid.
211 Ibid.

founded on the fundamentally subjective basis of our individual epistemic perspectives.

Further than this, Polanyi argues that the ideal of a scientific method capable of

generating 'facts' is actively obstructive to progress in our understanding of the world. A

better, more truthful methodology, he maintains, is to recognise in our statements of

'knowledge' both the role of the investigator's own epistemic standpoint, and the

influence of his or her personal, human interactions on the process of meaning-

production. Though such an approach may initially seem doomed to falsification, its

transparency regarding the biases it contains ought to be seen as a liberating constraint:

safe in the acknowledgment that his or her 'truths' are merely constructive, and possibly

predicated on entirely false affirmations, the scientist is freed up to treat his or her

findings as contingent aspects of an epistemic framework to which he or she is by

definition profoundly committed.

Demonstrating once again his interest in exploring the limitations of scientific

description when confronted with effectively non-quantitative phenomena, Coetzee's

class moved on to consider the "concepts of limit and homogeneity"[212] and, in

particular, the "problems when applying them to works with structure, e.g. art".[213]

Coetzee's work in stylostatistics illustrates his assimilation of Polanyi's approach into

his methodological approach, in the sense that it systematically seeks to highlight its

own inherent and inextricable limitations, and hence becomes as much a meta-study of

the discipline in which it partakes as it is a study within that discipline. Indeed, the

problematic nature of assessing the truth or falsity of a given proposition in any field of

study is the subject of further notes pertaining to this series of classes, including the

following:

> Only within closed systems like mathematics and the dictionary can we make
> true-false statements: $2 = 1$ ($P = 0$), a dog is a mammal ($P = 1$). All statements

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212 Ibid.
213 Ibid.

purporting to connect language with reality open the continuum, have $0 \leq P < 1$, and are called indeterminate.[214]

By drawing such a sharp distinction between the analytic statements of 'closed systems' and the synthetic statements of what one might by analogy call 'open systems', Coetzee seems to assent to a number of significant propositions: firstly, *pace* Potter, that mathematics is 'semantically tautologous'; secondly, that a self-contained linguistic corpus such as a dictionary is equivalent to mathematics, in the sense that its meanings are generated not according to external reference but through internal relations; thirdly, that language cannot express truths or falsehoods about the external world with certainty, and can do so only in probabilistic terms; fourthly, that the degree to which one may accept such expressions of truth or falsity as valid depends on the degree of validity one accords to at least two quantificatory concepts – probability theory and the continuum; and, finally, given the inequalities he uses in the expression $0 \leq P < 1$, that while it is possible to know for certain that something is false ($0 \leq P$), the validity of truth-claims tends to a limit that can never be reached ($P < 1$). Tellingly, the examination and restating of the nature of such claims is the principal function of the next text to which Coetzee's classes in stylistics turned: namely, Hans Reichenbach's *Theory of Probability*.

Coetzee's notes to this dense, technical tome are largely focused not on the detailed reconstruction of the logic of probability theory that fill the majority of its pages, but rather on the introductory sections in which Reichenbach establishes the philosophical basis for his motivation, in Coetzee's words, to "move from a two-valued logic to a probability logic with a continuous scale of values".[215] The passage to which Coetzee refers in this statement predicates its claim as to the significance of the need for a reconstituted probability theory on the fact that the "philosophical problems of the

214 Ibid.
215 Ibid.

concept of probability have time and again occupied the minds of philosophers and mathematicians".[216] "Recently", Reichenbach continues, "they have been brought to the fore with even greater emphasis":

> first, because of the prominence of the concept of probability in modern physics, where it has gradually replaced the concept of causality; second, because of the development of the modern philosophy of nature, which has analyzed the concept of probability for its own sake. With the incorporation of the results of symbolic logic, the new philosophy of nature has developed, in the meantime, from a critical investigation of the thinking of mathematical physics to a scientific theory of knowledge. It has now reached the stage at which it begins to replace the era of metaphysical constructions in philosophy by the establishment of a philosophical science.[217]

Indeed, Reichenbach claims, the way in which by this point in the early twentieth century probability theory had been so successfully brought to bear on issues ranging from "the investigation of the space-time problem [to] the general criticism of scientific concepts"[218] suggests that probabilistic conceptions of reality correspond to the phenomena they purport to describe and, as such, contain "the nucleus of every theory of knowledge".[219] If this is so, however, how can we reconcile such accounts with the problematic fact that they have an "intimate relation to the problem of induction[?]"[220]

Coetzee's notes to his class on Reichenbach largely refer to the physicist's introductory discussion of both the ordinary language conception of probability – such that our everyday experience engenders a sense "that there are no statements of absolute certainty, if the statements are not to designate empty logical relations but to assert the existence of specific facts"[221] – and the historical development of attempts to codify the nature of probabilistic statements in mathematical language. Following its original application in games of chance, Reichenbach explains, the "indispensability of the

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216 Hans Reichenbach, *The Theory of Probability: An Inquiry into the Logical and Mathematical Foundations of the Calculus of Probability*, 2nd ed., California Library Reprint Series (Berkeley: University of California Press, 1971), v.
217 Ibid.
218 Ibid.
219 Ibid.
220 Ibid.
221 Ibid., 3.

probability concept for the natural sciences became even more apparent when a new

field of application was opened – the kinetic theory of gases and liquids":

> Whereas in the theory of errors a higher precision of observational results, an
> improvement in the numerical aspect of physical knowledge, had been achieved,
> the appearance of the probability concept in the kinetic theory asserted that certain
> laws that had formerly been considered to be strict physical laws were statistical
> laws, that is, laws of a probability character.[222]

Reichenbach refers here to Ludwig Boltzmann's statistical interpretation of the second

principle of thermodynamics.[223] As Reichenbach points out, "the epistemological

implications"[224] of Boltzmann's theory gave twentieth-century thinkers an entirely new

issue to resolve, namely the problem of reconciling our conceptions of physical 'laws'

with statements of probability. "Boltzmann's theory", which compensates for "the

impossibility of following the movements of individual gas molecules with the methods

of physics"[225] by providing a statistical means of interpreting and predicting the

behaviour of gases,

> implied that certain laws that had previously been regarded as strict laws of nature
> are not different from statistical laws of games of chance, and that the law of great
> numbers, which was uncovered in the theory of games of chance, represents a
> general type of physical law.[226]

This, Reichenbach relates, connects the notions of probabilistic and causal

representations of reality, meaning that "the concept of the statistical law of nature took

its place beside that of the causal law of nature".[227]

Nevertheless, as Coetzee writes in his paraphrased summary notes to this section

of Reichenbach's argument, "[David] Hume had recognized that the causality relation

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222 Ibid., 6.

223 One source of Coetzee's familiarity with this major contribution to twentieth-century physics was his study of Samuel Beckett and, in particular, an essay by Darko Suvin on Beckettian cosmology he quotes in his notes to a 1970 class on Beckett's French-language fiction. See Darko Suvin, "Beckett's Purgatory of the Individual or the 3 Laws of Thermodynamics: Notes for an Incamination Towards a Presubluminary Exagmination Round Beckett's Factification," *The Tulane Drama Review* 11, no. 4 (July 1, 1967): 23–36.

224 Reichenbach, *The Theory of Probability*, 6.

225 Ibid., 7.

226 Ibid., 6.

227 Ibid.

establishes only a co-ordination of events, and that all metaphysical ideas of intrinsic

connections are anthropomorphisms",[228] while "Kant's unfortunate doctrine of the

apriority of causality misdirected subsequent analysis".[229] This misdirection,

Reichenbach suggests, obscured for many years the fact that the

> law never portrays the actual occurrence completely, but represents an idealization
> in which only certain prominent factors are considered, whereas an infinite
> number of others are neglected.[230]

In that sense, then, in the words Reichenbach uses to describe the pragmatic, but

ultimately falsifying approach historically adopted in physics, this reductiveness is a

necessary evil, as, "[w]ithout such a schematization, natural events would be too

complex for interpretation".[231]

To summarise, then, Reichenbach's principal goal in *The Theory of Probability*

was to establish a reconciliation between probabilistic descriptions of physical

phenomena and a reconstituted understanding of causality, which might generate a

deeper understanding of "the peculiar relation existing between natural law and

reality",[232] while also presenting

> a construction of the calculus of probability that is mathematically as well as
> logically satisfactory, and then, returning to the logical and epistemological
> problems, to show that all the questions on nature and application of the
> probability concept can be answered satisfactorily.[233]

In the sense that, in Coetzee's words, "the principle formulated by Reichenbach and

later by Heisenberg was that an increase in probability was restricted to a limit below

1",[234] we must now realise, as Reichenbach maintains in a line that Coetzee quotes in his

notes, that "we cannot make a single statement about reality the validity of which can be

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228 Coetzee, "Stylistics."
229 Ibid.
230 Reichenbach, *The Theory of Probability*, 9.
231 Ibid.
232 Ibid.
233 Ibid.
234 Coetzee, "Stylistics."

asserted with more than probability".[235]

In addition to the notes on Reichenbach, Coetzee's course on stylistics touched on similar issues of the relationship between mathematics and the physical world such as they appear in the works of Laplace and Leibniz. To begin with, he refers to L. Susan Stebbing's discussion of Laplace's 'Supreme Calculator' in her popular work, *Philosophy and the Physicists.* As Stebbing points out, it was Laplace who removed from Newton's mechanical conception of the universe the need for an interventionist God. For Laplace, the deterministic behaviour of the universe could be formalised according to law to such a perfect extent that, if an individual had access to all the necessary information pertaining to the present moment, then he or she could extrapolate every event of the past and future, with error calculable to zero. In Laplace's words, however, the

> human mind in the perfection it has been able to give to astronomy affords a feeble outline of such an intelligence. […] All its efforts in the search for truth tend to approximate without limit to the intelligence we have just imagined.[236]

In Stebbing's interpretation, the sort of extrapolation required of the 'Calculator' is a form of prediction, both forwards and backwards in time, from one set of nominalised 'events' to another. Alongside the quantum understanding of the universe to which Stebbing subscribed, however, such a concept seems hopelessly outmoded: Coetzee's notes summarise her argument as being that "the basis of quantum laws is statistical, and the conception of causality ceases to be effective".[237] For much the same reasons given by Reichenbach, then, Stebbing concludes that notions such as determinacy and the Supreme Calculator are built upon a faulty conception of reality born of a dependence on an inappropriately reductive mathematical conceptual metaphor: the linear, causal continuum cannot provide an appropriate model of reality, and ought, at

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235 Coetzee, "Stylistics," and Reichenbach, *The Theory of Probability*, 10.
236 Pierre-Simon Laplace, *A Philosophical Essay on Probabilities* (London: Wiley, 1902), 4.
237 Coetzee, "Stylistics."

the very least, to be replaced by a probabilistic, statistical alternative.

Finally, and perhaps most significantly, Coetzee's notes refer to "Leibniz's conception of an alternative mathematics".[238] Though brief, one can reasonably infer from this quotation Coetzee's familiarity with the German philosopher's attempts to free seventeenth-century mathematics from the shackles of a scholasticism that was at that time restricting the development of the discipline throughout the universities of Europe. In Leibniz's case, this reaction against the complacencies of tradition led to some of the most enduring accomplishments in the history of mathematics, including his discovery of binary arithmetic, his development of the basic principles of topology, and, most famously, his independent pioneering of the infinitesimal calculus. While each of these concepts is relevant in one form or another to the analysis of the mathematical elements of Coetzee's fiction, the present discussion of his interest in the migration of mathematical conceptual metaphor into non-mathematical concerns ends with reference to another concept that Leibniz, unlike many of his less adventurous peers, was prepared to use in service of his mathematical explorations: namely, the imaginary numbers.

2.4 Imaginary Numbers and Robert Musil

The context in which Coetzee's interest in imaginary numbers first becomes clear is in his engagement with the works of Robert Musil. To give a brief sense of the enduring influence of Musil's work on Coetzee's fiction and criticism, it is worth pointing out that while collections of Coetzee's criticism now run to five volumes, in comparison with other single authors Musil figures among his published output to a degree only surpassed by Beckett, having continually been the subject of lectures and essays from

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238 Ibid.

1974 – the year he published *Dusklands* – right up to the most recent, in 2001.[239] To

judge from that body of criticism, foremost among Coetzee's interests in Musil is the

way in which the latter adopts a metaphor drawn from mathematics to anatomise his

metaphysical concerns: by confronting his characters with the contradictions that arise

from critical enquiry into the foundational ontologies of mathematics, Musil develops a

powerful discursive language through which to illuminate and deconstruct analogous

contradictions arising from those characters' attempts to reconcile the amorphousness of

the conscious self's private experience and the increasing emphasis on the rationality,

usually a surreptitious form of Democritean atomism, that he deems to pervade the

modern social world: "[t]here is really no need to belabor the point", the third person

narrator of *The Man without Qualities* laments, "since it is obvious to most of us these

days that mathematics has taken possession, like a demon, of every aspect of our

lives".[240] Coetzee elaborates on this idea in his introduction to the recent Penguin

Classics edition of Musil's first novel, *The Confusions of Young Törless*:

> The master metaphor that Musil uses to capture these incommensurabilities (what
> Törless himself calls 'incomparabilities') comes from mathematics. Living in
> among the whole numbers and fractions of the whole numbers – which together
> make up the so-called rational numbers – and somehow made to interlock with
> them by the operations of mathematical reasoning, are the infinitely more
> numerous irrational numbers, numbers that evade representation in terms of whole
> numbers.[241]

Though Coetzee describes Musil's motif of irrationality as a "master metaphor," his

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239 Having first encountered Musil's work in the early 1960s (Coetzee and Attwell, *Doubling the Point*,
   208), Coetzee has returned to discuss it across the length of his career: in 1974 he taught a course at
   the University of Cape Town on the modern short story, which included a seminar on Musil's 'The
   Perfecting of a Love', an early piece that he would later identify as "an audacious piece of sustained
   poetic intensity, and one of the key texts of German modernism" (Ibid., 237.); in 1986 he wrote a
   review of Musil's *Three Women* for the *New York Review of Books* in which, surely not coincidentally,
   he recognises admiringly the way in which "Musil's power […] seems to flow from an effortless
   ability to annihilate his selfhood and enter the Other" (Ibid., 236.); in 1993 he contributed an essay to
   the *Threepenny Review* entitled 'Homage' that spoke explicitly of the influence of Musil, among
   others, on his own practice; in 1999 he reviewed a newly-curated edition of Musil's *Diaries*, choosing
   in particular to document several instances of Musil's subtle manipulation of the generic boundaries of
   fiction and autobiography; and in 2001, he contributed the introduction to the new Penguin Classics
   edition of Musil's semi-autobiographical first novel, *The Confusions of Young Törless*.
240 Robert Musil, *The Man Without Qualities*, trans. Sophie Wilkins and Burton Pike, New ed. (London:
   Picador, 1997), 36.
241 Coetzee, "Introduction," in *The Confusions of Young Törless*, by Robert Musil, 37.

comments elsewhere show without question that he is less interested in that metaphor as a *literary* device, and more concerned by its troubling and insidious *literal* component. In a culture where "mathematics has taken possession, like a demon, of every aspect of our lives" – from our constructions of self and other, to our aesthetics, to our socio-political policies – what could it mean for a quantificatory principle to be "incommensurable"? What might be the consequences of either the assimilation or the rejection of quantificatory procedures on the basis of either their logical consistency, their amenability to existing representational systems, or their concordance with experimental evidence?

Musil's protagonist in *The Confusions of Young Törless* is a teenaged schoolboy struggling to come to terms with the institutionalised bullying, rape, violence, prostitution, and kleptomania that pervades his military boarding school. At one particularly heightened moment, which takes places in his mathematics class, he finds himself also forced to reconcile his conviction in the pre-eminence of rationality with the successful use by mathematicians of calculations in which one may take advantage of a number of concepts he finds counterintuitive: these include non-Euclidean geometry[242] and various conceptions of infinity. As the novel progresses, Törless begins to imagine the seeming reality of these concepts is the result of an original definition designed to harbour covert and questionable ontological assumptions.[243] One other such concept that he has difficulty incorporating into his rational world-view, is the set of so-called 'imaginary numbers', an alternate continuum in which the unit of calculation is not one, but the square root of minus one. A quick example ought to suffice for explaining why imaginary numbers might initially seem problematic. First, in the set of real numbers, rational or irrational, positive or negative, all square numbers are

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242 Robert Musil, *The Confusions of Young Törless*, trans. Shaun Whiteside (London: Penguin, 2001), 82.
243 Ibid., 69.

necessarily positive:

$4^2 = 16$, $15^2 = 225$, $-7^2 = 49$, $\pi^2 =$ (approximately) 9.8696044.

A problem relating to this claim can be seen when we attempt to solve the following equation:

$x^2 + 1 = 0$

First we collect terms to get:

$x^2 = -1$

We can find the square root of both sides to get:

$x = \sqrt{-1}$

From here we can see that there is no real number solution for x, as there is by definition no real number value that satisfies the condition that, when it is multiplied by itself, the result will equal minus one, since all square numbers are positive.

Nevertheless, there remain mathematical expressions in which, by heuristically imagining there to be just such a number as the square root of minus one, we are able to reach a solution that seems in a very real sense 'correct'. Consequently, mathematicians eventually decided to pragmatically accept the validity of the imaginary numbers. Using the conventional symbol, i, for the so-called imaginary unit, they were then able to imagine a continuum built of multiples of i in just the same way that the real continuum is built from multiples of the real unit, 1.

With this acceptance, mathematicians may construct expressions involving i, such as the following conveniently basic third order polynomial:

$y = x^3 - 4i^2 + 6$ (Example 1)

Though we might not be able to represent i using real numbers – and therefore, in Törless's terms and within the representational frame of the real numbers, it "doesn't exist" – we can nevertheless find a real number value for this particular expression for

all values of x, since: $i^2 = -1$. Solving the above expression for $x = 2$, for instance, produces the following:

$$y = 2^3 - 4(i \times i) + 6$$

$$y = 2^3 - 4(-1) + 6$$

$$y = 8 + 4 + 6$$

$$y = 18$$

We can even plot this curve on the two-dimensional Cartesian plane, and find the value of the function at $x=2$ geometrically, as in Figure 1, below.
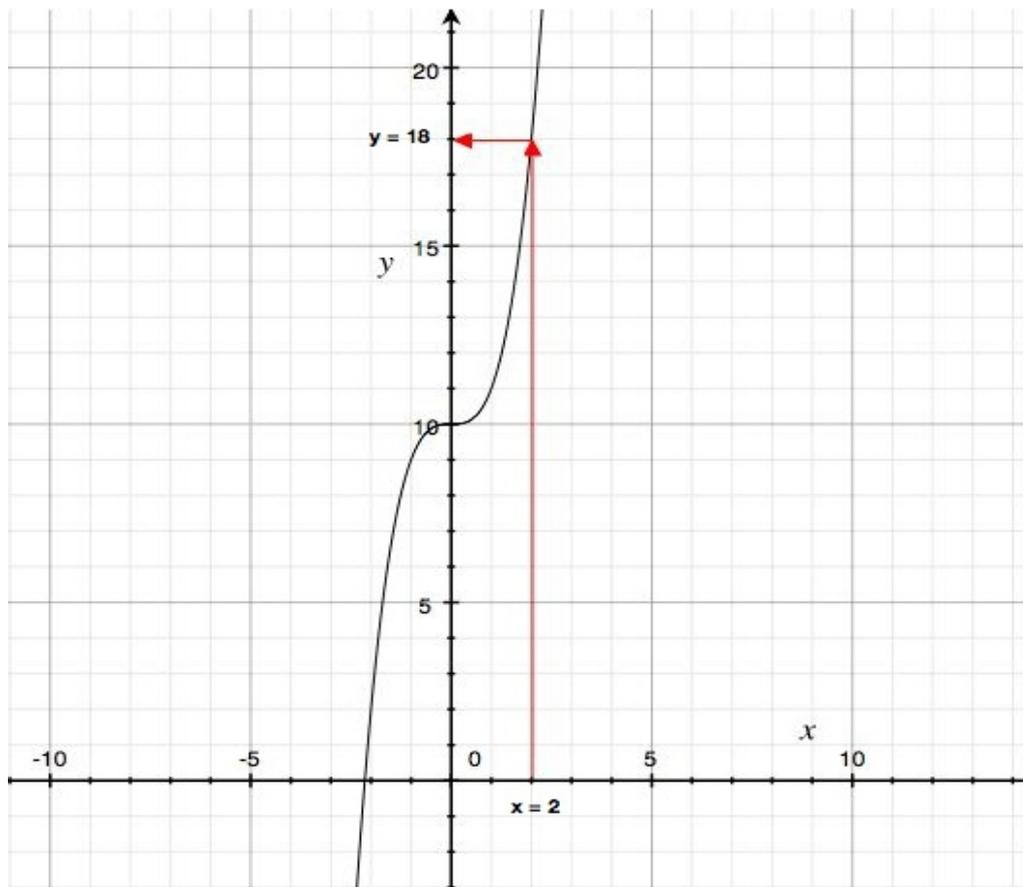

Figure 1:   A geometric representation in the two-dimensional Cartesian plane of the complex polynomial $y = x^3 - 4i^2 + 6$. As indicated, where $x = 2$, $y = 18$.

So, with a minor recalibration of our representational tools, we can incorporate this anomaly within two widely accepted representational schematics – algebra and geometry – without seeming to have invented any new and potentially questionable rules. We therefore seem to have proceeded without much damage to our trust in these systems and have managed to 'preserve the myth' upon which so much prior success has been built.

Preserving previously successful myths is an important role played by pure mathematics in the advancement of applied mathematics. Indeed, to give just one example, the foundational formulas of quantum mechanics – Schrödinger's equation[244] and Heisenberg's matrix mechanics[245] – make substantial use of complex numbers (numbers of the form $a + bi$, where a and b are real numbers and i is the imaginary unit) and therefore rely on our acceptance of the commensurability of the real and the imaginary within a single, unified representational system. Nevertheless, there are some obvious concerns connected with the 'convenience' of examples such as the one given above. As Coetzee notes, Musil voices one such concern through Törless's typically Musilian paroxysm of doubt:

> But isn't there still something very strange about it all? How should I put it? Just think about it for a moment: in that kind of calculation you have very solid figures at the beginning, which can represent metres or weights or something similarly tangible, and which are at least real numbers. And there are real numbers at the end of the calculation as well.
>
> But they're connected to one another by something that doesn't exist. Isn't that like a bridge consisting of only the first and last pillars, and yet you walk over it as securely as though it was all there? For me there's something dizzying about a calculation like that; as if it goes off God knows where for part of the way. But the

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244 Schrödinger first published his equation in Erwin Schrödinger, "Quantisierung Als Eigenwertproblem; Von Erwin Schrödinger," *Annalen Der Physik* (1926): 361–377. Accessible introductions include John D. Barrow, *The Book Of Nothing*, New ed. (London: Vintage, 2001), 208–210, and Brian Cox and Jeff Forshaw, *Why Does E=mc²?:* (Cambridge, MA: Da Capo Press Inc, 2009), 150–152.

245 Heisenberg laid the foundations for his matrix mechanics in Werner Heisenberg, "Über Quantentheoretische Umdeutung Kinematischer Und Mechanischer Beziehungen," *Zeitschrift Für Physik* 33 (July 29, 1925): 879–893. An English translation is available in B. L. van der Waerden, ed., *Sources of Quantum Mechanics* (Mineola, NY: Dover Publications, 1968), 261–276.

really uncanny thing about it is the strength that exists in such a calculation, holding so firmly that you land safely in the end.[246]

Törless's problem is not, then, with the imaginary numbers in themselves, but rather with having to accept as legitimised the 'certainties' that can be established by allowing operations that have been seen to hold for the real numbers also to apply the imaginary numbers. While the polynomial from Example 1 was 'convenient' to the preservation of the myth, then, observation of the graphic behaviour of a slightly different polynomial demonstrates why framing complex equations – those with both real and imaginary parts – on the real Cartesian plane is disingenuous. Consider the following cubic polynomial:

$$y = x^3 - 4i^3 + 6 \qquad\qquad\qquad \text{(Example 2)}$$

The only difference between this and Example 1 is that the exponent to which i is to be raised is now 3 rather than 2. So, again, solving for $x = 2$.

$$y = 2^3 - 4(i \text{ x } i \text{ x } i) + 6$$

$$y = 8 + 4 \,(\text{-1 x } i\,) + 6$$

$$y = 8 + 4 \,(\text{-}i) + 6$$

$$y = 14 - 4i$$

As a consequence of this small change, all values of x produce a complex number – a number with both real and imaginary parts that are incommensurable – and so cannot be plotted on the two-dimensional Cartesian plane, which makes no allowance for the location of the imaginary continuum. To generalise, in fact, whenever we raise i to an even exponent – such as i^2, i^4, i^6, and so on – we get a real number value (either 1 or -1) and so can evaluate the given expression as a whole in real terms: it is therefore commensurable with and representable within the two-dimensional Cartesian plane. Whenever we raise i to an odd exponent, by contrast, its value remains 'imaginary'

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246 Musil, *The Confusions of Young Törless*, 82.

(either i or $-i$) and so the solution to the expression remains 'complex', in the sense that it contains both real and imaginary elements. Complex expressions, to recall, are incommensurable with the two-dimensional Cartesian plane.

A provisional conclusion one might draw from this is that the representational framework commensurate with the set of the real numbers – i.e. both a number system including only the reals and a geometric system with only real number continua marked on its axes – is inadequate to the task of accounting for the entirety of the behaviour of our quantificatory categories and elements. The fundamental issue, then, concerns both the validity of accepting a representational frame designed to accommodate only the 'facts' already known to a particular discourse, and the inherent inevitability that such representative frames will demonstrate the consistency – otherwise the 'truth' – of the results they produce. By analogy, if the standard Cartesian model is inappropriate to the task of representing the totality of operations involving imaginary numbers, then it clearly fails to capture precisely and comprehensively the relationship that the real and imaginary numbers share. It is, in other words, a conveniently heuristic method for describing a certain limited aspect of this relationship, but is, in an important, ontological sense, both wrong and misleading. One could perfectly happily continue to represent complex numbers on the standard Cartesian plane – and produce solutions that are, judged by their predictive force, unequivocally 'right', right up until the point where one encountered a counter-example. Though unlikely in this instance – since the counter-examples of necessity constitute exactly half of the evidence-set – one can imagine constructing quantificatory representational frames, either algebraically or geometrically, that could continue to be corroborated for an unlimited period before encountering the counterexample that demonstrates the fundamentally fallacious nature of the representation.

Given the above, complex numbers are instead conventionally represented within the so-called 'complex plane', which amends the standard Cartesian co-ordinate model by representing single complex numbers as vectors – directed line segments[247] – drawn against real and imaginary axes. Figure 2, below, depicts the complex number $14 - 4i$ represented in the complex plane, with the direction of its vector described by the angle θ, and its magnitude by both the length of the line and its displacement from both the real and imaginary axes:
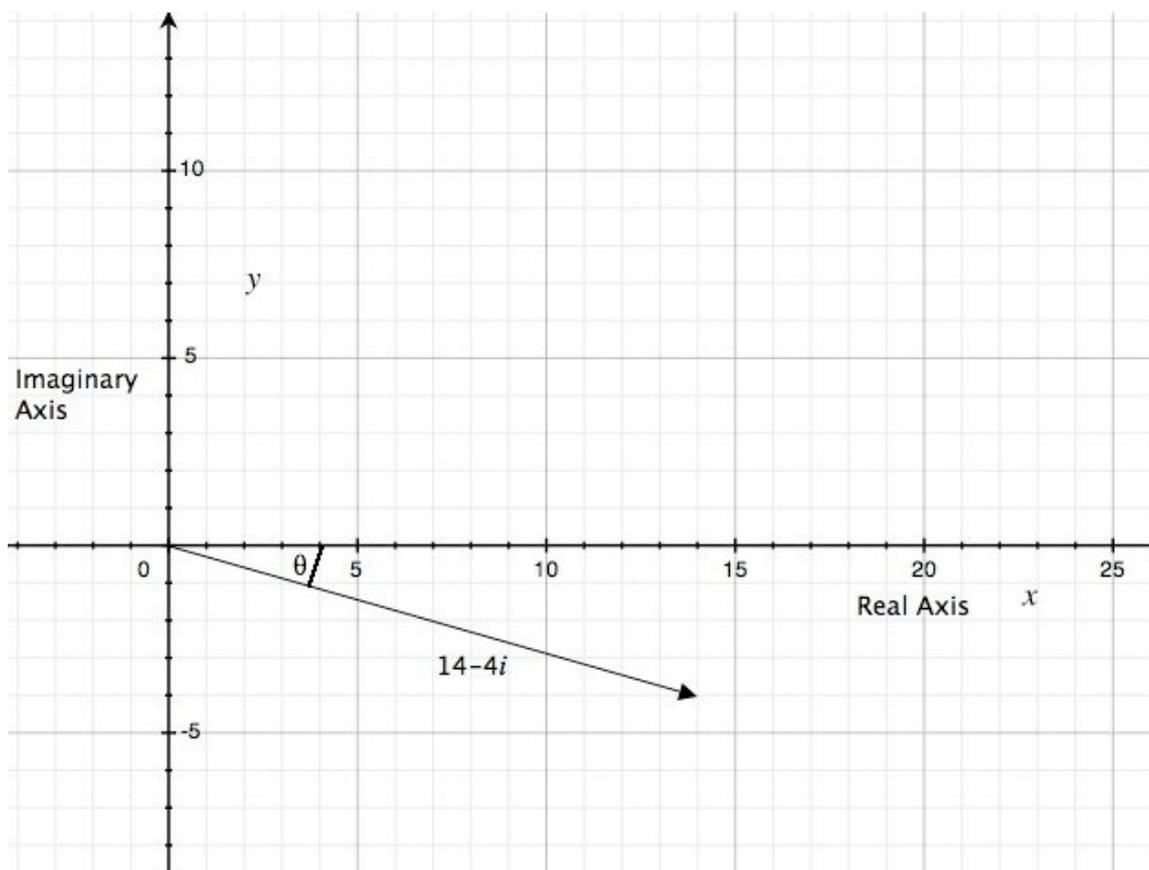
Figure 2:   A representation in the complex plane of the complex number $14 - 4i$.

The complex plane provides a far better model for representing the commensurable facets of the concepts of the real and imaginary continua and, as such, is far better at

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247 Vector quantities have both magnitude and direction, and can be contrasted with scalar quantities (such as the integers 1, 2, 3, …, *n*) which have magnitude but no direction.

preserving the myth of their overall commensurability, and at obscuring the insidious moves taken in its construction to prune those facets that are incommensurable. All the same, just as the *i* that appears in the Cartesian plane shares only minimal convenient features with the *i* that is the square root of minus one, owing to the attributes added and shorn by the representational process, so the *i* that appears in the complex plane, while it perhaps has a greater number of features in common with the *i* that is the square root of minus one is still, ultimately, quite a different ontological entity and, moreover, covertly adopts some new features in the process; that it is represented as a vector, for instance, conflates concepts regarding directionality and continuity in surreptitiously fertile ways. Results that come from the use of complex numbers, one might conclude, regardless of their predictive force, may capture the entirety of the phenomenon they seek to describe, but they only capture the notion of the *imaginary* to the extent that it can be represented by the necessarily limited, since limiting, representational frame through which it is being presented.

Ultimately, Coetzee's most enduring inheritance from his reading of Musil's engagement with irrational and imaginary numbers is most compellingly displayed in the following passage from his essay on 'Musil's Stories of Women':

> To live and function in the world of the rational, we must deliberately banish from awareness the irrational that lies dense under our feet and about us. We must accept a convention regarding what is to be treated as belonging to the real world. Such a convention will define everyday language (here Musil is close to his Austrian contemporary Wittgenstein). However, Musil proceeds, accepting the fact of a linguistic contract should not mean that we are committed to the repression of the irrational. Like Ulrich, the hero of *The Man without Qualities*, we can maintain a certain reserve toward the real world, a living sense of alternative possibilities. This reserve defines one as what Ulrich calls a "possibilitarian," someone prepared to exist in "a web of haze, imaginings, fantasy, and the subjunctive mood," to live a "hovering life" without ideological commitment, to be "without qualities," someone whose natural mode will be the mode of irony ("With me," said Musil in an interview, "irony is not a gesture of condescension but a form of struggle").[248]

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248 J. M. Coetzee, "Robert Musil's Stories of Women (1986)," in Coetzee and Attwell, *Doubling the Point*, 234–235.

The presence of a possibilitarian spirit resonates throughout Coetzee's work; in his novels, articles, and academic work alike, irony often functions to provide a distance not only from the subject at hand, but from the movements and assumptions of the critical voice itself. In particular, though, it is "the subjunctive mood" that characterises Coetzee's attitude regarding the provisionality and contingency of those mathematical concepts that, by virtue of their seemingly inarguable rationality, have been allowed to migrate into the web of non-mathematical conceptual metaphors that pervade the modern experience of the world.

Summary

Though the connection between mathematical concepts and the conceptual frameworks of other intellectual disciplines had been no more than a peripheral concern in his master's thesis on Ford, close analysis of the detail of Coetzee's engagement with this connection within that context reveals the origins of perhaps the most enduring relic of his early mathematical studies. Following his arrival in Texas, the quirks of his teaching schedule enabled him to nurture a philosophical interest in the migration of mathematical conceptual metaphor into the thinking of such disparate figures as Potter, Whitehead, Keyser, Polanyi, Reichenbach, Laplace, Leibniz, and Musil. On the basis of this extended period of exploration, he was therefore able to establish a sophisticated response to the complex assimilation of quantificatory metaphor within several of the ostensibly non-quantificatory discourses that go on to provide the thematic and theoretical content of his most powerful works of fiction.

Chapter 3

STATISTICS AND SAMUEL BECKETT

The instructor is good, but often seems closed to new ideas and often interprets material far too structurally giving a fixed and closed view.

Anonymous student review of Coetzee's teaching, Summer 1969[249]

3.1 Stylostatistics and 'Statistical Indices of "Difficulty" ' (1969)

Appearing in a 1969 edition of the periodical *Language and Style*, Coetzee's first published journal article, entitled 'Statistical Indices of "Difficulty" ', represents a succinct statement of his overall approach to the field of stylostatistics. As such, it also offers a concise introduction to the manner in which his findings as a literary academic were now beginning to stimulate other, more ethically driven impulses. Two years later, in a review that marked his return to the specific subject of the essay – the work of the renowned German stylostatistician Wilhelm Fucks – his various explorations of the ways in which statistical analyses systematically harness and codify the qualitative in quantitative terms had refocused his thinking to such an extent that, far from endorsing such a process, he now had a profound understanding of its potential ramifications as a means of manipulation in contexts both social and political.

Put simply, stylostatistics is the branch of stylistics concerned with those features of a text's style that can be subjected to numerical analysis. The principal aim of the stylostatistician is to strip away the subjectivity implicit in other types of literary

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249 Anonymous, "Student Evaluations," Summer 1969, Critical Reading, National English Literary Museum, Grahamstown.

criticism, leaving only quantitative propositions that, in Coetzee's words, "will not carry the kind of connotative freight that, for example, the proposition 'A's language is dense' came to carry in Scrutiny criticism".[250] Where the Leavisite tradition to which he alludes here founded its criticism on the notion that "it is upon a very small minority that the discerning appreciation of art and literature depends",[251] the stylostatistician attempts to evade such cultural elitism by constructing formulas that enable her or him to represent certain features of a given text in the form of an objective numerical value that both reveals something meaningful about the text at hand and facilitates direct, quantifiable comparison with other texts that have been subjected to the same analysis. By defining explicitly and with axiomatic precision the processes through which he or she has calculated each numerical value, the stylostatistician can, in theory, provide an 'index' pertaining to a given stylistic feature that is both entirely unambiguous and consistently reliable across a diverse body of texts. It is essential, however, that the stylostatistician should recognise that the explanatory scope of the results of her or his analysis is limited to an extent covariant with the degree to which her or his terms gain meaning from their natural language equivalents. In Coetzee's 'Statistical Indices of "Difficulty" ', for instance, the quotation marks surrounding the word 'Difficulty' communicate the fact that he is not in the final analysis interested in producing any clear definitions of 'difficulty' per se: this term, as it is used in natural language, will ultimately remain at least partially obscure. Given this inevitable impediment, Coetzee's opening paragraph clarifies his conception of the role of stylostatistical analysis:

> I take it as universally acknowledged that "difficult" in the proposition "A's style is difficult" is a complex word, and hence that the proposition in fact expresses a number of component conclusions, many of them quantitative in nature and therefore capable of being chiselled into numerical form. We may infer, indeed, that these quantifiable components take their origin in some quantitative,

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250 J. M. Coetzee, "Statistical Indices of 'Difficulty'," *Language and Style* 2, no. 3 (1969): 226.
251 F. R. Leavis, "Mass Civilisation and Minority Culture," in John Storey (ed.), *Cultural Theory and Popular Culture: A Reader* (Harlow : Prentice Hall, 2006), 12.

cumulative procedure, however loose, that we follow in our minds as we read, and hence that propositions about "difficulty" and perhaps other so-called qualities of style are most simply and logically formulated with their quantitative and nonquantitative components kept distinct.[252]

The stylostatistician, then, limits his or her analysis to those 'component' textual features that are "capable of being chiselled into numerical form", considering these as mere indicators of an overall 'composite' quality – in this case 'difficulty' – that, while it can never be fully accounted for without recourse to inherently subjective "Scrutiny criticism", the critic nevertheless wishes to assess to as great a degree of specificity as possible. By extension, we may deduce, any ordinary language term we might use to describe the style of a given text might conceivably be constructed at least in part from "quantifiable components" that correspond to an either literally or metaphorically quantitative or cumulative concept in which they in some likely subconscious form participate.

Within this methodological framework, 'Statistical Indices of "Difficulty" ' has at its core two principal concerns: first, to elaborate upon and refine a stylostatistical index of textual 'difficulty' proposed in 1952 by Wilhelm Fucks; and, second, to use this specific elaboration and refinement as a means of approaching more general and enduring issues within the field of stylostatistics. Using William Shakespeare's *Othello*, three works by John Galsworthy, and two by Aldous Huxley as object texts, Fucks proposed an index of 'difficulty' based on mean word-length, with the syllable as the unit of measurement.[253] From this initial affirmation, he constructed an algorithm that enabled him to 'chisel' the raw evidence of the distribution of mono- and polysyllabic words throughout each text into a corresponding numerical value, or 'trace'. Once the

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252 Coetzee, "Statistical Indices of 'Difficulty'," 226.

253 Fucks's decision to use the syllable as a measure of 'difficulty' is self-evidently problematic. As Coetzee points out, "the phenomenon in which we really ought to be interested is not the syllable (as Fucks assumes) but the morpheme, since we can give a more precise meaning to the definition of a word of many morphemes as 'difficult' than a word of many syllables (consider 'Oopsidaisy')" (Ibid., 232.) Here and elsewhere, one should note, while Coetzee criticises the detail of Fucks's methodology, he registers no objection to the underlying principles of the venture.

'trace' has been evaluated, it is possible to rank the object texts along a scale that might

for convenience be called the 'Fucks Index': Othello was seen to produce the highest

trace (107.65), followed by the works of Galsworthy (96.8, 94.06, and 91.07), with

those of Huxley falling some distance behind (62.04 and 57.72).

But what, Coetzee asks, does the Fucks Index measure, exactly? And how does

the trace it produces correspond with the natural language notion of 'difficulty'?

> [I]f we propose to describe the style of a text, an index must remain meaningless
> until we can specify precisely what it measures, i.e. with which phenomena in the
> text it varies systematically. If the value of the trace is high, as it is for Othello,
> what features of the language of Othello would this value enable us to predict
> without referring to the text? If its value is low, as it is for the present essay, what
> features of the essay are being reflected? Can we specify the features both simply
> and informatively?[254]

The most obvious, and least useful, answer to these questions, Coetzee suggests, is that

the "fullest statement of what the index measures is a mathematical restatement of the

definition of the index".[255] In other words, what the formula tests is exactly the formula:

any attempt to accord ordinary-language meanings to the mathematical terms that

constitute the formula, however innocent such translations might seem, can only detract

from its precision and increase the vagueness of the conclusions. Nevertheless, as

Coetzee points out, this "represents the defeat of any attempt to distinguish between a

quality in the text ('difficulty' or whatever) and a quantity which measures it":

> What we hope for is presumably a compromise: neither the extreme simplicity but
> extreme vagueness of words like "difficulty", nor the tautology of the restatement,
> but a fairly short, fairly precise set of empiric features of the text, between the
> index and which there is a fairly steady correlation.[256]

So, what Coetzee proposes here is that the index will be meaningful if and only if

variation in the trace is consistently accompanied in the object text by a commensurate

variation in certain other empirically observable features: if, for instance, the trace is

higher in one text than another, then we should reasonably be able to expect that the first

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254 Ibid., 228.
255 Ibid.
256 Ibid.

text will contain fewer 'clusters' of words of more than three syllables – where the term 'cluster' is sufficiently defined – and that this increase ought to be commensurate with the increase in the trace value.

Having established this basic goal of stylostatistics as exemplified by the Fucks Index, Coetzee demonstrates by counterexample that the specific formula Fucks uses to calculate his trace will not always yield results that stand up to this test: it is possible, he shows, to deliberately construct texts that have either a high trace and a relatively high number of clusters, or a low trace and a relatively low number of clusters. Moreover, the trace tends to accord disproportionate weight to the values generated by words of higher syllabic length: in other words, a text that has a high trace in respect of its constituent mono-, di-, and trisyllabic words may find its overall trace value affected in an exaggerated way by the occurrence of a couple of highly syllabic words. The second of these two problems he considers as one of categorisation: "if we are prepared to accept a word of three syllables as 'difficult' for our descriptive purposes," he proposes, then we can accept as valid the revised and more 'efficient' formula he constructs in the essay so as to negate the biases caused by the inclusion in the analysis of those relatively rare words of four or more syllables. The problem with this solution is again one of unavoidable compromise: the more we impose our natural-language definitions on the axioms of number, the more reliable our results will appear, but the more "connotative freight" the definitions in our conclusions will carry. For this moment at least, Coetzee is prepared to leave this as a methodological dilemma for the stylostatistician: the more troubling implication, however, is that the precision of our quantitative evaluations as such necessarily varies in inverse proportion with their qualitative meaningfulness. A useful analogy to the problem is Heisenberg's notion of complementarity, which states, in its best known manifestation, that the more precisely we can measure the momentum

of a particle, the less precisely we can measure its position, and vice versa.[257] Likewise, the more precisely we can state our claims about a text in quantitative terms, the less precise will be the qualitative notions to which those terms correspond, and vice versa.

In 'Statistical Indices of "Difficulty" ', Coetzee's major reservation as to the efficacy of stylostatistical analysis is manifest by the ease with which one might construct a subject text designed specifically to violate the propositions according to which a given index might be said to be 'meaningful'. In the case of the Fucks Index, he attributes the potential for counterexamples to the fact that stylostatistical analysis, like all statistical analyses of natural phenomena, operates not within a fixed, deterministic space, but rather a probability space within which there will inevitably exist superficially troublesome outliers:[258]

> language *en masse* exhibits many of the characteristics of chance phenomena, and […] the inverse correlation between the value of the trace and the degree of presence of polysyllables and polysyllable clusters, while not invariable, has a high probability associated with it.[259]

This leaves us in a quandary, for, while it "may seem odd at first sight that something which is so largely a matter of design as a literary text should exhibit randomness",[260] and, while this "kind of breakdown in the trustworthiness of the Fucks trace […] will in practice occur very seldom",[261] it is the nature of probabilistic distributions to throw up anomalies such as these without deliberate design. So, "[w]e cannot, unfortunately, claim that it will never occur, for then we would have to show that texts like [the counterexamples] are not 'natural', and would inevitably be reduced to talk about

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257 For a discussion of Heisenberg's interpretation of complementarity, see Kristian Camilleri, *Heisenberg and the Interpretation of Quantum Mechanics: The Physicist as Philosopher*, (Cambridge: Cambridge U.P., 2009), 108-116.

258 A 'space' is a structured set of points with fixed definitions as to the behaviour of the space and the relationship between the points; perhaps the most familiar example is the Euclidean plane. A 'probability space' is a finite space with an associated probability measure that assigns a value between 0 and 1 to the space as a whole. An 'outlier' is an observation that is considered not to conform to the general pattern of a given data set.

259 Coetzee, "Statistical Indices of 'Difficulty'," 231.

260 Ibid.

261 Ibid.

intention".[262] The thorny problem of intention, and to "texts [that] are constructed with

an eye to the code rather than to the message",[263] had not only been a driving force

behind Coetzee's work as a computer poet, but also occupies a significant position in his

contemporaneous work on Beckett: by the time his thesis was complete, what might

have initially appeared as mere irritations in the practice of a few esoteric critics

operating at the limits of stylistic analysis would in fact shed light on problems with a

far greater resonance.

3.2 'The English Fiction of Samuel Beckett' (1969)

While 'Statistical Indices of "Difficulty" ' might seem rather tentative in its criticism of

the orthodoxy of stylostatistics as an academic discipline, Coetzee's doctoral thesis, 'The

English Fiction of Samuel Beckett', is noticeably more sceptical from the outset. Having

by now immersed himself in the discourse of stylostatistical analysis for four years, and

having examined the relationship between language, numerical methods, aesthetics, and

epistemology from the position of both composer and critic, Coetzee now seemed to be

reaching something approaching a resolution to the more profound aspects of his

doubts. Crucially, the thesis begins with a reference to a quotation from David Hilbert:

> In the course of a fusillade against what he calls "the revolt against reason" in
> present-day humanistic studies, Joshua Whatmough quotes a pronouncement of
> David Hilbert's from 1918: "Everything that can be an object of scientific thought
> at all, as soon as it is ripe for the formation of a theory, falls into the lap of the
> axiomatic method and thereby indirectly of mathematics."[264]

Literary criticism *qua* Whatmough and Hilbert, then, can only be deemed to be

'scientific' if its commitment to the demands of the axiomatic method is absolute, such

that its terms and procedures are explicitly and rigidly defined and delineated,

immutable, and therefore repeatable and comparable across each and every subject that

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262 Ibid.
263 Ibid.
264 Coetzee, "English Fiction of Samuel Beckett," 1.

falls under its critical gaze. Coetzee, however, remained unconvinced by the position

represented here by Whatmough and Hilbert; the four years he had spent researching

and writing his thesis gave him the critical tools required to critique in minute detail the

use of axiomatic methods within literary criticism. It was on this basis that he was

consequently able to recognise the extent of the complexities involved in any attempt to

disentangle from their nested assumptions a workable distinction between natural

language and the language of mathematics.

In service of his ambitious and interdisciplinary thesis, then, Coetzee establishes

his critical methodology as operating within a theoretical space delimited by "two

poles" of thought he discerns within the existing discourse. The first of these 'poles' he

attributes to Bernard Bloch, according to whose "classic definition […], style had

indeed become an object of scientific thought, was ripe for the formation of a theory,

and was falling, not at all indirectly, into the lap of mathematics".[265] This definition

Coetzee exemplifies with a quotation from Bloch in which the American linguist

renders the 'style' of a text as reducible to "the message carried by the frequency

distributions and the transitional probabilities of its linguistic features, especially as they

differ from those of the same features in the language as a whole".[266] For Bloch, then,

the moment that we conceptualise 'style' as an "object of scientific thought" we

automatically circumscribe it in terms of a propositional content – its "message" – that

is fully coextensive, without remainder, with the quantitative description generated by

stylostatistical analysis.

Coetzee's selection of Bloch as the principal representative of his first 'pole'

situates the terms of debate in an unmistakeably pointed fashion: working within the

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265 Ibid.
266 Ibid. The quotation originates from Bernard Bloch "Linguistic Structure and Linguistic Analysis,"
    Report on the Fourth Annual Round Table Meeting in Linguistics and Language Teaching, ed.
    Archibald Hill (Washington, D. C.: Georgetown University, 1953), 42.

tradition of his mentor at Yale, Leonard Bloomfield, Bloch was among those most responsible for the development of the discipline of structuralist linguistics. By the time Coetzee came to work on 'The English Fiction of Samuel Beckett', this tradition had effectively been superseded in terms of academic prestige by the Standard Theory of generative grammar first outlined by Noam Chomsky in the late 1950s. Indeed, in his notes to a 1969 course on 'English and Linguistics', Coetzee outlines a brief "History of Syntax," in which he characterises 'American Structuralism' by way of a single quotation from Bloomfield, the implicit pessimism of which goes some way to indicating the beleaguered state in which this school of linguistics was considered at the time of Coetzee's thesis: "The statement of meanings is […] the weak point in language-study, and will remain so until human knowledge advances very far beyond its present state."[267] In the sense that Bloomfield's approach to linguistics was essentially positivist, determinist, and behaviourist – perhaps exemplified at its most extreme in his Laplacian contention that, if only one had sufficient data, then one could predict all future events, including all future speech-acts – it is perhaps unsurprising that the Coetzee of 1969 was interested in, but ultimately sceptical of the truth-claims of the discipline Bloomfield's work inaugurated.

While Coetzee's selection of Bloch as the representative of this 'pole' establishes one horn of the dialectic as a particular strain of structuralist linguistics, then, and hence indicates his entry-point into the discourse to which the thesis ostensibly contributes, his decision to introduce this perspective in the context of two thinkers concerned with, in Hilbert's case, the first principles of mathematical philosophy and, in Whatmough's case, " 'the revolt against reason' in present-day humanistic studies", indicates from the outset Coetzee's recognition of the potentially widespread ramifications of his own

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267 J. M. Coetzee, "English/Linguistics 211," Seminar Notes, Summer 1969, National English Literary Museum, Grahamstown.

conclusions. The terms through which he expounds his counterpoint to Bloch's position, moreover, delineate the scope of the thesis in accordance not merely within the boundaries of his own work as a stylostatistician, but also in such a way as to facilitate an extended interrogation into certain epistemological issues towards which his prior work had been at most tangentially oriented. He defines the second 'pole' by reference to the views of the principal subject of the thesis, Samuel Beckett, whom he characterises as reacting "strongly against any simplification of language […] and indeed against any abstraction from words as counters in a calculus of thought to words as counters in the less flexible calculus of language".[268]

At its most fundamental level, then, Coetzee's thesis originates from a compulsion to explore the sense in which Beckett's rejection of the type of abstraction routinely performed by structuralist linguists such as Bloch and Bloomfield constitutes a further denunciation of the apparent ease with which certain terms and categories from the discourses of statistics and probability theory had begun to migrate into humanistic studies. The dextrous manner in which he introduces his negotiation of these terms merits close examination:

> Between the conceptions of style held by Bloch and implied by Beckett there are no doubt similarities: Beckett's "writing without style" could be interpreted as writing with the statistical features of the language as a whole, whatever that may be. But there is a deeper cleavage which gives the two viewpoints a polar and antithetic relation. Underlying Bloch's definition is the idea of the text as a collection of sets of linguistic features (phonemes, morphemes, words, etc.) which can be treated like members of statistical populations; and a statistical population is only a metaphor for a set of points in probabilistic space. To Bloch, a word can be conveniently reduced, for the purposes of study, to a dimensionless and immaterial point. For Beckett, on the other hand, the "terribly arbitrary materiality of the word's surface" is, we infer, at least in 1937, a burden.[269]

Even as he establishes the nominal focus of 'The English Fiction of Samuel Beckett' as literary 'style', then, Coetzee indicates that his primary objective is in fact to map the

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268 Coetzee, "English Fiction of Samuel Beckett," 3.
269 Ibid. Coetzee's quotation of the "terribly arbitrary materiality of the word's surface" is a translation from Beckett's original German of the phrase "fürchtliche willkürliche Materialität der Wortfläche". See Samuel Beckett, "German Letter of 1937," in *Disjecta* (London: John Calder, 1983), 53.

process by which structuralist linguists such as Bloch and Bloomfield sought to transform quality into quantity, texts into statistical populations, and words into dimensionless, immaterial points in probabilistic space. Viewing the resulting map through the lens of Beckett's fiction, he enabled himself to touch upon a variety of issues far beyond the scope of either the traditional form of literary criticism he had undertaken in 'The Work of Ford Madox Ford', or the by now stabilising orthodoxy of stylistic analysis as exemplified by the work of Wilhelm Fucks. At issue in the thesis were not only questions of the stylistic qualities of Beckett's work and, by extension, literary texts in general; not merely metatheoretical concerns regarding the discourses and methodologies of stylistics and stylostatistics; and not simply the same problems of meaning construction in mathematics that had exercised Hilbert, Whitehead, and their followers: while 'The English Fiction of Samuel Beckett' has ramifications for each of these complex fields of study in isolation, its unique value is to be found in its subtle and delicately-handled assimilation of these issues into a more profound and further-reaching philosophical space that drew both its assumptions and its responses to those assumptions from the curious matrix of ideas through which each of these apparently disparate discourses pass during the various stages of their construction.

3.2.1 Traditional Versus Stylostatistical Criticism

On the basis of his introduction, Coetzee suggests that the "significance of Beckett's attack on 'style' should now be becoming clearer";[270] though its superficial target might well have been the nature of literary language – and especially the nature of any disparities that might obtain between French and English as vehicles of literary expression – Coetzee notes that "Beckett's description of the 'materiality of the word's surface' pictures language as a wall between objects and their percipients.[271] In the

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270 Coetzee, "English Fiction of Samuel Beckett," 4.
271 Ibid.

context of his own continuing investigation into the relative validity of attempting to

build this wall from either linguistic or mathematical 'bricks', or a combination of the

two, it is perhaps useful to note that Coetzee sees the "position on style" he adopts in

the thesis as being "plainly closer to Beckett's than to Bloch's".[272] He locates this

position more specifically as one that remains equally unconvinced by the

methodologies of, on the one hand, critics whose use of established literary-critical

language defers to imprecisely defined "connotative freight" and, on the other, the

prevailing orthodoxies of contemporary stylistics. In the first case, for example, he

characterises Hugh Kenner's principal approach as constituting an attempt "to catch the

essence of Beckett's style in a metaphorical way":

> Thus, for example, of the 'unique translucent enumerating style' of Watt he writes, 'It is an austere prose, not narcissistic, nor baroque. It is not opulent. It moves with the great aim of some computation, doing a thousand things but only necessary ones.'[273]

Similarly, he explains, Ludovic Janvier's *Pour Samuel Beckett* (1966) "has some

perceptive pages on the 'dizziness' (vertige) induced in the reader by his mathematical

comedy".[274] Pointing out that both Kenner and Janvier rely in these instances upon "a

tradition of literary criticism in which terms like 'austere' have an agreed meaning, and

in which insight into the nature of a style is a partly intuitive act",[275] Coetzee recognises

that though it may neither define its terms with the specificity demanded by the

stylostatistician nor proceed from "statements which can be verified by quantitative

analysis",[276] this type of traditional criticism nevertheless evades the "general

positivism"[277] to which he concludes stylistics – particularly in the structuralist tradition

represented by Bloomfield and Bloch – had by then become excessively beholden.

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272 Ibid., 6.
273 Ibid., 9–10.
274 Ibid., 9.
275 Ibid., 10.
276 Ibid.
277 Ibid., 17.

Stylistic analysis, he continues, is often predicated on ultimately arbitrary processes of division that fail to take sufficient account of the "artistic whole"[278] and therefore systematically neglect the fundamental truth that the "experience of a work of literature is not necessarily linear in time," and instead tacitly defer to an "analogy of reader to decoding device" that he considers "misleading".[279] Coetzee consequently devotes much of 'The English Fiction of Samuel Beckett' to a systematic reconstitution of certain arcane, technical aspects of stylostatistical practice that need not be rehearsed here. More significant for the purposes of the present study are those instances in the course of the thesis in which his wider philosophical allegiances begin to make themselves known.

It is probably not too controversial to state baldly that *Watt*, begun in February 1941 and eventually published, following extensive revisions, in 1953, is generally considered to be among Beckett's most 'mathematical' novels. In this sense, Coetzee's comment that the novel's eponymous protagonist is "like Leibniz's automaton with a spark of life"[280] and, "[s]tanding Bergson on his head, […] something living encrusted on the mechanical"[281] represent additions to an existing consensus rather than anything more revolutionary. To clarify Coetzee's precise conception of Watt's condition, though, one might first note that he considers it to be "characteristic of Watt that he believes that an empirical question can be solved by logical analysis":

> No empirical data are introduced into his chains of speculation. The multiplication of these chains depends on a maneuver in four stages: statement of a question, proposal of a hypothesis, breakdown of the hypothesis into components, and analysis of the implications of the hypothesis and its components. [...] The third stage typically breaks the chain into two or more branches. The only qualification Watt demands of a hypothesis is that it answer the question: his criterion is one of logic rather than of simplicity.[282]

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278 Ibid.
279 Ibid., 18.
280 Ibid., 31.
281 Ibid., 32.
282 Ibid., 81.

On the one hand, then, Watt's consciousness represents the very model of the supposedly perfectly closed logical system of mathematics; on the other, his access to the sensory world beyond this closed system introduces experiential data that consistently evade its processes of assimilation and hence are habitually disregarded. This disregard, Coetzee continues, is in fact a "disregard for simplicity" and is the

> foundation of [Watt's] logical comedy, for simplicity is the only criterion that can put a stop to an endless proliferation of logical speculation. In *Watt* we regularly, with a sinking feeling, find ourselves at the beginning of infinite series.[283]

Such is the finite nature of a text – and, indeed, a consciousness – however, that, whatever Watt's predilections, "the infinite series which automatically spring up must somehow be terminated",[284] with inevitably absurd consequences. One such example, Coetzee reminds us, "terminates in the solipsism that is one of Watt's answers to the infinities of logic: fish that need to rise and fall exist because my naming of them brings them into existence".[285] Without the incursion of external experiential data, Watt's case informs us, a closed system of logic shall produce no meaning other than that embedded in its logical categories; without a logical system predicated on experience to guide its selections, however, the process through which such experiential data are collected is as likely to cause the regression to terminate in absurdity as in rationality; and without a referential framework in which to compare our findings, moreover, we must conclude that we shall inevitably have no means of telling the difference.

Watt's consciousness, then, is analogous to the type of deterministic formal axiomatic system of which the modern computer is perhaps the most familiar model. Built from a series of axioms or rules for behaviour, the system is set into motion by the intrusion of an essentially arbitrary piece of empirical data, which consequently acts as its originary affirmation. As Coetzee explains, with every passing instance in which

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283 Ibid.
284 Ibid.
285 Ibid.

Watt initiates an exhaustive combinatorial analysis in response to a particular set of

circumstances, the reader gains a cumulative sense of the inextricability of his

condition; the "attempt to understand the nature of the simplest sensory perceptions,"[286]

he elaborates, leads to a paradox born of the complex, self-referential nature of the

concept of infinity.

Without the means to make qualitative value distinctions beyond the basic logical

tools with which he is endowed, then, Watt is radically unable to determine the limit-

point at which his analysis of each given set of circumstances might be said to

approximate truth to an extent sufficient to justify action. Indeed, the very idea of cause

and effect becomes more and more undermined as Watt's experience becomes

progressively 'inverted':

> The explosion of logic, epistemology, and ontology takes Watt into another zone
> (the asylum) in which he lives a progressively inverse life. Decline and inversion
> are reflected in Watt's language, as reported by the narrator Sam. Decline and
> inversion constitute what I call the shape of the telos. What is still lacking is the
> causal element. For certain reasons a certain kind of man experiences a call to a
> certain kind of situation, and the result is decline and inversion: we see the results
> but not the causes, unless we take the step of calling Watt's whole universe
> absurd.[287]

It is in a similar context in the essay 'Samuel Beckett and the Temptations of Style'

(1973) – the last to be published of the three journal articles he adapted from 'The

English Fiction of Samuel Beckett' – that Coetzee introduces Richard Dedekind's

hypothesis to the effect that "[i]f we can justify an initial segmentation of a set into

classes X and not-X [...], the whole structure of mathematics will follow as a gigantic

footnote."[288] Given that this constitutes one among very few additions he made in the

process of distilling sections from his thesis into forms suitable for publication as

journal articles, one might suggest that this aspect of his study had taken on a greater

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286 Ibid., 35.
287 Ibid., 35–36.
288 Coetzee, "Samuel Beckett and the Temptations of Style (1973)," 43.

significance in his thinking during the four years between the completion of the thesis and the publication of the article. In Coetzee's characterisation of them, both Dedekind and Beckett are "mathematician enough to appreciate" that, on the basis of merely one "single sure affirmation," a "whole contingent world […] can, with a little patience, a little diligence, be deduced".

3.2.2 Stylostatistics as a Constructivist Discipline

In the context of 'The English Fiction of Samuel Beckett' one can observe Coetzee's recognition that even a representational framework so seemingly free from interference from the world of unnegated affirmation as stylostatistical analysis serves as a model for rejecting the 'reality' of truths developed within closed meaning systems, in favour of picturing them as merely constructivist:

> On the other hand, the smallest amplifications of meaning, particularly those which were probably not under the conscious control of the author - - for example, the frequencies of the words in the text - - show, when quantified, what looks suspiciously like system, i.e. they act like well-behaved mathematical functions. Turning the syllogism upside down, we infer that well-behaved mathematical functions defined on the quantified components of the text define components that belong to the smaller amplifications of meaning.[289]

In other words, certain initial – and often subconscious – affirmations are ultimately responsible for determining the nature of both the component features we discern as constitutive of a given text and the types of mathematical function that appear to describe or even govern their behaviour. Once a reader makes these affirmations, both the nominal and the functional aspects of the text become ontologically linked in a manner that has astonishingly little to do with the ontological status of the text prior to those affirmations. Extrapolating this observation to the use of natural language alongside quantitative evaluations, one can see the potential for such frameworks to engender obfuscation rather than the desired objective clarity. In Coetzee's example, for

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289 Coetzee, "English Fiction of Samuel Beckett," 40.

instance, one might question the effect of introducing an index for a term such as 'elevation in diction' as a descriptor for certain textual features, other than to provide a misleading 'connotative freight':

> By the time sufficiently many literary works have been described in terms of the same measures, the measures themselves may come to have associative values with different texts. We may find, for example, that a high noun-to-adjective ratio is common to Pliny and Thomas à Kempis, a low ratio to Virgil and Tacitus. The ratio may then become associated with a quality we may call elevation in diction. But ultimately elevation will have to be defined in terms of the noun-to-adjective ratio and other measures. There is no escape from the absolute measure of quantification here[290].

More troublingly, perhaps, it is not just in descriptive terms of this nature that we encounter such a problem: the origins of even the most apparently basic linguistic terminology are equally as precarious:

> a little computation shows us that, whatever definitions of noun and verb we adopt, their effect on the noun-to-verb ratio, while greater than the effect introduced by the uncertainties created by implicit nouns and verbs, is considerably less than the effect that could be introduced by uncertainties in the classifications "noun" and "verb" […]. It does imply that the potential for disastrous error is high when we depend on figures not derived from identical and therefore exhaustive definitions of noun and verb for the purpose of comparing the "nominalism" of different texts and authors.[291]

Coetzee draws attention here, then, to the fatal circularity of any analysis that fails from the outset to recognise the uncertainties inherent in categorisations even as seemingly fundamental as 'noun' or 'verb'. Put simply, the comparison of the works of any two authors requires strict definition of the terms of that comparison: the result of this comparison, however, is destined ultimately to become primarily a comment on the act of definition that has taken place, rather than on any inherent quality of the texts or authors themselves. To Coetzee's mind, the only conceivable solution to this problem that might help to "square intuition with mathematics"[292] would be to refine the precision of our terminological definitions: "our only recourse", he explains, "is

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290 Ibid., 44.
291 Ibid., 46.
292 Ibid., 49.

therefore to assign different numerical weights to different nouns and verbs, based on such criteria as their rarity, their degree of compoundness, etc".[293] Just like Watt and Zeno, however, we find ourselves at the beginning of an infinite regression:

> But now we have opened the floodgates. For we are not concerned, for example, with absolute rarity (whatever that is) but with rarity in a context. The position becomes untenable, for no generalization is possible, and the reason for computing to ratio in the first place is to have a measure of nominalism in the text, i.e. to have a generalization about a certain aggregate of particulars.[294]

Ultimately, we are left to conclude that the use of the same index on two separate occasions is logically counter-intuitive: whereas two words could previously become "equal by being used with the same frequency", Coetzee explains, "the notion of equality in meaning is tenuous".[295] The consequences for stylostatistics, as the following quotation suggests, are effectively fatal:

> We are faced, then, with a story in which statistical analysis of the distribution of vocabulary, classification of the less neutral diction, and analysis *en masse* of sentence structure, seem at best only to confirm our understanding of the structure of the work and at worst to remain trapped in their own terminology.[296]

As such, then, these "amplifications of meaning" – affirmations for which the critic is solely responsible, ranging from the grouping of verbs under some grammatical concept such as transitivity ("hold" with "throw" and "reveal" for example) to the less robustly delineable association of nouns on a semantic basis ("building" with "edifice" and "construction") – are necessarily echoed in the "function" that analysis of them reveals. In other words, in stylostatistics, as in mathematics generally, our observable and delineable data and our modes of observation and analysis are irrevocably bound up with one another and, in a sense, offer little more than tautology.

Perhaps the most critical of all Coetzee's observations in 'The English Fiction of Samuel Beckett', though, corresponds to a brief, aborted train of thought explored in an

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293 Ibid.
294 Ibid.
295 Ibid., 50.
296 Ibid., 54.

endnote that, though it is not followed through to its completion in the thesis, ramifies

throughout his contemporaneous work. How is it, he wonders, that certain linguistic

phenomena, such as the "inverse relation […] between rank and frequency"[297] of lexical

items in an object text are "describable in mathematically simple terms?"[298]

> Is it coincidence, or is it one instance of isomorphism between the structure of
> language and the structure of mathematics? In the first case the Zipf-Mandelbrot
> law[299] is a useful descriptive fact, loosely a "law." In the second case it is indeed
> tautologous, but the consequences are too immense to bear contemplation.[300]

Coetzee, then, was unwilling to contemplate in the context of his doctoral thesis the

"immense" consequences attendant on the possibility that the structure of natural

language and the structure of mathematics might be isomorphic. Beyond the confines of

'The English Fiction of Samuel Beckett', however, he was already finding a number of

ways to approach exactly this problem.

3.3 Statistics, Physics, and the 'Samuel Beckett' Seminars (1970)

As he moved towards completion of his doctoral dissertation in stylostatistics the

subject matter of Coetzee's next period of teaching facilitated an immediate exploration

into the plausibility of the existence of a correlation between, on the one hand, human

thoughts and perceptions, and, on the other, the various structures, both linguistic and

quantitative, through which the academic discourses of which he was a part sought to

capture them.

In the spring of 1970, the State University of New York at Buffalo found itself,

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297 Ibid., 240.
298 Ibid.
299 As Coetzee defines it in his essay Beckett's *Lessness*, the Zipf-Mandelbrot Law describes the
   phenomenon such that "in normal discourse each extension of the length of the text adds, though more
   and more slowly, to the number of different lexical items called on." See J. M. Coetzee, "Samuel
   Beckett's 'Lessness': An Exercise in Decomposition," *Computers and the Humanities* 7, no. 4 (1973):
   195.
300 Coetzee, "English Fiction of Samuel Beckett," 240–241.

according to a staff memo circulated on April 8, in a state of "continuing crisis".[301] With forty-five members of the faculty facing Supreme Court charges initiated against them by their own administration, and with student protests against the American invasion of Cambodia as intense in Buffalo as anywhere else across the campuses of America, this "crisis" appeared to be moving towards an explosive finale.

On their return from court the four co-signatories to the 'Crisis memo' – two from the Department of English and one each from the Departments of History and Mathematics – urged the entire body of staff at the University to recognise that the prosecutions laid against them bore "implications of the utmost gravity for the future of academic freedom at Buffalo";[302] to learn "to discount the rumors of impending clemency by which, in [their] view, too many of [their] colleagues [had] been lulled to sleep";[303] and to set about planning their "mutual defense."[304] "The bricks may have stopped flying," the *de facto* leaders of the insurrection warned, "but the crisis on our campus is by no means over. It involves all of us and touches us in many ways."[305]

In the retrospective light of events at the nearby Kent State University, where, barely a month after the 'Crisis memo' was sent, four protesting students were shot dead and another nine wounded by the gunfire of the Ohio National Guard, such portentous language seems proportionate to the seriousness of the situation. Nevertheless, perhaps the most enduring legacy to emerge from the chain of events at Buffalo in the spring of 1970 concerns the owner of one of the four pens that signed the memo; namely, a young lecturer from Cape Town by the name of John Coetzee.

In an interview some twenty-seven years later Coetzee described the circumstances of his arrest as follows:

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301 J. M. Coetzee et al. to "Our Colleagues on the Faculty," "The Continuing Crisis on This Campus," Memo, April 8, 1970, National English Literary Museum, Grahamstown.
302 Ibid.
303 Ibid.
304 Ibid.
305 Ibid.

> I was indeed arrested in Buffalo at the height of the anti-war demonstrations in 1970, but not in an anti-war demonstration as such. Along with some thirty [sic] colleagues from the faculty, I took part in a protest against the way in which our university – SUNY Buffalo – was being led, that is to say, by a President who quartered hundreds of police officers on campus and retreated from his office to a secret bunker. This was not, in our view, a responsible way in which to run a university: it created a highly charged atmosphere in which teaching and learning were impossible. My colleagues and I went to the President's office one Sunday morning and refused to leave until he agreed to come and meet with us. He didn't come. Instead, he sent in the police. We were arrested, charged with trespassing, and convicted. A year later, on appeal, the conviction was overturned. That's the history.[306]

Despite the eventual overturning of the conviction, the many postponements of the so-called 'Hayes 45 Case' ensured that Coetzee's arrest ultimately precipitated his enforced and deeply undesired return to South Africa in 1971. Having originally left his homeland "in the spirit of shaking the dust of the country from his feet"[307] and, in part, to escape its brutal political frictions, this environment – an irresponsible leadership acting in isolation against the wishes of the majority of its populace; a pervasive police presence; an absurd and repressive legal bureaucracy; and the oppression of basic intellectual freedoms – must have struck Coetzee as in some senses disconcertingly familiar. He would later reflect, indeed, that though his "major emotional involvement, from a political point of view, was not with the South African situation but with the war in Viet Nam",[308] he had already begun to recognise that the two socio-political narratives that impacted upon him most intensely during this "crucial period of [his] life" were indeed "products of the same force in the history of the West".[309]

Disillusioned by the events of that spring, Coetzee found solace in a familiar source: the works of Samuel Beckett had provided the material for the stylostatistical analysis of his 1969 doctoral dissertation and were now, for the first time in his

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306 J. M. Coetzee and Joanna Scott, "Voice and Trajectory: An Interview with J. M. Coetzee," ed. Robert Boyers, *Salmagundi: A Quarterly of the Humanities and Social Sciences* 114-115, no. Spring-Summer (1997): 82–102.

307 Coetzee and Attwell, *Doubling the Point*, 393.

308 J. M. Coetzee and Stephen Watson, "J.M. Coetzee. Interview with Stephen Watson," *Speak*, no. May/June (1978): 23.

309 Ibid.

academic career, the subject of his teaching. In a letter dated May 25 1970 and

addressed to the Director of Admissions and Records at Buffalo, he describes this class

as one he "always enjoyed meeting because of the brilliance and variety of its interests,"

continuing that he was "delighted with [its] development, which made for a stimulating

course."[310] Coetzee's general feeling of alienation in relation to his teaching is well

documented: he once claimed, for instance, that he had "no particular talent for

teaching" and that he devoted more "time to a kind of niggling preparation than [he]

ought to be doing[;] basically I'm afraid of the lecturing situation".[311] The lack of

enthusiasm in these comments is indicative of the instinctive affinity he has always felt

with Beckett's writing, which, as he would later explain, had been for him aesthetically,

stylistically, and perhaps even epistemologically formative:

> Beckett's prose, up to and including *The Unnamable*, has given me a sensuous
> delight that hasn't dimmed over the years. The critical work I did on Beckett
> originated in that sensuous response, and was a grasping after ways in which to
> talk about it: to talk about delight.[312]

> I read those books over and over again. That kind of close repeated reading tends
> to influence the cadences of one's prose and perhaps even one's habits of
> thinking.[313]

At the time of the State Supreme Court charges, the Beckett course had reached *How It*

Is, a later work which Coetzee elsewhere describes as one of which he is "not fond",

designating it as in essence a "rerun of part of *The Unnameable*".[314] This indifference to

How It Is combined with the duress of the time to produce some telling documentary

evidence of this "crucial moment": in amongst an especially dense collection of

otherwise neat and orderly preparatory notes towards the Beckett seminars – almost

exclusively written in lucid, continuous prose, and on identical sheets of uniform white

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310 J. M. Coetzee to Director of Admissions and Records, May 25 1970, National English Literary
    Museum, Grahamstown.
311 Peter Temple and J. M. Coetzee, "J. M. Coetzee: Major Talent in SA Literary Scene," *The Argus*
    (Cape Town, June 14, 1974).
312 Coetzee and Attwell, *Doubling the Point*, 20.
313 Coetzee and Scott, "Voice and Trajectory: An Interview with J. M. Coetzee," 85.
314 Ibid.

notepaper – Coetzee's notes to the class on *How It Is* are to be found scrawled, in bullet points and apparent haste, on the verso of a copy of the 'Crisis memo', and continuing onto one further sheet of the same incongruous stock. Accordingly, these hurried notes and few quotations conjure up a uniquely crystallised image of Coetzee's instinctive response to the work at this time; the following examples demonstrate that his natural recourse in these difficult times was to the distinctively quantificatory:

Its mathematical its our justice.

Unwitting, they are in fact in parts, meeting the Other only.

They are not in a closed curve, but a straight line, therefore they have to be infinite.

Links 'ten words fifteen words' with 'ten yards fifteen yards', eg 40.

Next theory: that there is no movement.

Last solution.[315]

In a sense, this single leaf provides an apt metaphor for the convergence of Coetzee's anxieties regarding politics, justice, academia, mathematics, and the works of Samuel Beckett: from the context of the recto, then, one can envision the politically-charged would-be liberal struggling to negotiate and reconcile his emergent values amid the turbulent social upheaval of a nation within which he still feels essentially alien; in its content, one may observe the development of an unflinching opposition to the rationalisation of injustice he perceives as commonly inherent to the American judicial system, to institutionalised Western academia, and to the American military operation in South-East Asia. The context of the verso simultaneously reveals an enthusiastic acolyte of Samuel Beckett, at last finding a sense of pleasure and affinity in an academic career that would extend for over thirty years; its content demonstrates that the instinctive response of this young man to an oblique work by an author who had by now begun to

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315 J. M. Coetzee, "English 489c: Samuel Beckett," Seminar Notes, 1970, National English Literary Museum, Grahamstown. The inconsistencies in grammar and punctuation have been retained from the original notes.

inform his patterns of thought as much as his writing, is in part located – perhaps, in these most pressurised of circumstances, as a matter of intuitive recourse to the reassuringly familiar – within a lexical and epistemic field that had suffused his life to this point: namely, the field of mathematics.

Whereas the notes to the class on *How It Is* are ultimately too brief to assimilate into a coherent reading of their significance with regards to Coetzee's perspective on the philosophy of mathematics, the more densely filled pages pertaining to the rest of Beckett's body of work together furnish us with a clear picture of the various foci of his critical approach. The significance of structuralism, mathematics, and mathematical physics within his reading of such key works as *Murphy*, *Watt*, *Molloy*, *Malone Dies*, and *Waiting for Godot*, for instance, is conspicuous from the outset, and offers a clear sense of the ways in which he was by now beginning to integrate analysis of the metaphysical elements of these discourses alongside his work in stylostatistics. The first of the classes in the series, for example, tasked students with responding to the 1938 novel *Murphy* in the following way:

> Task on *Murphy*: Put together the following: The fable of the biscuits, the form of Murphy's mind in its three zones, Murphy on "outer reality", Murphy's experience of Nothing and of Endon's eye, and the various other closed systems (The horse leech's daughter, Miss Counihan and non-Miss Counihan, the elect, the insane, the old boy, "autology", Neary's endless consciousness, the chess game, Endon.) [316]

This enumeration of the various "closed systems" that accumulate throughout the novel leaves little doubt as to the terms of class discussion, with the consideration of Beckett's fascination with structural patterns and logico-mathematical reasoning unquestionably to the fore. For one thing, the inclusion of the horse leech's daughter – according to the character Wylie a "closed system" whose "quantum of wantum cannot vary" [317] – indicates, however obliquely, Coetzee's awareness of and interest in the notion of

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316 Coetzee, "English 489c: Samuel Beckett."
317 Samuel Beckett, *Murphy* (London: Faber and Faber, 2009), 36.

quantum indivisibility. Coetzee's reference to "Neary's endless consciousness",

moreover, suggests a parallel with *Dusklands*'s Eugene Dawn, who dreams, in a futility

that will soon result in tragedy, of becoming just such a Beckettian archetype: "My true

ideal", Dawn says, "(I really believe this) is of an endless discourse of character, the self

reading the self to the self in all infinity".[318]

While the remainder of the 1970 course on Beckett focused on a series of texts in

which mathematics is an at most peripheral concern, Coetzee's notes nevertheless

indicate again his preference for exploring them with a line he quotes there from one

such work clearly in mind: "Extraordinary", says the eponymous protagonist of *Molloy*,

"how mathematics helps you know yourself".[319] Intriguingly, Coetzee adorned his notes

to the class devoted to this particular novel with a curious handwritten note ("Kafka –

Zamyatin – Orwell – Burroughs. Bleak House, the bureaucracy of Austria-Hungary,

KGB, Gestapo, CIA") that, in its curious paratactic logic, lends an obliquely politicised

edge to the context of the critical resources to which he subsequently directed his

students. The essay from which he quotes at the greatest length in his notes, for

instance, is Dieter Wellershof's 'Failure of an Attempt at De-Mythologization: Samuel

Beckett's novels'. One clear point of comparison between Wellershof's essay and

Coetzee's own intellectual development comes in the form of the former's account of the

failure of each of the narrators of Beckett's later fiction to attain the limit-point to which

his consciousness tends. Referring to the interior monologue that constitutes the

narrative of *How It Is*, for example, Wellershof wonders "[w]hy can't that voice stop?":

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318 J. M. Coetzee, *Dusklands*, New ed. (Vintage, 1998), 38.
319 Samuel Beckett, *Beckett Trilogy: "Molloy", "Malone Dies", "The Unnamable"*, New ed of 1959 ed.
(London: Calder Publications Ltd, 1997), 30.

> Precisely because that is what it wants once and for all. As an endless discourse about the desire to come to an end, it circles around the secret of its own origin. It wants to say the last, conclusive word that will leave no more to be said, that word which does not exist and for the sake of which talking exists. It is an infinite circle in which the desperate determination to come to an end is identical with the determination not to give up.[320]

The Unnamable toils, in Wellershof's interpretation, in a boundless, objectless, infinite state of production such that, with "the loss of the object, talking loses its possibility of reaching a limit, for it can only come to a halt when it encounters a definite, definable thing".[321] In his notes to the essay, Coetzee builds on this by quoting from Wellershof's characterisation of the Unnamable's helplessness amid "the potential infinity of limitless speech":[322]

> The language game without limitation, whether it is carried on as a constant variation or perennial contradiction, only produces indifference. It is as bereft of qualities as the empty time within which it takes place and which it cannot fill. It is perhaps the image of that time: an unending progress of negations, a permanent dying in what Hegel has called "Bad Infinity." The talking "I" comprehends it as its own impotence that its speech which cannot be ended can no longer abolish time.[323]

For Wellershof, this strain in Beckett's work epitomises "the unending dialectic of language that has lost its subject-matter," in which "error is no longer definable; for movement has no outside against which it could find its bearing".[324]

While Wellershof's essay provides some sense of the connection Coetzee was now beginning to draw between the language of mathematics and his many other concerns at this time, however, it is the latter's inclusion of Darko Suvin's 1967 essay on *Waiting for Godot* that best enables us to locate at this point of his intellectual development an awareness of a further, and perhaps deeper connection between the structures of mathematics, the mathematical expression of the laws of physics, and its representation

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320 Dieter Wellershof, "Failure of an Attempt at De-Mythologization: Samuel Beckett's Novels," in *Samuel Beckett: A Collection of Critical Essays*, trans. Martin Esslin (Engelwood Cliffs, NJ: Prentice-Hall, 1965), 92.
321 Ibid., 103.
322 Ibid.
323 Ibid., 104.
324 Ibid., 103.

in the work of Beckett. For instance, he quotes Suvin's argument that the universe of

Waiting for Godot

> tends asymptotically to an absolute lack of light, movement, and warmth – with
> which the fin-de-siècle physicists such as Boltzmann used to frighten a fin-de-
> siècle Europe. Professor Kenner has wittily noted that the main characteristics of a
> Beckettian cosmos -- a closed system and the degradation of energy -- are in fact
> the two laws of thermodynamics, as formulated in Newtonian physics. There
> remains, unnoted, however, the third law of thermodynamics (Nernst's theorem:
> absolute zero can be approached only asymptotically), which is just as
> characteristic of Beckett's rhythm and vision in *Waiting for Godot*.[325]

In the first instance, and in the sense that he had previously engaged with it in his

classes on Borges, Zeno, and Keyser, the notion of tending asymptotically to a limit was

evidently one to which Coetzee had by this point given considerable thought. Indeed,

the place of Zeno's paradoxes in his response to the nature of Beckett's universe is

highlighted once more in both the task he set for his students on 6 April 1970 – in which

he asks them to consider the "Terrors of the infinite. Zeno, Pascal, Newton, Leopardi,

and all the others you can think of. What Beckett does with Infinity in all or some of the

works we have read"[326] – and his inclusion of a partially paraphrased passage from

Michael Robinson's book, *The Long Sonata of the Dead*:

> One of Zeno's paradoxes: take a heap of millet; take half away and pour on
> another heap; then half the remainder; and so on until all the millet is in a single
> pile again. The closer the heap approaches to its completion, the slower its
> increase becomes. "Endgame depicts the last stages of this struggle with the heap
> of days." […] In Hamm's head we hear "the accumulating seconds."[327]

While the references to Zeno's paradoxes once again indicate Coetzee's interest in the

philosophical inconsistencies that can be derived from otherwise seemingly acceptable

mathematical systems, it is his inclusion of Suvin's essay in the course that provides the

most direct connection between, on the one hand, his study of Beckett and, on the other,

the more rigorous critique of the process through which mathematical language might

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325 Suvin, "Beckett's Purgatory of the Individual or the 3 Laws of Thermodynamics," 129.
326 Coetzee, "English 489c: Samuel Beckett."
327 Ibid. For the original source, see Michael Robinson, *The Long Sonata of the Dead: A Study of
    Samuel Beckett* (New York: Grove Press, 1970), 262–263.

be used to model our perceptions of the world that he was already by this time developing in his stylostatistical studies.

In particular, Coetzee's decision to include a quotation in which Suvin chooses the Ludwig Boltzmann as his representative of the classical thermodynamic picture of the universe as tending asymptotically towards a higher entropy state – a state in which the universe's energy is distributed so evenly as to approach, without ever quite reaching, "an absolute lack of light, movement, and warmth" – is in itself intriguing on a number of levels. To begin with, rather than being primarily associated with this somewhat antiquated, classical understanding of the phenomenon of entropy, Boltzmann's enduring significance in fact chiefly rests upon his role in the development of the statistical interpretation of the second law of thermodynamics, and therefore of the statistical conceptualisation of entropy that superseded the classical model Suvin describes. Boltzmann's statistical model in turn led to the general acceptance among physicists of the hypothesis that the causation and determinism apparently observable at a macroscopic level within a given system are in fact no more than the chance consequence of the accumulated statistical probabilities associated with non-causal phenomena at the subatomic level. In other words, Boltzmann's model states that while the outcome of individual molecular collisions in a gas is essentially indeterminate, the sheer quantity of collisions dictates that the probabilities of apparently determinate – but in fact merely more probable – individual outcomes accumulate in such a way as to increase the probability of associated overall states of a system (in this case the degree of disorder in a gas) at an exponential rate, tending towards certainty; hence, the probability of observing indeterminate behaviour at the level of a whole system approaches zero so closely as to be practically negligible.

All of this assumes an altogether more critical significance for our present

purposes when one considers the convergence in Coetzee's doctoral thesis of his critiques of Beckett's fiction and of statistical and probabilistic models of interpretation. The extent of Coetzee's engagement with the ideas involved here can be further exemplified by remembering that the next reference to Boltzmann in his seminar notes corresponds with a Fall 1970 class on the logical positivist Hans Reichenbach, for whom, to recall Coetzee's words, since "the basis of quantum laws is statistical, […] the conception of causality ceases to be effective", and, in a quotation he gives from Reichenbach's *The Theory of Probability*, "we cannot make a single statement about reality the validity of which can be asserted with more than probability."[328] These ideas begin to coalesce in more substantial form in the next of Coetzee's published works.

3.4 Review of *Nach allen Regeln der Kunst* (1971)

It is on the basis of Coetzee's second published discussion of the work of Wilhelm Fucks – a review of the German linguist's 1968 work, *Nach allen Regeln der Kunst*, published in a 1971 issue of the journal *Style* – that one gets the clearest sense of the state of his attitude towards the philosophical machinery of statistical analysis such as it emerged from his immersion in that discourse during the late 1960s. Nowhere is his ambivalence towards the wider potential consequences of a positivism founded on the migration of mathematical structures into ostensibly non-mathematical concerns better encapsulated than in his review's vivid opening description, in which he depicts Fucks as either a far-sighted visionary or a reductivist brute: "Depending on how you view him," he begins,

> Wilhelm Fucks is a polymath of refreshing synoptic vision or another of those muscle-men of statistics (Yule, Herdan et al) to whom a ward of kwashiorkor[329]

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328 Reichenbach, *The Theory of Probability*, 10.
329 Common in areas experiencing drought and famine, and characterised most visibly by the distension of the sufferer's abdomen, kwashiorkor is a form of malnutrition that results from insufficient intake of protein.

victims or a page of print is first of all a set of quantifiable phenomena and only secondarily people or literature.[330]

Given that Coetzee was already by this stage developing a dramatisation of an extremely similar process in *Dusklands*, it seems especially significant that he chose in this review to extrapolate from Fucks's seemingly harmless literary exercises to an apparently genuine fear that the possible emergence of a "speakable formalized language",[331] developed "as a universal language for the technocratic elite",[332] might "tie succeeding generations into a twentieth century positivist mythology more tightly than natural languages tie us into the mythologies of the past".[333]

The essential purpose of *Nach allen Regeln der Kunst*, Coetzee explains, is to reiterate "the theme that the artist, like any other organism, exhibits regularities of behaviour, which can be exposed by statistical analysis",[334] thereby revealing "the elegantly formulable mathematical distributions underlying such phenomena as the lengths of sentences in a text and the pitches of note-pairs in a concerto".[335] Given the philosophical reservations upon which he had predicated the ambivalence at the heart of his doctoral thesis, then, it comes as no surprise to find that Coetzee's response to such a project as Fucks's is at best cautious. Inasmuch as it in principle welcomes the advent of a general introduction to a discourse in which he was himself at this point still relatively heavily intellectually invested, Coetzee's review initially praises Fucks for his capacity to "explain so patiently and with such lavish visual aids his basic procedures"[336] and hence render "seductive […] a field which many think of as rather arid".[337] Equally, while the book is "emphatically not a handbook",[338] and does not constitute "a

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330 J. M. Coetzee, "Review: Nach Allen Regeln Der Kunst," *Style* 5, no. 1 (1971): 92.
331 Ibid., 94.
332 Ibid.
333 Ibid.
334 Ibid., 92.
335 Ibid.
336 Ibid.
337 Ibid.
338 Ibid.

compendium of investigations into intrinsically interesting stylistic topics",[339] it

nevertheless contains examples of such investigations that may indeed 'seduce' the non-

specialist reader, not least by indicating the value of stylostatistical procedures beyond

the academy; in a chapter pointedly entitled 'Literary Criminology', for instance, Fucks

demonstrates "inter alia that the Gospel of St. John and Apocalypse are probably not

from the same hand",[340] thereby intimating not only the literary value of such practice,

but also alluding to its potentially crucial application in the courtroom.

Coetzee's praise is tempered, however, by his enduring conviction that the means

through which stylostatistical analysis enacts its negotiation between the qualitative and

the quantitative is intrinsically flawed. While any "reasonable man must be convinced

that regularities of all kinds, regularities of stress, of syntax, of word choice, and so

forth, run through literary compositions, [and] that the set of these patterns comprises a

great deal of what we call style",[341] it nevertheless remains the case that the

"overwhelming proportion of [stylostatistical indices] either have no critical application

or represent quantitative restatements of qualitative propositions ('A's verse is more

varied than B's')".[342] As he had earlier expressed at greater length in 'The English Fiction

of Samuel Beckett', Coetzee points out that this problem is predicated in the first

instance on the fact that the "kind of datum that the statisticians, Fucks included, feel at

home with is extremely elementary: word length, sentence length, ictus, grammatical

class, depth of subordination",[343] and that he or she will only escape rather prosaic

conclusions by producing "a whole new typology of structures"[344] and programming his

or her computer with procedures that are able to "classify and count in a much more

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339 Ibid.
340 Ibid.
341 Ibid., 93.
342 Ibid.
343 Ibid.
344 Ibid.

complex way"[345] than those that the discourse of the time seemed happy to accept.

While the review is essentially concerned with commenting upon Fucks's contribution to the discipline of stylistics, then, Coetzee's more considered conclusions refer not strictly to issues of literary criticism, but instead to an epistemological model that stylostatistical analysis covertly advocates. By suggesting that "it would be fairest to take this book as a work of propaganda, a work intended to convince the uninitiated first that there are regularities they had never suspected underlying behaviour",[346] Coetzee draws attention to the surreptitiously political nature of any attempt to specify and formalise these "regularities". Fucks, he explains, "has a distaste for the 'swarms of associations and emotions' that accompany reading and for the 'whole layers of primitive taboos and antiquated mythology' concealed in natural languages"[347] and hence prefers to reduce linguistic behaviour to those "formal phenomena of the printed text"[348] that happen, by virtue of their accordance with conveniently quantifiable structures, to be amenable to inclusion within an "objective descriptive aesthetics"[349] that is unified, comprehensive, and hence logically closed.

By the end of the review, then, one is left with the clear message that, whereas Fucks's "propaganda" is aimed towards assuring his readers that "a literary science of exact numerical description is a good thing",[350] Coetzee is concerned here, as elsewhere throughout his work as a stylostatistician, to highlight the ramifications of believing, as Fucks does, in the merits of an "objective analysis",[351] even where this necessitates that we "omit a great deal"[352] in our description of the phenomenon under observation. It is in the final paragraph of the piece, indeed, that Coetzee briefly discusses Fucks's

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345 Ibid., 94.
346 Ibid., 92-93.
347 Ibid., 94.
348 Ibid.
349 Ibid.
350 Ibid., 92-93.
351 Ibid., 94.
352 Ibid.

contemplation of the potential development of "a 'speakable formalized language' as a universal language for the technocratic elite".[353] Though Fucks is aware of "Whorf's thesis that languages have built-in epistemological biases,"[354] Coetzee notes in pointed fashion the book's failure to consider the possible ramifications for a future society in which the language developed by the 'linguistic engineers' has enshrined in its users a positivist mythology with an even greater delimiting power than 'natural language' has had on the cultures of the past and present.

In some regards, Coetzee's route from the review of *Nach allen Regeln der Kunst* to *Dusklands* is not difficult to retrace. In the most explicit thematic sense, for instance, the essay prepares the context for the rationale that the two protagonists of that novel share: a relentless positivist rationality, designed to locate and exploit regularities underlying the thought and behaviour of others. In the final piece of stylostatistical work he was to publish, however, there emerge other, more subtle connections emerging in his contemporaneous thought.

3.5 'Samuel Beckett's *Lessness*: An Exercise in Decomposition' (1973)

Appearing in its English version in 1970 – having originally been published in French, as *Sans*, in 1969 – the subject text of Coetzee's 'Exercise in Decomposition' displays, in his words, "features not often encountered in connected discourse".[355] The "most notable" of these, Coetzee elaborates, is its "finiteness": in the sense that the text of *Lessness* is divided into two halves, each consisting of the same sixty sentences, only in a different order, the novella's linguistic resources are limited to just 166 lexical items, a "finite subset" of the natural language, English, from whose theoretically infinite

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353 Ibid.
354 Ibid.
355 Coetzee, "Samuel Beckett's 'Lessness'," 195.

resources it is ultimately drawn. "It is this fact," Coetzee states, "which suggests a mathematical approach to the text, an approach not only via the mathematics of indeterminacy, namely probability theory […] but also via combinatorial mathematics".[356]

From this starting point, Coetzee first establishes by means of Spearman's rank correlation coefficient[357] that one cannot dismiss "with any acceptable degree of certainty"[358] the hypothesis that the re-ordering of the sentences is effectively random. From here, he next determines that the "unit of combination in *Lessness* is not the word but the phrase of one or more words",[359] and that, by using a specified algorithm, we are enabled to "obtain an unambiguous segmentation of the text into 106 different phrases varying in length from 1 to 12 words and occurring, on an average, 5.7 times each".[360] He goes on to demonstrate by means of methods drawn from statistics and probability theory that there are "no closed subsets of phrases",[361] that "there is no statistical reason for rejecting the hypothesis that phrases are distributed randomly over paragraphs",[362] and that the occurrence of any 'clusters' of phrases that do happen to form throughout the text "do not fall into any […] elementary patterns".[363] *Lessness*, in short, exhibits randomness at practically every conceivable textual level, actively evading capture within mathematically expressible system at every turn.

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356 Ibid.

357 Spearman's rank correlation coefficient is a measure of the correlation between two variables in a bivariate data set. For example, if one wanted to measure the degree to which the height and mass of each individual in a given set of n students are correlative, one would first rank the students according to each of the two variables (height and mass), calculate the difference in ranks for each student (d) and then calculate the coefficient using the formula:

$$1 - \frac{6 \sum d^2}{n(n^2 - 1)}$$

The resulting coefficient ranges from 1 (perfect positive correlation), through 0 (no correlation), to -1 (perfect negative correlation).

358 Ibid.

359 Ibid., 196.

360 Ibid., 197.

361 Ibid.

362 Ibid.

363 Ibid.

In the sense that it generates a relatively mechanistic and conventional form of analysis, and as such is fairly typical of the discourse of computer-assisted literary criticism as it existed in 1973, 'Samuel Beckett's *Lessness*: An Exercise in Decomposition" might to this point seem at best unexceptional, and at worst academically indulgent. Where the essay offers an especial insight into Coetzee's intellectual development, however, is in its philosophical interpretation of Beckett's revolt against system. Coetzee begins this interpretation, then, by establishing that "Beckett's most recent fictions, the *Residua*, of which *Lessness* is one, portray an existence whose conditions are stripped further and further down".[364] This 'stripping-down' is constituted of three 'levels,' which Coetzee characterises as follows:

> The first level of this consciousness contains a past womb-existence, a set of figments. The second level contains the figments of the new fiction *Lessness* that the consciousness now inhabits: ruin, sand, body, etc. The third level contains only the pair dawn-dusk, each of which eventually cancels both the other and the figments for which the other is responsible.[365]

In another essay from 1973 – 'Samuel Beckett and the Temptations of Style' – he explains that in *Lessness* "an infinite series of nested consciousnesses, each dismissing the figments of its predecessor, is presented in the paradigm of a two-component switching mechanism," each of which ultimately "annihilates the figments of the other".[366] As a writer whose novels often play with multi-level stagings of competing editorial effacement – most prominently, perhaps, in *Dusklands*, *In the Heart of the Country*, *Foe*, and *Slow Man* – Coetzee's location of this process in *Lessness* presents one point of methodological kinship. Most interesting, however, is his attribution to Beckett of a particular conception of consciousness, its representation in an apparently linear text, and the value of using a mathematical analysis to determine a means for exploring issues without succumbing to commitment or belief in any component met

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364 Ibid., 198.
365 Ibid.
366 Coetzee, "Samuel Beckett and the Temptations of Style", 46.

along the way. In his essay, Coetzee demonstrates that "there are no determinate

principles of ordering among phrases, sentences or paragraphs, yet that all are

interdependent and connected" and that, consequently, there is "no principle of

hierarchy or priority among the components of the work".[367] The upshot of this lack of

"hierarchy or priority" is that any of the millions of alternative re-orderings Beckett may

have chosen to publish would be as "valid as fiction"[368] as that which was, in fact,

published. Similarly, the final, linear ordering of the fragments is less expressive of the

fundamental meaning of the text than is the process through which the text came to be:

> Since any fragment can combine with any other fragment, and since the 106
> phrasal components are not only formal elements but also pretty irreducible
> elements of meaning, composition is a combinatorial game played with creations
> of what I have called the second level of the imagining consciousness – a level
> whose creations are dismissed as figments – and the upshot of the game is nothing
> more than what Sam, in Watt, called "a pillow of old words."[369]

Ultimately, then, Coetzee proposes that one ought not to take too seriously any

cumulative effects resultant from the essentially arbitrary route taken by the

consciousness enacted through Beckett's fiction, but rather to the ephemeral, non-linear

motions through which it passes within the working-out of its finite process:

> The residue of the fiction is not then the final disposition of the fragments but the
> motions of the consciousness that disposes them according to the rules we have
> traced, and no doubt others we have failed to trace.[370]

The "subject of *Lessness*", he ultimately concludes, "is the plight of consciousness in a

void, compelled to reflect on itself, capable of doing so only by splitting itself and

recombining the fragments in wholes which are never greater than the sums of their

parts".[371] Reflecting back upon Coetzee's own novels, one may note that it is far from

coincidental that many of them – *Dusklands*, *In the Heart of the Country*, *Foe*,

Disgrace, *Elizabeth Costello*, and *Diary of a Bad Year* in particular – are not unlike

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367 Coetzee, "Samuel Beckett's 'Lessness'," 198.
368 Ibid.
369 Ibid.
370 Ibid.
371 Ibid.

Lessness, in the sense that they represent the motions of a consciousness through an apparently disordered maze of assertions, appearing to enact a cumulative process as the consciousness experiences, affirms, and effaces various propositions, often paired in binary oppositions, before seemingly arriving at fixed conclusions by the novel's end.

Summary

Almost all of Coetzee's academic work between the years of 1969 and 1973 involved either Samuel Beckett or the statistical analysis of literary style; on many occasions it involved both. As such, these few years not only saw a significant shift in his conception of the potential for mathematics – and statistics in particular – to convey truths regarding the world beyond their enclosed, self-referential space, but did so in a context richly influenced by Beckett's highly idiosyncratic mode of thought. Where 'Statistical Indices of "Difficulty" ' registers Coetzee's recognition of the inherent Heisenbergian complementarity of numerical and semantic descriptions of literary texts, then, 'The English Fiction of Samuel Beckett' sees him eventually siding with the Irish writer against the structuralist accounts of Bloomfield and Bloch, and ultimately beginning to develop a nascent constructivism regarding mathematical descriptions of non-mathematical phenomena. Suddenly finding himself at the centre of the protest movement against American activities in Vietnam and Cambodia, his immersion in Beckett's more existentially disquieting later works led him, by serendipitous synthesis, to the almost damascene fervour of his rejection of the stylostatistical methods of Wilhelm Fucks. Finally, returning a last time to stylostatistical analysis in his essay on Beckett's *Lessness*, he cut the figure of a man not only profoundly and intricately aware of the fragility of mathematical methods, and not only deeply in touch with the cutting edge of contemporary fiction, but, crucially, both.

Chapter 4

HEROES OF ENUMERATION AND THE ART OF ZERO:

Dusklands and *In the Heart of the Country*

Published in their initial forms just three years apart,[372] Coetzee's first two novels have much in common. Critical comparisons of *Dusklands* and *In the Heart of the Country* have tended to focus on the ways in which these two defiantly modern works present visions of colonialist violence emerging from a specifically South African context,[373] interrogate the textualised constructedness of histories both personal and social,[374] and engage with the ethics of otherness.[375] One locus of intersection that has remained insufficiently examined within this otherwise highly developed discourse, however, is the fact that in both novels Coetzee frequently enters into these thematic concerns using the vocabulary and metaphorical resources of mathematics. Indeed, as each of his narratives unfurls it becomes increasingly apparent that the disquiet experienced by his protagonists is inextricable from the deep-rooted assimilation into their mental operations of such quantificatory figures as the zero, infinity, continuity, discreteness, and the differential calculus. Ultimately, as quantificatory paradox takes hold, and as reality stubbornly fails to conform to rational expectation, each of Coetzee's first two

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372 *In the Heart of the Country* was originally published in 1977, but later edited for the South African market in 1978. This edition incorporated into its otherwise English-language narrative stretches of dialogue in Afrikaans between Magda, the white colonial landowner, and her 'coloured' servants, Hendrik and Anna. The 1977 edition, intended for an international audience, is entirely in English. For a full analysis of the implications of these differences, see Brian Macaskill, 'Charting J. M. Coetzee's Middle Voice," *Contemporary Literature*, 35, no. 3 (Autumn, 1994): 441-475. All subsequent references refer to the text of the 'English' edition.

373 Among the many critiques on this subject, see the respective chapters on the two novels in Head, *J. M. Coetzee*, 28-48; 49-71.

374 See Attwell, *J. M. Coetzee: South Africa and the Politics of Writing*, 35-69.

375 See Derek Attridge, *J. M. Coetzee and the Ethics of Reading*, (Chicago: University of Chicago Press, 2004), 1-31.

extended works of fiction becomes immersed in the bleak, unsettling irony that would come to be a defining characteristic of his finest work.

4.1 *Dusklands*

Strictly speaking, Coetzee's first 'novel' actually comprises two 'novellas': among the reasons one may prefer to conceive of *Dusklands* as an integrated whole is the prominence that both 'The Vietnam Project' and 'The Narrative of Jacobus Coetzee' afford to the thematisation of the migration of mathematical conceptual metaphor into apparently non-mathematical mental processes. In each of the two putative novellas Coetzee foregrounds in a number of ways the role played by quantificatory procedures and mathematical metaphors in his protagonists' conceptualisation of both their own identity and the moments of colonial conflict that occasion their emerging narratives: from the highly suggestive mathematical vocabulary that pervades each work to the complementary structural effects and mathematical metaphors he develops, Coetzee's beginnings as a novelist resonate throughout with echoes from his experiences as a latterly sceptical advocate of the methods of mathematics.

4.1.1 'The Vietnam Project'

'The Vietnam Project' is divided into five distinct sections, each of which contributes a different perspectival, chronological, or generic aspect to the emerging narrative. Coetzee's narrator is Eugene Dawn, an employee of the United States Government charged with the task of evaluating the effectiveness of the American programme of broadcast propaganda during the war in Vietnam. Alongside Dawn's introduction to the report – which may well have been edited by an unnamed third party prior to our viewing it – are a series of what appear on first inspection to be diary entries, seemingly

written in the periods directly before, during, and after the construction of the report.

From the outset of it is evident that Dawn spends the majority of his waking hours in an environment suffused with mathematics. In his role as a 'mythographer' it is his responsibility to evaluate the prior success and future potential for certain types of broadcast propaganda within American military activities in Vietnam. In order to do this he is tasked to "make extracts, check references, compile lists, do sums".[376] Having decided during his preliminary studies that "[w]e cannot know until we can measure",[377] he consequently brings his report to a close with conclusions drawn from his forays into the fields of statistics, probability, and geometry, presenting certain aspects of his analysis in the form of equations he has constructed using data received from the so-called "master of statistics".[378] This process is monitored throughout by a supervisor – the suggestively-named 'Coetzee' – who "made his name in game theory"[379] and therefore might also be considered a professional mathematician. As his narrative proceeds, though, it becomes apparent that the further Dawn immerses himself in his work, the deeper he descends into a disquiet that is to a large degree consequent on the mathematicised view of reality that his work as a mythographer has apparently instilled in him.

The first few pages of Dawn's story – in large part a barrage of short declarative statements – establish the fundamental role his work has played in the development of his highly positivistic and self-affirming outlook. Having concluded that "[p]eople who doubt themselves have no core",[380] for instance, he has rejected such doubt and is "doing [his] best to fashion a core for [him]self, late though it be in life".[381] To this end his work on the Vietnam Project has provided him with the network of certainties he

376 Coetzee, *Dusklands*, 6.
377 Ibid., 28.
378 Ibid., 14.
379 Ibid., 32.
380 Ibid., 2.
381 Ibid.

imagines such a 'core' to require: "I believe in my work," he says: "I am my work. For a year now the Vietnam Project has been the center of my existence".[382] He wishes to show 'Coetzee' that he is "formally accreting [him]self around the bold and the true",[383] believing that whatever learned behaviours he may develop to supplement this core identity will fulfil his "high hopes for an integrated future".[384]

As a man whose professional life so frequently involves mathematics, Dawn's dream of an "integrated future" seems immediately rich with conceptual connotation; it is in this particular metaphor that the crux of Dawn's tragic narrative is most richly illustrated and, in the sense that Coetzee's choice of imagery conjures up ideas pertaining to the integral calculus, it merits close attention. Just as Dawn's dream is to evaluate the integrated totality of his identity, then, the mathematical process of integration is designed to evaluate the total area of a region with a curved boundary. Consider a function, $f(x)$, wherein every possible value of x is transformed by the function, f, to produce a second value, which corresponds to the vertical axis. The results may be plotted on the Cartesian plane, and may produce a curve such as the one represented in Figure 3.

Subsequently, imagine that, for whatever reason, we wish to evaluate the area under the curve between $x = 0$ and $x = 3$. One way of doing this is by integration: this involves approximating the value of the area under the curve by evaluating the sum of the individual areas of a series of rectangular sections of width Δx, the heights of which correspond to $f(x)$ at successive intervals along the curve. In Figure 4, $\Delta x = 0.25$.
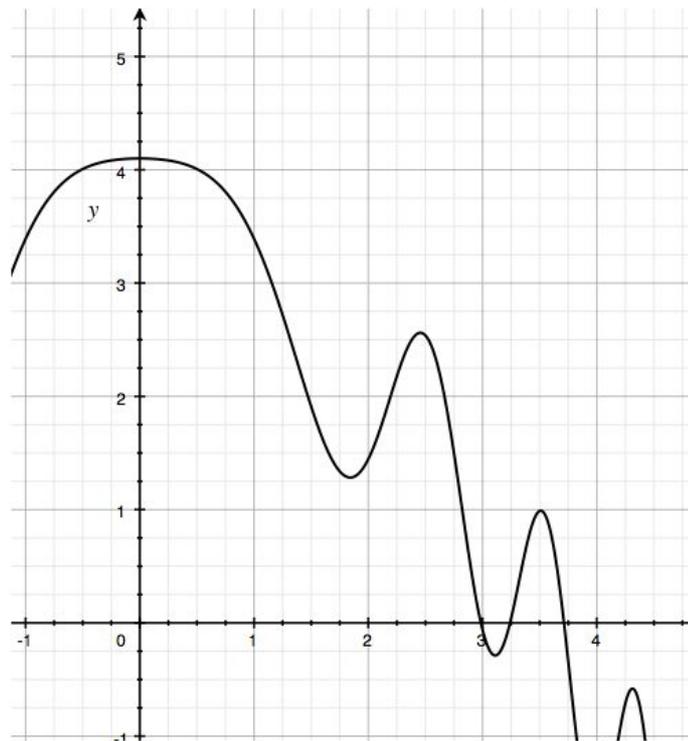
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382 Ibid.
383 Ibid.
384 Ibid.

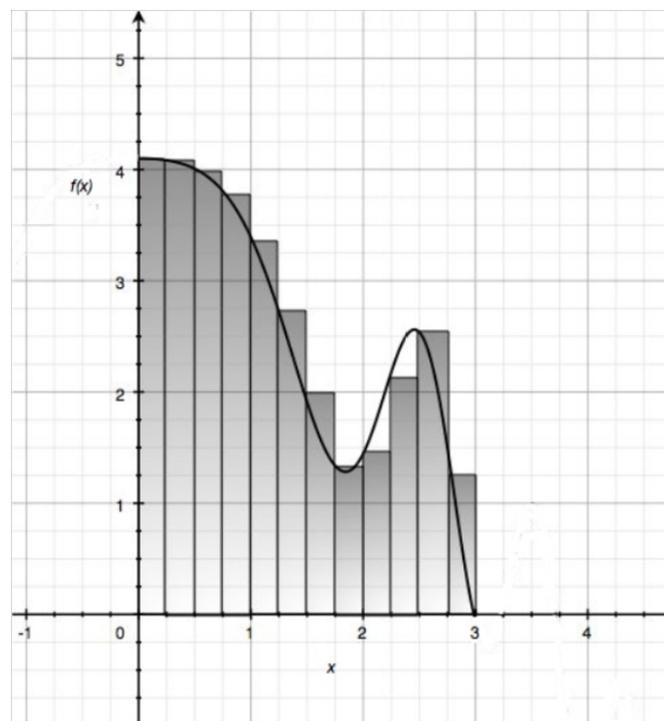Figure 3: A representation in the two-dimensional Cartesian plane of a curve, $f(x)$.

Figure 4: A representation of the curve $f(x)$. The rectangular sections approximate the area under the curve, where $0 \leq x \leq 3$ and $y \geq 0$, and are marked at intervals of width 0.25.

The smaller we make the value of Δx, the greater the number of rectangular sections, and the greater the accuracy of our approximation to the value of the area; in other words, as the number of rectangular sections approaches infinity, our approximation tends towards the true value. By analogy, if Dawn is to articulate his identity to himself completely, then this act of integration will require an infinity of iterations; put differently, Dawn's mathematicised conceptualisation of the journey to total self-knowledge is like one of Zeno's paradoxes, in that it posits a limit that can never be reached.

The reading of Dawn's journey of self-realisation as Zenonian paradox is supported by his later admission – revealed at a moment of frustration that the responses he elicits from others seem illogically and inextricably to refuse to conform to his own image of himself – that his "true ideal [is] of an endless discourse of character, the self reading the self to the self in all infinity".[385] Again, while one may use an infinite process to generate progressively closer approximations to the true value for the given area under a curve, one must accept that no matter how many iterations one performs, dreams of an entirely integrated future remain another infinity of iterations away: since a 'point' is defined as having position without magnitude, there theoretically exist an infinity of points between any two one may choose. Ultimately, to extend the metaphor, it is exactly Dawn's faith in the robustness of his mathematicised process of self-construction that ensures both its convincing proximity to reality and its essential and inextricable falsehood; it is in the resulting incongruity between the positivistic certainty he derives from his explorations of self and the illogical behaviour of the world beyond that self that 'The Vietnam Project' locates its narrative conflict.

Given that Coetzee wrote his review of *Nach allen Regeln der Kunst* during the period in which he was working on *Dusklands*, it is worth noting here the resemblance

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385 Ibid., 38.

between Dawn and the "technocratic elite" he discusses there: just like Wilhelm Fucks's future leaders, to elaborate, Dawn is so attuned to the positivism of his work that his ability to engage with the world becomes more and more delimited by his inflexible belief in the regularities underlying human behaviour. In this context, and in addition to his desire for an 'integrated future', there are a number of other vocabulary choices in the opening pages that, being suggestive of Dawn's mathematicised view of the world, require comment. Firstly, in much the same way that Dawn conceptualises his own identity according to positivistic concepts drawn from his work, such talk is also reflected in the 'integration' of this self-image with his preferred methods for imposing order on the world beyond the workings of his consciousness: his fervour for abstraction is emphasised in his belief "that an alphabetical ordering of the world will in the end turn out to be superior to the other orderings people have tried";[386] in accordance with the structuralist aesthetic favoured among most practising mathematicians, he considers himself "a specialist in relations rather than names";[387] and, intrigued by the workings of fixed, logical systems, it is no surprise that he finds "insects fascinating, even more fascinating than birds" on account of "the invariability they achieve in their behaviour".[388]

Significantly, the language Dawn uses to describe this dual process of constructing the self and its world betrays the mapping of mathematical metaphor onto the conceptual domain within which he forges his identity. On an elementary level, his considering the development of his "integrated future" to be a process of 'accretion' rather than, say, 'growth', indicates an atomised rather than a holistic approach to personal identity. More pressingly, one might also conclude from the fact that he is not merely "accreting" his identity around the initial affirmation of fixed truths, but doing

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386 Ibid., 30.
387 Ibid., 36.
388 Ibid.

so "formally", lends an explicitly mathematical character to his understanding of the process: to elaborate, in disciplines such as astrophysics and geology the term 'accretion' commonly refers to the incremental addition of matter around an initial central mass; to express this process 'formally' is to do so using strictly defined conventions, of which mathematical equations are the most refined instance.

Having established the quasi-mathematical grounds for Dawn's claims to certainty, Coetzee immediately undermines the wisdom of this attitude: it quickly becomes apparent that nothing outside Dawn's mind will conform to its will in quite the way that his mental calculations have led him to believe that it should. The disquiet that results from this dissonance is evident in a number of ways: the gradual disintegration of the integrated self he seeks to accrete; his increasing inability to find harmony in his married life; the failure of his attempts to rationalise the effects of psychological propaganda on the Vietnamese people; and his tragic final recourse to what he retrospectively calls "violent solutions to problems of living".[389]

On a personal level, Dawn's life is beset by a raft of anxieties that are now gradually beginning to overwhelm his capacity for the rational, socio-normative behaviour expected of him by those he keeps closest. Despite the order he tries to impose upon his life, for instance, he is "vexed by the indiscipline of [his] body"[390] and is from "head to foot […] the subject of a revolting body",[391] a body that "betrays" him.[392] He itemises this fraught Cartesian dualism in sickeningly graphic detail, in descriptions of his muscular system – "Clamped round my body this parasite starfish dies in rictus"[393] – and of his sexual relations with his wife – "my seed drips like urine into the futile sewers of Marilyn's reproductive ducts".[394] That his increasingly erratic

389 Ibid., 48.
390 Ibid., 5.
391 Ibid., 7.
392 Ibid.
393 Ibid.
394 Ibid., 8.

behaviour might be a consequence of his work has not, moreover, gone unnoticed.

Marilyn, it appears, is becoming progressively more estranged from him the deeper he

immerses himself in the Vietnam Project: he concludes that she "upholds a fixed-

quantum theory of love"[395] to the effect that whatever "love [he has] to spend on other

objects […] must be stolen from her".[396] Similarly, he imagines that she considers his

reluctance to conform to the orthodoxies of his field as indicative of the kind of

"deviation [that] leads into the wilderness"[397] and is unable to "believe that America is

big enough to contain its deviants".[398] Marilyn's faith in him has been stunted by

changes in his behaviour she deems consequent upon his work – his "moral balance was

being tipped", she has decided – but she nevertheless still "lives in the hope that what

her friends call [his] psychic brutalization will end with the end of the war and the

Vietnam Project, that reinsertion into civilization will tame and eventually humanize

[him]".[399] The language Dawn uses here is again indicative of the cross-pollination of

mathematical metaphors with the conceptual domain that characterises his experience of

the world. He takes his metaphor for Marilyn's supposed "fixed-quantum theory of

love" from the concept in mathematical physics such that the energy within a system

may only be transferred in multiples of a fixed quantity, as specified by Planck's

constant. Similarly, the notion of "deviation" is as familiar within statistical analysis as

it is in the social context in which he means to use it here, and its placement in the

lexical context of 'taming the wilderness' represents the first instance of what will

become a common motif in Coetzee's early fiction: the idea that the phenomenal world

is a 'wilderness' that may be 'tamed' only by mathematical reasoning recurs in exactly

those terms in both 'The Narrative of Jacobus Coetzee' and *In the Heart of the Country*.

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395 Ibid.
396 Ibid.
397 Ibid., 9.
398 Ibid.
399 Ibid., 9-10.

While much of the above constitutes a subjective reading of vocabulary choices from which critics might reasonably extract quite different connotations, other components of Dawn's narrative are more emphatically and explicitly mathematical. He remarks, for instance, that the crippling anxiety his involvement in the Vietnam Project has caused is not strictly a result of his complicity in the war, but rather a consequence of the blunt and indubitable mathematical form in which news of its horrors reaches him:

> It is the bomb tonnage and target recitals in particular that I have no defense against. Not the information itself – it is not in my nature to be disturbed by the names of places I will never see – but the plump, incontrovertible voice of the master of statistics himself calls up in me a tempest of resentment probably unique to the mass democracies, which sucks a whirlpool of blood and bile into my head and renders me unfit for consecutive thought.[400]

Both the linear, monologic form of the radio voice and the atomised, delimited nominalism of the statistics leave Dawn impotent in the face of an authority that is categorically unresponsive to any potential dissent. In this state of mind, that he should consider the capacity for "consecutive thought" a virtue – rather than, say, 'continuous thought' – is again indicative of his desire to attain authority by atomising or quantising experience; in other words, to render reality amenable to discrete rather than holistic analysis. Just as Coetzee found in his stylostatistical work, then, Dawn is experiencing here the vertiginous discord produced when one's unquestioning acceptance of the logico-propositional validity of statistical representations of reality meets with a sense of disquiet at the apparently irrational conclusions these representations entail in practice.

It is not, however, these radio broadcasts that cause Dawn the greatest disquiet; it is in fact the blankly permutative nature of the printed word that "properly evokes

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400 Ibid., 14.

terror":[401] the "message of the newspaper",[402] he stresses, is not to be found in its

content, but instead in its continual affirmation of the truth that it "can say anything and

not be moved",[403] as if it were constantly intoning a callous denial of the significance of

its contents: "Watch", it seems to say, "as I permute my 52 affectless signs",[404] blank to

the horrors those arbitrarily assigned characters convey. In this context one might well

reflect upon Coetzee's thoughts on the similarly blankly permutative quality of his own

computer poetry. Indeed, such reflections are supported by Dawn's use here of a key

phrase Coetzee had earlier used in relation to Dedekind's development of set theory as a

constructivist aesthetic:

> Print-reading is a slave habit. I discovered this truth, as I discovered all the truths
> in my Vietnam report, by introspection. Vietnam, like everything else, is inside
> me, and in Vietnam, *with a little diligence, a little patience*, all truths about man's
> nature.[405]

Like Dedekind – and hence in Coetzee's comparison like Beckett – Dawn is apparently

of the belief that one may develop a whole system of meaning on the basis of its

originary affirmations, and that every 'truth' one subsequently derives was, in fact,

implicit from the outset. This reading lends an altogether more mathematical context to

Dawn's reflections on his contribution to the Vietnam Report; at one moment, for

instance, he recalls with pride his refusal to tour Vietnam for the purpose of

familiarization:

> I refused, and was permitted to refuse. We creative people are allowed our whims.
> The truth of my Vietnam formulations already begins to shimmer, as you can see,
> through the neat ranks of script. When these are transposed into print their
> authority will be binding.[406]

Unprepared to experience the reality of Vietnam for himself, then, Dawn can only

develop an understanding of the conflict by processing the limited input he receives

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401 Ibid.
402 Ibid.
403 Ibid.
404 Ibid.
405 Ibid., emphasis added.
406 Ibid.

through the fixed originary affirmations – or axioms – upon which his engagement with the world as a whole is predicated.

Alongside the bald statistics and blankly permutative texts that inspire such horror in him, Dawn is given a series of somewhat harrowing photographic images, which force him to confront the nature of the Vietnamese people whose lives he is indirectly responsible for ending. How to understand an enemy that is apparently wholly other, he wonders, yet whose psychological states a propagandist must deeply comprehend in order to effectively manipulate them? Even these images, it turns out, he approaches under the subconscious influence of mathematical conceptual metaphor: "We brought with us weapons," he notes, "the gun and its metaphors, the only copulas we knew between ourselves and our objects".[407] Having worked in the field of stylostatistics, Coetzee would not only have been familiar at this time with the grammatical sense of the word 'copula' – meaning a verb that identifies the subject with its predicate – but also with its usage in probability theory: in this latter sense a 'copula' may be used to define the dependence between two or more separate univariate distribution functions (i.e. two or more functions that each describe a distribution of data with only one variable) in order to produce a single multivariate distribution function (i.e. a distribution with more than one variable dimension). In general terms, then, a copula enables the commensuration of two otherwise incommensurate sets of values, indexed to an understanding of the features they share. In Dawn's case, this mathematical reading suggests that he believes the only external 'function' one might use to define the relationships that exist between the American and Vietnamese people is that which is revealed through the primal, elemental, and horrific violence he goes on to describe:

> We cut their flesh open, we reached into their dying bodies, tearing out their livers, hoping to be washed in their blood; but they screamed and gushed like our most negligible phantoms. We forced ourselves deeper than we had ever gone

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407 Ibid., 17.

> before into their women; but when we came back we were still alone. And the women like stones. […] For a while we were prepared to pity them, though we pitied more our tragic reach for transcendence. Then we ran out of pity.[408]

Tellingly, it is in this brutal context that Coetzee introduces a change in genre, from the diaristic narrative of the opening section, to what purports to be a copy of Dawn's 'Introduction' to a report on the role of broadcast propaganda in "Phases IV-VI of the conflict in Indo-China".[409] While his final contribution to "Coetzee's project New Life for Vietnam"[410] begins in a formal and professional tone, its generic integrity is gradually invaded by indications of Dawn's mental breakdown in the face of the horrors to which his blunt enumerations have contributed. To begin with, he sets out the thesis that "[p]sychological warfare is the negative function of propaganda; its positive function is to create confidence that [the U.S. Government's] political authority is strong and durable".[411] The failures of prior programmes of broadcast propaganda, however, lead Dawn to conclude that "the effective psychological pressure [the propagandists] bring to bear on the guerillas and their supporters is within their limits of tolerance".[412] Given that his job is to analyse the effectiveness of broadcast propaganda using the supposedly culturally non-specific language of mathematics, Dawn's belief that the gun and its metaphors are the only copulas through which the propagandists and the Vietnamese may understand one another is somewhat contradicted by his attempts to provide an objective account of events using certain mathematical frameworks. In essence, his role as a mythographer encompasses the rationalisation of the entire war effort, encoding the raw data of everything from the psychic effects of radio broadcasts to the degree of success of napalm attacks, into equations and formulae amenable to quantifiable analysis, infinitesimal recalibration, mutual commensuration, and absolute

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408 Ibid., 18.
409 Ibid.
410 Ibid.
411 Ibid., 19.
412 Ibid.

victory. Mythography, such as Dawn characterises it, is the science of establishing by rationalisable, quantifiable means the hegemonic authority of a particular representational frame, thereby enabling one ideological group to convince another of the legitimacy of its world-view. Within the context of his own work of mythography, the definition of the notion of the 'truth' of a given myth naturally becomes key:

> A myth is true – that is to say, *operationally* true – insofar as it has predictive force. The more deeply rooted and universal a myth, the more difficult it is to combat. The myths of a tribe are the fictions it coins to maintain its powers. The answer to a myth of force is not necessarily counterforce, for if the myth predicts counterforce, counterforce reinforces the myth. The science of mythography teaches us that a subtler counter is to subvert and revise the myth. The highest propaganda is the propagation of a new mythology.[413]

Just like a mathematical theorem, then, a mythographic representational frame is considered 'true' only insofar as it 'preserves the myth'. To recall, once the concept of imaginary numbers was accepted, the two-dimensional Cartesian plane needed to be amended in order to account for complex numbers; hence, the complex plane was born. By analogy, if the mythographic representational frame fails to provide a basis for the commensuration of seemingly incommensurable observations then the frame must be modified to include the counterexamples, perception of its affirmations must be recalibrated, and a new mode of representation must be instituted. Whatever else, if the myth serves the political purposes of the mythographer, it must be preserved; if not, it must be amended until it does.

Much of the darkly satirical and bleakly comic effect of Coetzee's novella arises from the ironies implicit in Dawn's attempts – as mathematician and mythographer – to tame the non-quantifiable within quantificatory representational frames, and therefore his attempt to reduce the war and its antagonists to a closed axiomatic system of 'factors'. As part of the introduction to his report, he states that "[a]trocity charges are empty when they cannot be proved. 95% of the villages we wiped off the map were

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413 Ibid., 24-25.

never on it".[414] In a literal sense, the various representational frames in competition here – the cartographic, the legal, the statistical, the taxonomic – are obviously incommensurate to one another in sufficient ways as to make Dawn's logic both infallible and utterly misguided. That Dawn is fully aware of the brazenness of the evasion here is clear, moreover, from his ability to even calculate a percentage: the map may not acknowledge the villages, the villagers, or the atrocities, and neither may the law, but they each still figure in any genuine reckoning of the atrocity.

This map, then, is not so different from the complex plane: it yokes together concepts that are in at least some senses incommensurable, elides those senses by refining the concepts down to those atomised aspects of them that can be in any sense compared, and then acts as if such an elision has not taken place, and as if the entirety of each concept has been accounted for in the chosen representational frame. Dawn, however, is still sufficiently self-aware to recognise that America's failure to penetrate the Vietnamese psyche is ultimately symptomatic of its deeper failure to exorcise the ghosts of another form of Cartesianism:

> But the voice which our broadcasting projects into Vietnamese homes is the voice of neither father nor brother. It is the voice of the doubting self, the voice of René Descartes driving his wedge between the self in the world and the self who contemplates that self. The voices of our Chieu Hoi (surrender/reconciliation) programming are wholly Cartesian. Their record is not a happy one […] because they speak out of an alienated *doppelgänger* rationality for which there is no precedent in Vietnamese thought. We attempt to embody the ghost inside the villager, but there has never been any ghost there.[415]

This "*doppelgänger* rationality" is opposed directly to Dawn's own, in the sense that the ghost that inhabits his 'machine' is most clearly represented by his resistance to any form of knowledge that cannot be captured in mathematical form. This is most apparent in his institution of a polynomial equation to measure in advance the success of future napalm attacks:

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414 Ibid., 22.
415 Ibid., 20.

We cannot know until we can measure. But in the political air-war there is no easy measure like the body count. Therefore we use probability measures (I apologize for repeating what is in the books, but I cannot afford not to be complete.) When we strike at a target, we define the probability of a success as

$$P_1 = aX^{-3/4} + (bX - c)Y$$

where X measures release altitude, Y measures ground fire intensity, and a, b, c are constants. In a typical political air-strike, however, the target is not specified but simply formalized as a set of map co-ordinates. To measure success we compute two probabilities and find their product: P_1 above (the probability of a hit) and P_2, the probability that what we hit is a target.[416]

In this example, Dawn simultaneously uses three representational frames – map co-ordinates, a polynomial equation, and probability measures – to account for and rationalise the 'event' of a postulated napalm attack. This conflation is sufficient to enable the commensuration of those aspects of the 'event' that are important to the U.S. Government, and thus to provide apparently robust 'facts' upon which future action might be predicated. In the remainder of the report, Coetzee makes the inimical ethical status of such a practice perfectly clear: since the authors of this representational frame require that it produce quantitative results in order to serve their wider purposes, and since those results may prove politically unwelcome, all they need to do is recalibrate the frame in such a way as to eliminate the root cause of the unwanted evidence. Dawn's report highlights both the absurdity and the brutality of just such a confluence of myth-preserving rationalism and military might:

> Since at present we can do little more than guess at P_2, our policy has been round-the-clock bombing, with heavy volume compensating for infinitesimal products $P_1 P_2$. The policy barely worked in Phase III and cannot work in Phase IV, when all bombing is clandestine. What policy should we adopt in Phase V?[417]

In other words, where the probability is infinitesimal – theoretically infinitely small while still being nonzero – sufficient volume turns this effective zero into as great a probability as one desires. For success to be guaranteed, however, the probability would

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416 Ibid., 28.
417 Ibid.

need to be 1; that this would require an actual rather than merely theoretical infinity of strikes – and hence infinite time – renders the equation meaningless; more problematically still, if the products P_1 and P_2 are truly infinitesimal, then one would require an infinity of strikes even to get started on the way to the possibility of a strike. Just as in the cases of Zeno's paradoxes and Dawn's attempts to construct an "integrated self", then, we find ourselves faced with an infinite series predicated on contradictory notions of continuity and discreteness that provide little in the way of practical solutions. As Dawn himself notes, the attempt to rationalise the success of air strikes using mathematical concepts is therefore fraught with difficulty:

> When we attack the enemy via a pair of map co-ordinates we lay ourselves open to mathematical problems we cannot solve. But if we cannot solve them we can eliminate them, by attacking the co-ordinates themselves – all the co-ordinates![418]

The chilling truth behind this disturbingly zealous conclusion is that a co-ordinate system in which one treats all co-ordinates equally is necessarily meaningless: why impose a geometric frame at all if one intends to annihilate the territory it maps with absolute indifference to the measurements it provides? Even Dawn is aware of the absurdity of such a plan, noting towards the end of his introduction that any claim to its rationality or its surgical precision is no more than a smokescreen intended to hide the blunt, random, brutal terrorism that has long driven U.S. Military strategy:

> For years now we have attacked the earth, explicitly in the defoliation of crops and jungle, implicitly in aleatoric shelling and bombing. Let us, in the act of ascending consciousness mentioned above, admit the meaning of our acts. We discount 1999 aleatoric missiles out of every 2000 we fire; yet every one of them lands somewhere, is heard by human ears, wears down hope in a human heart. A missile is truly wasted only when we dismiss it and are known by our foes to dismiss it. Our prodigality breeds contempt in the frugal Vietnamese, but only because they see it as the prodigality of waste rather than the prodigality of bounty. They know our guilt at devastating the earth and know that our fiction of aiming at the 0.058% of a man crossing the spot we strike at the moment we strike it is a guilty lie. Press back such atavistic guilt! Our future belongs not to the earth but to the stars. Let us show the enemy that he stands naked in a dying

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418 Ibid.

landscape.[419]

Ultimately, as the novella gears towards the tragedy for which Dawn's gradual accretion of mathematicised, positivist mental machinery has prepared him, he finds himself "in no mood for irrational behaviour".[420] That he has by this point kidnapped his own son and retreated to the hyper-aptly named Loco Motel locates his claims amid a telling juxtaposition of the double meaning of 'irrational': his own behaviour, while now strictly conforming to the rational core he has built for himself, is beginning to tend ever further from the rational norms of the society of which he is a part. Finally, as Marilyn arrives with the police in order to apprehend him, he provides a blank, disinterested narration of his abject disintegration of self from body:

> Also, something which I usually think of as my consciousness is shooting backwards, at a geometrically accelerating pace, according to a certain formula, out of the back of my head, and I am not sure I will be able to stay with it. The people in front of me are growing smaller and therefore less and less dangerous. They are also tilting. A convention allows me to record these details.
>
> I have missed certain words.[421]

The mathematical language with which he describes his retreat from conscious responsibility for his action – "geometrically accelerating" and "formula" – is echoed in the ultimate act of brutality that immediately follows. He has picked up a fruit-knife and is now holding it to his five-year-old son's chest:

> At first it resists the orthogonal pressure, even this child-skin. Then: pop. Perhaps I even heard the pop through my hand, as in quiet country one hears a far-off locomotive through the soles of one's feet.[422]

Not only does the word "orthogonal" describe the perpendicular angle of the blade's entry, but it also evokes connotations from its uses in statistics and computer science that suggest once more Dawn's dispassionate removal of himself from the realm of responsibility: for two statistics to be orthogonal is for them to be statistically

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419 Ibid., 29.
420 Ibid., 38.
421 Ibid., 42.
422 Ibid.

independent, to have no bearing on one another, and hence to be confidently treated as unrelated; in computer science, moreover, orthogonality is the capacity for a component of a given system to act without interfering with the ordinary workings of the other components belonging to that same system, and therefore to be able to function as if entirely discrete. Likewise, Dawn has now reached the end-point of his continual process of abstracting himself from the social world through his conflation of personal experience and mathematical conceptual metaphor.

Following Dawn's act of brutality, the final section of the novella depicts the mental institution from within which it would appear that much of the text has in fact been composed. Dawn's exposure to psychotherapy is writ large upon his contemplation of the events that have landed him here; to an equal extent, however, the continuing influence of mathematics upon his way of thinking is indicated by the prevalence of mathematical vocabulary within both his rationalisations of his behaviour and his commitments to change. In the "aftermath"[423] of events he has decided to "think positively";[424] he sees himself as "someone of no mean value",[425] full of the hope that the path from his difficult personal history towards a cure will not end up "following perhaps a curvature too slight for the human eye to perceive"[426] and that will ultimately "lead us all in enormous wasteful circles".[427] He recalls how he "strove too against great odds, to impose order on an area of chaos"[428] and looks back not primarily upon his crime but rather the "definite contributions to the science of warfare"[429] he believes himself to have made. His treatment, he states, will determine an answer to one key question: "How do such data come to coexist in a single biography?"[430] The answer

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423 Ibid., 46.
424 Ibid., 45.
425 Ibid.
426 Ibid.
427 Ibid.
428 Ibid., 44.
429 Ibid., 45.
430 Ibid., 47.

offered by his doctors is in a significant sense similar to the pathology outlined in this chapter:

> The hypothesis they test is that intimate contact with the design of war made me callous to suffering and created in me a need for violent solutions to problems of living, infecting me at the same time with guilty feelings that showed themselves in nervous symptoms.[431]

In Dawn's case these "violent solutions to problems of living" were just that: mathematical 'solutions' ill-suited to the non-mathematical 'problems' with which he found himself confronted. As such, a mathematically-literate reading of 'The Vietnam Project' offers a route into Coetzee's first published prose fiction that would otherwise remain closed to us. In the context of the second narrative within *Dusklands*, moreover, a similarly mathematically-literate reading reveals the development of this theme into an exploration of the ramifications not only wrought upon the individual protagonist at its heart, but also in the context of their full socio-historical significance.

4.1.2 'The Narrative of Jacobus Coetzee'

While Eugene Dawn is without doubt the character in Coetzee's fiction most directly engaged with mathematics in a professional capacity, the character whose language is most saturated with the discipline's language and metaphorics may well be the one with whom he shares the role of protagonist in *Dusklands*. 'The Narrative of Jacobus Coetzee' charts the progress of its eponymous figure, an eighteenth-century Boer frontiersman, as he negotiates the boundaries of the colonial encounter. In his attempts to provide a rational, objective account of his journey into Namaqualand, Jacobus Coetzee[432] betrays the foundational influence of mathematical metaphor on his ability to perceive his self, the external world, and the others with whom he is suddenly forced to share that world. Just as in Dawn's case, though, when reality refuses to conform to the

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431 Ibid., 48.
432 To differentiate him from his creator, Jacobus Coetzee is hereafter referred to simply as 'Jacobus'.

strictures of his rationalised vision, Jacobus's resort to brutality urges a profound condemnation not only of his actions, but, moreover, of the positivistic, mathematicised rationalism underlying the colonial enterprise as a whole.

Rather like 'The Vietnam Project', 'The Narrative of Jacobus Coetzee' also comprises an assortment of interconnected texts: an 'official deposition' from 1760 detailing the journey undertaken by an explorer and elephant hunter named Jacobus Coetsé into "the land of the Great Namaquas";[433] a translation into English from the original Dutch of an apparently fuller version of the "truncated account hitherto current", compiled by a certain S. J. Coetzee in 1951 with the intention of presenting "a more complete and therefore more just view of Jacobus Coetzee";[434] S. J. Coetzee's introduction to that work, translated into English from the original Afrikaans; and a preface from the translator of the entire volume, a man tantalisingly named J. M. Coetzee.

From the beginning, the mathematical component of Coetzee's critique is placed immediately in the foreground. Firstly, the questionable historical integrity of the text before us is signalled in the 'Translator's Preface': baldly stating that the original text of *Het relaas van Jacobus Coetzee, Janszoon* has undergone a number of revisions in the ensuing years, the preface also affirms that the "present publication is an integral translation of the Dutch of Jacobus Coetzee's narrative and the Afrikaans of [the translator's] father's Introduction";[435] this latter text appears as an appendix. In the context of the thematisation of mathematics in 'The Vietnam Project', the language used

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433 Ibid., 123. Modern-day Namaqualand is divided between South Africa and Namibia, with Great Namaqualand being contained with the Karas region of Namibia. Great Namaqualand is populated to this day by the Namaqua, a Khoikoi people known to colonial settlers such as Jacobus as 'Hottentots'. The Khoikoi are closely related to the other ethnic group Jacobus encounters on his journey, the 'Bushmen' or San. To ensure consistency with Jacobus Coetzee's narrative, the terms 'Hottentot' and 'Bushman' are used here throughout, and ought to be considered on each occasion as suitably pregnant with a reflective response to Jacobus's derogatory intent.
434 Ibid., 108.
435 Ibid., 55.

here merits comment. In translation studies, though rarely used today, the term 'integral translation' simply indicates that the translator has retained in his or her version all those components of the original text that he or she deems to be essential to the production of a complete translation. Even in these terms the role of the translator seems dubious, as it implies a kind of historical impartiality that the highly politicised publication history of the text of the *Relaas* has almost certainly precluded. Reading the phrase 'integral translation' with mathematics in mind, however, adds another dimension to our suspicions of historical revisionism. Firstly, in mathematics, a 'translation' is the wholesale movement of a graph, via a specified function, from one position in geometric space to another, without alteration in its size or orientation; if one considers this as analogical with the linguistic translation described above – such that the two texts correspond to the two graphs, and the agenda of the translator corresponds to the function according to which the translation is carried out – one might reflect that both actions involve the wholesale appropriation of an existing figure for use in a different context, for the purpose of producing different meanings more suited to the requirements of the 'translator'. Secondly, it is important to note that the mathematical process of integration again alluded to here is by definition eternally incomplete, since, to recall, its use of the concept of the infinitesimal legitimises belief in a theoretical infinity of iterations. The significance of this reading becomes apparent as the text of Jacobus's narrative unfurls and the migration of mathematical conceptual metaphor into ostensibly non-mathematical contexts begins to overwhelm the text.

Even the most cursory examination of Jacobus's vocabulary reveals much about the role his absorption of mathematical concepts has come to play in his conceptualisation of the colonised other as occupying the object-position in his pseudo-scientific explorations. Looking more closely still, indeed, one may observe at close

quarters Coetzee's dramatisation of both the limiting function of mathematical metaphor on the colonialist's capacity to imagine the inner life of the other, and the crippling solipsism his enforced isolation as the observing subject entails. Just as in 'The Vietnam Project', then, Coetzee marks his protagonist's descent into brutality through the progression of an ever-more debilitating existential disquiet caused at least in part by the growing dominance of mathematical metaphors within his conceptualisation of the world around him. In 'The Narrative of Jacobus Coetzee', though, this progression takes the form of a systematic account of Jacobus's mathematicised conceptualisations, in turn, of 'difference', 'other', and 'self'.

Jacobus starts his narrative by anxiously wondering "how differences can be maintained"[436] between his people and the 'Hottentots' and 'Bushmen' their colonial expansionism necessarily subjugates, noting that "[e]verywhere differences grow smaller as they come up and we go down".[437] One such difference that might be used to the white man's advantage, he argues, is that the 'Bushman' "has no conception of number, anything more than two is 'many'. One, two, many, that is how he counts".[438] This, he suggests, enables the colonialist to maintain his superiority by virtue of his better understanding of abstract economic processes: for example, since Dutch girls belong to a fixed socio-economic hierarchy predicated on the numerically unequivocal monetary system, they "carry an aura of property with them",[439] such that by "connecting yourself to the girl you connect yourself into a system of property relationships"[440] and can hence maintain material wealth. By contrast, he continues, "a wild Bushman girl is tied into nothing, literally nothing";[441] as such, she is hence outside the economic realm, and is therefore devoid of rationalisable value. Because of this,

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436 Ibid., 57.
437 Ibid.
438 Ibid., 61.
439 Ibid.
440 Ibid.
441 Ibid.

according to Jacobus's world-view, "she is as good as dead",[442] has given up "the wellknown attachment to life",[443] and her "response to you is absolutely congruent with your will".[444] The resonances of phrases such as "property relationships" and "absolutely congruent" within a mathematical context establish from the outset a tendency in Jacobus's thinking towards quantificatory metaphorics.

Perhaps more significantly, the lexical field Jacobus employs in his depiction of the otherness of the 'Hottentots' and 'Bushmen' as compared to the Dutch betrays the influence of mathematical concepts upon his ability to reason about the inner life of those he considers categorically other. He notes, for example, that in the course of his narrative he "should doubtless interpolate here something about man in his wild state".[445] In the mathematical subfield of numerical analysis, 'interpolation' is the process of constructing data points that, while not actually observed in one's empirical study, fit perfectly with the ideal curve generated from real observed data. Consider a study of an accelerating body, for instance, in which one's observations reveal the following data:

Distance Travelled (cm)	0	2.5	5	7.5	10	11	12.5
Speed (cm/s)	0	0.5	2	4.7	8.3	Not observed	13

As Figure 5 shows, plotting this data on the two-dimensional Cartesian plane reveals a an exponential curve. Though no observation was made at 11cm, we can interpolate either numerically or graphically that the speed of the body would likely have been approximately equal to 9cm/s. This may not have actually been the case, but since it fits

442 Ibid.
443 Ibid.
444 Ibid.
445 Ibid., 65.

with our expectations of the movements of accelerating bodies, we can feel justified in making such an assumption.
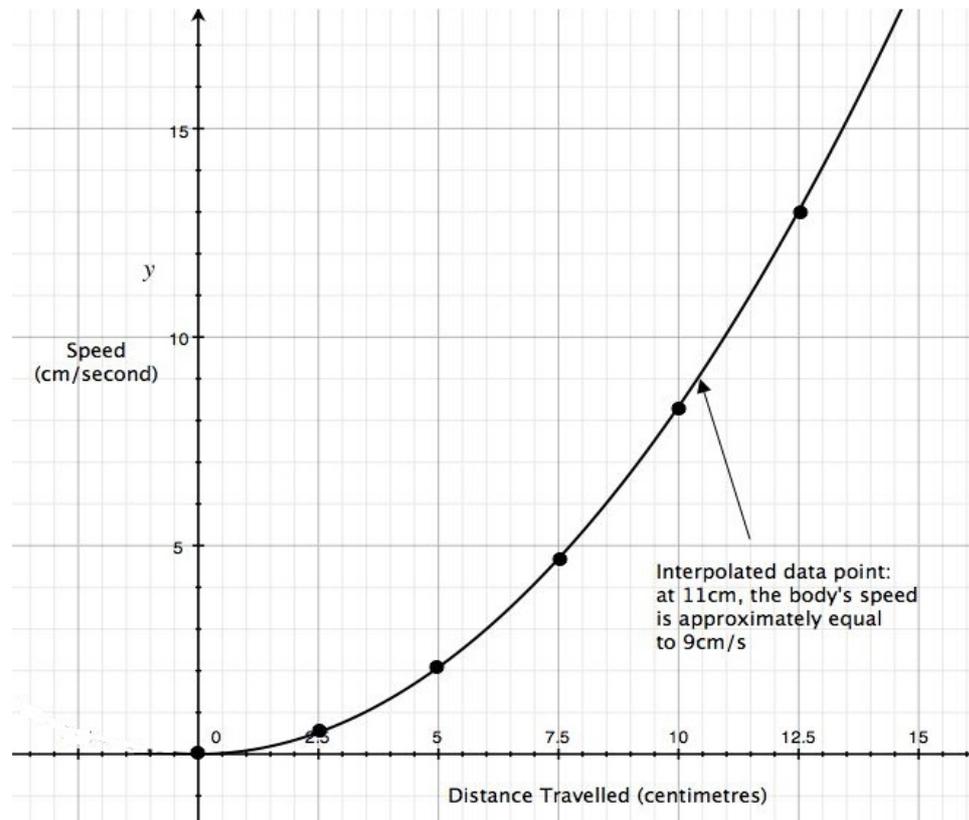
Figure 5:   A representation in the two-dimensional Cartesian plane of the exponential acceleration of a moving body.

Jacobus's construction of a narrative is analogous to the plotting of the curve: there will be certain 'points' that Jacobus did not strictly observe, but which fit with the revised history he wishes to recount. In this sense, interpolation seems a fitting metaphor for historical revisionism of the kind so often deployed in the attempt to rationalise and justify the darker aspects of colonial expansion.

Significantly, just as this act of interpolation brings the integrity of the document before the reader's eyes into question, the word 'integrity' itself begins to appear on a number of occasions: Jacobus claims that those few 'Hottentots' that have been

socialised according to the coloniser's values have merely learned to act in such a way as to please their white masters, regardless of their true intent or desires; as such they "have no integrity, they are actors".[446] On the other hand, a "wild Hottentot, one who has lived all his life in a state of nature, has his Hottentot integrity",[447] even though it is "based on an illusion of course, a delusion of strength, of equivalence".[448] In addition to the resonances with the process of integration discussed above, one might also note that in statistics and computer science – Coetzee's two principal areas of mathematical expertise – the integrity of a data set is a measure of its 'completeness': if no alterations occur during the transfer of data from one system to another – for instance in its retrieval from hard drive storage to RAM usage – then the data set is said to have absolute integrity. Jacobus's denigration of the integrity of those he wishes to exploit might then be said to reflect the colonialist's belief in the incompleteness of the colonised other, and hence the justification for his subjugation.

Even the language Jacobus uses to describe the land into which his colonial adventure takes him indicates the influence of mathematical metaphor. Describing a Hottentot camp near the Leeuwen River, he notes that it "consisted of perhaps forty huts arranged in a rough circle with outliers, plus five set quite apart across the stream";[449] within this circle, each hut is constructed such that the "apex is open, allowing the Hottentot abed a barred view of the night sky.[450] In addition to the commonplace reference to the number of huts and the geometric shape of the camp, Jacobus also uses less obviously mathematical terms such as "apex" and "barred" that may further indicate the mathematical character of his thinking.[451] More compelling, however, is his use of the word "outliers", which, in statistical analysis, refers to data points that deviate

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446 Ibid.
447 Ibid.
448 Ibid.
449 Ibid., 71.
450 Ibid.

significantly from the rest of the data set. In 'Statistical Indices of "Difficulty" ' Coetzee recognised the problem represented by outliers for the practice of stylostatistics, where anomalous data threaten the integrity of quantificatory statements about ostensibly non-quantificatory phenomena. By analogy, then, how is Jacobus to reconcile his monolithic, undifferentiated, interpolated account of the 'Hottentots' with the fact that some of them seem to exist as 'outliers' to the group?

During his stay at the camp, Jacobus succumbs to the grips of a fever dream: it is in this state that he surmises – in "a moment of sober arithmetic"[452] – that his chances of survival in the depths of Namaqualand are in steep decline. In confinement alongside Jan Klawer, his closest confidant among his men, he expounds upon the question of whether one might dream one's whole universe, in what he calls a "fertile but on the whole effete topos of dreaming oneself and the world".[453] His use of the word 'topos' seems significant in the sense that, in mathematical terms, topology is the study of the general properties of shapes and space, without reference to metrics: in other words, topology does not concern itself with quantifiable measurements of, for instance, the distance between points, but rather with relational properties – such as connectedness and orientation – that remain unchanged by continuous deformations, such as stretching. Tellingly, the conclusion of this 'topos' leads him on to "an exposition of [his] career as tamer of the wild"[454] in which he notes that the wilderness renders four of his five sensory modalities – such as he counts them – useless; as his hearing, smell, taste, and

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451 The term 'apex' is used in geometry to refer to the furthest point from the base of an isosceles triangle, a cone, or a pyramid. When a mathematical expression is 'barred' – indicated by the placement above it of a vinculum, or horizontal line – this represents that it forms a group, rather than just the expression alone. A common example is the vinculum drawn above one or more numbers in a decimal expansion, which indicates that the number or numbers repeat infinitely. For example, 1/3 may be represented as:

$$0.\overline{3}.$$

452 Ibid., 76.
453 Ibid., 78.
454 Ibid.

touch all "stretch into a vacuum",[455] he becomes "a spherical reflecting eye moving through the wilderness and ingesting it".[456] "What is there that is not me?" he asks. "I am a transparent sac with a black core full of images and a gun".[457] Just as with Eugene Dawn, then, this brutal coloniser believes that the "gun is our mediator with the world and therefore our saviour",[458] in the sense that it "stands for the hope that there exists that which is other than oneself".[459] To shoot, for instance, a hare is to make it pass from life into death, and from possible subjecthood into indisputable objecthood:

> The death of the hare is the logic of salvation. For either he was living out there and is dying into a world of objects, and I am content; or he was living within me and would not die within me, for we know that no man ever yet hated his own flesh, that flesh will not kill itself, that every suicide is a declaration of the otherness of killer from victim.[460]

Jacobus's self-evidently circular and vividly Cartesian logic is a mechanism for preventing himself "from merging with the world":[461] though he may doubt all else, he cannot doubt the singularity of his own being; from this initial affirmation of the oneness of his being, other beings may pass from the "undifferentiated plenum"[462] – a phrase he uses later in his deposition and which links his thought unmistakeably with the differential calculus – into a countable, objectified oneness of their own. It is in this context that the analogy with mathematics is made clear; the passage in question merits inclusion here in its entirety:

> We cannot count the wild. The wild is one because it is boundless. We can count fig-trees, we can count sheep because the orchard and the farm are bounded. The essence of orchard tree and farm sheep is number. Our commerce with the wild is a tireless enterprise of turning it into orchard and farm. When we cannot fence it and count it we reduce it to number by other means. Every wild creature I kill crosses the boundary between wilderness and number. I have presided over the becoming number of ten thousand creatures, omitting the innumerable insects that

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455 Ibid.
456 Ibid., 79.
457 Ibid.
458 Ibid.
459 Ibid.
460 Ibid.
461 Ibid., 80.
462 Ibid., 101.

> have expired beneath my feet. I am a hunter, a domesticator of the wilderness, a hero of enumeration. He who does not understand number does not understand death. Death is as obscure to him as to an animal. This holds true of the Bushman, and can be seen in his language, which does not include a procedure for counting.[463]

For Jacobus, then, the colonial enterprise is about the violent transformation of impression into statistic, converting topological space into geometric space, producing an integral analysis of the otherwise continuous, and ultimately denying the priority of continuity in favour of a process of nominalisation, which leads inevitably to the affirmation of the infinitesimal. This act of reducing the world to number enables the assimilation of that which is other into a semantic framework, fundamentally quantificatory in nature, that serves the interests of the colonising force. Whether the "hero of enumeration" seeks to impose quantification upon aesthetic, epistemic, economic, ethical, or religious concepts, however, is secondary to the fact that it is he alone who possesses the only copula capable of determining the meaning of the relationship between coloniser and colonised:

> Savages do not have guns. This is the effective meaning of savagery, which we may define as enslavement to space, as one speaks obversely of the explorer's mastery of space. The relation of master and savage is a spatial relation. The African highland is flat, the approach of the savage across space continuous.[464]

Without guns, he surmises, the 'savage' is unable to differentiate reality according to his own needs, and is so tied to topological, continuous space. Jacobus watches the 'savage' approach, passing "[a]cross this annulus"[465] of continuous space and "bearing the wilderness in his heart".[466] While "[o]n the far side he is nothing to me and I probably nothing to him",[467] Jacobus affirms, the 'savage' crosses the annulus

> as representative of that out there which my eye once enfolded and ingested and which now promises to enfold, ingest, and project me through itself as a speck on a field which we may call annihilation or alternatively history. He threatens to

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463 Ibid., 80.
464 Ibid.
465 Ibid., 81.
466 Ibid.
467 Ibid.

have a history in which I shall be a term.[468]

In the microcosm of the colonial encounter that Jacobus describes here, Coetzee stages

an archetypal postcolonial reading of the violent means through which the 'official'

history of colonisation comes into being. A breakdown of the mathematical language he

uses is once again instructive: an 'annulus' is the ring-shaped region between two

concentric circles; a 'field' is any algebraic structure in which, as in the arithmetic of

ordinary numbers, the foundational operators addition, subtraction, multiplication, and

division may be performed; an 'annihilation' operator is a function that, in mapping from

one domain to another, reduces the number of elements by one; and a 'term' is a member

of a given series, whether finite or infinite. Taken together, these mathematical concepts

depict the colonial encounter as taking place in a space already inscribed with the

foundational features that shall determine its outcome: and so it is, as Jacobus describes

the approach of the "dark figures"[469] towards him, that their "devious pursuit"[470] will

inevitably end

> in the frank straight line, the transformation of savage into enigmatic follower, and
> the obscure movement of the soul (weariness, relief, incuriosity, terror) that comes
> with this familiar transformation, we feel as a fated pattern and a condition of
> life.[471]

Once more, the language of the 'transformation' prevails, as the 'savage' becomes

assimilated into the 'patterns' and 'straight lines' upon which the colonialist's conception

of life is conditional. So subjugated, the 'savage' leaves behind the metaphysical

questions of his past life, to be replaced by those of his colonial master: "Why the

Creation should consist of interspersed plena and vacua", Jacobus claims, "is a question

that does not exercise them".[472] In other words, why the universe should conform to a

mathematicised model, in which discrete points superimpose themselves upon the

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468 Ibid.
469 Ibid.
470 Ibid.
471 Ibid.
472 Ibid., 83.

otherwise empty but nevertheless ordered space is of no concern: God, the Hottentots

sing, "must give up the ghost if into naught I sink".[473]

From here, however, Jacobus's abstract narrative is overwhelmed by the demands

of his physical being: his fever escalates, his stomach can bear no food, and a painful

carbuncle swells on his buttock. Unable to bear the shame of his loss of authority amid

his Hottentot hosts, he seeks once more to assert himself, and once again does so in the

language of mathematics:

> If they had calculated that surprise and shame would leave me impotent, that they
> could count on a morning's healthy fun being shambled after […], they had
> miscalculated. Roaring like a lion and enveloped in spray like Aphrodite I fell
> upon them.[474]

Despite his claims to godliness, it is Jacobus whom the conflict demonstrates has

miscalculated: soundly thrashed, and wracked with despair, he resolves to head home, to

regroup. On this journey he finds "an abstract pleasure in eating into the finite number

of miles that would take [him] home"[475] and soon begins the exegesis of self that

confirms both his enthralment to mathematical conceptual metaphor, and his

banishment to a self-constructed prison of solipsism.

On his journey back to the colonial settlement he calls home, Jacobus stops to

recount the tale of a particular beetle of which, he tells us, he has "always been fond".[476]

With typical sadism, he manifests this fondness for the beetle by pulling its legs off, one

by one, with the aim of seeing how many one must remove before it dies. Unless one

removes its head, he deduces, the beetle's life will merely recede fraction by fraction:

"in a formal sense", he claims, the beetle "is a true creature of Zeno".[477] He proceeds to

assume the voice of this Zeno-creature in its hypothetical dying moments:

"Now I am only half-way dead. Now I am only three-fourths dead. Now I am only

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473 Ibid.
474 Ibid., 90.
475 Ibid., 93.
476 Ibid., 96.
477 Ibid.

seven-eighths dead. The secret of my life regresses infinitely before your probing finger. You and I could spend eternity splitting fractions. If I keep still long enough you will go away. Now I am only fifteen-sixteenths dead".[478]

To judge from the fractions quoted, the beetle becomes increasingly 'dead' with every limb one removes: indeed, the degree to which it may be considered 'dead' after each iteration may be formalised according to the series:

$$x_n = \frac{2^n - 1}{2^n}$$

where n = 'the number of legs removed' and x = 'the degree to which the beetle is dead'. Theoretically, since x tends to a limit of 1, but shall never reach it, the beetle shall never die. While such a proposition is clearly absurd – the beetle has a finite number of legs, and, if the legs are not vital to its persistence in life, is presumably equally as alive after the removal of one leg as all – Jacobus notes that "[u]nder the Hottentot captivity [he] had not failed to keep the Zeno beetle in mind":

> There had been legs, metaphorical legs, and much else too, that I had been prepared to lose. In the blindest alley of the labyrinth of my self I had hidden myself away, abandoning mile after mile of defences.[479]

Suddenly forced to see himself not as the "invader of the wilderness"[480] but also as "the Hottentots' patient victim",[481] Jacobus watches his being regressing geometrically towards its barest limit. Intrigued, he pares away at his sense of self through a series of self-directed questions, each of which he has designed in order to help him "find a place for [the Hottentots] in [his] history".[482] Of course, this process is destined to fail as his understanding of the Hottentots as individual selves is continually forestalled by his dependency on the mathematical constructs upon which his conceptual faculties are founded: he cannot understand why "their torments [had] been so lacking in system",[483]

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478 Ibid.
479 Ibid.
480 Ibid., 97.
481 Ibid.
482 Ibid.
483 Ibid.

cannot find any evidence to suggest "that they had a way of life of any coherence",[484] and cannot get past his observation that they had not "exhibited any consistent attributes but sloth and an appetite for meat".[485] To the Hottentots, he states, "life was nothing but a sequence of accidents"[486] of which his presence had been simply another.

Having dismissed the place of the Hottentots in his history in this way, Jacobus sets off for home, inventing mental games to pass the time: pitting himself against "an indifferent universe",[487] he imagines a series of scenarios that could conceivably unfold following his expulsion from the Hottentot camp, from fantasies of brutal revenge to dark visions of his slow death by starvation. "In each game", he says, "the challenge was to undergo the history, and victory was mine if I survived it".[488] Tellingly, the game he considers "most interesting"[489] once again reveals the power of mathematical conceptual metaphor over his ability to conceive of himself: the game in question concerns "the Zenonian case in which only an infinitely diminishing fraction of [his] self survived, the fictive echo of a tiny 'I' whispered across the void of eternity".[490] In his passage across the wilderness, then, he imagines the last vestiges of his cultural self being annihilated, a "retrogression"[491] in which "[e]ven the white skin could go",[492] leaving behind nothing but the limits of the self. The mathematical metaphorics of this "Zenonian case" are rendered even clearer when he notes that his means of evading this disagreeable retrogression involved "comput[ing] all the denominators [he] could think of […]: the number of paces in three hundred miles, the number of minutes in a month"[493] and occupying himself with "the busy calculation of percentages".[494] All of

484 Ibid.
485 Ibid., 98.
486 Ibid.
487 Ibid.
488 Ibid.
489 Ibid.
490 Ibid.
491 Ibid., 99.
492 Ibid.
493 Ibid.
494 Ibid.

sudden, "on the borders of settlement",[495] he revives from the hunger, thirst, and

mathematics that have become the only contents of his consciousness and takes his

bloodthirsty revenge on an unsuspecting camp:

> I glutted myself on a day of bloodlust and anarchy whose story would fill another
> book, an assault on colonial property which filled me out once more to a man's
> stature and whose consequences were visited on the unfortunate heads of the
> Bushmen.[496]

Bloodlust thus temporarily sated, Jacobus arranges for a second expedition into the land

of the Great Namaquas, bent on exacting a more comprehensive and personal revenge

on those who had betrayed him. Having dreamed of his day of vengeance for months,

however, he finds the pleas for clemency advanced by his former servants oddly

unsettling:

> But this abject, treacherous rabble was telling me that here and everywhere else
> on this continent there would be no resistance to my power and no limit to its
> projection. My despair was despair at the undifferentiated plenum, which is after
> all nothing but the void dressed up as being.[497]

Amidst all the superiority and lust for power this megalomaniacal colonialist has

nurtured in himself, then, his experiences have ultimately taught him the essential

superficiality of his notions: if his power knows no limit, if it meets no resistance, then

it is no power at all; if it fails to differentiate the reality before him in any way other

than providing a mere 'dressing' that only he and his kind can see, then the plenum shall

remain fundamentally and irrevocably undifferentiated:

> There was nothing that could be impressed on these bodies, nothing that could be
> torn from them or forced through their orifices, that would be commensurate with
> the desolate infinity of my power over them. […] I was undergoing nothing less
> than a failure of imagination before the void.[498]

In lieu of imagination, Jacobus settles for brutality: in a storm of fire, rape, and killing,

his men "wipe the village off the face of the earth, do what is fitting with the

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495 Ibid.
496 Ibid.
497 Ibid., 101.
498 Ibid., 101-102.

Hottentots".[499] After killing off the last of the men, he proceeds to explain how it comes to be that he can claim without remorse not to "have killed something of inestimable value".[500] The presence of mathematical language is again conspicuous:

> I am an explorer. My essence is to open what is closed, to bring light to what is dark. If the Hottentots comprise an immense world of delight, it is an impenetrable world, impenetrable to men like me, who must either skirt it, which is to evade our mission, or clear it out of the way. As for my servants, *rootless people lost forever to their own culture* and *dressed now in nothing but the rags of their masters*, I know with certainty that *their life held nothing* but anxiety, resentment, and debauch. They died in a storm of terror, *understanding nothing*. They were people of *limited intellect* and people of *limited being*. They died the day I cast them out of my head.[501]

As far as Jacobus is concerned, the Hottentots are "rootless" without the cultural certainties upon which he predicates his own being. Without the "rags" and moral anguish imposed upon them by "their masters", they have, are dressed in, and understand precisely "nothing". But if these are really the people whose intellect and being is "limited", subject to limits beyond which they cannot break, then why is it that Jacobus, finally, spends "wakeful nights computing the percentage of threescore years and ten already devoured and projecting [himself] into the day after [his] decease[?]"[502] Why is it that Jacobus "can retreat before a beckoning finger through the infinite corridors of [his] self[?]"[503] Why is that he too can, if he thinks about it for long enough to confess the deeper truth, "be seen to be superfluous"[504] to the story of which he has so often claimed to be integral?

In a postscriptural answer to such unresolved questions, Coetzee presents the reader with another 'Afterword': just as the narrative itself has been translated by the fictional 'J. M. Coetzee' into English, this text is apparently an 'integral translation' from the Afrikaans of S. J. Coetzee's original Dutch introduction to the 1951 edition of *Het*

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499 Ibid., 102.
500 Ibid., 106.
501 Ibid., emphasis added.
502 Ibid.
503 Ibid., 107.
504 Ibid.

relaas van Jacobus Coetzee, Janszoon. From the outset of this 'translated' account, S. J. Coetzee states that the scarcity of reliable information regarding Jacobus Coetzee beyond his brief deposition means that to "understand the life of this obscure farmer requires a positive act of the imagination".[505] Given that the actual deposition runs to a mere three pages, and furthermore consists solely of a list of bare 'facts' – as least such as they were recorded by the government official to whom Jacobus related his case – S. J. Coetzee's emphasis ought to be on his act of 'imagination' far more than his attempts to 'understand'. In a sense, then, Jacobus is indeed superfluous to both the narrative and the various political and ideological purposes in service of which it has been used in the two centuries since the events it recounts occurred.

The political imperatives weighing upon whomsoever has been responsible for the final text of the 'Afterword' – S. J. Coetzee? 'J. M. Coetzee'? Some other functionary of state censorship? – are also clear in both their inherent racism and their dependence upon quantificatory accounts of reality. For instance, the author/editor suggests that we

> may in passing pause to glance with sorrow at the pusillanimous policy of the Company in regard to White colonization, with regret and puzzlement at the growth of the United States, which in the same era increased its White population geometrically and checked its native population growth so effectively that by 1870 there were fewer Indians than ever before.[506]

For S. J. Coetzee, Jacobus's heroism is a direct product of his brutality and his capacity to tame the wilderness: "Coetzee cut his double swathe", he writes "through the partially unknown"[507] and "rode like a god through a world only partly named, differentiating and bringing into existence".[508] As if the mathematical resonances of such 'differentiation' of the 'partially unknown' were not clear enough, S. J. Coetzee's account of the physical remnants of the expedition makes a mathematical reading of the real Coetzee's intentions practically unavoidable:

505 Ibid., 109.
506 Ibid., 112.
507 Ibid., 116.
508 Ibid.

> From scalp and beard, dead hair and scales. From the ears, crumbs of wax. From the nose, mucus and blood (Klawer, Dikkop, a fall and blows respectively). From the eyes, tears and a rheumy paste. From the mouth, blood, rotten teeth, *calculus*, phlegm, vomit. From the skin, pus, blood, scabs, weeping plasma (Plaatje, a gunpowder burn), sweat, sebum, scales, hair. Nail fragments, *interdigital decay*.[509]

Amidst the dispassionate list of bodily disjecta, two stand out by virtue of double meanings that seem inarguably deliberate on Coetzee's part: while 'calculus' can refer to the concretion of minerals found in the body, it is without doubt more commonly used, even beyond mathematical circles, to refer to the branch of mathematics involving the summation of infinitesimal differences in the techniques known as differentiation and integration; likewise, while 'interdigital decay' refers in this instance to materials produced as a consequence of decomposition between the fingers and toes, one might well prefer to read it as implicitly drawing to our attention that it has been in the midst of his enumerations – 'between the digits' – that Jacobus plunged into the moral decay that marked his brutal second sojourn into the land of the Great Namaqua. Coetzee's next novel introduces a protagonist for whose experience "interdigital decay" is even an more apt description.

4.2 *In the Heart of the Country*

4.2.1 An Art of Zero

In 'Samuel Beckett and the Temptations of Style' (1973), Coetzee states that the "art of Samuel Beckett has become an art of zero".[510] The content of Beckett's later work, he states, tends towards the embodiment of "two opposing impulses that permit a fiction of net zero: the impulse toward conjuration, the impulse toward silence":

> A compulsive self-cancellation is the weight imposed on the flight of the sentence toward illusion; the fiction itself is the penance imposed on the pursuit of silence, rest, and death. Around the helix of ever-decreasing radius described by these conditions Beckett's art moves towards its apotheosis, the one word text "nothing"

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509 Ibid., 119. Emphasis added.
510 Coetzee, 'Samuel Beckett and the Temptations of Style,' 43.

under the title "Fiction."[511]

Though by no means to be found within the tightest radii of Beckett's helix of self-cancellation, *In the Heart of the Country* is without question Coetzee's most recognisable attempt at producing an 'art of zero'; rather like in his earlier description of *Lessness*, in fact, the subject of the novel might well be described as "the plight of consciousness in a void, compelled to reflect on itself, capable of doing so only by splitting itself and recombining the fragments in wholes which are never greater than the sums of their parts."[512]

Coetzee's second novel is at first glance an autodiegetic narrative, in which an ageing, white 'spinster' explores feelings of frustration and rage – towards her father, her servants, and, crucially, herself – in an isolated rural landscape she is powerless to transcend. Beyond its surface appropriation of many elements of the *plaasroman* genre – a tradition Coetzee was later to dissect in his essay collection, *White Writing* (1988) – *In the Heart of the Country* is a highly stylised piece, which integrates into its 266 numbered paragraphs a wealth of seemingly incongruous scholarship, including direct quotations from Rousseau and Hegel.[513] Built around stretches of narrative that often seem to reiterate or contradict one another, the novel prioritises ambiguity over cohesion, relentlessly problematising the notions of linearity, continuity, and fidelity to truth.[514] The first thirty-five paragraphs, for instance, are immediately undermined by the thirty-sixth: where the opening stretch of the novel narrates the return of Magda's father with a new bride, and Magda's bloody, murderous vengeance against him for her forsaking, section thirty-six reveals her father to still be alive, implicating the earlier paragraphs as little more than fantasy. Likewise, each of the passages from 205 to 209

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511 Ibid.

512 Coetzee, 'Samuel Beckett's *Lessness*', 198.

513 The relevant passages in the novel can be found on pages 39 and 141 respectively.

514 As Coetzee has said, in this regard it reflects the influence on his practice of the techniques of montage pioneered in film by such auteurs as Chris Marker and Andrzej Munk. See Coetzee and Attwell, *Doubling the Point*, 60.

tells an alternate version of Magda's apparent rape at the hands of her servant, Hendrik, each subtly different in detail and hence subject to doubt. Finally, by suggesting that Magda's father has been alive the whole time and that she has merely been his bored yet dedicated carer, the novel's final six sections seem to render as potentially false all that has gone before.

Avoiding the temptation to fashion its fragmented elements into a unified, monological and cohesive narrative, Ian Glenn provides one of the more persuasive interpretations of the fundamental framework of the book in his discussion of what he calls "the persistently double frame of reference of Magda's 'I' ".[515] The first person narrative, he argues, refers to both a character within the ostensible narrative – the "spinster with a locked diary"[516] – and the creator of that character, a storytelling 'I' engaged in a meditative and reiterative writing process, the provisional results of which are presented to the reader as discrete notes towards an implied, coherent whole. Taking this reading as its point of departure, the following interpretation considers the novel's rejection of linear, causal interpretations of reality in the context of its staging of the migration of mathematical conceptual metaphor.

4.2.2 'I have been a zero'

Just as Beckett's work often combines its explorations of the art of zero with the development of narrative superstructures both containing and constructed according to explicitly mathematical concepts, Magda's 'impulse toward conjuration' is frequently figured through the language and structures of mathematics. Indeed, as was the case for both of Coetzee's protagonists in *Dusklands*, the words through which Magda conceptualises her means of 'taming the wilderness' of experience betray a consciously

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515 Ian Glenn, "Game Hunting in *In the Heart of the Country.*" in Graham Huggan and Stephen Watson, eds. *Critical Perspectives on J. M. Coetzee.* (Basingstoke: St Martin's Press, 1996), 123.
516 J. M. Coetzee, *In the Heart of the Country* (London: Vintage, 2004), 4.

mathematical metaphorics of thought: "I pick up and sniff and describe and drop, moving from one item to the next," she states, "numbering the universe steadily with my words".[517] All the same, where Eugene Dawn and Jacobus Coetzee saw themselves as heroes of enumeration, empowered by their ability to differentiate singular self from multitudinous other, Magda recognises in her acts of "numbering" the simultaneous destruction of her own self: "I have been a zero," she confides as early as the novel's second page, "null, a vacuum towards which all collapses inward".[518] Where on the one hand she is responsible, like Jacobus, for excerpting and nominalising elements of the nameless and numberless world that surrounds her and hence conferring upon those elements a nominal, enumerable reality, the truth of their individual existence within the overall text that emerges is endlessly deferred, endlessly subject to revision.

Conceived of in this way the text might be said to be coextensive with one or more of the three interrelated aspects of Magda's being that she attempts to unpack throughout the novel: her consciousness, her self, and her voice. Just like the text, her being is a vacuum, a singularity into which the universe collapses; as such, she is for both herself and her reader no more and no less than the words she produces to describe herself; once these words are removed, all that remains is the 'hole' of her self:

> I move through the world not as a knifeblade cutting the wind, or as a tower with eyes, like my father, but as a hole, a hole with a body draped around it […]. I am a hole crying to be whole. I know this is in one sense just a way of speaking, a way of thinking about myself, but if one cannot think of oneself in words, in pictures, then what is there to think of oneself in?[519]

For her own part, she wonders whether she is "one of those people so insubstantial that they cannot reach out of themselves save with bullets?"[520] Is she to become like Jacobus Coetzee and Eugene Dawn, her question implies, fated by circumstance to engage with the world only through the copula of the gun? And if she is not merely "a thing among

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517 Ibid., 29.
518 Ibid., 2.
519 Coetzee, *In the Heart of the Country*, 44-45.
520 Ibid., 65.

things, a body propelled along a track by sinews and bony levers"[521] does that make her instead "a monologue moving through time"[522] and continually subject to the possibility that the ground may "turn out to be just another word, in which case [she is] indeed lost?"[523]

The issues of gender politics implicit in passages such as these become ever more prominent as Magda reveals her awareness of and subjugation to the phallocentric and quasi-mathematical trope according to which man corresponds to presence and woman to absence:

> I am […] not unaware that there is a hole between my legs that has never been filled, leading to another hole never filled either. If I am an O, I am sometimes persuaded, it must be because I am a woman.[524]

As a woman in a patriarchal world, Magda sees herself as an 'O' capable of becoming 'fulfilled' only by being 'filled'; her conscious self is radically and necessarily 'zero' and shall remain so until her life – if not exactly her being – is given meaning through its objectification in the context of a man's story. Indeed, she occasionally reveals the desire that she "should have been a man",[525] such that she could have spent her "days in the sun doing whatever it is that men do, digging holes, building fences, counting sheep".[526] While the latter two of these supposedly 'male' activities correspond with the conception of the 'hero of enumeration' outlined in 'The Narrative of Jacobus Coetzee', the first indicates again Magda's acceptance of herself as a 'hole', whose existence is predicated entirely on the activities of men. Unlike the truly 'substantial' men with whom she shares her place in history, then, she wonders whether she is perhaps "simply a ghost or a vapour floating at the intersection of a certain latitude and a certain

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521 Ibid., 68.
522 Ibid.
523 Ibid.
524 Ibid. 44-45.
525 Ibid., 22.
526 Ibid.

longitude".[527] In the absence of her father, she demurs, she and her servants ought to "accept that [their] lives are vacant, as vacant as the desert [they] live in, and spend them counting sheep or washing cups with blithe hearts?"[528]

Towards the novel's end, however, she locates the seeming inevitability of her emptiness within the logical structure of the concept of desire itself, such as it is configured in a universe written by men. "I am not one of the heroes of desire", she says:

> what I want is not infinite or unattainable, all I ask myself, faintly, dubiously, querulously, is whether there is not something to do with desire other than striving to possess the desired in a project which must be in vain, since its end can only be the annihilation of the desired.[529]

Etymologically speaking, to 'annihilate' is reduce to nothing: in this sense, Magda's existence as a 'zero' colludes with her desire to 'number the world' to produce an annihilated universe, a scorched earth. She is, in others words, exactly the embodiment of the art of zero, replete with its self-cancelling impulses toward conjuration and silence. Considering her plight alongside that of the young servant, Anna, moreover, she realises that the question of desire becomes all the more pressing "when woman desires woman, two holes, two emptinesses":

> For if that is what I am then that is what she is too, anatomy is destiny: an emptiness, or a shell, a film over an emptiness longing to be filled in a world in which nothing fills. I speak to her: 'Do you know what I feel like, Anna? Like a great emptiness, an emptiness filled with a great absence, an absence which is a desire to be filled, to be fulfilled.[530]

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527 Ibid., 19.

528 There exist a number of feminist readings of *In the Heart of the Country*. Adopting the critical tools of Cixous, Kristeva, and Irigaray, Susan Vanzanten Gallagher reads the novel as a demonstration of the "inadequacies of the patriarchal discourse of South Africa" (Susan Vanzanten Gallagher, *A Story of South Africa: J. M. Coetzee's Fiction in Context* (Cambridge: Harvard U.P., 1991), 111.) E. Kim Stone considers how Coetzee figures various conceptualised 'spaces' as the arena for Magda's attempts to engage in feminist identity politics. See E. Kim Stone. "Good Housekeeping: Single Women and Global Feminism in J.M. Coetzee's *In the Heart of the Country*," *ARIEL: A Review of International English Literature*," 34, no. 2-3 (April-July 2003).

529 Coetzee, *In the Heart of the Country*, 124. The conspicuously Lacanian conceptualisation of 'desire' articulated here was first and most comprehensively explored in Teresa Dovey's chapter on *In the Heart of the Country* in her monograph: see Teresa Dovey, *The Novels of J.M. Coetzee: Lacanian Allegories* (Johannesburg: Ad Donker, 1988), 149-207.

530 Coetzee, *In the Heart of the Country*, 124-125.

While the content of Magda's narrative might suggest the inevitability of her destiny as radically zero, however, Coetzee incorporates into its design a variety of textual features that expose the provisional, contingent status of the nominal, linear, causal continuity upon which much of her sense of 'destiny' is predicated.

4.2.3 Continuity

Though Magda may see herself as a zero, then, certain questions regarding the place of number in the novel announce themselves from its outset and consequently render her conceptualisation of such a zero intrinsically problematic. In the most immediately visible instance, and as Coetzee himself has said, the fact that the text is divided into numbered paragraphs, each apparently recounting a singular constituent 'incident' from Magda's fragmentary life, is not merely an organising principle. "I think at the formal level", he explains, "the enabling device in *In the Heart of the Country* turned out to be the numbering of the sections, because that enabled me to drop all pretense of continuity":

> After a few hundred words of prose, there comes a break – a three-digit number. As a reader you can't lose yourself in the represented. But once, as a writer, you have given up on the possibility of continuity, of the reader's absorption, then all kinds of benefits flow. Like radical juxtapositions. Like going over the same story twice, but in different forms.[531]

Asked by his interviewer, Joanna Scott, as to whether this numbering system "[g]rounded [him] in some way",[532] or prevented him from being "lost in the maze of doubt",[533] Coetzee simply and emphatically replies in the negative: "No. The numbers don't point anywhere".[534] All the same, according to his correspondence around the time of the novel's publication, Coetzee evidently saw the numbering of the fragments as an essential and indispensable aspect of its structure. In a letter to Gill Berchowitz of

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531 Coetzee and Scott, "Voice and Trajectory: An Interview with J. M. Coetzee," 89-90.
532 Ibid., 90.
533 Ibid.
534 Ibid.

Ravan Press dated 1 December 1977, for instance, he makes perfectly clear his

objection to his publisher's removal of those paragraph numbers from a proof copy:

> The omission of the section numbers is a serious mistake and must be corrected. I don't know who took it upon himself to order their omission, but I was not consulted and would certainly not have authorized it. The manuscript, by numbering and spacing, indicates a clear distinction between sections and paragraphs. Now that the text is no longer even in galley form I don't know what you are going to do to introduce spacing. But the numbers have to be restored -- there can be no argument about this -- even if (a suggestion) they go into the margins in bold face.[535]

The fervour of his annoyance at this omission is also suggested by his recourse to rather

blunt laconicism later in the letter, where he notes that, since Ravan's "copy editor

began the job of changing American spellings to British, [he has] completed it."[536] In a

letter to Sheila Roberts dated 6 December 1977, furthermore, he depicts the omission of

the numbers as "such a fuckup of the typesetting that the book has to be reset from

scratch."[537] Similarly, when considering the possibility that the censors might ban the

international edition of the novel about to be published by Secker and Warburg, Coetzee

suggests to Peter Randall, at that time still director of Ravan Press, that he might

consider releasing his company's edition, specifically for the South African market,

"with the four or five most 'offensive' paragraphs blanked out".[538] Tellingly, though,

despite his willingness to compromise on the content of certain sections – most likely

paragraphs 206, 209, and 221 – he nevertheless asks in a letter eight days later for the

numbers to remain in place, suggesting that the offending passages should be printed

merely as their related numeral, followed by the approximate amount of space that the

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535 J. M. Coetzee, "Letter to Gill Berchowitz," 1 December 1977, National English Literary Museum, Grahamstown. Courtesy of the author.

536 Ibid.

537 J. M. Coetzee, "Letter to Sheila Roberts," 6 December 1977, National English Literary Museum, Grahamstown. Courtesy of the author.

538 J. M. Coetzee, "Letter to Peter Randall," 11 July 1977, National English Literary Museum, Grahamstown. Courtesy of the author. Interestingly, Coetzee reveals in an earlier letter to Randall a rather more complicated relationship with the censors than one might imagine: "I have applied to become a one-day-a-week censor," he writes, "and have been rejected". See J. M. Coetzee, "Letter to Peter Randall," 26 March 1976, National English Literary Museum, Grahamstown. Courtesy of the author.

passage would have taken up.[539]

With all of this in mind, Magda's desire to structure her world in a chronological, numerical form assumes a certain irony: firstly, her narrative frequently explores the tensions consequent upon her attempts to assimilate these individuated and often contradictory fragments of experience within a continuous, linear narrative structure; concomitantly, her repeated claim that she wants to convey her story in a linearly coherent fashion is lent a rather self-defeating air: "I want my story to have a beginning, a middle, and an end",[540] she exhorts, before recognising that it is "[o]ut of the blankness that surrounds" her that she must "pluck the incident after incident after incident whose little explosions keep [her] going".[541]

In the textual structure of the novel, each act of 'plucking' produces an individuated fragment; this fragment is then assigned a number and placed in numerical order; but, ultimately, just as the novel begins to erect a conventional narrative structure from the skeleton of these fragments, its aggregation of false starts, fantasies and authorial rewrites once again resists singular interpretation, with the disjunctive, self-contradictory movements of Magda's fraught consciousness tending instead towards an art of net zero. By analogy, just as the statistical, probabilistic account of physics refutes classical conceptions of continuity and causality, and just as the paradoxes of Zeno threaten the affirmations underpinning the conceptual metaphors of the linear, delimited

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539 See J. M. Coetzee, "Letter to Peter Randall," 19 July 1977, National English Literary Museum, Grahamstown. Courtesy of the author.

Though Coetzee's fears for *In the Heart of the Country* eventually proved unfounded, Randall was served with banning orders by the Ministry of Justice on 17 October 1977. The terms of his ban precluded him from attending gatherings or leaving the Johannesburg magisterial area without express permission from the Chief Magistrate. See *Not without Honour: Tribute to Beyers Naudé* (ed. P. Randall). (1982) Ravan: Johannesburg. For further context on the issue of censorship with regard to the novel, two fascinating articles stand out: Peter McDonald, " 'Not Undesirable': How J. M. Coetzee Escaped the Censor." *Times Literary Supplement* (19 May 2000): 14-15; and Hermann Wittenberg, "The Taint of the Censor: J. M. Coetzee and the Making of *In the Heart of the Country*." *English in Africa* 35, no. 2 (2008): 133-150.

540 Coetzee, *In the Heart of the Country*, 46.

541 Ibid., 46-47.

continuum, Magda's voice recedes towards nothingness under the weight of its own words.

Alongside the evidence of Coetzee's determination to retain the numbering of the fragments, then, it seems all the more significant that, as the novel progresses, Magda associates herself less with the continuum, and more with an aching desire for its dissolution. In stark contrast to Jacobus's belief that one may 'tame the wild' by turning it into number, for instance, Magda's use of that same phrase marks her out as one equally as bound by those same conceptual metaphors of enumeration, but lured into mad desolation by the knowledge she possesses of the fallaciousness of the relentless onward linearity of those numeric structures used by man to impose his will upon the blankness of reality:

> One day some as yet unborn scholar will recognize in the clock the machine that has tamed the wilds. But will he ever know the desolation of the hour of the siesta chiming in the cool green high-ceilinged houses where the daughters of the colonies lie counting with their eyes shut?[542]

The clock functions here as the acme of the mechanised reduction of experience to linear, numbered order; her mind fully colonised by the metaphysics of time, Magda has herself been reduced to an agent of its solving enumeration, as the contradictions of her experience are flattened out, codified, and assimilated within the onward propulsion of indifferent, abstract number.

In such a context, the fragmentation, non-linearity, and self-contradictions of Magda's narrative represent a fitting counterpoint to the time-bound structures within which she finds herself imprisoned. Moreover, the conceptual metaphor that holds together these contradictory desires for continuity and fragmentation also makes its presence felt in her response to the colonial history of the barren lands in which she finds herself. In one instance, she visualises the migration of labour across the veld as a

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542 Ibid., 3.

topological phenomenon, the mapping of linear relations between fixed points, which

she represents to herself in algebraic form:

> Hendrik's forebears in the olden days crisscrossed the desert with their flocks and
> their chattels, heading from A to B or from X to Y, sniffing for water, abandoning
> stragglers, making forced marches. […] I wonder whether a speculative history is
> possible.[543]

Such a reductive history – where the lives of the migratory labourers are defined solely

by their presence and activities at named colonial settlements – fails to conform with

Magda's experience. Not only does the geometric representation of the movement of

Hendrik's forebears make no practical sense to her, but its topological equivalent seems

equally incredible:

> [Hendrik] arrived one afternoon asking for work, though why here I cannot
> imagine, we are on a road from no A to no B in the world, if such a fate is
> topologically possible, I hope I use the word correctly.[544]

Magda's speculations lead her not simply to deny the pre-eminence of settlements A and

B, but furthermore to implicitly posit the existence of 'no-A' and 'no-B' hypothetical

points in topological space to be provisionally maintained as logical fictions so long as

the narratological 'road' incorporating Hendrik's arrival requires them. As such, Magda's

ability to account for her experience is so subject to the narrative histories her culture

has bestowed upon her that she can only assimilate new information by analogy with

the structures of stories she has already been told. Her own personal tragedy, moreover,

is subject to just the same inextricably linear conception of a individual life:

> I fear what I am going to do, nevertheless I am going to do whatever I do because
> if I do not, but creep away till better days come, my life will continue to be a line
> trickling from nowhere to nowhere without beginning or end.[545]

In this instance Magda perceives her consciousness as subject to the linear propulsion of

the continuum; yet, unlike Jacobus Coetzee's Zenonian self, Magda's life persists

without bound or limit; and still yet, just like Jacobus's fears for that same self in a

[543] Ibid., 20.
[544] Ibid., 21.
[545] Ibid., 55.

world of limitless power over the indifferent other, Magda's limitlessness is a source of anxious uncertainty, and of failure to locate or ground meaning.

While Magda is generally forced to accept the validity of the mathematical structures that in turn structure her experience, however, there are moments of doubt that indicate the possibility, albeit slight, of rebellion. Looking back again at her own ancestry, for instance, her growing distaste for the influence of mathematical structures on an individual's capacity to think becomes increasingly apparent. Though she refers to the building in which Jakob and Anna live as 'the schoolhouse,' she does so only because she has ascribed to it a speculative history, the events of which she has interpolated from evidence no more secure than the presence of a few wooden benches stacked within. When she comes to elaborate upon the subject-matter of the classes she imagines to have taken place in the schoolhouse before it fell into disuse, moreover, she includes "geometric and arithmetic progressions",[546] and finds herself wondering "[h]ow many generations can have intervened between those children chanting the six times table and [her] dubious self".[547] She speculates, moreover, as to whether her father may have been taught there and, if so, what "the six times table [taught] him about the iron laws of the universe".[548] Subsequently, when she comes to interrogate her own family history, her speculations on the origins of her melancholic disposition lead her to outline an apparently insoluble contradiction between the Christian and mathematical accounts of her genetic ancestry:

> Is there something in me that loves the gloomy […] where does it come from? […] From my parents? From my father, angry, loveless? From my mother, that blurred oval behind my father's head? Perhaps. Perhaps from them, jointly and severally, and behind them from my four grandparents, whom I have forgotten but could certainly recall in case of need, and my eight great-grandparents and my sixteen great-great-grandparents, unless there is incest in the line, and the thirty-two before them and so forth until we come to Adam and Eve and finally to the

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546 Ibid., 50.
547 Ibid.
548 Ibid.

> hand of God, by a process whose mathematics has always eluded me. Original
> Sin, degeneracy of the line.[549]

Magda's attempt to rationalise her line of inheritance by way of a geometric progression leads inevitably to the uneasy conclusion that either the biblical story of Adam and Eve is false, or the line extending back to the Garden of Eden involved the cardinal sin of incest. While a less mathematically sensitive reading might not recognise it as such, Coetzee's final phrase here – "degeneracy of the line" – constitutes a play on words with far-reaching implications for our reading of the text as whole. To clarify, one might first contrast the two extremes through which Magda's ancestry may extend back in time: in its most linear and hence most incestuous form, her line of ancestry requires just two individuals per generation, resulting in a family tree with no extraneous branches; in its most complex form, in which procreation occurs exclusively among partners with absolutely no blood relation, no matter how distant, the expansion of the geometric series necessitates that the number of branches is theoretically infinite. Significantly, the first of the two mathematical structures opposed here might legitimately be described according to mathematical convention as the 'degenerate' form of the latter: this means that, though they are ostensibly mathematical phenomena of the same form, the former has been simplified to its limits, and hence no longer appears to be a geometric progression at all, but rather a straight line. Having explicitly mentioned the "mathematics that has always eluded" her in her consideration of her ancestry, Magda's description of the act of incest as "degeneracy of the line" seems far from coincidental. The literal connotation of the phrase indicates an – albeit reluctant – capacity for challenging the orthodoxies of the authorised history, in this case religious, that has been handed down to her; the mathematically metaphorical connotation indicates a capacity to doubt the validity of seemingly indubitable mathematical structures, and

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549 Ibid., 25.

specifically those that deify the linear.

To consider for a moment the connotations of this section for our reading of Coetzee's novel itself – and to think again of the double reference of Magda's 'I' – one might note that a critic's attempts to impose a linear, 'truthful' account upon Magda's narrative could also be said constitute the limiting case – the degenerate version – of the overlapping, multivalent, non-linear version she actually tells. Magda's story, like all stories, is not a simple linear journey from singular, unequivocal A to singular, unequivocal B, but is instead the messy, infinitely multiply subjective agglomeration of a theoretical infinity of elements competing to be the few that she "plucks out of the blankness that surrounds" her. Indeed, Magda contrasts her own awareness of her generative role in the story-writing process with the fate of those who, for her at least, are merely characters in the tale she is engaged in telling:

> I lie here involved in cycles of time, outside the true time of the world, while my father and Hendrik's wife travel their arrow-straight paths from lust to capture, from helplessness to the relief of surrender.[550]

Put another way, Magda, as author, is not subject to the same linearity as the characters she depicts in her story. With this in mind, one may well be reminded of the lack of freedom afforded to people such as Hendrik in this colonial context: he is a character not only in Magda's story, but in the story of colonialism, as told by the coloniser, and as such is limited to live in "arrow-straight paths," degenerate versions of the "cycles of time" circumscribed by his colonial masters. All the same, Hendrik's desire to overturn the power dynamic within which circumstances have imprisoned him lends the novel a postcolonial dimension that resonates throughout. Hendrik, Magda explains, "wishes to start a line, a humble line of his own in parallel to the line of my grandfather and my father";[551] in the times out of which Magda writes, however, she can confidently state

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550 Ibid., 39.
551 Ibid., 26.

that "although the line will ramify it will not ramify too far".[552]

4.2.4 Infinity

If the concepts of the zero and the continuum dominate the early parts of the novel, its latter parts explore in equal measure the closely connected notion of infinity. In a conceptual context in which the zero is taken to be simultaneously both a nominalisable 'thing' and a 'nothing' – analogous to a 'hole' or an 'O' – the idea of measurement within that entity is rendered paradoxical: if the zero is a 'thing' then it must, in some sense, have extension; if it has extension, then it can be divided; if it can be divided once, it can be divided again, and so on, *pace* Zeno, to infinity; but if the total extension of the undivided zero is equal to zero, then each constituent part is also equal to zero.

Magda is not unaware of this paradox: "Here in the middle of nowhere," she notes, "I can expand to infinity just as I can shrivel to the size of an ant. Many things I lack, but freedom is not one of them".[553] A hole within a hole, Magda's consciousness extends infinitely into an abyss of its own making, resulting in an infinite, inescapable solipsism. Looking beyond herself to the other 'holes' she sees around her, she cannot help but wallow in the extension of this solipsism to the social realm:

> The wind blows everywhere, it issues from every hole, it turns everything to stone, to the stone, glacial, chilled to the core, of the remotest stars, the stars we shall never see, living their lives from infinity to infinity in darkness and ignorance, if I am not confusing them with planets.[554]

Like lonesome stars in infinite space, the people of the veld seem cold and distant; to appropriate Eugene Dawn's words, they are thereby doomed to spend their lives endlessly reading the self to the self in all infinity. With her rejection of the linear conception of a life, moreover, even Magda's dreams of escape devolve into vertiginous,

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552 Ibid.
553 Ibid., 55.
554 Ibid., 60-61.

repetitious permutations of existence that recall in both tone and detail the melancholy

drift of Beckett's *Waiting for Godot*:

> That is to say, while I have the feet and legs, and while I would be deceiving
> myself if I claimed a need for sustenance – with locusts and rain-showers and the
> odd change of shoes I can go on to infinity.[555]

While "there is infinite space around" her,[556] she notes that the similar infinity of time

that extends into her past and future is a continuum "from which history seems to have

retreated."[557] "What is there for me," she wonders, "but dreary expansion to the limits of

the universe?"[558] In such instances, Coetzee is staging through Magda a growing

awareness of the paradoxical yet ineluctable symbiosis of infinity and nothingness in

the conceptual framework covertly imposed by the commonplace characterisation of

human life as finite, linear, and continuous. The logic progresses as follows: a

theoretical infinity of stories could be told of Magda's life, none more true or false than

any other; in order to fit them within the limits of a finite, linearly continuous life, these

stories must be infinitesimal in extension; in order to be comprehensible to a finite

being, though, these stories themselves must be finite in extension; if this is the case,

then each individual story must itself be divisible into an infinity of infinitesimal

fragments; and so on, indeed, to infinity. Magda's route out of this paradox is to reject

the foundations of time, of story, and of continuity itself:

> Born into a vacuum in time, I have no understanding of changing forms. My talent
> is all for immanence, for the fire or ice of identity at the heart of things. Lyric is
> my medium, not chronicle. [...] I smell the odour that blood has in common with
> stone, with oil, with iron, the odour that folk travelling through space and time,
> inhaling and exhaling the black, the empty, the infinite, smell as they pass through
> the orbits of the dead planets [...].[559]

Since 'lyric' is Magda's medium, it is in the final analysis the singularity of her voice

that offers her only sanctuary from imposition of the quantificatory conceptual

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555 Ibid., 69.
556 Ibid., 81.
557 Ibid.
558 Ibid.
559 Ibid., 77.

metaphors that circumscribe the framework out of which that voice emerges. "But these words of mine come from nowhere and go nowhere," she concludes: "they have no past or future, they whistle across the flats in a desolate eternal present, feeding no one".[560]

4.2.5 A Desolate Eternal Present

Towards the end of the novel, Magda identifies two other closed, finite stretches of narrative that, together with the events narrated in *In the Heart of the Country*, make up the story of her life: the "idyllic […] old days"[561] before the narrative began, and "a future in a garden behind barbed wire".[562] These are, however, just "[t]wo stories to comfort [her]self with":

> for the truth is, I fear, that there is no past or future, that the medium I live in is an eternal present in which whether heaving under the weight of that hard man [Hendrik] or feeling the ice of the scissors-blade at my ear or washing the dead or dressing meat, I am the reluctant polestar about which all this phenomenal universe spins. I am pressed but not possessed, I am pierced but my core is not touched. At heart I am still the fierce mantis virgin of yore. Hendrik may take me, but it is I holding him holding I.[563]

By expressing the primacy of the 'I', though, Magda raises a question as to the constitution of that timeless, extensionless, subjective entity. If it is not part of the physical or chronological world, then how can the 'voice' of that 'I' be heard?

> I would need at the very least, besides eyes and ears, two hands and the use of them, and a store of pebbles to build patterns with: and how long can one go on building patterns before one longs for extinction?[564]

Such a life seems comparable to both Coetzee's computer poetry and the fifty-two affectless signs of Eugene Dawn's newspaper reports: without substantive connection to the world upon which they purport to comment, such exercises in permutation remain blank and meaningless. Recognising this fact, Magda yearns for context, for company,

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560 Ibid., 125.
561 Ibid., 126.
562 Ibid.
563 Ibid., 126-127.
564 Ibid., 130.

and for the forms of connected meaning that only continuous narrative can provide:

> I am not a principle, a rule of discourse, a machine planted by a being from another planet on this desolate earth beneath the Southern Cross to generate sentiments day after day, night after night, keeping count of them as I go, until I run dry. I need more than merely pebbles to permute, rooms to clean, furniture to push around: I need people to talk to, brothers and sisters or fathers and mothers, I need a history and a culture, I need hopes and aspirations, I need a moral sense and a teleology before I will be happy, not to mention food and drink.[565]

The 'I' that Magda wishes to sustain needs more than the counting of infinities, more than the delimiting of continua, more than the differentiation of things, and more than the permutation of prefabricated elements into meaningless narratives: her numbering of the world is empty without a cultural context to which it might provide a metric. Without belief in the verities of a culture – its morality, its teleology, its shared history – the 'I' will continue to be a zero, a hole, a vacuum into which meaning is sucked; but without the solving palliative of time, the linearity that each of those cultural verities requires is again subject to crippling suspicion:

> Or perhaps there is no time, perhaps I am deceived when I think of my medium as time, perhaps there is only space, and I a dot of light moving erratically from one point in space to another, skipping years in a flash, now a frightened child in the corner of a schoolroom, now an old woman with knobbly fingers, that is also possible, my mind is open, and it would explain some of the tentativeness with which I hold my memories.[566]

As the novel draws to a close, any pretence of the 'truth' of Magda's narrative collapses under the weight of her increasingly surreal visions. Alone on the farm, she describes the periodic appearance of flying machines in the skies above. These machines, she reports, begin to speak to her in 'Spanish' words that she identifies as belonging "not to a local Spanish but to a Spanish of pure meanings such as might be dreamed of by the philosophers".[567] The meanings these machines convey, however, are "so deeply embedded" in Magda's consciousness that she equates them with "pure meaning",[568]

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565 Ibid., 130-131.
566 Ibid., 134-135.
567 Ibid., 137.
568 Ibid.

and considers them as being somehow "tied to universal meanings".[569] But pure meaning, she discovers, is endlessly empty: "I am gagging on a diet of universals," she laments: "I will die before I get to the truth. I want the truth, certainly, but I want finality even more!"[570]

Summary

Coming so soon after his ostensible denunciation of the discipline of stylostatistics, and given his growing sense that mathematical representations of reality can be put to ethically questionable use by corrupt political powers, it is no surprise to find that Coetzee's first two novels present a largely negative view of the migration of mathematical conceptual metaphor into otherwise non-mathematical discourses. Both the constitutive novellas of *Dusklands* stage the descent of rabidly megalomaniacal positivists into personal and social cataclysms that are in large part consequent upon the inflexibly mathematical concepts that provide both the source of their cultural power and the basis for their failure to understand a culture radically othered from their own. Coetzee develops this theme in *In the Heart of the Country* by not only bestowing upon his protagonist an awareness of the pernicious influence of quantificatory conceptual metaphor, but by staging his 'art of zero' within the confines of a narrative structure that reflects and augments the taut, paradox-laden anguish that her bitter knowledge engenders.

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569 Ibid.
570 Ibid., 142.

Chapter 5

PERFECT NUMBERS AND SUBSTANTIAL GHOSTS

Isaac Newton, *Waiting for the Barbarians*, and *Foe*

Coetzee spent the year preceding the publication of his third novel, *Waiting for the Barbarians* (1980), on leave from the University of Cape Town; in addition to finishing the novel, he occupied himself during this time by catching up with the latest developments in linguistics by attending seminars at the University of California, Berkeley, and the University of Texas at Austin. This period of study resulted in the publication of the three interrelated essays: 'The Rhetoric of the Passive in English' (1980), 'The Agentless Sentence as Rhetorical Device' (1980), and 'Isaac Newton and the Ideal of a Transparent Scientific Language' (1982). Reflecting on these essays in one of the interviews included in *Doubling the Point*, he summarises his conclusions as follows:

> Gravitation as a real existent is not necessary to Newton as mathematical physicist. All he needs is a variable g. Then the movements of "bodies" – abstract bodies, admittedly, but with a certain resemblance to the earth, the sun, and so forth – relative to each other will be predicted by a set of equations involving g and other variables. The question is, why is there a homology between operations on the mathematician's page and operations out in the heavens? It is in an effort to answer this question that Newton physicalizes g. I, in my naiveté – I am not a philosopher – stand unconvinced and puzzled. I don't understand why the universe behaves as mathematics predicts it should. In certain particularly dubious moods I wonder whether we know at all how the universe *really* behaves: is our image, our representation of what happens in the universe perhaps not of the same order of privacy as our mathematics?

> Is this idealism? Probably. It is certainly scepticism.[571]

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571 Coetzee and Attwell, *Doubling the Point*, 145.

One might productively compare this quotation to the inclusion in his notes to a master's course on *Robinson Crusoe* that took place five years after the publication of *Doubling the Point* of a paraphrased sentiment originally belonging to Defoe's eponymous hero: "Given enough time," he writes, "and given reason/mathematics as a basis, one can reinvent the whole of civilization".[572] If the first of these two quotations reflects an idealism on Coetzee's part with respect to mathematics, then, the discursive territory whose limits the two together circumscribe urges several questions as to exactly the nature and implications of such an idealism. What might it mean, for instance, to say that our mathematics and our descriptions of the world around us are "of the same order of privacy"? If mathematics is indeed 'private', moreover, what might be the consequences of a belief that it might help us "reinvent the whole of civilization"? In a world so receptive to reinvention, to what extent can we rely on our mathematicised picture of the world in moments of cultural conflict such as that depicted in *Robinson Crusoe*? Finally, if intercultural disagreements cannot be resolved, and if even mathematics is an idealist and therefore relativist language, then whose will and authority shall prevail?

By looking closely at the mathematical component of those essays, and placing them in the context of Newton's most celebrated contribution to mathematical physics, this chapter provides a mathematically-literate critical framework in which to assess the ways in which Coetzee stages such questions as these in two of his most highly regarded novels, each of which was published within a six-year period surrounding his Newton essay: namely, *Waiting for the Barbarians* (1980) and *Foe* (1986).

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572 J. M. Coetzee, "Robinson Crusoe," Seminar Notes, Realism MA, 1997, National English Literary Museum, Grahamstown. Coetzee's version does not quite reflect Crusoe's belief accurately: in its original context in Defoe's novel the passage merely states that "as reason is the substance and original of the mathematicks, so by stating and squaring every thing by reason, and by making the most rational judgment of things, every man may be in time master of every mechanick art" (Daniel Defoe, *Robinson Crusoe,* New Edition. (London: Penguin Classics, 2001), 85.

5.1 Mathematics as an Ideal Transparent Language

The three essays in stylistics document a decisive point in Coetzee's intellectual

development: namely, the moment at which, in his own words, he became "cured" of

the "scientistic arrogance"[573] that had previously led him to believe that

> a new and *mathematicized* stylistics would, by its capacity to define terms
> rigorously, to build theorems, to construct analytic procedures, and so forth, be
> able to answer all the questions about the relation of form and meaning that the
> schools of rhetoric had been fumbling helplessly with for two and a half
> millennia.[574]

Prior to this realisation, the frustrations he had experienced in his own work as a

stylostatistician had already left him at best sceptical regarding the likelihood of

bridging the gap between the supposedly nonreferential symbolism of mathematics and

the "connotative freight" of natural language. Though not all of the three essays deal

with this question directly, the cumulative effect of their conclusions – each of which

refers in one sense or another to the question of how the form of an utterance affects or

delimits its capacity for producing meaning – is to lead Coetzee to an exposition of his

developing critique of the ideally and exemplarily 'transparent' way of expressing

meaning of which mathematics is supposedly the highest form.

5.1.1 'Isaac Newton and the Ideal of a Transparent Scientific Language' (1982)

The Newton essay begins with a brief introduction to a familiar yet controversial theory

that has far-reaching consequences for a number of academic disciplines. In the form

chiefly associated with the nineteenth-century German philosopher and statesman

Wilhelm von Humboldt, the so-called linguistic relativity thesis states, as Coetzee

depicts it, that "one thinks in forms limited and determined by the forms of one's native

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573 Coetzee and Attwell, *Doubling the Point*, 142.
574 Ibid., 141-142. Emphasis in original.

language".[575] In the latter half of the twentieth century, he continues, the related 'Whorf

hypothesis', such that "we see nature along lines laid down by our native languages",[576]

was widely discredited within the prevailing discourses of several of the academic

disciplines in which it had previously been considered plausible: in philosophy and

linguistics, he states, it is usually now denounced as circular; in anthropology and

psychology, by contrast, it is generally considered unsuitable for experimental

verification.

More interesting for Coetzee in this essay, though, is how the idea of linguistic

relativity applies to the language of the sciences and, more profoundly still, the

language of mathematics. Just as a close reading of a literary text and its translation

might enable one to recognise some of the limitations of each of the two languages

concerned, a comparison of the metaphysics of two different linguistic communities

enables us to locate assumptions embedded in the formal linguistic categories used to

express certain metaphysical concepts, and so to confront in a more scrupulous manner

any conclusions that are consequently generated. To clarify the significance of this

problem for our attempts to understand the world through the language of science,

Coetzee introduces the following passage from Whorf's *Language, Thought, and*

Reality:

> English and similar tongues lead us to think of the universe as a collection of
> rather distinct objects and events corresponding to words. Indeed, this is the
> implicit picture of classical physics and astronomy . . . The Indo-European
> languages and many others give great prominence to a type of sentence having
> two parts, each built around a class of word – substantives and verbs . . . The
> Greeks, especially since Aristotle, built up this contrast and made it into a law of
> reason . . . Undoubtedly modern science, strongly reflecting western Indo-
> European tongues, often does as we all do, sees actions and forms where
> sometimes it might be better to see states.[577]

In Coetzee's own wording the deterministic relation between form and concept is

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575 J. M. Coetzee, "Isaac Newton and the Ideal of a Transparent Scientific Language (1982)," in
    Doubling the Point: Essays and Interviews, by J. M. Coetzee and David Attwell (London: Harvard
    U.P., 1992), 181.
576 Ibid., 182.

rendered even more strongly: he states that Whorf's line of thinking leads to the conclusion that "we tend to excerpt objects out of the endless flow of nature because we have nouns that predispose us to do so"[578] and to "see actions and forces where our verbs predispose us to see them".[579]

In a literary context, Coetzee's interest in this phenomenon can be traced back at least as far as 1968. In the notes to a class from December 9 of that year – part of the 'Linguistics and Literature' course from which his later work on computer poetry emerged – he cites Richard Ohmann's observation that "any language persuades its readers to see the universe in certain set ways, to the exclusion of other ways."[580] Coetzee's course notes refer to Whorf in particular on a number of occasions from this time onwards: part of the course outline to the 1970-71 stylistics class involving Leibniz, Laplace, and Boltzmann, for instance, reads as follows: "Linguistic relativity and linguistic universals. Epistemic determinism and epistemic choice. Language acquisition. The generative-transformative model. Transformational stylistics."[581] Similarly, the notes to the first class of a 1975 course on 'Linguistics and Literature' raise some intriguing questions that ramify throughout Coetzee's fiction, and particularly within *Waiting for the Barbarians* and *Foe*:

> Class 1: Looking at "thisness." Are facial gestures a system? A repertory? How do we read them? Some other signs (eg 0, 1). When do we see signs, when things? What is an event? In history?[582]

As Coetzee explains in the Newton essay, Whorf's rather pessimistic conclusion offers up Newton himself as the archetypal language-bound scientist who, failing to recognise

577 Benjamin L. Whorf, *Language, Thought, and Reality: Selected Writings*, ed John B. Carroll (Cambridge, MA: MIT Press, 1956), 240-244. Quoted in Coetzee, "Isaac Newton and the Ideal of Transparent Scientific Language", 183.

578 Coetzee, "Isaac Newton and the Ideal of Transparent Scientific Language", 183.

579 Ibid.

580 J. M. Coetzee, "Linguistics and Literature," Seminar Notes, December 1968, National English Literary Museum, Grahamstown.

581 Coetzee, "Stylistics."

582 J. M. Coetzee, "Linguistics and Literature," Seminar Notes, 1975, National English Literary Museum, Grahamstown.

the assumptions embedded in his own language, projects its structure onto the universe

he observes, and concludes that the image of the universe that results is truly

representative of its reality. Taking issue with Whorf's depiction of Newton, Coetzee

spends the remainder of the essay using examples from Newton's writings to test the

degree of complicity attributable to inherited linguistic structures – both Latin and

English – in the origins of classical Western cosmology.

Following the publication of the first edition of his *Principia Mathematica*,

Coetzee notes, Newton endured widespread criticism among his rivals – including such

luminaries as Leibniz and Huygens – to the effect that his inverse square law of

gravitational force relied upon a fatally ill-defined notion of 'attraction'.[583] The 'occult'

nature of this notion, they proclaimed, recalled mediaeval standards of explanation.

Stung by this criticism, Newton set out to reconstitute his theory in more rigorously

definable and hence less controversial terms. While the commutative language of

mathematics, free from agentives and their implications of causality, seemed ideal,

however, Newton's correspondence indicates a determination to outline the inverse

square law not only in "the mathematical language appropriate to natural science",[584]

but also in more " 'figurative' presentations whose language is 'artificially adapted to the

sense of the vulgar' ".[585] Such 'vulgarisation' would serve both to render his theories

more amenable to the understanding of a wider public audience and, in Coetzee's words,

allow Newton

> to get beyond the self-enclosure of the *mathematical principles of natural philosophy* (as his great opus is titled) to natural philosophy itself, that is, to get beyond stating the mathematical relations between idealized bodies to stating in "real" terms relations between elements of the physical universe.[586]

The "self-enclosure" Coetzee describes here sounds enticingly similar to the conclusion

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583 The inverse square law states that two bodies attract one another with a force that is directly
    proportional to their masses and inversely proportional to the square of the distance between them.
584 Coetzee, "Isaac Newton and the Ideal of Transparent Scientific Language," 188.
585 Ibid.
586 Ibid. Emphasis in original.

he reached in his doctoral thesis, such that qualities stated in purely mathematical terms are condemned to remain "trapped in their own terminology":[587] in other words, the claim that a mathematical system is "self-enclosed" implies that its constituent expressions will necessarily remain meaningless beyond the tautologies they articulate until some element of the expression is defined in referential, non-mathematical language; yet, once this is done, the mathematical expression will no longer retain the ideal nonreferentiality for which it was initially prized. This was the double-bind beyond which his work in stylostatistics was ultimately unable to progress, and which energised much of the conflict at the heart of 'The Vietnam Project'. In this respect, then, one might choose to see the Newton essay not as a digression from Coetzee's intellectual path, but rather as the continuation of a long-standing and productive site of unresolved anxiety in his wider aesthetic.

In order to demonstrate the "desired transition or translation from mathematics to 'real' language – language with 'real' powers of reference to the universe",[588] Coetzee uses the example of the conceptual escalation from simply stating that any two given bodies can be associated with forces that can be expressed as functions of mass and distance, to defining that force as one of 'attraction'. This escalation, however, comes at a cost not unlike that Coetzee encountered when attempting to define qualities of style in Beckett's writing: while it "allows the reader to anchor his understanding of gravitation analogically to instances of attraction in his own experience, [...] he does so at the risk of attributing agency and even volition to the bodies".[589] By enabling an explanatorily useful illustration through the metaphor of 'attraction', then, one also adds meaning in a manner that is contingent to a significant degree upon the syntactic form in which the metaphor is expressed.

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587 Coetzee, "English Fiction of Samuel Beckett," 54.
588 Coetzee, "Isaac Newton and the Ideal of Transparent Scientific Language," 188.
589 Ibid.

Newton, as Coetzee explains, saw this added meaning "as the cause of error and the source of dispute"[590] and sought in those scholia intended for a more philosophically literate audience to resist "the temptation of the telling elucidatory metaphor in favor of a style of rhetoric degree zero as the appropriate philosophical equivalent of the relational symbolism of mathematics".[591] It was this sense of attempting to tend towards the supposedly purely relational language of mathematics that led Newton to not only avoid semantically metaphorical verbs such as 'attract' or 'repel,' but furthermore to avoid Subject-Verb constructions in Latin (and Subject-Verb-Object constructions in English) in which time order and causal order are arbitrarily implied. In the example Coetzee shares, Newton's use of the passive allows him to defer indefinitely the choice between an agentive account of gravity (whereby the centripetal forces themselves are responsible for the 'attraction') and an instrumental account (whereby the forces mediate the 'attraction' on behalf of some unaccounted-for agent). As Coetzee explains, though, this deferral may be useful to Newton, "but only as long as his purpose is understood to be a strategic or rhetorical rather than a scientific one – that is, to present an incomplete theory as persuasively as possible".[592] Rather than answering the question of the origins of the impulse of gravitational attraction, then, Newton's use of the passive here enables him to evade it, since, as Coetzee puts it, "it allows the elimination, by neat syntactic means, of a semantic agent felt to be irrelevant to the subject at hand".[593]

Another such evasion enabled by the systematic preference for one linguistic structure over another that is noticeable in post-Newtonian scientific papers, Coetzee continues, "is a fondness for nominalization":

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590 Ibid.
591 Ibid., 189.
592 Ibid., 191.
593 Ibid., 192.

> Transitive Subject-Verb-Object structures tend to be replaced with blocks of nominals linked with copulas or prefixed with existentials: "Corrosion of unpainted surfaces takes place" replaces "Rust corrodes unpainted surfaces." In the latter sentence it is the animistic metaphorical content that is felt to be irrelevant and therefore eliminated: Subject-Verb-Object order holds a threat of becoming a metaphor (at the level of syntactic structure) for transitive action. [594]

The replacement of transitive, agentive constructions with nominalised, passive ones leads the scientific writer away from a covertly metaphorical means of expression and towards the commutative, nominalised nonreferentiality of mathematics. Even so, while this may seem preferable, since "[m]etaphoric language is always ambiguous",[595] the distance between even the most stripped-down natural-language constructions and the language of mathematics, however small, is categorical. To begin with, Coetzee leaves this question open, stating that

> metaphor-free language may or may not achieve the unambiguous one-for-one mapping of reality, the no-nonsense 'mathematical plainness' that stood for the ideal of the Bishop Sprat and the Royal Society of Newton's day.[596]

Just as he had discovered in his own work in stylostatistics, though, there remains an apparently unavoidable double-bind: if mathematical language is genuinely non-referential and absolutely metaphor-free, it will be unable to express anything beyond logical extrapolations from its initial affirmations; whereas if it does express such a novelty, then its affirmations cannot be truly nonreferential and metaphor-free.[597]

Even more profoundly, perhaps, Coetzee states another problem regarding the claim that we may hope to gradually mitigate the mediating effect of natural language

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594 Ibid.

595 Ibid., 193.

596 Ibid. Coetzee uses this same quotation from Sprat in his notes to a 1978 course on 'Realism', in the context of a discussion of Ian Watt's *The Rise of the Novel: Studies in Defoe, Richardson and Fielding* (1957). Coetzee writes: "Locke's philosophy of language reflects the same faith in things directly experienced. The further back you go in language, the closer you come to <u>things</u>. The linguistic ideal is expressed by Sprat: the Royal Society wants to encourage 'a close, naked, natural way of speaking, positive expression, clear senses, a native easiness, bringing all things as near the mathematical plainness as they can, and preferring the language of artisans, countrymen, + merchants before that of wits and scholars.' " J. M. Coetzee, "Realism," Seminar Notes, 1978, National English Literary Museum, Grahamstown.

597 In relation to his assessment of Coetzee's engagement with realism, Jonathan Lamb suggests, without much elaboration, that Coetzee's consideration of an idealist solution to Newton's struggle is no more than a "detour that takes us back to the non-referential purity of mathematical symbols" Lamb, " 'The true words at last from the mind in ruins': J. M. Coetzee and Realism," 180.

by tending ever closer to the ideal of transparent, purely abstract, mathematical forms of expression:

> Can we really assert that the truth of the [gravitational] theory has emerged out of the attrition of animistic terms like *attraction* in which it was originally expressed? If we do so, we are embracing the most radical idealism: we are asserting that there exists a pure concept of attraction toward which the mind gropes via the sideways process of metaphoric thinking, and which it attains as the impurities of secondary meanings are shed and language becomes transparent, that is, becomes thought.[598]

Having raised the question, Coetzee decides that the scope of the Newton essay is insufficient to discuss fully the "ideal of a pure language in which a pure, pared-down, unambiguous translations of the truths of pure mathematics can be effected".[599] Though the two other essays Coetzee produced during this period engage with 'Newton's struggle' in a slightly more oblique fashion, the possibility that mathematics might provide a solution to deeply-rooted linguistic and literary problems is an essential element of each.

5.1.2 Rhetoric, the Agentless Passive, and the Language of Science

'The Rhetoric of the Passive in English' proceeds towards its mathematically-literate conclusion from an exploration of the question – long familiar in the field of stylistics – as to whether a speaker's epistemological habits might be derived analytically from his or her habits of language-use. Most pertinently to the present discussion, though, is Coetzee's discussion of the potential semantic issues consequent upon the unwitting identification of grammatical agency with causal agency in the language of science. While the early scientific papers of the Royal Society tend to describe observed phenomena using active structures – 'lime deters insects', in Coetzee's example – the more modern tendency is to remove the sense of agency such structures bestow upon

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598 Coetzee, "Isaac Newton and the Ideal of Transparent Scientific Language", 193.
599 Ibid., 193-194.

their grammatical subjects in favour of passive structures – 'insects are deterred by lime'
– in which this chance ascription of animistic powers is seemingly absent. Coetzee
develops the arguments he rehearses here in 'The Agentless Sentence as Rhetorical
Device', in which he specifies by way of example a number of methods through which
the agentless passive may be used to produce a series of unique rhetorical effects. The
first of these he derives from a passage from the opening of *Robinson Crusoe*, in which
the protagonist's father describes the favourable circumstances of the 'middle station' in
life through a series of agentless passives: where members of this class of people "were
not subjected"[600] to the same difficulties as those belonging to other classes, for
instance, and where they were not "harassed with perplexed circumstances",[601] and so
on, Defoe's narrative specifies no agent responsible for bestowing such good fortune.

As Coetzee points out, one might construct a plausible argument that Defoe's use
of the agentless passive enables him, deliberately or not, to present the failure or refusal
of Robinson's father to recognise the genuine source of his bourgeois privilege: the
removal of a grammatical agent removes the need for a named author, whether divine or
otherwise. Indeed, as Coetzee notes, one could quite legitimately use this example to
comment upon the movement towards the scientific understanding of the world that had
begun to flourish during Defoe's life:[602]

> The change-over from an "active" conception of God's role ("God shares the
> calamities of life ...") to a "passive" agentless conception ("The calamities of life
> are shared ...") can very well be taken as marking the transition from from the
> personal religious world of seventeenth-century Puritanism, whose prose
> representative is Bunyan, to a post-Newtonian world in which God has become a
> more abstract principle of order.[603]

It is in this connection between the use of the agentless passive and the transition to the

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600 J. M. Coetzee, "The Agentless Sentence as Rhetorical Device (1980)," in *Doubling the Point: Essays and Interviews*, by J. M. Coetzee and David Attwell (London: Harvard U.P., 1992), 170.
601 Ibid.
602 Born some time between the years of 1659 and 1661, Defoe's life developed contemporaneously with that of the early years of the Royal Society, which was founded in 1660.
603 Coetzee, "The Agentless Sentence as Rhetorical Device (1980)," 171.

modern scientific preference for a secular conception of causality that Coetzee's interest

in the relationship between natural-language descriptions and the language of

mathematics is first and most straightforwardly outlined. Given the structures of Indo-

European languages, he maintains, "it is difficult to think of acts as occurring without

agents":

> We might say that, in requiring that a predicate take a subject, the active sentence form expresses a certain preconception that acts have agents, and that the short [or agentless] passive, despite its convenience, leaves an uneasy feeling: it opens up an area of vagueness that can be simply skated over (as most of us do in everyday usage), but that can be explored and exploited for their own ends by writers who take seriously the question of whether language is good map of reality.[604]

One such serious writer, as Coetzee again explains, was Isaac Newton: recognising the

propensity for the intrinsic structures of Indo-European syntax to project otherwise

arbitrary causal relationships upon the bodies or forces being described, Newton

realised that science would only progress effectively if the natural-language structures

used to express its findings were deliberately rendered as unobtrusive as he believed

their mathematical equivalents to be. As Coetzee argues in 'The Rhetoric of the Passive

in English',

> it is plain that the highly relational, atemporal symbolism of mathematics (epitomized in the axiom of commutativity)[605] is more congenial to [Newton's] enterprise than subject-object sentence form, which tends to be iconic both of time relations (left-to-right) and of process (cause-result).[606]

Newton's "struggle with the inbuilt metaphysics of his language",[607] then, resulted in a

systematic programme of removing from his natural-language descriptions of physical

phenomena as much of the mediating effect of its formal aspects as the syntactic

constructions available to him allowed. As such, this resulted in an attempt to reconcile

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604 Ibid., 174.
605 Commutativity is the principle whereby the order of a group of quantities in a mathematical
    expression connected by one of a certain group of operators does not affect the result: the
    commutativity of multiplication, for instance, ensures that, for all real and complex numbers, $a \times b = b \times a$.
606 Coetzee, "The Rhetoric of the Passive in English," 167.
607 Ibid.

the apparently transparent, relational, nonreferential language of mathematics with the descriptive explanatory power available only through the referentiality of natural language. All the same, the story of how Newton came to make his most celebrated contribution to mathematics – the differential calculus – reveals that transparency was not always top of his agenda, and simultaneously provides a metaphor that resonates throughout Coetzee's fiction of the 1980s.

5.1.3 Newton's '*o*': A Substantial Ghost

Briefly put, the differential calculus is an analytical tool for measuring the 'rate of change' of two variables in relation to one another according to a given function. Capable of contributing to the articulation of precise models of change and motion, the differential calculus has applications within just about every branch of modern science, from predicting the behaviour of subatomic particles to modelling the orbits of celestial bodies; as such, the advent of a systematic method for calculating differentials proved to be a watershed moment for the history of science. Its very origins, however, were nevertheless based on a the affirmation of a pragmatic fiction: namely, the 'infinitesimal', a nonzero value so small as to be beyond measurement. Consider the equation:

$$y = x^2 - 4\mathrm{x} + 1$$

As the value of one of the two variables x and y changes, so must the value of the other, in order to maintain the equality of the equation. As shown in Figure 6, the resulting pairs of values may be plotted as coordinates on the Cartesian plane and represented by a quadratic graph:
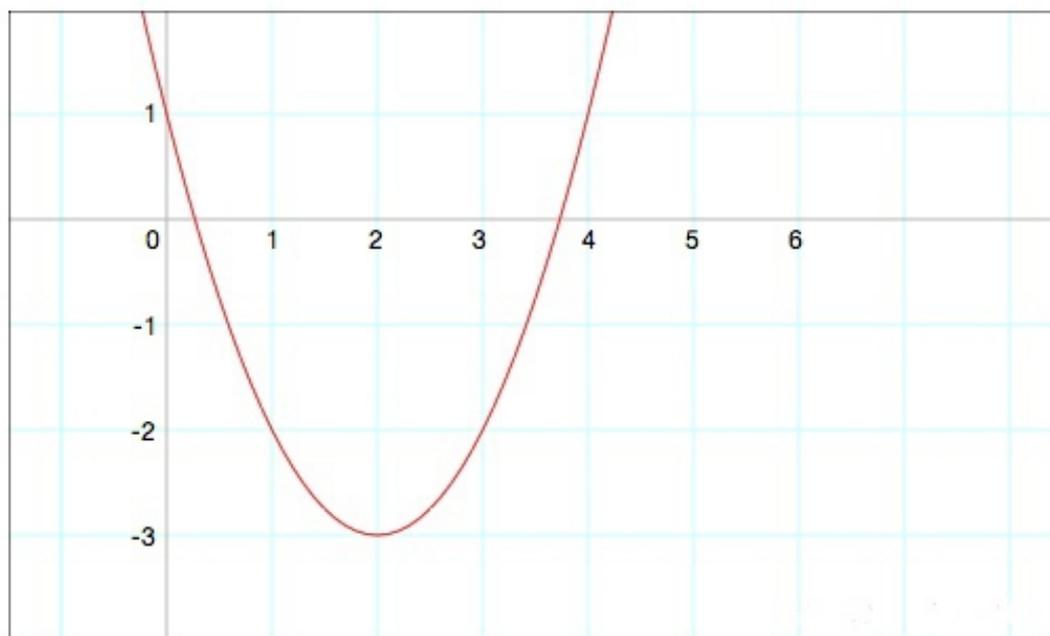
Figure 6:   A representation in the two-dimensional Cartesian plane of the equation $y = x^2 - 4x + 1$.

As we follow the progress of the graph along either axis, the rate at which the values of

x and y differ in relation to one another also varies. The value of the rate of this change

– the 'derivative' – of y with respect to x is equal to the gradient of a tangent line to the

curve at the specified point, (x, y). Consequently, as the curve of the graph becomes

steeper, the gradient increases accordingly.[608]

By way of example, consider again the equation given above.[609] In order to

determine the derivatives of the two variables in respect of one another – which he

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[608] Though each of Newton and Leibniz has a credible claim to having first invented the calculus, the following discussion focuses on the former, not least because of Coetzee's critical interest in his work. Newton's demonstration of his 'method of fluxions' appears in his *Mathematical Papers: Vol. III*: 79-81. The description outlined here of the history of Newton's development of the process is adapted from that work, in conjunction with the description given in Charles Seife, *Zero: The Biography of a Dangerous Idea,* (Harmondsworth: Penguin, 2000),115-116. It is also vital to note that the notation reproduced here is Newton's own, and is no longer in widespread use.

[609] Readers who find the following algebraic manipulation difficult to follow may prefer simply to engage with the accompanying prose: the most important point to take from this passage is Newton's decision to treat his *o* as either substantial or insubstantial depending on convenience rather than fidelity to truth or transparency.

denotes as $\dot{x}$ and $\dot{y}$ – Newton begins by postulating the smallest possible change in the value of x; or, in other words, the distance one might travel along the curve described by the function on the Cartesian plane in the shortest possible nonzero time. In that infinitesimal time, which Newton represents with the zero-like symbol o, the value of y would itself change an infinitesimal amount, a value that Newton denotes as $(y + o\dot{y})$; similarly x would change to $(x + o\dot{x})$. Substituting terms into our function produces

$$(y) \qquad = \quad (x)^2 \qquad - 4\,(x) \qquad + 1$$

$$(y + o\dot{y}) = (x + o\dot{x})^2 - 4(x + o\dot{x}) + 1$$

If we multiply out the terms of $(x + o\dot{x})^2$, we get

$$y + o\dot{y} = x^2 + (o\dot{x})^2 + 2x(o\dot{x}) - 4x - 4o\dot{x} + 1$$

Rearranging this expression produces

$$y + o\dot{y} = (x^2 - 4x + 1) + 2x(o\dot{x}) - 4(o\dot{x}) + (o\dot{x})^2$$

Since our initial function specified that $y = x^2 - 4x + 1$, we can subtract y from the left hand side and $x^2 - 4x + 1$ from the right hand side without consequence. What remains looks as follows:

$$o\dot{y} = 2x(o\dot{x}) - 4(o\dot{x}) + (o\dot{x})^2$$

At this stage, Newton decides that, if $o\dot{x}$ is infinitesimally small, then $o\dot{x}^2$ must be so small as to be close enough to zero to treat it as if it does not exist: "since o is supposed to be infinitely small so that it be able to express the moments of quantities," he concludes, "terms which have it as a factor will be equivalent to nothing in respect of the others. I therefore cast them out."[610] If we accept this move, then we must also accept that the same for all higher exponents of $o\dot{x}$. By removing the infinitesimal $o\dot{x}^2$ from the equation, then, we allow ourselves to follow the final few steps:

610 Isaac Newton, *The Mathematical Papers of Isaac Newton: Volume III*, (Cambridge: Cambridge U.P., 2008): 81.

$$o\dot{y} = 2x(o\dot{x}) - 4(o\dot{x})$$

$$\frac{o\dot{y}}{o\dot{x}} = 2x - 4$$

$$\frac{\dot{y}}{\dot{x}} = 2x - 4$$

In plain English, this final equation means that the derivative of y with respect to x is equal to $2x - 4$, for all real number values of x. In our example, it follows that at the exact instant that $x = 2.5$, the derivative of y with respect to x can be calculated to 1. This can be represented graphically as shown in Figure 7.
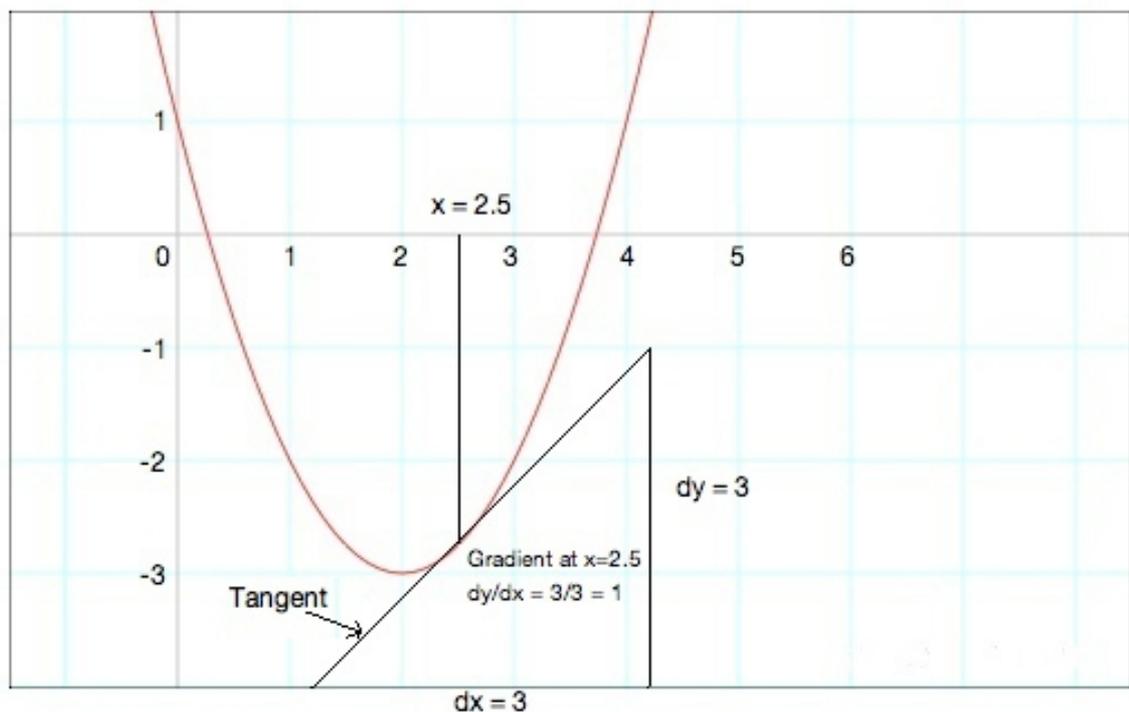
Figure 7:   A representation of $y = x^2 - 4x + 1$, with a tangent drawn at $x = 2.5$.

By the time $x = 3$, however, the gradient of the curve becomes steeper; the derivative has increased to 2, as in Figure 8:
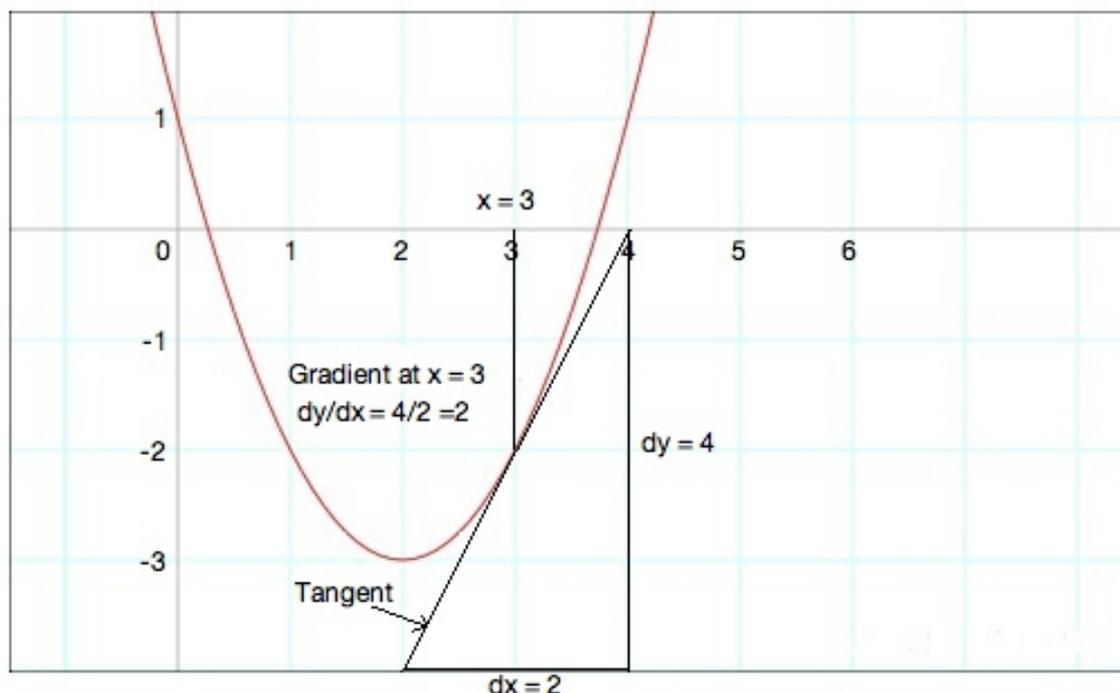
Figure 8: A representation of $y = x^2 - 4x + 1$, with a tangent drawn at $x = 3$.

In summary, Newton's trick here is to treat o as simultaneously zero and nonzero, simultaneously absent and substantive. To prefigure a metaphor Coetzee uses in *Foe*, one might therefore consider Newton's o to be a 'substantial ghost': it has substance when substance is required, but can just as easily dissolve into nothingness when a favourable narrative so necessitates.

In more general terms, the story of Newton's o comes back to the nature of the point in the Cartesian plane: though the point is by definition zero-dimensional, its reality as a grammatical fiction enables it to play a productive, generative role in a number of mathematical contexts. In Newton's example, the spaces measured by differentiation are not literally infinitely small, as then they would occupy no space at all. We must, however, assume them to be so – to be both zero and nonzero – for differentiation to work; and years of successful usage within just about every field of

science imaginable, from quantum mechanics to deep space cosmology, gives us good reason to believe that it works perfectly adequately for any scientific purposes thus far encountered. Newton's *o* ramifies exactly because it is simultaneously both void and substance: for it to communicate effectively in the context of the discourse of either geometry or algebra – in other words, perhaps, the 'cultural grids' from which those two sign-systems emerge – it must be both a nominalised, 'real' thing and an embedded, prenominalised nothing.

In his summary conclusion to the Newton essay, Coetzee ultimately locates in this evasive, contradictory figure something of a kindred spirit:

> we find in Newton a real struggle, a struggle sometimes […] carried out in awareness of the issues involved, to bridge the gap between the nonreferential symbolism of mathematics and a language too protean to be tied down to single, pure meanings.[611]

Coetzee had been engaged in just this kind of struggle in his stylostatistical work of the late 1960s. As he looked further into the issue during the 1970s, he came to conclude that the gaping river between mathematics and natural language was infinitely wide, and so renounced his earlier attempts at bridge-building. Now, in the early 1980s, he could approach the struggle renewed by placing his fictional protagonists on one side of the river, and the objects of their desire in clear sight, on the distant, opposite bank. In both *Waiting for the Barbarians* and *Foe* the concepts of the zero and the substantive are essential to Coetzee's wider thematic concerns: in each case his protagonists are forced to confront the falsifying biases implicit in the historical-cultural matrix through which they seek to engage with a silent and obscure 'outsider' in whom they gradually take an unlikely interest; in each case, moreover, his depiction of the privacy and non-transparency of mathematics is key to our understanding.

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611 Coetzee, 'Isaac Newton and the Ideal of a Transparent Scientific Language," 194.

5.2 *Waiting for the Barbarians* (1980)

> And now, what's going to happen to us without barbarians?
> They were, those people, a kind of solution.[612]

Completed during the same period in which Coetzee undertook the research upon which his three essays in stylistics were based, *Waiting for the Barbarians* not only engages with a number of similarly mathematically-influenced concepts, but does so in the context of a taut, disquieting fictional narrative towards the resolution of which an awareness of such concepts is perhaps surprisingly illuminating. Much of the conflict at the heart of the novel derives from its protagonist's scrupulous unwillingness to accept the convenient 'truths' underlying his community's blithe complicity in the colonialist activities of the Empire he serves. Like Coetzee has said of himself, then, this provincial Magistrate is "suspicious of formulas of language that have hardened and set, that people believe in without question";[613] most abhorrent to him, to paraphrase the Cavafy poem from which the novel takes its title, is the way in which such formulas figure the barbarian people outside the walls of their community as a "kind of solution" to whatever problems the imperial culture may have.

Before the narrative time in which the novel takes place, the Magistrate had apparently been an exemplarily dutiful functionary of state; his complex and conflicted desire for a particularly enigmatic barbarian girl, however, makes him begin to question the foundations of the relationship he seeks to build with her. How should he reconcile himself to her wordless hand-gestures, or to the emblems of past torture that scar her near-blinded eyes? "It has been growing more and more clear to me", he concludes,

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612 C. P. Cavafy, 'Waiting for the Barbarians,' in *Collected Poems*, trans. Edmund Keeley and Philip Sherrard, ed. George Savidis. Rev. ed. (Princeton, N.J.: Princeton U.P., 1992), 18.
613 Scott, 'Voice and Trajectory,' 84.

"that until the marks on this girl's body are deciphered and understood I cannot let go of her".[614] Closer though the two of them become in physical proximity, though, her thoughts, gestures and motives remain inexplicable to him. Meanwhile, in their frustrated analogue of a sexual relationship their bodies remain "diffuse, gaseous, centreless, at one moment spinning about a vortex here, at another curdling, thickening elsewhere; but often also flat, blank".[615] Finally, as his growing desire for truth becomes overwhelming, he comes to accept that he can do no more than "swoop and circle around the irreducible figure of the girl, casting one net of meaning after another over her".[616] The Magistrate's direct superior – the brutal Colonel Joll – has no such problems: bound by the necessities of his office to manufacture the most expedient of 'truths', this representative of callous imperialism uses torture as a medium for manipulating the testimony of those perceived to be enemies of the state. Thus mandated, he has come to see torture as constituting an iterative, truth-directed process aimed at leading the subject towards the limit of tolerance, the point before which his or her words cannot be trusted: "Pain is truth," he maintains, "all else is subject to doubt".[617] Whatever self-serving words a man may concoct, Joll concludes, "the last truth is told only in the last extremity".[618] In this way Joll satisfies his and the Empire's appetite for definite truths, thus furnishing the imperial drive to expand with all the fixed certainties it requires.

The Magistrate, by contrast, is unprepared to debase himself before such an obviously corrupt and self-serving process; consequently his world becomes increasingly saturated with voids, with ambiguities towards the resolution of which language is no certain guide. Over the course of the novel, the gnawing presence of

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614 Coetzee, *Waiting for the Barbarians*, 33.
615 Ibid., 36.
616 Ibid., 89.
617 Ibid., 5.
618 Ibid., 105.

those voids seeds in him a growing distaste for the distorting, falsifying rhetoric through which the Empire represents and vilifies the so-called 'barbarians' that dwell at its limits. As he comes to comprehend the limits of his capacity to locate the 'truth' of this nomadic tribe, and as he becomes more familiar with each of the closed discourses that together make up the truths and certainties that bind and sustain his culture and community, he begins to understand the tendency of those discourses towards self-justification, insularity, and fear of that which is other. One of the principal ways in which Coetzee thematises this journey from credulous conformist to sceptical, isolated outlaw is through a subtly woven motif of the unbridgeable gap between, to quote the Newton essay once more, "the nonreferential symbolism of mathematics and a language too protean to be tied down to single, pure meanings".[619]

5.2.1 Perfect Numbers

As is so often the case in Coetzee's early fiction, one of the primary themes of *Waiting for the Barbarians* concerns its protagonist's dawning realisation of the partiality and constructedness of history and cultural norms. Fascinated by the past civilisations upon whose dune-covered ruins his own Empire has both literally and metaphorically been built, the Magistrate begins to excavate the stories hidden beneath the desert sands. Among the ruined, subterranean settlements he discovers relics of a lost 'barbarian' society distanced from his own not only by time, but also by culture and language. The relics that most occupy his thoughts are a series of wooden slips that are marked with a script the like of which he has never previously encountered. While the first such slips his team of excavators uncover are "scattered like clothespegs in the ruins, but so bleached by the action of sand that the writing has been illegible",[620] he ultimately

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619 Ibid.
620 J. M. Coetzee, *Waiting for the Barbarians*, (London: Vintage, 2000), 16.

comes upon "a bag that crumbled to nothing as soon as it was touched"[621] containing a cache upon which the characters are "as clear as the day they were written".[622] Unable to locate any reference to the buried settlement in the recorded legends of the barbarian people, the Magistrate begins to speculate on the nature of their civilisation and the lessons that he might learn from its demise:

> Perhaps ten feet below the floor lie the ruins of another fort, razed by the barbarians, peopled with the bones of folk who thought they would find safety behind the high walls. Perhaps when I stand on the floor of the courthouse, if that is what it is, I stand over the head of a magistrate like myself, another grey-haired servant of Empire who fell in the arena of his authority face to face at last with the barbarian. How will I ever know? By burrowing like a rabbit? Will the characters on the slips one day tell me?[623]

In service of his desire to bridge the cultural gap between himself and the barbarian other, then, the Magistrate determines that he must first bridge the historical gap between his impending moment of colonial encounter and that of the generation buried beneath his feet; to achieve this, he surmises, he must divine whatever meaning he can from those silent, inscrutable slips. In the first instance, he seeks to connect with the lost culture they represent through the means of a purely lexigrammatic system; namely a syllabary, containing signs that need not bear a graphical resemblance to their referents. In the absence of any frame of semantic reference, however, the characters on the slips remain radically untranslatable; they are effectively reduced to the same pre-linguistic status as the buildings and ceramics alongside which time has buried them, as substantive signifiers divorced from their signifieds.[624]

Considering the slips once more, he follows his native instinct to count them and

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621 Ibid., 15.
622 Ibid., 16.
623 Ibid.
624 This aspect of the novel has understandably prompted readings within which the work of Jacques Derrida are instructive. Perhaps the most convincing is that of Lance Olsen, who discusses the novel in terms of what Derrida calls the 'metaphysics of presence', arguing that it thematises the necessary frustration of the reader's desire to locate a stable and singular 'truth' behind every written sign. See Lance Olsen, "The Presence of Absence: Coetzee's *Waiting for the Barbarians*," *Ariel*, 16 (April 1985), 47-56.

is rewarded for his mathematical awareness with a potentially significant finding: "There were two hundred and fifty-six slips in the bag," he notes: "Is it by chance that the number is perfect?"[625] Having raised the question, he lays the slips out on the floor, "first in one great square, then in sixteen smaller squares, then in other combinations",[626] in the hope that a picture might reveal itself within these familiar geometric shapes. No such picture emerges.

A reader insufficiently familiar with Coetzee's background in mathematics might be tempted to reluctantly join the Magistrate in his decision to give up on excavating their meaning; the slips' re-emergence at the novel's end, however, not only provides a neat framing device for the events contained within, but also implies their significance as a motif. On this understanding, Coetzee's choice of the number 256 is in this context far from idle. The simple fact that the Magistrate attributes the quality of 'perfection' to this quantity tells us something potentially meaningful about the system of numeration employed within his own culture, while also tempting both him and the reader to draw conclusions about the possible connections between his culture, the 'barbarian' culture, and our own. Since the slips refuse to conform to any pictographic or lexigrammatic system he knows, the only meaningful statement the Magistrate can make regarding them concerns their quantity. In the absence of a semiotic or semantic context, then, is this bald statement of quantity sufficiently universal as to convey meaning across radically othered cultures? More broadly, are the signs of mathematics genuinely capable of transcending cultural difference and projecting meaning across such radically othered communities, or as Coetzee's quotation regarding Newton suggests, are they categorically private?

In the first place, it is necessary to establish that conventional usage in

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625 Ibid., 16-17.
626 Ibid., 17.

contemporary number theory does not define the number 256 as 'perfect', exactly. A 'perfect number' is defined as a positive integer that is equal to the sum of its proper divisors. The lowest-value perfect numbers are therefore:

$$6 = 1 + 2 + 3$$

$$28 = 1 + 2 + 4 + 7 + 14$$

$$496 = 1 + 2 + 4 + 8 + 16 + 31 + 62 + 124 + 248$$

By contrast, 256 is not perfect:

$$256 \neq 1 + 2 + 4 + 8 + 16 + 32 + 64 + 128 = 255$$

The phenomenon to which the Magistrate refers is, in fact, the 'perfect square': these far more common numbers[627] are those that are equal to the product of a rational number multiplied by itself: in the case of 256 this number is 16. The Magistrate's immediate response to his realisation that the number of slips is 'perfect' is to consider the ways in which the geometric consequences of 256 being a perfect square facilitate further possibilities of referential, pictographic signification: in this regard his reading of the slips necessarily excludes any meaning beyond the scope permitted by his existing linguistic and semiotic experience.

The Magistrate's reflections, though, might not have ended with the pictographic or lexigrammatic potential of the slips. Importantly, the mathematical observation he makes is geometric rather than arithmetic: he observes only how the number 256 may be represented visually – as a sixteen-by-sixteen square – rather than how the quantity of slips may be represented numerically. Attracted to the possibility of forging a connection with the lost society through a shared symbolic, referential meaning, he fails to recognise the one plausibly non-referential feature of his discovery that may transcend cultural difference: the sheer arithmetic fact of their existence as individuated,

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627 To illustrate this disparity, one might note that, including 0, there are as many as eight perfect squares less than 50; by contrast, to find the eighth perfect number, one must count as high as 2305843008139952128.

countable, material units. To elaborate, since the Magistrate's discovery of the number

of slips is written in words rather than numerals – i.e. "two hundred and fifty-six" rather

than "256" – it is apparent that his culture uses a decimal positional notation, denoting

numerically the number of hundreds, tens, and units.[628] This observation is further

supported by the fact that, in decimal notation, $256 = 16^2$. The proposition that the

culture that produced the slips shared this decimal system seems, by contrast, far less

likely: whereas in decimal notation, a quantity equal to two hundreds, five tens, and six

units is written as a seemingly insignificant 256, several other notations give a clearer

indication of the 'special' quality of this particular quantity of units, and so seem more

plausible as the system used by this earlier culture. Being a power of two (i.e. 2^8, or

2x2x2x2x2x2x2x2), then, 256 is a 'round' number in a variety of bases, as the following

table indicates:

Base	Quantity of slips in given base
2 (binary)	100000000
4 (quaternary)	10000
8 (octal)	400
16 (hexadecimal)	100
32 (duotrigesimal)	80

For a number of reasons, of course, this fact alone may be no more than coincidence:

the number of slips that remain in the bag may have accrued totally by chance; the

barbarian culture may have used a different base altogether; or the Magistrate's

geometric 'perfect square' observation may hold true. All the same, wherever a culture

predicates its meaning system upon an initial base-2 affirmation, each of the powers of

two, including the number represented in decimal notation as 256, is likely to occur

628 The 'base' or 'radix' of a positional numerical system is the number of digits it counts for each
    position before assigning an additional position. For example, the decimal or base-10 system counts
    the ten digits between 0 and 9, inclusive, whereas the binary or base-2 system counts just zeros and
    ones.

with far greater than chance frequency.[629] As such, in the absence of counter-evidence, there is good reason to believe that the buried culture that produced the slips had a mathematical system that originated from a binary division that retained its visible presence in the culture, not to be superseded by more intricate systems such as the decimal notation. Following Coetzee's work on Whorf and Newton, then, one might justifiably work on the provisional assumption that the metaphysics of the buried culture must have been predicated on binary division to an even greater extent than the Magistrate's and our own, and that their language and thought must therefore have been founded on even sharper distinctions between such binary concepts as substance/absence, plenum/vacuum, self/other, and, indeed, 1/0.

One example of a linguistic community in which the number represented in decimal notation as 256 occurs frequently is that of computing. As Coetzee would have been eminently familiar from his time as a programmer, computers have traditionally operated through binary code, storing information as 'bits' – an abbreviation of 'binary digits' – such that the information recorded in a position in the code is simply either a '0' or a '1'. Historically, these bits have been put together in strings of eight places, such that the *de facto* standard unit of information in a computer, known as a 'byte', contains 2^8 values; in other words, a byte contains 256 pieces of information. As a standard unit – of which the megabyte, gigabyte, and terabyte are familiar multiples – 256 therefore

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629 It is worth noting that an anthropology of mathematical notation suggests that the proposition that these cultures share numerical systems is far from given. Not only is it the case that even the dominance of positional notation confirmed itself only relatively recently in human history – one need only consider the 'sign-value' system of Roman numerals to see this – but the relative homogeneity of the underlying metaphysics of number we see today in the widespread use of the decimal (base-10) system is also a fairly modern reality: the Babylonians, for instance, used a sexagesimal (base-60) system, while the Mayans used a vigesimal (base-20) system. Similarly worthy of comment here is the fact that historical accounts of the alternative number systems encountered by anthropologists during periods of colonial exploration have often reflected the essentially racist attitudes of the explorers, for whom the most commonly encountered bases – quinary and vigesimal in particular – conveniently, though illogically, represent evidence of an inherent 'primitivism.' Claudia Zaslavsky's *Africa Counts: Number and Pattern in African Culture*. 3rd. ed. (Chicago: Lawrence Hill Books, 1999) recounts the history of this process in relation to anthropological studies of the use of numerical concepts among the peoples of the African continent.

appears quite naturally throughout the world of computer programming: there are, for instance, 256 characters available in the extended ASCII character encoding scheme; each of the three colour channels in a digital colour image enables 256 different values; and, prior to the Office 2007 update, spreadsheets in Microsoft Excel contained 256 columns. Computer programming therefore provides a useful example of the widespread proliferation of 256, and is especially relevant in this instance owing to its prominent place within Coetzee's intellectual development.

The most important point to note here, though, is that the quantity itself – represented by the bit string – has no meaning at all until it is decoded by an informed reader. As the following table suggests, it is embedment within a context of agreed conventions for interpreting the strings that renders them meaningful to the culture or community among whom the translational convention is familiar:

Context	Meaning of the Bit String '01000001'
Decimal Number	65
ASCII character encoding scheme	A
Intel 8080 B-bit processor	The operation 'MOV B, C'
Red Colour Channel	A shade of red with 65/256 intensity
Braille	

As the last element of this table demonstrates, one use of the 8-bit binary code resonates in an intriguing fashion with another theme of the novel: given the prominent thematisation of various forms of blindness – both literal and metaphorical – in *Waiting for the Barbarians*, there is perhaps a certain irony in the fact that the Braille 8-dot system, following the computer industry standard Unicode, is yet another language system with a total of 256 characters. The novel begins with the Magistrate wondering whether Colonel Joll might be blind, for instance, while his inability to assess quite the

degree to which the barbarian girl can see from her apparently torture-scarred eyes is a constant source of anxiety. While the thematisation of blindness in the novel has already received a significant degree of critical attention, to which the above may provide an interesting complementary aspect,[630] the connection of binary systems to the idea of mathematics enabling us to reinvent the whole of civilization requires close attention in the context of *Waiting for the Barbarians*.

5.2.2 Binary Systems and Information Theory

For two of the more influential thinkers within the development of Coetzee's interest in the philosophy of mathematics – namely Leibniz and Laplace – the question of whether the complexity of the universe may be compressed and encoded in binary notation was highly significant: for Leibniz, whose refinement of the binary system often sees him credited as the first computer scientist and information theorist, this truth is contained in the maxim *Omnibus ex nihil ducendis sufficit unum* (One suffices to derive all out of nothing); for Laplace, originator of the idea of the Supreme Calculator and responsible for the first published articulation of causal or scientific determinism in the form of his 'Demon', Leibniz's ideas border on sacrilege, in the sense that he

> saw in his binary arithmetic the image of Creation . . . He imagined that Unity represented God, and Zero the void; that the Supreme Being drew all beings from the void, just as unity and zero express all numbers in his system of numeration . . . I mention this merely to show how the prejudices of childhood may cloud the vision of even the greatest men![631]

Likewise, to recall, both 'Truth Lies Sunken' and 'Samuel Beckett and the Temptations

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630 An early essay on the subject is Dick Penner, 'Sight, Blindness and Double-thought in J. M. Coetzee's *Waiting for the Barbarians*,' *World Literature Written in English* 26, no. 1, (1986), 34-45. The thematised opposition of knowledge and blindness in the novel forms a significant part of Sue Kossew's critique of the novel; see, in particular, Sue Kossew, *Pen and Power: A Post-colonial Reading of J. M. Coetzee and André Brink*, (Amsterdam: Rodopi, 1996), 89-94. Finally, for a discussion in relation to Foucault's thoughts on blindness, see Jane Poyner, *J. M. Coetzee and the Paradox of Postcolonial Authorship*, (Farnham: Ashgate, 2009), 62.

631 Pierre-Simon Laplace. Quoted in Gregory Chaitin, *Metamaths: The Quest for Omega*, rev. ed. (London: Atlantic Books, 2007), 61.

of Style' demonstrate Coetzee's familiarity with the constructivist principle, following

Dedekind, that one need only make an affirmation of separation into two categories – *x*

and not-*x* – in order to provide the foundations for the whole of mathematics, the

particular details of which are essentially therefore contingent upon features intrinsic to

the initial act of affirmation. During the latter part of the twentieth century, moreover,

one discipline in which Coetzee was highly educated demonstrated in no uncertain

terms the possibility that this principle has even greater significance beyond the

philosophy of mathematics.

During the 1960s and 1970s Coetzee's work as a linguist – and particularly as a

stylostatistician – brought him into close and continuous contact with the academic

discipline of information theory. To give one example, one might consider his notes to

the 1975 course in 'Linguistics and Literature' discussed earlier in this chapter, in which

he cites the theorem from information theory such that "information is inversely related

to the probability of occurrence."[632] He expresses this theorem in its conventional form,

as

$$I = -\log_2 P$$

in which *I* stands for information, *P* for the probability of an event's occurrence, and

$-\log_2$ indicates that one should calculate the negative of the binary logarithm for the

value of *P*.[633] Put simply, this formula quantifies the number of 'bits' of information –

effectively the number of places in a binary system – one needs in order to express the

amount of information resulting from the occurrence of a given event. For instance, if

an event is certain to happen (i.e. *P* = 1) – such as achieving a head in the toss of a

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632 Coetzee, "Linguistics and Literature," 1975.

633 The logarithm of a number is the power or exponent to which another number, its base, must be raised in order to produce that number. For example, in base 2, the logarithm of 8 is 3, since 2 must be raised to the power of 3 in order to produce 8. In other words, $2^3 = 8$. Further, one may clarify the general concept of the logarithm with the general definition such that $y = \log_b X$ is the inverse function of $b^y = x$. So, since $2^3 = 8$, one may state that $3 = \log_2 8$.

single, totally biased coin – then no information is to be learned from its occurrence (i.e. $I = 0$). If one were to toss a totally fair, four-sided die with sides labelled *a, b, c, d,* though, the probability of observing a *b* is 0.25: given that a binary system with two bits can be permuted in four ways – (0,0), (0,1), (1,0), (1,1) – the amount of information learned by the occurrence of *b* is equal to two bits, one for each of the positions required to express a zero or a one.

The central point to take from this strand of information theory is its founding contention that non-numerical information may be encoded in numerical form, by means of characterising events in probabilistic terms; the formula $I = -\log_2 P$ provides the conventional method for doing just this. One implication of accepting these two principles together that has become widely accepted in the discourses of both information theory and artificial intelligence is that *all* information can be expressed in numerical form, and that these numerical expressions might themselves be reduced to truisms implicit in form of the initial affirmation of *x* and not-*x*. As such, the nature and the validity of that initial affirmation – which, adopting the language of binary notation, one might perhaps gloss as the affirmation of the 'zero' and the 'one' – become pivotal factors not only for the development of a valid mathematics, but also in the construction of a natural language system which depends in any significant sense on oppositions such as presence/absence, being/nothingness, or substance/void.

5.2.3 Reinventing the Whole of Civilisation

In *Waiting for the Barbarians*, it is ultimately the Magistrate's inability to extract the meaning hidden within the wooden slips that catalyses his realisation that the Empire's brutal treatment of the barbarians is enshrined not only in their culture, but in the conceptualisation of the 'civilised world' that emerges from the self-enclosure of their

linguistic community. As the novel draws to a close, and with the Magistrate having

extricated himself from this community at great personal cost, he is once again forced to

consider what the slips might tell him about the buried culture and how the information

he discerns might help him to live in the future. Standing accused as a traitor, he finds

himself being interrogated by Colonel Joll as to whether the slips and the symbols they

bear constitute a secret language of which he is apprised, and through which he has been

communicating with the enemies of the Empire. Seeking a means of defending himself,

he once again ponders the meaning of the script:

> I look at the lines of characters written by a stranger long since dead. I do not even
> know whether to read from right to left or from left to right. In the long evenings I
> spent poring over my collection I isolated over four hundred different characters
> in the script, perhaps as many as four hundred and fifty. I have no idea what they
> stand for. Does each stand for a single thing, a circle for the sun, a triangle for a
> woman, a wave for a lake; or does a circle merely stand for 'circle', a triangle for
> 'triangle', a wave for 'wave'? Does each sign represent a different state of the
> tongue, the lips, the throat, the lungs, as they combine in the uttering of some
> multifarious unimaginable extinct barbarian language? Or are my four hundred
> characters nothing but scribal embellishments of an underlying repertory of
> twenty or thirty whose primitive forms I am too stupid to see?[634]

Finding no answer to his own questions, Coetzee's protagonist ends his story still unable

to bridge the gap between his culture and the past, and so instead looks ahead to an

equally obscure future: with his once heavily populated outpost now seemingly living

out its last days under Imperial rule, the Magistrate sits down to write a history for the

benefit of whichever future historians should come to take his place. Beginning to

represent his civilisation by means of the natural cycles to which its culture orients itself

– it was "the time of the seasons, of the harvests, of the migrations of the waterbirds"[635]

– he realises the truth of his own inability to escape the falsifying rhetoric implicit in the

telling of this story; he "wanted to live outside the history that Empire imposes on its

subjects, even its lost subjects",[636] and "never wished it for the barbarians that they

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634 Ibid., 121.
635 Ibid., 169.
636 Ibid.

should have the history of Empire laid upon them".[637] Though he realises at last the possibility that the poplar slips might "contain a message as devious, as equivocal, as reprehensible"[638] as his own, he finally accepts that a future civilisation will find more of interest in them than in anything he might leave behind as a relic of his own history.

Finally, then, the Magistrate concludes that self-abnegation is his only legitimate course of action in a world where the chance metaphysics imposed by one's place in history entirely determine and circumscribe one's ability to engage with that world and its inhabitants. Unprepared to accept the constructed truths of his culture, he is left cultureless, bereft of all meaning and direction; this, the novel seems to propose, is the only truly noble path open to the idealist. Placing this conclusion alongside the two quotations with which this chapter began, moreover, one might choose to equate this position to some degree with Coetzee's own at this stage in the early 1980s: if our metaphysical speculations are of the same order of privacy as our mathematics, and if our mathematical concepts are constructivist in nature, then the forms of 'civilisation' they allow us to invent are mere tools of oppression in the hands of those whom history has chosen to place in the position of greatest power. Opting out of such a history, the Magistrate ends his story with a solemn pledge to preserve the slips with linseed oil and an oilcloth, and then to bury them where he found them; for another of Coetzee's most enduringly intriguing protagonists, by contrast, the excavation of an inscrutable sign-system is in an important sense where the story begins, and where a discussion of mathematical idealism is most illuminating.

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637 Ibid.
638 Ibid.

5.3 *Foe* (1986)

Though it took three years from inception to publication, Coetzee began to write his fifth novel, *Foe*, in 1983, immediately after the publication of *Life and Times of Michael K*.[639] As such, the intellectual context within which he developed the Newton essay was still fresh in the memory. With both this and the above discussion of *Waiting for the Barbarians* in mind, it shall be necessary to focus here on the specifically mathematical context of the novel's thematisation of the pervasion of the binary opposition between irreducible, non-referential, material 'substance' and subjective, referential, abstract 'story'.

Taking into account Coetzee's own statement in a 1985 interview that he didn't "see any disruption between [his] professional interest in language and [his] activities as a writer",[640] as well as the thematisation of the capacity of the 'zero' to simultaneously communicate both absence and substance, the novel's principal engagement with the notions of storytelling, subalternity, and the circular logic of realism can be seen as in part exploratory of a problem not too dissimilar to Newton's struggle "to bridge the gap between the nonreferential symbolism of mathematics and a language too protean to be tied down to single, pure meanings".[641] One might also recall here Coetzee's earlier engagement with the work of Simeon Potter, for whom the "mathematician's symbols are semantically tautologous and his constructions signify in terms of relationship, not of substance".[642]

Rather like the Magistrate in *Waiting for the Barbarians*, then, *Foe*'s protagonist spends much of her time seeking to substantiate the terms through which she experiences her existence. Having first gone to Brazil in search of her estranged

639 See Coetzee and Attwell, *Doubling the Point*, 146.
640 Jean Sevry, "An Interview with J. M. Coetzee", *Commonwealth: Essays and Studies*, 9 (1986), 1.
641 Coetzee, "Isaac Newton and the Ideal of a Transparent Scientific Language," 193-194.
642 Potter, *Language and the Modern World*, 168-169.

daughter, Susan Barton finds herself shipwrecked on an island with two enigmatic

figures, the 'truth' of whose personal histories is to remain irreconcilably beyond her

grasp: Cruso, by virtue of the fact that "the stories he told […] were so various, and so

hard to reconcile with one another",[643] and Friday, because his tongue has apparently

been cut out by 'slavers'. In her search for the truth of the story these two men have

shared – and that of her own role in the developing narrative – Susan ultimately finds

herself caught in the limbo between Cruso's surfeit of substantive 'truths' and Friday's

lack. At the novel's enigmatic conclusion, the narrative leaves behind the "place of

words"[644] within which Susan's search had taken place, and dives into "a place where

bodies are their own signs"[645] and in which each "syllable, as it comes out, is caught and

filled with water and diffused".[646] This apparent rejoicing in the ineluctable singularity

of the substantial body, however, encounters significant difficulties when considered

alongside the novel's thematisation of the complex nature of both metaphysical

'substance' and the zero.

5.3.1 Substance

One of the most prominent themes in the novel is that of the cultural process through

which a civilisation allows certain events and concepts to be deemed 'substantial' while

others must remain eternally 'insubstantial'.[647] In the development of this theme, Coetzee

frequently depicts Susan as the archetype of the anxious empiricist, as she seeks to

convey truth in the only way that her socio-cultural context allows her: through the

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643 J. M. Coetzee, *Foe*, (London: Penguin, 1986), 11.
644 Ibid., 157.
645 Ibid.
646 Ibid.
647 Perhaps the most extensive critical discussion of the role of 'substance' in *Foe* is that of Bill Ashcroft, for whom the "question of the substance, or *substantiality* of the characters themselves, is one that haunts the novel as it haunts all Coetzee's work in which the border between the narrative and that which lies without it is continually ruptured". Bill Ashcroft, 'Silence as Heterotopia in Coetzee's Fiction,' in *Strong Opinions: J. M. Coetzee and the Authority of Contemporary Fiction*, Sue Kossew, Julian Murphet, and Chris Danta (Continuum: New York, 2011), 151.

accumulation of what she sees as the undeniable material facts of her empirical

experience. One emblem of this desire is her quest to have the famous writer, Daniel

Foe, construct for publication an official account of the singular 'truth' of her time on the

island. In a letter pleading thus, she emphasises through her description of the island the

empiricist, realist pretensions to which her understanding of 'truth' holds so fast:

> Closing my eyes, I gather my strength and send out a vision of the island to hang
> before you like a substantial body, with birds and fleas and fish of all hues and
> lizards basking in the sun, flicking out their black tongues, and rocks covered in
> barnacles, and rain drumming on the roof-fronds, and wind, unceasing wind: so
> that it will be there for you to draw on whenever you have need.[648]

Just prior to this description, the first mention of 'substance' in the novel clarifies

Susan's conflation under this banner of the concepts of materiality and truth, while also

simultaneously alluding to the tendency for storytelling to render the storyteller herself

insubstantial and disembodied:

> When I reflect on my story I seem to exist only as the one who came, the one who
> witnessed, the one who longed to be gone: a being without substance, a ghost
> behind the true body of Cruso. Is that the fate of all storytellers? […] Return to me
> the substance I have lost, Mr Foe: that is my entreaty. For though my story gives
> the truth, it does not give the substance of truth (I see that clearly, we need not
> pretend it is otherwise).[649]

From here, Susan experiences an increasing desire to ensure the survival of "the

substance of truth" against the onslaught of storytelling. Back in England with Friday,

for instance, she is confronted by a young girl who claims to be her daughter.[650]

Convinced of the untruth of this story, and believing it to be a concoction of the absent

Foe's making, she leads the girl into a forest, planning to abandon her, and prompts her

to close her eyes. Here, as she begins to denounce the story of the girl's parentage, her

description again alludes to the difficulty she has in reconciling the fact that they are

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648 Coetzee, *Foe*, 53.
649 Ibid., 51.
650 As an aside, it might be worth noting the girl's claim that her father is a man named George Lewes; it
    seems far from coincidental that another George Lewes – lover of George Eliot and prominent
    nineteenth-century literary critic – is widely considered to be responsible for the first use of the word
    'realism' in English. For the context of this use, see George J. Becker (ed), *Documents of Modern
    Literary Realism*, (Princeton, NJ: Princeton University Press, 1963), 7.

"two substantial beings"[651] with the ghostly contexts of the fictions in which their meeting is taking place. Subsequently, Susan wonders whether Foe, observing her, might say to himself: "This is no woman, but a house of words, hollow, without substance";[652] her own reply is to withhold the truth of whatever substance her story may contain: "I choose not to tell it because to no one, not even to you, do I owe proof that I am a substantial being with a substantial history in the world".[653]

As the novel progresses, however, she comes to realise that this opposition between substance and story crumbles under close scrutiny. In one such instance she now comes to conclude that her 'daughter' exists in fact in a state somehow in-between substance and absence:

> I say to myself that this child, who calls herself by my name, is a ghost, a substantial ghost, if such things exist, who haunts me for reasons I cannot understand, and brings other ghosts in tow.[654]

It is in this regard that Susan's story echoes the tale of Newton's development of the differential calculus, and might also remind us of the statement in information theory such that 'stories' of any kind need to be decoded within a particular semantic framework in order to convey meaning: both Susan's and Newton's stories take place in a fixed representational, semantic framework the foundational affirmations of which existed prior to the beginning of the story (i.e. 'Western civilisation' and the Cartesian plane[655]); both stories consist of an accumulation of substantial affirmations – an information string – which is designed to help the storyteller discern some underlying truth about that very framework; the meaning conveyed by both stories is entirely delimited by its capacity to be decoded by the framework, and the understanding that

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651 Coetzee, *Foe*, 90.
652 Ibid., 131.
653 Ibid.
654 Ibid., 132.
655 It needs to be said here that the Cartesian plane is just one means of representing the differential calculus; however, all that follows here might equally be exemplified with reference to the arithmetic representational framework.

the framework is shared by whomsoever its meaning is to be conveyed; and, finally, both stories encounter the 'in-between' existence of a 'substantial ghost', the presence of which provides a constant and disquieting reminder of the provisionality and constructedness of the framework and the story alike.

5.3.2 Friday's *o*: A Substantial Ghost

Much of the critical response to *Foe* has understandably focused on the postcolonial significance of Susan's efforts to induct Friday into the conventions of the 'civilised world' of metropolitan London. The most prominent example is perhaps her attempt to teach him to write in English. The fact that Friday's only inheritance from these lessons is an ability to produce the character *o* resonates deeply with the above discussion, and so again demonstrates how a mathematically-literate reading provides an important complementary aspect to the existing discourse on the novel.

As Susan seeks to understand the nature of Friday's silence – in other words, his inability or refusal to produce information strings amenable to decoding within the representational framework of her culture – she proposes that he cannot be satisfactorily summed up simply as "a substantial body":[656] his silence, embedded in the context of the world she has made for him in London, means that "he is to the world what [she] make[s] of him",[657] whether that be cannibal, laundryman, or any other "mere name".[658] To define an individual as substantial, she claims, is to allow his or her subjugation to the authority of the agent of nominalisation. The affirmation of substance, she moreover realises, is not a transparent or objective act; it is inherently both subjective and politicised, such that any narrative that extends from such an affirmation is a construct contingent upon the assumptions intrinsic to the act. In the light of this realisation, and

656 Ibid., 122.
657 Ibid., 122.
658 Ibid., 121.

in correspondence with Foe, she clarifies her own resolution to remain insubstantial:

> I could return in every respect to the life of a substantial body, the life you recommend. But such a life is abject. It is the life of a thing. A whore used by men is used as a substantial body.[659]

Nevertheless, whatever the idealism Susan's resolution entails, and however she might wish for her information strings to remain undecodable, the final page of the novel's third section brings home an unavoidable truth: as users of a language both borrowed from and shared within the linguistic culture of which they are inextricably a part, Susan concludes, the players in her story cannot escape the substantiality into which their existence is already cast. Her reply to Foe's question as to whether she believes her 'daughter' to be insubstantial is unequivocal:

> 'No, she is substantial, as my daughter is substantial and I am substantial; and you too are substantial, no less and no more than any of us. We are all alive, we are all substantial, we are all in the same world.'[660]

As Foe points out, however, one of the story's central figures is absent from this description: despite having earlier expressed a desire to return him to a state of being "immersed in the prattle of words as unthinking as a fish in water",[661] and "to the world of words in which you, Mr Foe, and I, and other people live",[662] Susan has "omitted Friday".[663] At just this moment, Friday's activity and Susan's and Foe's response to it lend themselves readily to the mathematically literate reading for which the foregoing discussion has prepared us:

> I turned back to Friday, still busy at his writing. The paper before him was smudged, as by a child unused to the pen, but there was writing on it, writing of a kind, rows and rows of the letter *o* tightly packed together. A second page lay at his elbow, fully written over, and it was the same.
>
> 'Is Friday learning to write?' asked Foe.'
>
> He is writing, after a fashion,' I said. 'He is writing the letter *o*.'

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659 Ibid., 125-126.
660 Ibid., 152.
661 Ibid., 60.
662 Ibid.
663 Ibid., 152.

It is a beginning,' said Foe. 'Tomorrow you must teach him *a*.'[664]

As inhabitants of that "world of words" to which Susan refers, it is perhaps understandable that both she and Foe assume that the small circular markings Friday makes on the page represent the letter *o*. Their unquestioning acceptance of this assumption, however, is undermined throughout the text of which they are themselves a part. Circular images resembling Friday's suffuse the novel, often in contexts in which they stand in some sense or other for absence or nothingness; this might lead us to conclude that Friday would be more familiar with the relation of a circle to the concept of the zero than to the Roman letter *o*.[665] Among these 'substantial ghosts' one might list Susan's prediction that in "a year, ten years, there will be nothing left standing but a circle of sticks to mark the place where the hut stood";[666] her belief that Friday's story is "properly not a story but a puzzle or hole in the narrative," a hole she pictures as "a button hole, carefully cross-stitched around, but empty, waiting for the button";[667] and the "little O of a mouth"[668] belonging to her supposed daughter, from which the stories she deems to be insubstantial continually emerge.

Alongside these literal zero-images, moreover, the theme of absence pervades the text both in terms of vocabulary – the word 'nothing' appears on thirty-two occasions, 'silence' thirty-four, and 'empty' ten – and narrative. Among the 'absences' that intersperse the narrative, perhaps the most profound emerges from Susan's anxious inability to excavate the 'truth' of Friday's history: indeed, by the novel's end she has

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664 Ibid.

665 With the exception of Claudia Egerer's essay on the subject, discussed below, few critics have commented on this possible alternative reading in any real detail. Others that have noticed the place of the zero in the text but chosen not to discuss it further include Paola Splendore, "J. M. Coetzee's *Foe*: Intertextual and Metafictional Resonances," *Commonwealth: Essays and Studies* 11, no. 1 (1988): 55-60. Richard Begam, 'Silence and Mut(e)ilation: White Writing in J. M. Coetzee's *Foe*,' *South Atlantic Quarterly* 93, no. 1, (1998): 111-130; and Bill Ashcroft, 'Silence as Heterotopia in Coetzee's Fiction,' in *Strong Opinions: J. M. Coetzee and the Authority of Contemporary Fiction*, Sue Kossew, Julian Murphet, and Chris Danta (Continuum: New York, 2011), 141-157.

666 Coetzee, *Foe*, 54.

667 Ibid., 121.

668 Ibid., 75.

begun to reconcile herself to the likelihood that her attempts are necessarily futile:

> 'The story of Friday's tongue is a story unable to be told by me. That is to say, many stories can be told of Friday's tongue, but the true story is buried within Friday, who is mute. The true story will not be heard till by art we have found a means of giving voice to Friday['].[669]

Claudia Egerer's account is one of very few critical responses to *Foe* that recognises the possibility for a mathematically literate analysis of Friday's *o*; it focuses in the first instance on the way in which the novel

> illustrates how the very symbol of subjection, Friday's tongueless silence, can be seen as a means to resist and undermine that subjection by usurping the story, gaining in potency until it finally overwhelms the narration.[670]

Egerer's innovation is to suggest that the 'thing' that is Friday's silence is simultaneously both void and substance, zero and one, somehow both existing and not existing in such a way as to ramify uniquely throughout the discursive, substantive currents of the text and, by extension, its whole invented world. In this sense, she argues, Coetzee's "strategy of silence draws attention to and questions the unspoken cultural assumptions that govern our perceptions of the world".[671] In particular, her depiction of Friday and his own "zero-image" as "no longer confined to either a symbol of fullness or emptiness but possibly both"[672] is apposite to the present discussion and merits further development here.

Referring to Friday's production of the *o* sign and Foe's desire that he should next learn how to produce an *a*, Egerer argues that "the letter 'a' and the numeral 'zero' share the same initial position in their respective system of signification and as such possess the power to act as effigies of beginnings".[673] Her discussion from this point onwards suffers somewhat from a failure to recognise that, at least with regard to mathematics

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669 Ibid., 118.
670 Claudia Egerer, "Hybridizing the Zero: Exploring Alternative Strategies of Empowerment in J. M. Coetzee's *Foe*," 96.
671 Ibid.
672 Ibid., 98.
673 Ibid., 99.

and possibly even in the case of the alphabet, this is not the whole case. In the first place, to refer to mathematics as a whole as a "system of signification" with a single "initial position" implies a transcendental realism that Coetzee's intellectual history shows little sign of supporting; though it might be the case that there exists a sufficiently widespread lay belief that 'zero' occupies the 'initial' position in mathematics, an understanding of the diversity of significatory systems of which the whole discipline of mathematics is constituted urges a more refined view. To recall the brief discussion of group theory from Chapter One, above, not all mathematical 'groups' retain 0 as the identity element: in the group of rational fractions under the multiplication transformation, for instance, the identity element is 1, since, for instance, ¼ x 1 = ¼. In this case, moreover, not only does 0 not occupy the initial position, but it is in fact not even a member of the group.

One area of mathematics, however, provides a relatively straightforward way of demonstrating the productive, substantive quality of the zero in mathematics and hence that it is not simply and always considered equivalent to 'absence', but rather as a fundamental token of both absence and substance upon which a whole significatory system may be built; or, to borrow Susan's words, as a 'substantial ghost'. This discipline, with which, to recall, Coetzee was by this time long since familiar, is set theory. As Paul Benacerraf shows in his influential paper 'What Numbers Could Not Be' (1965), not only may one construct the entire set of real numbers using just the concept of the set and the concept of emptiness, but there are infinitely many ways to do so. While each of these methods results in its own internally consistent mathematical system, the 'truth' of an individual proposition in one such system does not guarantee its 'truth' in another. Recall, first of all, the empty set: this is conventionally symbolised as $\varnothing$ and may for the purposes of the present argument be legitimately considered as

equivalent to 0. If we consider this empty set as being the sole member of another set – symbolised $\{\varnothing\}$ – then we have constructed a set with one member, and hence the concept of 1. By extension, we may say that $2 = \{\{\varnothing\}\}$, $3 = \{\{\{\varnothing\}\}\}$, and so on indefinitely; by this method we can define all of the natural numbers, as follows:

$$
\begin{aligned}
0 &= \varnothing \\
1 &= \{\varnothing\} \\
2 &= \{\{\varnothing\}\} \\
3 &= \{\{\{\varnothing\}\}\} \\
4 &= \{\{\{\{\varnothing\}\}\}\}
\end{aligned}
$$

Consider again the empty set, $\varnothing$. Next we may again construct 1 by placing $\varnothing$ within another set, such that $1 = \{\varnothing\}$. At this stage, however, we may prefer to define 2 not as the set which contains the set which contains $\varnothing$ – i.e. $\{\{\varnothing\}\}$ – but instead as the set which contains the both the empty set, $\varnothing$ or 0, and the set-which-contains-the-empty-set, $\{\varnothing\}$ or 1. This would mean that $2 = \{\varnothing, \{\varnothing\}\}$. Once more, we may define all of the natural numbers in this way, as follows:

$$
\begin{aligned}
0 &= \varnothing \\
1 &= \{\varnothing\} \\
2 &= \{\varnothing, \{\varnothing\}\} \\
3 &= \{\varnothing, \{\varnothing\}, \{\varnothing, \{\varnothing\}\}\} \\
4 &= \{\varnothing, \{\varnothing\}, \{\varnothing, \{\varnothing\}\}, \{\varnothing, \{\varnothing\}, \{\varnothing, \{\varnothing\}\}\}\}
\end{aligned}
$$

By adding a successor function and the fundamental operators addition and multiplication to each of these methods, we are able to define the whole of arithmetic in a perfectly self-consistent manner. For the purposes of arithmetic, then, it makes little difference that our definitions for the natural number 3 look so different. Once we start to delve further into the logical implications of the fact that $\{\{\{\varnothing\}\}\}$ and $\{\varnothing, \{\varnothing\}, \{\varnothing, \{\varnothing\}\}\}$ are so fundamentally different in structure, however, we find that it becomes possible to produce statements that, while arithmetically isomorphic, are logically

inconsistent.

This is one sense, then, in which it can validly be argued that the zero is capable of functioning both as absence – it is conceived in the initial stage of the process outlined above as equivalent to 'emptiness' – but also simultaneously as substance, in the sense that one needs no more than the affirmation of this emptiness and a context in which it can be decoded in order to produce a whole structure of meaning with its own unique and self-consistent truths. Taking this into account, there is good reason to conceive of Friday's *o* as being constitutive of his initial affirmation in the development of a discourse through which to represent and shape a 'reality': this, in other words, is his first step into providing the world with substance, into empowering himself with the ability to wield linguistic control over his surroundings, and into a position from which he might, as Susan has, "use words only as the shortest way to subject [others] to [his] will". The fact that he does so using a symbol that throughout the text – and throughout much of human history – is thematised as representing absence rather than substance raises some important questions: if one accepts as given that he has produced a 'zero', for instance, what might it mean if his next steps into discourse-building were to coincide with Foe's desire that he learn how to produce an *a*? Would that *a* mean what Foe and Susan think it does, or would it only exist meaningfully within the new significatory system Friday has begun to develop? If Friday were to continue his 'writing' using only the *o*, how might this develop into a significatory system at all?

Ultimately, a mathematically-literate response to the thematisation of Friday's *o* reveals a powerful analogy for the possibility for the colonised other to use his or her silence as the basis for inaugurating a rival to the hegemonic discourse. Rather like Robinson Crusoe, Friday needs nothing more than time and mathematics to reinvent the whole of civilisation; the substantial ghost of his *o* provides the first step towards a new

language of resistance and autonomy, unbeholden to the assumptions and formal categories of Empire and radically resistant to its attempts to decode and assimilate the speaker's meaning within an existing epistemic framework that may not have his best interests at heart.

Summary

Read in the context of Coetzee's contemporaneous work in stylistics, and particularly his essay on Newton, both *Waiting for the Barbarians* and *Foe* stage their primary thematic engagements in the presence of profound questions as to the difference between natural language and the supposedly transparent language of mathematics. In both novels, however, Coetzee undermines this claim to transparency by hinting at the possibility that an oppressed culture might use its strategy of silence – its system of zeros – to inaugurate a rival discourse in which its otherness is a source of strength. Friday's discourse was shown to be no more decodable to the metropolitan hegemony than the barbarian slips were to the Magistrate. In each case, the mere provision of an alternative acts as a reminder of the provisionality and the constructedness of power, of authority, and of history. The philosophy of mathematics that emerges is not, then, a form of idealism, but rather a thoroughgoing constructivism; and just like he appears to believe is the case for mathematics, Coetzee's fiction of the early 1980s seems to advocate a constructivist view of the phenomenal world, in which none of our enumerations can truly be perfect, since our most fundamental affirmations can never be more than substantial ghosts.

Chapter 6

VECTORS OF THE MATRIX: LATER FICTION

Elizabeth Costello and *Diary of a Bad Year*

Throughout much of his fiction, one of the ways in which Coetzee builds his characteristic existential disquiet is by exposing his protagonists to ethical dilemmas towards the solution of which the limited cultural and linguistic tools they possess offer no prospect. The moral paralysis his characters consequently experience can in many cases be traced back to their failure to disentangle their existing ethical convictions from the quantificatory concepts upon which those convictions are founded. In his eleventh novel, *Diary of a Bad Year*, Coetzee introduces a character prepared to confront this exact issue head-on: "In the course of a lifetime's mental activity", he confesses,

> the one and only idea I have had that might count as abstract came to me late, in my fifties, when it dawned on me that certain everyday mathematical concepts might help clarify moral theory. For moral theory has never quite known what to do with quantity, with numbers.[674]

This failure to deal with quantity, he continues, often renders moral theory helpless as a guide to the relative moral status of even the most apparently comparable of cases: can there possibly be a proportional relation, for instance, between the number of people a murderer kills and the amount of moral opprobrium we ought to reserve for him or her? Is it possible to calculate in any meaningful way the degree of wrongdoing committed in the theft of money from victims of differing wealth or need?

Ultimately, Coetzee's protagonist locates the origins of this problem in the unconscious inclusion within our moral vocabulary of the mathematical concept of the wholly ordered set: "In mathematics", he clarifies,

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674 Coetzee, *Diary of a Bad Year*, 204.

a wholly ordered set is a set of elements in which each element has to stand either to the left of or to the right of each other element. Where numbers are concerned, *to the left* of can be interpreted to mean less than, *to the right of* to mean greater than. The integers (whole numbers), positive and negative, are an example of a wholly ordered set.[675]

In certain cases, the metaphor of the wholly ordered set – more commonly known as the totally or linearly ordered set – provides a helpful shorthand for use in comparative moral judgements: for instance, when lawgivers come to decide the ethical basis for establishing the point during prenatal development at which it ceases to be legal to perform an abortion, the debate is likely to be indexed to the linearly-ordered time continuum stretching between conception and birth; when assessing the morality of a particular abortion as against this continuum – effectively an abstract, linear representation of the complex, multifaceted process of prenatal development – we tend, to appropriate Coetzee's protagonist's words, to "think of *to the left of* as worse than, *to the right of* as better than".[676]

In cases where such a continuum offers no such straightforward guidance, he points out, a better analogy for the scale of moral judgement is "a set that is only partially ordered", in which "the requirement that any given element must be either to the right of or to the left of any given element does not hold":

> If we treat the set of elements about which we wish to come to a moral judgement as constituting not a wholly ordered set but a partially ordered set, then there will be pairs of elements (a single victim as against two victims; a million dollars against a mite) to which the ordering relation, the moral question *better or worse?*, does not necessarily apply. In other words, the unrelieved *better or worse?* line of questioning has simply to be abandoned.[677]

It is therefore the false "presumption that any and every set of elements can be ordered"[678] that leads to the moral "quagmire"[679] we can observe in issues as disparate as, for instance, the comparative moral status of animals as against that of severely

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675 Ibid.
676 Ibid., 205.
677 Ibid.
678 Ibid.
679 Ibid.

brain-damaged infants, and the determination of an appropriately punitive sentence for as heinous a criminal as Adolf Eichmann. For some, Eichmann's being sentenced to a death no 'worse' than the millions for which he was responsible might seem too generous; in such cases, the narrator concludes, the difficulty originates from the fact that if morality and punishment can be quantified as against a linear continuum, then death seems to constitute an absolute limit:

> Death is absolute. There is no worse; and this is so not only for Eichmann but for each of the six million Jews who died at the hands of the Nazis. Six million deaths are not the same as – do not "add up to," in a certain sense do not "exceed" – one death ("merely" one death); nevertheless, what does it mean – what *exactly* does it mean – to say that six million deaths are, in ensemble, worse than one death? It is not a paralysis of the faculty of reason that leaves us staring helplessly at the question. It is the question itself that is at fault.[680]

Yet, this is exactly the kind of question that recurs throughout the various discourses of ethics, politics, economics, and international relations, within which the consistent application of comparative judgements across disparate complex cases is essential.

In this context it is interesting to note that Coetzee's protagonist claims to have come to this realisation in his fifties; during that decade of his own life – which took place during the 1990s – Coetzee engaged with a set of similarly complex issues in the series of lectures and articles that would eventually be collated in the form of *Elizabeth Costello*. Indeed, it is to the restatement of several key questions within these fields of enquiry that both *Elizabeth Costello* and *Diary of a Bad Year* are in large part directed. The structural aspects of these two later works play a crucial role in the staging of their content. While much of the early period of Coetzee's literary project dissolves the traditional structure of the novel as a means of staging a resistance to the conventions of narrative fiction, one of the most striking features of his later fiction is its appropriation and dissolution of the conventions of non-narrative non-fiction. In particular, both *Elizabeth Costello* and *Diary of a Bad Year* include as part of their overall machinery a

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680 Ibid., 206.

monologistic, didactic element – public lectures and short essays, respectively – more common to non-fiction. Significantly, these elements are voiced by characters that in terms of both biography and perspective simultaneously urge and resist identification with the author himself. Like Coetzee, then, Elizabeth Costello is a veteran novelist from an English-speaking southern hemisphere nation, whose retelling of a canonical literary classic has earned her both global acclaim and a platform from which to present her strongly held beliefs regarding the rights of animals. Unlike Coetzee, however, she is a female Australian born in 1928, the novel she reinvented was *Ulysses* rather than *Robinson Crusoe*, and her advocacy for animals takes an altogether less measured tone than that of the male, South African counterpart twelve years her junior. Similarly, the narrator of *Diary of a Bad Year*, though not explicitly named in the text, shares his first and last initials with Coetzee; among certain other common biographical details, this 'JC' is a South African novelist now living in Australia, who has perhaps won the Nobel Prize for Literature, and is the author of both a novel entitled *Waiting for the Barbarians* and a collection of essays on censorship.[681]

With all of this in mind, this chapter presents an argument in three parts: firstly, that in their responses to such questions the principal figures of these two novels subscribe to what is known as a 'cognitive' philosophy of mathematics; secondly, that the multivocal and transgeneric structures of the two novels enable Coetzee to problematise the extrapolation of this cognitive account to questions within wider human experience; and, thirdly, that in the notions of vectors, matrices, and probabilistic

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681 In addition to the many engaging articles that focus on negotiating the relationship between Coetzee and Costello, several of the most sustained discussions are collected in Jane Poyner, *J. M. Coetzee and the Idea of the Public Intellectual* (Athens: Ohio U.P., 2006). In her own monograph on the subject of paradoxical authorship in Coetzee's work, Poyner devotes a chapter to *Elizabeth Costello* and *Diary of a Bad Year*: see Jane Poyner *J. M. Coetzee and the Paradox of Postcolonial Authorship* (Farnham: Ashgate, 2009), 167-184. For a convincing study of the relationship between Coetzee and his protagonist in *Diary of a Bad Year*, see Jonathan Lear, "Ethical Thought and the Problem of Communication: A Strategy for Reading *Diary of a Bad Year*," in Anton Leist and Peter Singer Eds, *J. M. Coetzee and Ethics: Philosophical Perspectives on Literature* (New York: Columbia U.P., 2010), 65-88.

space, he develops a strong analogy for the synthetic, self-contradictory model of his later fiction, and as such lays down a significant challenge to contemporary literature as a whole.

6.1 Reasoned Argument and the 'Cognitive' Account of Mathematics

From the beginning, the pages of *Diary of a Bad Year* are divided into an uneven bifurcation – later to become a trifurcation – of interconnected texts: at the top of each page runs a series of numbered essays, covering subjects as diverse as Tony Blair, paedophilia, and avian influenza, each apparently written by the 'JC' figure; beneath a decisive dividing line is a succession of what seem like diary entries, and which appear to have been crafted by the same hand as the essays; next, twenty-five pages in, these two texts are joined by another, apparently the diary of the novelist's attractive young neighbour, Anya, who gradually begins to exert her own unique influence by offering a further counterpoint to the intertextual dialogue that is gradually developing; finally, by relating some of his words, Anya introduces the voice of her partner – a neo-liberal Australian businessman named Alan – and thus completes the multivocal matrix through which the novel explores its subject matter. On the basis of the two 'diary' narratives of *Diary of a Bad Year* the reader discovers that the essays are intended for publication in a German book with the translated working title of *Strong Opinions*. Tellingly, one of the ways in which JC seeks to endow his opinions with the necessary 'strength' is through his attempt to interrogate rigorously the quantificatory metaphors that operate within each of the discourses they inhabit; as the other two narratives begin to complicate matters, however, it transpires that his supposed mathematical literacy is

far from immune from the challenges his interlocutors provide.[682]

6.1.1 'On Zeno'

While it might superficially seem unimportant alongside the other issues about which he

expresses his 'opinions', the essayist – whom Anya calls 'Señor C' – dedicates more

space to a discussion of what exactly it means to 'count' than almost any other of his

subjects. He begins the section entitled 'On Zeno' by considering the difference between

the act of counting and the process of learning to count. He first proposes two methods

for teaching a child to 'get the idea' of counting. Each of these methods introduces the

child to a series of buttons and requires her or him to engage in an act of induction from

this finite object set to the infinite set of the natural numbers. Whether the teacher

introduces the child to an *existing row* of buttons and asks the child to read along from

left to right – hence prioritising the unity of the continuum – or reveals the buttons one

by one – hence prioritising the individuality of the integers themselves – the 'idea' that

the teacher is transferring to the child is essentially that

> although the list is unending (and therefore unmemorizable, unlearnable),
> individual new names in it are quite few in number; furthermore, that the list is
> ordered and has a system, with individual names being combined and recombined
> according to a rule.[683]

Underlying the entire discussion as to the validity of the two methods of teaching a

child how to count are a number of assumptions that rarely face the interrogation that,

given their significance, they merit: these conventions, whether taught to the child or

merely coaxed from his or her deep-seated cognitive faculties, are the unit, succession,

and the continuum. Recognising this fact, 'Señor C' points out that the requirement in

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682 The sense in and extent to which *Diary of a Bad Year* might be called a 'novel ' is the subject of
several critiques. For a convincing example, see Benjamin H. Ogden, "The Coming into Being of
Literature: How J. M. Coetzee's *Diary of a Bad Year* Thinks through the Novel," *Novel* 43 (2010),
466-482. For a consideration of the issue as it pertains to the ethics of reading, see Peter D.
McDonald, "The Ethics of Reading and the Question of the Novel: The Challenge of J. M. Coetzee's
Diary of a Bad Year" *Novel* 43 (2010), 483-499.

683 Ibid., 88.

English-language societies to memorise twelve names – 'one' to 'twelve' – from which subsequent names may systematically be worked out, is somewhat extravagant: "In theory", he specifies, "you can manage with only two names, *one* and *two*, or with a single name, *one*, plus a concept, adding (adding one to something)".[684] As Coetzee discussed in relation to Dedekind and Beckett, it is now a commonplace of mathematical philosophy that this affirmation of the 'unity' alongside a 'successor function' not only opens up the world of counting, but, by a series of logical, deductive steps, provides the foundations for the entirety of mathematics. As Señor C puts it, from "the moment when the learner *gets it*, namely gets the rule for naming the next number, the whole of mathematics takes off":

> The whole of mathematics rests on my ability to *count* – my ability, given the name of N, to name N+1 without knowing its name beforehand, without memorizing an infinite list. Much of mathematics consists of clever stratagems for recasting situations where I can't count (can't work out the name of the next element of the series – the name of the next irrational number, for instance) in terms of situations where I can count.[685]

In the context of the philosophy of mathematics this process might lead us to question – as Señor C does – whether the act of working out the name of the next button in the sequence should be conceived of as one of *construction* or *prediction*; in other words, whether to conceive of mathematics as a constructivist or a realist endeavour. For Señor C, the consensus in contemporary discourses of mathematics implicitly affirms the former:

> Most practising mathematicians practise mathematics on the understanding that we construct the numbers as we go: given *one* we construct *two* by applying the rule *add one to the given number*, one; then we construct *three* by applying the rule to two; and so on indefinitely. The numbers are not there waiting to be found (waiting to be reached as the counting process proceeds): by following the rule we effectively construct them out of thin air, one after another, without end.[686]

All the same, he continues, the "thesis that the numbers are constructed by us as we

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684 Ibid., 89.
685 Ibid., 90.
686 Ibid., 90-91.

count faces certain obstacles".[687] The example that he uses to demonstrate this concerns the fact that, though we can prove that there exist an infinite amount of prime numbers, and though we can demonstrate that a given number, N, is prime, we have no means through which to either construct the $(N+1)^{th}$ prime or to determine to any degree of accuracy how distant these two adjacent primes might be from one another. While we can be sure that the $(N+1)^{th}$ prime exists, then, the constructivist stipulation that it be constructible – at least in a finite time, or as Señor C puts it, "within the lifetime of the universe"[688] – is far from assured.

All the same, the realist alternative, wherein we "say that the numbers are not constructed by us but are already there, waiting for us to find our way to them and plant markers (names) on them",[689] is at least as fraught with difficulty. Where one may be able to count from 1 to N, affirming the systematic progression of the natural numbers as one goes, there remains the possibility that any number beyond N may not conform to the expectations my experience of the numbers 1 to N has bestowed upon me. Such a situation may seem unlikely in the simple case of the cardinal numbers, but one need not extrapolate too far from this basic foundation of mathematics to observe the presence of deeply rooted paradox. Much as Coetzee does elsewhere throughout his work, Señor C expands upon this by reference to "the dark possibility at the heart of the paradoxes of Zeno":

> Before the arrow can reach its target, says Zeno, it must get half-way there; before it can get half-way it must get a quarter of the way; and so forth: 1, ½, ¼, … $\frac{1}{2}^{(N+1)}$, … If we grant that the series of markers it needs to pass on its way to the target is infinitely long, then how can we ever get there?[690]

Valid solutions to Zeno's arrow paradox may be separated into two categories: first, those that seek to supplement Zeno's characterisation of a mathematical series with the

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687 Ibid., 92.
688 Ibid., 93.
689 Ibid.
690 Ibid., 94.

concept of the limit; and second, those that deny the validity of his implicit assumptions regarding the foundations of number. Señor C alludes to another of Coetzee's regular points of reference as a representative of the former category of solution, pointing out that by "inventing a way of summing the infinite number of infinitesimal steps on the way to the target and reaching a finite total, Isaac Newton believed he had overcome Zeno's paradox".[691] To recall the discussion from Chapter Five, though, Newton's infinitesimal calculus relies upon the affirmation of a singularity that is contradictorily simultaneously both zero and nonzero; as such, it provides little in the way of closure to Zeno's paradoxes. Señor C's own doubts regarding Newton's solution to the paradox, however, take a rather more plaintive form: "What if," he wonders, "in the interval between the newly attained N^{th} step and the never yet attained – never in the history of the universe – $(N+1)^{th}$, the arrow were to lose its way, fall into a hole, vanish?"[692] Though he does not pursue this particular train of thought further, the path his considerations do take once again contextualises the question as to the origins of human reason alongside a reading of a story by Borges and an allusion to Kant's metaphysics:

> Jorge Luis Borges wrote a poker-faced philosophical fable, "Funes the Memorious," about a man to whom the counting rule, and indeed the even more fundamental rules that allow us to encompass the world in language, are simply alien. Through an immense, solitary effort, Funes constructs a counting that is not a system of counting, a counting that makes no assumptions about what comes next after N.[693]

Funes's system involves attributing apparently arbitrary names to each new 'number' he encounters such that, for instance, in "place of seven thousand [and] thirteen, he would say (for example) *Máximo Pérez*; in place of seven thousand [and] fourteen, *The Railroad*".[694] As Borges's narrator explains, "this rhapsody of incoherent terms was precisely the opposite of a system of numbers"[695] in the respect that it ignores the

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691 Ibid.
692 Ibid.
693 Ibid., 94-95.
694 Ibid., 95.
695 Ibid.

systematic, orderly logic of a conventional place-value system. For Señor C, though, the foremost conclusion to be drawn from Borges's story is not merely about counting, but rather about the likelihood that both constructivist and realist accounts ought to be rejected in favour of what, though he does not name it thus, corresponds most closely to the so-called 'cognitive' account of the nature of mathematics:

> Borges' kabbalistic, Kantian fable brings it home to us that the order we see in the universe may not reside in the universe at all, but in the paradigms of thought we bring to it. The mathematics we have invented (in some accounts) or discovered (in others), which we believe or hope to be a key to the structure of the universe, may equally well be a private language – private to human beings with human brains – in which we doodle on the walls of our cave.[696]

Whether he means to or not, Coetzee alludes in that last parenthetical phrase – "private to human beings with human brains" – to a school in the philosophy of mathematics that has come to prominence only since the turn of the millennium: namely, the cognitive account of mathematics pioneered and popularised by the cognitive linguist George Lakoff and the psychologist Rafael E. Núñez in their influential work, *Where Mathematics Comes From* (2000). Lakoff and Núñez develop the idea of what they call an 'embodied mind theory of mathematics,' according to which the foundations of mathematics are predicated on and determined by certain conceptual metaphors that are in themselves contingent upon the forms and structures of human cognition. Advocates of the theory contend that such innate faculties as the ability to subitise – to recognise at a glance a number of presented items, typically limited in humans to seven – are developed through usage and formalised as a result of the neural connections that consequently form between sensory-motor operations. This then leads to the development of conceptual metaphor at the neural, pre-linguistic level, and finally extrapolation to wider experience. The concept of counting, for instance, emerges from spatial conceptual metaphors developed in consort with the structural limitations of the

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696 Ibid., 96.

inferior parietal cortex;[697] once practice in the real world reveals the methodology to be reliable, neural connections become fixed, and our ability to count finalised and formalised. The unconscious, 'natural' development of this process typically causes us to believe that mathematics and mathematical reason are universal, rather than contingent on the structure of our brains and our means of sensory perception. Lakoff and Núñez make a compelling case such that each of our most foundational mathematical principles is developed in a similar way, and that our more advanced concepts are essentially no more than extrapolations from these contingent beginnings.

It is now apparent that Señor C's philosophy of mathematics might help to resolve a question that earlier in his academic career Coetzee had deemed "too immense to bear contemplation":[698] a cognitive account of mathematics can account for the apparent fact that the structures of mathematics and natural language are isomorphic by simply stating that both structures originate in the interaction of the same innate cognitive processes with our perceptual experiences of the same external world.

6.1.2 The Case of Srinivasa Ramanujan

In the context of *Elizabeth Costello*, this understanding of the relationship between mathematics, natural language, and the structure of human cognition takes on a more synthetic form: namely, in its eponymous, and once again Coetzee-esque figure's withering appraisal of the origins and status of human reason and rationality.

Prior to its publication in both *The Lives of Animals* (1999) and *Elizabeth Costello* (2003), Coetzee originally performed 'The Philosophers and the Animals' as the first of his two Tanner Lectures at Princeton, on October 15 1997. It contains a lecture by Elizabeth Costello, accompanied by a narrative involving, among others, Costello's son

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697 See George Lakoff and Rafael E. Núñez, *Where Mathematics Comes From*, (New York: Basic Books, 2000), 24.
698 Coetzee, "English Fiction of Samuel Beckett," 240-241.

John and his wife Norma, a physicist and a specialist in the philosophy of mind

respectively. It is within the conceptual framework circumscribed by the dispute

between Costello and Norma that a cognitive theory of mathematics proves most

amenable. After a preliminary salvo in which she compares the industrial-scale

slaughter of nonhuman animals for human consumption to the horrors of the Nazi

concentration camps, Costello attempts in her talk to convince her audience of the

fundamental flaw in any argument in favour of an omnivorous or carnivorous diet in

which the human capacity for reason is submitted as a means of essential distinction

between humans and non-human animals. Albeit in quite different ways, she states,

three of the most influential advocates of the special significance of human reason –

namely St. Thomas Aquinas, Plato, and Descartes – each subscribe to the

complementary beliefs that "the being of God is reason" and that the "universe is built

upon reason":

> God is a God of reason. The fact that through the application of reason we can
> come to understand the rules by which the universe works proves that reason and
> the universe are of the same being. And the fact that animals, lacking reason,
> cannot understand the universe but have simply to follow its rules blindly, proves
> that, unlike man, they are part of it but not part of its being: that man is godlike,
> animals thinglike.[699]

This is not a position that Costello is prepared to accept, either in its premises or its

conclusions. She prefers instead to follow Kant's "intuition that reason may not be the

being of the universe but on the contrary merely the being of the human brain";[700]

considering Kant's failure to pursue this idea in the context of our responsibilities

regarding animals a source of some disappointment, however, she determines to extend

to her audience the detailed – and self-consciously hypocritical, since rationalised –

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699 Coetzee, *Elizabeth Costello*, 67. To ensure consistency with those 'Lessons' not featured in *The Lives of Animals*, references to 'The Philosophers and the Animals' and 'The Poets and the Animals' include the relevant page numbers from *Elizabeth Costello*, rather than *The Lives of Animals*. Where there exist minor differences in orthography – 'center' and 'centre,' for instance – the version adopted in *Elizabeth Costello* is quoted.
700 Ibid.

reasoning behind her conviction that "reason is neither the being of the universe nor the being of God",[701] but instead more specifically and "suspiciously like the being of human thought; worse than that, like the being of one tendency in human thought. Reason is the being of a certain spectrum of human thinking".[702] Just like Señor C, then, Costello appears to be leaning towards a cognitive account of human rationality, which she apparently considers to be to some degree co-extensive with human mathematics.

Costello's first argument against the pre-eminence of human rationality involves the case of Srinivasa Ramanujan, whom she describes in the first instance as being

> widely thought of as the greatest intuitive mathematician of our time, that is to say, as a self-taught man who thought in mathematics, one to whom the rather laborious notion of mathematical proof or demonstration was foreign.[703]

Given his apparently innate affinity for mathematics – which she implicitly and unquestioningly equates here with reason – Costello wonders whether it necessarily follows that Ramanujan was "closer to God because his mind […] was at one, or more at one than anyone else's we know of, with the being of reason?"[704]

The Ramanujan case assumes a layer of specifically postcolonial significance when one considers the fact that, had Hardy and his colleagues at Cambridge not taken the time to translate Ramanujan's so-called 'speculations' into the accepted language of conventional Western mathematics, then his potential kinship with reason, and hence with God, would most certainly have remained unrecognised. Costello takes this a step further by questioning whether the case of Ramanujan allows us to conclude that the difference between a trained mathematician such as Hardy and any given member of the various species of great apes might simply be that "the former is conversant with the protocols of academic mathematics while the latter are not".[705]

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701 Ibid.
702 Ibid.
703 Ibid., 68.
704 Ibid., 69.
705 Ibid.

On the wider concern of the possibility that mathematical reason might be the being of the universe, Costello is equally sceptical. Is it not suspicious, she wonders, that each successive generation of humanity produces countless thinkers capable "of making a contribution to the decoding of the great book of nature via the physical and mathematical disciplines?":

> Might it not be that the phenomenon we are examining here is, rather than the flowering of a faculty that allows access to the secrets of the universe, the specialism of a rather narrow self-regenerating intellectual tradition whose forte is reasoning, in the same way that the forte of chess-players is playing chess, which for its own motives it tries to install at the centre of the universe?[706]

It is worth reiterating here that implicit in Costello's account is the assumption that reason and mathematics are effectively synonymous. As such it seems reasonable to characterise the view she expresses here not only as an outright rejection of mathematical realism, but also as a denial of the possibility of a genuinely transparent constructivist account: in the sense that she restricts the limits of human mathematics to that which is rendered possible by the structure of the human mind, one may therefore confidently characterise hers as a cognitive theory of mathematics.

Intriguingly, a look back through Coetzee's personal history reveals that his connection to Ramanujan is not just one of distant sympathy, but rather of a shared academic heritage. According to *Youth*, Coetzee considered just four of his lecturers to "inhabit an exalted realm".[707] Alongside three classicists – the papyrologist Anton Paap; Maurice Pope, a translator of Sophocles; and Maurits Heemstra, a specialist on Heraclitus – he names Douglas Sears, Professor of Pure Mathematics at UCT. While the testimony of *Youth* is of course not always to be trusted, Sears did indeed hold this position at that time, and it is through him that Coetzee is directly linked to Hardy and, hence, to the story of Ramanujan. To begin with, one would meet little opposition when

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706 Ibid.
707 Coetzee, *Youth*, 24.

advancing the claim that, of the doctoral students whose theses Hardy supervised during his time as Savilian Professor of Geometry at Oxford University, and with the possible exception of Ramanujan, the one whose work has been most influential both within and without the world of mathematics was Edward Charles ('Ted') Titchmarsh. Having worked closely with Hardy until his graduation in 1922, Titchmarsh's mathematical vision unified a passion for idealised yet rigorous abstract thinking, strongly encouraged by his mentor, with a scientist's fervour for new technologies. Titchmarsh, who would eventually succeed to Hardy's chair at Oxford, demonstrated a remarkable combination of foresight and ambition as he attempted to apply his own pioneering machine-led work to one of the most notoriously intractable problems in number theory – the Riemann Hypothesis[708] – and thereby to tackle the most daunting frontiers of both pure and applied mathematics in one bold and unified project. It is worth noting at this point that Alan Turing himself would come to acknowledge Titchmarsh's work as the inspiration for his transition from working on the ramifications of Gödel's Incompleteness Theorem – to which Coetzee would later turn his own attention – to his revolutionary and discipline-defining work in the field of computers and artificial intelligence. A more direct connection between Titchmarsh and Coetzee can be seen in the former's other great contribution to the parallel developments in twentieth-century mathematics and physics: the study of eigenfunctions.[709] His two-volume *Eigenfunction Expansions* in particular was to become famous beyond mathematical circles for its seminal contribution to the emerging field of quantum mechanics:[710] it had been Titchmarsh, for instance, who first demonstrated the continuity of the spectrum of a

708 For an accessible explication of the Riemann Hypothesis, and for a historical account of attempts to either prove or disprove it, see Marcus Du Sautoy, *The Music of the Primes.*

709 In short, an eigenfunction is each of the set of individual functions that together constitute the possible solutions to a given differential function.

710 See also E. C. Titchmarsh, 'On the Nature of the Spectrum in Problems of Relativistic Quantum Mechanics', *Proceedings of the Royal Society of London. Series A, Mathematical and Physical Sciences,* Vol. 262, No. 1311 (Aug. 8, 1961), 489-502.

hydrogen atom in a uniform electric field and hence threw into further doubt the by then almost untouchable belief among contemporary physicists of the universality of discreteness at the quantum level. In his later work on eigenfunctions Titchmarsh was assisted by a promising doctoral student of his own, a young South African who would go on to become a distinguished Professor at both the University of South Africa and the University of Cape Town, Head of Mathematics at the University of the Witwatersrand, and in whose memory a prestigious South African mathematics prize was conceived. This student, with whom Titchmarsh also collaborated on the important 1949 journal article 'Some Eigenfunction Formulae,' was none other than Douglas Sears.

The purpose of the foregoing exposition was primarily to draw attention to the interconnectedness of several strains of mathematically-oriented thinking to which Coetzee was exposed during his formative undergraduate studies. In the first instance, he had a direct connection to E. C. Titchmarsh, a major figure in the development of the precursors to modern day computers. Secondly, his consequent connection to G. H. Hardy, and therefore to the legend of Ramanujan, and to the publications of the London Mathematical Society, give a certain degree of justification to the assumption that he may well have been aware of the publication – in 1957, the year of his enrolment at UCT – of Ramanujan's notebooks in a facsimile edition that finally made them available, a full thirty-seven years after their author's premature death, to a whole new generation of mathematical students.

6.1.3 Paul Davies's *The Mind of God*

The case for attributing a cognitive account of mathematics not only to Costello, but also to Coetzee, is lent support by the observation of one subtle but significant

difference between *The Lives of Animals* and *Elizabeth Costello*: the inclusion of a series of footnotes in the former that are absent from the latter. That several of these appear not in reference to Costello's lectures, but rather to moments during her private conversations, suggests that the footnotes are not hers, but rather Coetzee's. The context developed by a footnote he appends to this passage on Ramanujan involves a book – Paul Davies's *The Mind of God* (1992) – that is particularly relevant to our present purposes, and so requires brief exposition.

In support of its general thesis regarding the interface between scientific and theological quests for the 'ultimate' meaning of the universe and our place within it, *The Mind of God* (1992) explores many of the issues under discussion throughout this thesis: these include the relationship between reason and belief; the role covertly played by foundational mathematical notions in delimiting our physics and metaphysics; the question as to whether mathematical phenomena are discovered or invented; the validity of the distinction between supposedly transparent but tautological mathematical language and potentially falsifying but non-tautological natural language; and the human consequences of the inevitable collapse of an explanatory chain founded on the principles of mathematics. For Davies, it is the problem of the explanatory chain that is fatal to our attempts to provide a grounding for belief: eventually, he argues, we must accept one affirmation as given, "whether it is God, or logic, or a set of laws, or some other foundation for existence".[711] Likewise, he argues, Gödel's incompleteness theorem renders even the supposed internal consistency of mathematical systems open to irreconcilable doubt. Paradoxes born of self-reference will always occur in systems sufficiently complex as to contain arithmetic, and these "paradoxical limitations […] ensure we can never grasp the totality of existence from deduction alone".[712]

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711 Paul Davies, *The Mind of God*, 15.
712 Ibid., 22.

Costello frames this same problem from a slightly different perspective. Accepting the essential limitations of totalising logical systems, she begins to question how reason has come to claim such authority over the Western way of thinking. On the one hand, she argues "seen from the outside, from a being who is alien to it, reason is simply a vast tautology";[713] on the other, it is an inherent feature of reasoning systems that they should deny the 'reasonable' occupation of any such 'outside' position:

> Of course reason will validate reason as the first principle of the universe – what else should it do? Dethrone itself? Reasoning systems, as systems of totality, do not have that power. If there were a position from which reason could attack and dethrone itself, reason would already have occupied that position; otherwise it would not be total.[714]

In *The Mind of God*, Davies provides a comprehensive and compelling account of precisely this proposition. Among the examples he uses are simple binary systems such as the programmer John Conway's early composition, 'Game of Life': encoded with nothing more than a few logic gates that operate as rules for the 'propagation' or 'reproduction' of a population of units, 'Game of Life' is capable of evolving self-reproducing organisms of any desired level of complexity.[715] As Davies points out, this entails the real possibility that a universe as complex as our own – with organisms and phenomena as complex as humans and hurricanes – could theoretically arise from axioms no more complex those encoded in 'Game of Life'. Equally, however, following Gödel, it is true that once a system is sufficiently complex as to entail self-reference, its essentially deterministic structure may contain undecidable statements that give the illusion of indeterminacy, but are in fact merely the consequence of flaws inherent in the structure of our formal logic. In other words, if our structures of reason are genuinely

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713 Coetzee, *Elizabeth Costello*, 69-70.
714 Ibid., 70.
715 Conway's 'Game of Life' appears as a two-dimensional grid of cells, each of which can either be 'populated' or 'unpopulated'. The logic gates operate as follows: 1) if a populated cell has zero or four neighbouring populated cells, it switches to unpopulated; 2) if a populated cell has two or three neighbouring populated cells, it remains populated; 3) if an unpopulated cell has three neighbouring populated cells, it switches to populated.

total, then whatever crevices of unreason they may disclose are simply to be ejected from the realm of the rational and treated as false, so that reason may survive upon its self-made throne.

6.2 Vectors of the Matrix: Origins, Limits, Continua

In the sense that it provides direct opposition to the monologic argument of Costello's lecture on 'The Philosophers and the Animals', the conversation between John and Norma that follows is one of many indicators in *The Lives of Animals* and *Elizabeth Costello* that one ought not simply to equate Coetzee's perspective with the direct 'line of thought' presented in the lectures, but rather with the multivalent, equivocal and often self-contradictory 'space' opened up by the interaction of the text's many voices. 'The Poets and the Animals' begins with a dialogue between this physicist and philosopher of mind, and more specifically with Norma's presumption that her mother-in-law's lecture was an attempt

> to say that rational accounts are merely a consequence of the structure of the human mind; that animals have their own accounts in accordance with the structure of their own minds, to which we don't have access because we don't share a language with them.[716]

In the light of her husband's implied acquiescence to this proposition she replies that it is "naive[,] the kind of easy, shallow relativism that impresses freshmen", and which ultimately "leads to total intellectual paralysis".[717] As far as Norma is concerned, observation of the behaviour of animals has taught us that one "cannot, in the abstract, distinguish between an animal mind and a machine simulating an animal mind".[718] Humans, she states, are different:

> Human beings invent mathematics, they build telescopes, they do calculations, they construct machines, they press a button, and, bang, *Sojourner* lands on Mars,

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716 Ibid., 91.
717 Ibid., 92.
718 Ibid.

exactly as predicted. That is why rationality is not just, as your mother claims, a game. Reason provides us with real knowledge of the real world. It has been tested, and it works, you are a physicist. You ought to know.[719]

Though he essentially agrees, saying that human rationality does seem to 'work', John wonders whether there might be "a position outside from which our doing our thinking and then sending out a Mars probe looks a lot like a squirrel doing its thinking and then dashing out and snatching a nut";[720] in other words, he questions whether human reason is any more free and autonomous than the seemingly instinctual, mechanical mental procedures undertaken by the squirrel. "But there isn't any such position!" Norma rages: "I know it sounds old-fashioned, but I have to say it. There is no position outside of reason where you can stand and lecture about reason and pass judgment on reason".[721] The dialogue continues, starting with John's response, as follows:

"Except the position of someone who has withdrawn from reason."

"That's just French irrationalism [...]"

"Then except for God."

"Not if God is a God of reason. A God of reason cannot stand outside reason."

"I'm surprised, Norma. You are talking like an old-fashioned rationalist."

"You misunderstand me. That is the ground your mother has chosen. Those are her terms. I am merely responding."[722]

Though his two interlocutors characterise each other according to such terms, the debate Coetzee stages here is not strictly a zero-sum play-off between rationalism and irrationalism. As he shows in *Diary of a Bad Year*, it is once again the question itself that is at fault, and not least because it is reducible in large part to conceptual metaphorics drawn from mathematics that consequently cannot lead to useful conclusions in the wider, non-mathematical world.

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719 Ibid.
720 Ibid.
721 Ibid., 93.
722 Ibid.

6.2.1 The Irrational Enemies of Reason

Several of the Strong Opinions in *Diary of a Bad Year* discuss what can happen to closed structures of rationality once they admit into their discursive space oppositional voices that, by rejecting the supposedly rational conventions otherwise prevalent within that discursive space, are characterised as irrational. In a Strong Opinion entitled 'On avian influenza', for instance, Señor C discusses the seemingly irrational method through which viruses multiply. To the extent that one may describe the behaviour of viruses as purposive or intentional, he states, it seems unlikely that it is their 'intention' to kill their host organisms, as the greater the quantity of hosts, the greater the proliferation of the virus: as Señor C puts it, the "death of any individual host is therefore a form of collateral damage, a mistake or miscalculation".[723] As such, "the method of random mutation"[724] that ultimately leads to the propagation of the genetic material, and hence the continuation and growth of the species at large, "cannot be said to be arrived at by rational planning".[725]

The modern human response to the random mutations of the virus is to employ a rational scientific process in order to either eradicate the virus or by other means render it harmless. Moreover, the methods employed by the scientists involved also constitute a rationalised process: namely, "a process of trying out biochemical, neurological options, under the command of some master neurological programme called the reasoning process, and seeing which one works".[726] In Señor C's opinion, this asymmetry between the rational and the irrational can be thought of as a game in which the competing sides play according to different rules, "human beings thinking about viral threats in the human way and viruses thinking about prospective hosts in a viral way".[727] While the

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723 Coetzee, *Diary of a Bad Year*, 67.
724 Ibid., 68.
725 Ibid.
726 Ibid.
727 Ibid.

game is in a sense rather like chess in its ebb and flow between attack and counterattack, however, there is an essential difference: while "[t]wo parties who embark on a game of chess implicitly agree to play by the rules[,] in the game we play against the viruses there is no such founding convention".[728] The virus makes no commitment to play fairly, then, and may one day "make the equivalent of a conceptual leap and, instead of playing the game, will begin to play the game of game-playing, that is to say, will begin to reform the rules to suit its own desire".[729]

In the fight against viruses, Señor C proposes, it may end up that a failure to recognise the fallibility and contingency of human reason will be what leads to our ultimate defeat. "We assume", he elaborates, "that, as long as it is applied with enough tenacity, human reason must triumph (is fated to triumph) over other forms of purposive activity because human reason is the only form of reason there is, the only key that can unlock the codes by which the universe works":

> Human reason, we say, is universal reason. But what if there are equally powerful modes of "thinking," that is, equally effective biochemical processes for getting to where your drives or desires incline you? What if the contest to see on whose terms warm-blooded life will continue on this planet does not prove human reason to be the winner? The recent successes of human reason in its long contest with virus thinking should not delude us, for it has held the upper hand a mere instant in evolutionary time. What if the tide turns; and what if the lesson contained in that turn of the tide is that human reason has met its match?[730]

The most striking proposition here is that 'reason' is described as a 'biochemical process': the implication is not only that human reason might have been otherwise had our physiology been different, but it might indeed have been more evolutionarily advantageous. This, again, conforms with the cognitive account of mathematics.

Señor C's interest in the incursion of supposed irrationality into supposedly rational discourses does not end here: while in the Strong Opinion on avian influenza he

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728 Ibid., 69.
729 Ibid.
730 Ibid., 70-71.

seems to conflate 'human reason' with the specifically 'Western' tradition that goes by such a name, an earlier section draws its argument by contrasting this form of rationality with its most vociferously discussed recent enemy: the 'irrational' terrorist. In the fifth of his Strong Opinions, entitled 'On terrorism', he explains why pending Australian laws regarding terrorism seem to indicate a hysteria that is not only out of proportion with the observed *modus operandi* of present-day terrorists, but is also historically unprecedented in its extent. "One explanation on offer", he says, "is that the new foe is irrational":

> The old Soviet foes might have been cunning and even devilish, but they were not irrational. They played the game of nuclear diplomacy as they played the game of chess: the so-called nuclear option might be included in their repertoire of moves, but the decision to take it would ultimately be rational (decision-making based on probability theory being counted here as eminently rational, though by its very nature it involves making gambles, taking chances).[731]

For the governments of the West, the actions of Islamic terrorists cannot be accounted for within the rational discourses that kept the Cold War cold, since their actions are answerable to a divine authority beyond the limits of the game. The game is not, therefore, "being played by the rules of rationality",[732] since these terrorists do not "follow the rationalist calculus of costs and benefits".[733]

As is immediately apparent, the mathematical concepts Señor C mentions here – probability theory and cost-benefit calculus – reflect his profoundly mathematical conceptualisation of the modern state, in which quantificatory conceptual metaphors are foundational in the determination of what it means to be an individual in a global environment. In addition to this, though, the Strong Opinion ends by considering one of the means by which the closed, 'rational' system of the modern democratic state ensures the integrity of its boundaries: censorship. Recalling his own collection of essays on the

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731 Ibid., 19.
732 Ibid., 20.
733 Ibid.

subject – and by proxy Coetzee's own *Giving Offense* (1996) – Señor C notes that things

have changed dramatically since its publication, apparently in the era immediately

following the collapse of the Berlin Wall and the dismantling of the Soviet Union. In the

new world of 2005, he states, state legislation allowing the surveillance of electronic

and telephonic communications across the globe means that "the era in which secrets

counted […] is over; nothing worth knowing cannot be uncovered in a matter of

seconds".[734] According to Señor C, however, this claim reveals more about the modern

state's atomistic, nominalising, reductive conception of an individual's beliefs and

actions than it does of those beliefs and actions in their own right:

> What is striking about such a claim is not so much its arrogance as what it
> inadvertently reveals about the conception of a secret that prevails in official
> quarters: that a secret is an item of information, and as such falls under the wing
> of information science, one of whose branches is *mining*, the extraction of
> scintillae of information (secrets) from tons of data.[735]

Such closed systems, he continues, fail to comprehend the potential for an individual to

possess negative capability, to hold not merely the linear, coherent opinions of the

standard non-fiction text, but to conceive of belief as a shifting, multivocal, self-

contradictory space equivalent to poetry:

> The masters of information have forgotten about poetry, where words may have a
> meaning quite different from what the lexicon says, where the metaphoric spark is
> always one jump ahead of the decoding function, where another, unforeseen
> reading is always possible.[736]

By the novel's end, Coetzee's thoughts regarding the contrast between poetic and

mathematical thinking – earlier explored through his computer poetry, soon to appear in

his review of *Strange Attractors* – would once again take centre stage. Prior to a final

discussion of that issue, though, it is necessary to consider the gradual emergence in

Elizabeth Costello of a similar conception of the limits of the conventional notion of

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734 Ibid., 22.
735 Ibid., 23. For a comprehensive and recent guide to data mining, see Luenberger (2006: 301-328) and
   'The Contribution of Data Mining in Information Science,' Chen and Liu, *Journal of Information
   Science*, 2004.
736 Ibid.

'belief' to that which appears in *Diary of a Bad Year.*

6.2.2 The Limits of the State

In 'What is Realism?', John is presented with the opportunity to discuss with the

convenor of the jury – a Canadian literature professor from McGill University named

Gordon Wheatley – the rationale behind his mother's selection as "the best […]. Not the

best Australian, not the best Australian woman, just the best":[737]

> 'Without infinity we would have no mathematics,' says Wheatley. 'But that
> doesn't mean that infinity exists. Infinity is just a construct, a human construct. Of
> course we are firm that Elizabeth Costello is the best. We just have to be clear in
> our minds what a statement like that means, in the context of our times.'[738]

For clarity, Wheatley's analogy might best be glossed as meaning that, just as one must

accept and prioritise the reality of a contingent and ideal concept in order to get on with

the business of mathematics – in Wheatley's example this requires a particular form of

'infinity', defined according to the context of a given problem – one must equally accept

and prioritise another ideal concept in order to identify the single writer who most

closely fits the chosen criteria for 'best' in the context of a given year – in Costello's case

something more nebulous, perhaps involving the articulation of the uniquely female

voice. The analogy, then, is predicated on a belief that both mathematics and the

discourses surrounding the attribution of literary merit are constructivist in nature, and

therefore require the construction of a contingent context, based on an initial and

conceivably fallacious affirmation, prior to the assignation of value.

While John considers this an unsatisfactory response to his question – the

"analogy with infinity makes no sense to him"[739] – it seems unlikely, given his

background in physics and astronomy, that this 'not making sense' translates to a failure

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737 Coetzee, *Elizabeth Costello*, 8.
738 Ibid.
739 Ibid., 9.

of comprehension. One might therefore better read the 'not making sense' as a consequence of John – again by virtue of his professional interests – being predisposed to reject Wheatley's constructivism on philosophical grounds; both physics and astronomy are after all essentially constructed upon an intrinsically realist conception of mathematics, in many instances of which the use of various forms of infinity is a *sine qua non*.

Echoing Wheatley's sentiment, *Diary of a Bad Year*'s Señor C explores the notion of the constructed rationality of the sovereign state in terms that frequently involve interrogating the mathematical principles through which this rationality bases its claim to objectivity. In particular, three concepts involving the infinite emerge as being especially influential: origins, limits, and continua. The very first section of *Diary of a Bad Year* presents the machinery of modern democracy as fundamentally delusory: just as the language or mathematical discipline we adopt determines the limits of our ability to express ourselves freely, so our expression of democratic freedom is confined by the pre-existing structures through which we are permitted to express it. We "are born into the state", Señor C notes, "and our forebears too were born into the state as far back as we can trace. The state is always there before we are".[740] Just as in 'What is Realism?', then, *Diary of a Bad Year* begins by questioning the validity of a structure into which we are helplessly thrown – sovereign state and novel alike – and in which the initial affirmations that determine the context into which our ideas are embedded have been made prior to our having the opportunity to challenge them. "If, despite the evidence of our senses," Señor C continues, "we accept the premise that we or our forebears created the state, then we must also accept its entailment: that we or our forebears could have created the state in some other form, had we chosen".[741] Just like the contingent

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740 Coetzee, *Diary of a Bad Year*, 3.
741 Ibid.

structure of mathematics, then, in which the foundational affirmations are ultimately a

provisional construct, the conventional sovereign state could take an entirely different

form. Señor C goes on to consider how the modern subject's expression of his or her

democratic freedom is necessarily forestalled by the pre-existence of an established

state and the built-in exclusion from the democratic electoral process of a genuinely free

choice:

> Always the subject is presented with the accomplished fact: in the first case with
> the fact of his subjecthood, in the second with the fact of the choice. The form of
> the choice is not open to discussion. The ballot paper does not say: *Do you want A
> or B or neither?* It certainly never says: *Do you want A or B or no one at all?* The
> citizen who expresses his unhappiness with the form of the choice on offer by the
> only means open to him – not voting, or else spoiling his ballot paper – is simply
> not counted, that is to say discounted, ignored.[742]

The state does not allow for indecision, for the expression of uncertainty; it requires

nominalised, definitive, and certain gestures, and conforms to and obeys at all times the

law of the excluded middle:

> The ordinary person would like to say: *Some days I incline to A, some days to B,
> most days I just feel they should both go away*; or else, *Some of A and some of B,
> sometimes, and at other times neither A nor B but something quite different*. The
> state shakes its head. *You have to choose*, says the state: *A or B*.[743]

The problem, as Señor C defines it, is that the political sphere has already determined its

limits: "Why is it so hard to say anything about politics from outside politics?" he asks.

"Why can there be no discourse about politics that is not itself political?"[744] Señor C's

third Strong Opinion – 'On democracy' – begins to develop an answer to this problem,

and once again finds the metaphorical vocabulary of mathematics to be especially

elucidatory: "The main problem in the life of the state is the problem of succession,"

Señor C states: "how to ensure that power will be passed from one set of hands to the

next without a contest of arms":[745]

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742 Ibid., 8.
743 Ibid., 9.
744 Ibid.
745 Ibid., 13.

Early solutions to the problem of succession have a distinctly arbitrary look: on the ruler's death, his firstborn male child will succeed to power, for example. The advantage of the firstborn male solution is that the firstborn male is unique; the disadvantage is that the firstborn male in question may have no aptitude to rule.[746]

The monarchical solution is self-evidently absurd, then, in that it is beholden to structure at the expense of content: its purpose is not to provide strong rulership, but merely to ensure the continuity of a linear series of individuals whose authority is by definition beyond question. Again adopting conspicuously mathematical terminology, Señor C consequently states that the "rule of succession is not a formula for identifying the best ruler; it is a formula for conferring legitimacy on someone or other and thus forestalling civil conflict".[747] Firstly, the notion that such an important social institution as the passage of power be decided according to a given 'formula' is deeply problematic in the light of the earlier discussion of the relativism of rationality and mathematical logic. Secondly, the allusion to Pierre Simon Laplace's 'rule of succession' seems conscious and pointed. To elaborate, having tasked himself with discovering the probability that the sun shall rise tomorrow, Laplace constructed a general question of the following form: if a given experiment can only result in absolute success or failure, and if having repeated the experiment n times we have observed s successes, then what is the probability that the next experiment shall result in success? Using a sample of the previous 5000 days, Laplace calculated the probability to be 1826251:1, and therefore massively in favour of the sun rising the next day.[748] At the heart of Laplace's methodology lie two related issues that echo throughout Coetzee's more mathematical work and also seem relevant to the discussion of democracy: firstly, circumscribing the complex phenomenon of the sunrise according to a binary probability distribution that forces our conceptualisation of reality to conform to just one of two discrete states is

746 Ibid.
747 Ibid., 14.
748 It is unnecessary to go into the mathematical detail of Laplace's calculation in any depth. A full statement of the problem and Laplace's solution can be found in Kai Lai Chung and Farid AitSahlia, *Elementary Probability Theory*, Fourth Edition. (New York: Springer-Verlag, 2003), 129-131.

hugely and distortingly reductive; secondly, whatever probability we calculate can only ever respond to whatever data is available to our calculations. In the absence of Laplace's Supreme Calculator, then, our probabilistic reckonings regarding reality can only ever reflect the limited information contained with the closed, totalising system of data we choose to observe.

Back in the context of Señor C's discussion of democracy, this connection to totalising systems is clearly informative. As he points out, "the power of the ballot-count formula, like the power of the formula of the firstborn male, lies in the fact that it is objective, unambiguous, outside the field of contestation".[749] However, just like Laplace's statement of the sunrise problem, "[d]emocracy does not allow for politics outside the democratic system. In this sense, democracy is totalitarian".[750]

6.2.3 Tending to the Limits

If the modern democratic state exists with predefined limits, such that anything beyond what is accepted is deemed as irrational and as such ignored from the calculations that count, what might it mean to approach those limits or, to use the mathematical language Costello prefers, to tend towards them? Providing an especially charged context for this question, the sixth of the Costello 'Lessons' explores the covert role played by the concepts of the continuum and the limit in our conceptualisations of moral good and evil.

Immediately after encountering a disturbing scene in a book she has been reading – *The Very Rich Hours of Count von Stauffenberg* by Paul West, a real book by a real author – Costello is asked to speak at a conference in Amsterdam on the subject of 'Silence, Complicity, and Guilt'. Under the dark spell of a passage in which the

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749 Coetzee, *Diary of a Bad Year*, 14.
750 Ibid., 15.

execution of Hitler's would-be assassins is depicted in devastating and sickening detail, she tries to unpack the nature of her outrage at what she deems to be doubly "obscene":

> Obscene because such things ought not to take place, and then obscene again because having taken place they ought not to be brought into the light but covered up and hidden for ever in the bowels of the earth.[751]

Stunned by her own propensity to be so offended, Costello wonders how it comes to be that the acts of "Adolf and his cohorts" strike up more vivid feelings of offence than those of, say, Stalin. The very attribution of the term 'evil', Costello concludes, is a process fraught with danger:

> A measuring of vileness against vileness in which the very act of measuring leaves a vile taste in the mouth. Twenty million, six million, three million, a hundred thousand: at a certain point the mind breaks down before quanta; and the older you get – this at any rate is what has happened to her – the sooner comes the breakdown.[752]

Costello here figures the attribution of evil as a diminishing series, within which each term acquires its meaning through a surprisingly complex matrix: first, the deaths involved must be rounded up and delineated as a single entity; second, this newly defined 'event' – 'a hundred thousand dead' – is established as earning its place among the ranks of the 'evil', rather than among the potentially justifiable; finally, this newly defined 'evil event' finds its rightful place in the order of 'evil events', weighed up against its evil kin. On the basis of such a process, a continuum of the evil is implicitly constructed, against which new acts of supposed evil are routinely judged. And the boundaries of this continuum? At one end, the obscene, the "*off-stage*", beyond the limits of measurable evil; at the other, the good to which we must tend, though which we can by definition never reach, an infinite, immeasurable goodness that allows us to measure our acts; without infinity, to recall Wheatley's words, there can be no mathematics.

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751 Coetzee, *Elizabeth Costello*, 158-159.
752 Ibid., 159.

Later, after an embarrassing realisation that West is to be in the audience for her lecture – in which she had intended to vilify him as fundamentally 'evil' – Costello begins to register certain doubts about the kind of society in which she finds herself at this point in history:

> She should never have come, never have accepted the invitation, she knows it now. Not because she has nothing to say about evil, the problem of evil, the problem of calling evil a problem, not even because of the ill luck of West's presence, but because a limit has been reached, the limit of what can be achieved with a body of balanced, well-informed modern folk in a clean, well-lit lecture venue in a well-ordered, well-run European city in the dawn of the twenty-first century.[753]

It would be hard to deny that the problem Costello faces here is one that also exercises her creator: namely, the problem of defining and validating our most fundamental or originary principles once the intellectual structures that allow us to do so – in this case the academic proprieties of order, balance, and supposed informedness – have made themselves and their inherent biases comfortable in our patterns of thinking. Coetzee's novels and criticism function, for much of the time, in such a way as to interrogate the ways in which our initial and potentially arbitrary affirmations of principle inevitably propagate their silent contaminations throughout our most seemingly innocuous discourses. What is uniquely interesting in the case of 'The Problem of Evil' is the way in which an individual such as Costello can – despite the seeming reason and logic that have led to and delimited her current set of convictions – find herself approaching a limit beyond which her available standards and rationalisations cannot take her. Some questions arise: what constitutes such a 'limit'? What might it mean to 'approach' such a 'limit'? How might one reconcile ethical concerns with the claim that 'a limit has been reached' in our attempt to solve, amongst other problems, 'the problem of evil'?

Coetzee's essay 'Taking Offense', written at around the same time as the first Costello lectures as an opening gambit for the volume *Giving Offense* (1996), gives

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753 Ibid., 175.

some sense of the conceptual ground within which he might approach such questions.

Identifying himself as a writer and intellectual born into the "tail end [of a] historical

movement"[754] stretching back to the Romanticism of the late eighteenth century, he

consequently recognises in himself the tendency common to artists of his kind

> to assume it as their social role, and sometimes indeed as their vocation and
> destiny, to test the limits (that is to say, the weak points) of thought and feeling, of
> representation, of the law, and of opposition itself.[755]

This tendency, he contends, is driven by an urge to challenge the validity of the

particular brands of reason and affirmation that enable totalising belief systems to

become pervasive and, as such, to proliferate their own foundational affirmations and

conceptualisation of reason. His parenthetical conflation of 'limits' with 'weak points'

requires some unpacking: while he uses the term 'limits' here to denote the outer reaches

of a coherent discourse, and hence employs an essentially topological metaphor (i.e. one

that designates a non-metrical 'inside' and 'outside' rather than a 'limit' towards which

ideas may in some quasi-numerical sense tend), it is apparent elsewhere in his work that

he understands the ways in which other, related ideas depend for their meaning on a

strictly numerical notion of the limit as the end-point towards a continuous, linear

progression asymptotically tends. Just two pages later in 'Taking Offense,' for instance,

he exhibits the customary negative capability that makes his work so fissile and so

elusive by provisionally acceding to what he calls

> the teleology of liberalism, which believes in throwing open the marketplace to
> contending forces because in the long run the market tends to the good, that is to
> say, to progress, which liberalism understands in a historical and even
> metaphysical light.[756]

A contributing factor here, he continues, is that in the dialectical machine of the modern

democratic state and its discontents, dissenting voices are usually welcomed, rather than

automatically silenced, insomuch as they are likely to awaken "more convincing

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754 J. M. Coetzee, *Giving Offense*, (Chicago: Chicago U.P., 1996), 9.
755 Ibid.
756 Ibid., 11.

countervoices […] defending the authority of the state, praising God, exalting chaste love".[757] The supposed 'good' that society tends towards under such conditions, then, will just be a reaffirmed, possibly reinvigorated product of a belief system whose origins, once again, evade significant challenge.

Following his interest in the thought of Cassius Jackson Keyser, and in the retrospective light of the discussion of the linearly ordered set with which this chapter began, perhaps the most compelling example of the metaphor of the 'moral limit' in Coetzee's fiction occurs, again, in 'The Problem of Evil'. Despite the fact that she has found his work as a novelist morally reprehensible, Costello is prepared to consider the possibility that a countervoice such as West's might ultimately be good for society:

> Paul West, a good man, for all she knows, or as good as a man can be that is also a novelist, that is to say, perhaps not good at all, but tending nevertheless to the good, in some ultimate sense, otherwise why write?[758]

In its own right, she submits, West's fiction might seem to tend towards an individual 'evil'; in the wider context of society, however, his work aids an ultimate tendency towards the limit of the 'good'. Interestingly, these ideas are prefigured by a handwritten note Coetzee wrote in 1974. On the back of notebook to a class on Theodor Dreiser he taught at as part of a course on American Literature at UCT, the note is headed 'What is America?' and reads as follows:

> Does the <u>free</u> individual tend to <u>vice or virtue</u>? Is human nature fallen (and therefore to be checked by laws), or is it innocent? Is nature a place of uncorrupted good or a lawless place where anything can happen? What does the Indian, living in a state of nature, teach Americans about <u>human nature</u>? What happens to people who live ~~beyond~~ outside the law of civilization? Does civilization tend towards the betterment or the corruption of man?[759]

In each of these instances the reader is offered a variant of the phrase 'tending to the good' – with its implication that the 'good' is a desired 'limit' towards which society

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757 Ibid.
758 Coetzee, *Elizabeth Costello*, 180.
759 J. M. Coetzee, "American Literature," Seminar Notes, 2 August 1974, National English Literary Museum, Grahamstown. Underlining and strike-out retained from original.

ought to 'converge' – along with the suggestion that the liberal (or perhaps liberated or liberating) writer may contribute to this progression merely by offering up a voice to contend with the rest in the marketplace of ideas.

As so often the case in his criticism, however, the devious complexity of Coetzee's construction in the passage of 'fiction' from *Elizabeth Costello* – with its evasively third-person perspective wracked with back-pedalling paratactic commas, equivocating conjunctions, and a sense of rhetorical doubt – hints at the unease Costello, and possibly Coetzee, feels concerning the validity of the notion of 'tending to the good'. The most obvious problem is the disparity between the type of economic liberalism from which Coetzee borrows his "marketplace" terminology and the social, cultural, or ethical liberalisms to which the analogy might be applied. In this instance, and when Costello reaches her conclusion that "a limit has been reached," beyond which the existing structures of the complacently "well-ordered" and "well-informed" academic community cannot reach, Coetzee seems to be holding up for analysis the very foundational principles upon which such grand notions as social, cultural, or ethical progress, as opposed to the objectively, if still problematically, measurable status of economic progress, are built.

6.2.4 Vectors of the Matrix

Coetzee elaborates on the fragility of this highly quantificatory marketplace metaphor in *Diary of a Bad Year*. In the Strong Opinion entitled 'On competition', and after discussing how in recent years competitive sport has undergone a transformation from 'play' into 'work' not least because of its subordination to economic imperatives, Señor C goes on to note how the discourses surrounding global economic activity seem now to have assimilated a notion of the 'individual' as necessarily 'belonging' to a particular

sovereign state, and that those states must necessarily 'compete' with one another for economic advantage. For Señor C, however, while the "figure of economic activity as a race or contest is somewhat vague in its particulars, […] it would appear that, as a race, it has no finishing line and therefore no natural end".[760] In his opinion, while economic activity, such as it is conventionally perceived in our times, may give the appearance of teleology, of tending to the good, it does so in the absence of exactly the defined limit that is necessary for the conferral of value; in other words, the figure of economic activity as a race is analogous to the paradoxes of Zeno and therefore to an infinite series that fails to converge. The quantificatory metaphor of the linear, continuous economic 'race' is as such explanatorily unhelpful and ultimately misdirecting.

While for Señor C the market is a linear model that may or may not tend towards the good, however, the tri-partite structure of *Diary of a Bad Year* enables Coetzee to invoke a countervoice that both provides a more sophisticated model of global economics, and in so doing offers a clear vision of what a literary text that follows the same model might be able to achieve. The narrative largely told in Anya's voice often introduces the perspectives of her partner, Alan; his model of global economics replaces the simple notions familiar to Señor C with more suitable mathematical concepts such as vectors, matrices and probability, and enables Coetzee to once again stage strong monological versions of each of the two sides of a conceptual dispute about which the text as whole need assume no such fixed position.

According to Anya's narrative, her partner seems a suitably qualified countervoice in opposition to Señor C: "Alan isn't a scientist," she explains, "his degree is in business, but he has become a whiz at mathematical modelling, he has given seminars on it".[761] Very much the hard-headed pragmatist, Alan claims not to concern himself

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760 Coetzee, *Diary of a Bad Year*, 79.
761 Ibid., 103.

with the type of rarefied philosophical thinking to which both Costello and Señor C

attend when considering mathematics. At one point, indeed, Anya recalls him referring

in his blunt, no-nonsense fashion to the latter's discussion of probability theory as

"bullshit":

> It is what I call mathematico-mysticism. Mathematics is not some arcane mumbo-jumbo about the nature of the number one versus the nature of the number two. It is not about the nature of anything at all. Mathematics is an activity, a goal-directed activity, like running.

> Running doesn't have a nature. Running is what you do when you want to get from A to B in a hurry. Mathematics is what you do when you want to get from Q to A, from question to answer, quickly and reliably.[762]

Though he would doubtless recoil at characterising it in this way himself, then, Alan is

essentially a constructivist: in his opinion the attempt to locate the 'reality' of

mathematical entities is a naïve vanity and, since they typically constitute an attempt to

"draw a line between realities and perceptions",[763] Señor C's opinions foolishly ignore

the deeper truth that, as Alan sees it, "everything is a perception. That is what Kant

proved. That was the Kantian revolution. We don't have access to the noumenal".[764] In

Alan's view, Señor C's view of democratic governments as akin to a self-serving band of

Kurosawan despots emerges from his inability to "think structurally"[765] and his desire to

"see personal motives at work":

> It is all a morality play to him, good versus evil. What he fails to see or refuses to see is that individuals are players in a structure that transcends motives, transcends good and evil. […] Within the market, if you like. Which is beyond good and evil, like Nietzsche said. Good or evil motives, they are just motives in the end, vectors of the matrix, that get evened out in the long run.[766]

However imprecise or oversimplifying his interpretations of Nietzsche and Kant, Alan's

metaphor of "vectors of the matrix" not only lends a mathematical basis to his

apparently amoral neo-liberalism, but also hints at a surprising and unacknowledged

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762 Ibid., 104-105.
763 Ibid., 90.
764 Ibid., 103.
765 Ibid., 97.
766 Ibid., 97-98.

common ground between himself, Señor C, Costello, and, given his comments in 'Taking Offense', perhaps even Coetzee. In mathematics, a matrix is a bracketed, two-dimensional, quadrilateral array of entries, such as the example below:

$$\begin{pmatrix} 11 & 2 & 6 & 23 \\ 2 & 3 & 7 & 3 \\ 4 & 2 & 8 & 18 \\ 5 & 9 & 12 & 3 \end{pmatrix}$$

To recall from Chapter Four, a vector is defined as having both direction and magnitude. In the context of a matrix such as the example above, the series (11 2 6 23) is a 'row vector'; it differs from (11 2 6) because of its greater magnitude, and from (11 3 8 3) because of its different direction. In Alan's metaphor, vectors are analogous to motives in the sense that while each may differ in terms of magnitude and direction, they each are no more and no less than elements of a pre-existing structure. While each vector does in one sense contribute to the production of the overall 'meaning' of the matrix, it might equally be seen as a line of mere description, and one which furthermore cuts across many other competing descriptions with which it shares constituent elements, but not direction and magnitude. Similarly, in Alan's opinion, while certain politicians may be "bandits on a personal level […] even those guys work within the system, whether they are aware of it or not".[767] The conflict between 'good' and 'evil' is over, he continues, since modernity has rendered the application of those terms to individuals meaningless: "That is what defines modernity. The big issues, the issues that count, have been settled".[768]

There is a certain liberalising existentialism to Alan's world-view that, though potentially chilling in its concomitant permissiveness, actually chimes rather closely with the opinions that Señor C and Costello begin to reach as their respective novels

767 Ibid., 97.
768 Ibid., 99.

draw to a close. Despite his conceited bluster, this fact is not entirely lost on Alan: in his interpretation, Señor C's employment as a conveyor of opinions allows him to simultaneously operate in both the "individual dimension and the economic dimension",[769] realms of the personal and the collective respectively. But, Anya asks, "what is the economic dimension, in the end, but the sum total of extensions from our individual dimensions, our dreams and opinions and so forth?"[770] In Alan's opinion, the essential difference is that the

> datum has to start its life in the individual dimension […] before it can migrate to the economic. But then something happens. Once a critical mass is reached, quantity becomes quality. So the economic not only sums up the individual, it also transcends it.[771]

Alan's point here might remind us of the young John's query in *Youth* as to whether the huge computational resources at his disposal allow his computer-generated poetry to "turn quantity into quality".[772] For Alan, though, all of life's decisions may be reduced to the hedging of individual risks within a marketplace that, already being in existence, will always treat us with dispassionate indifference to our individual sense of right and wrong. "That is about the sum of it", he says: "You balance the pluses against the minuses and decide. That is how everything works, pluses and minuses. Natural justice".[773]

It is in relation to this rather callous quantificatory approach to morality that Anya provides an important countervoice to Alan's; she is, of course, another vector within the matrix of the novel. Having installed a spyware program on Señor C's computer, Alan plans to secretly siphon millions of dollars from the ageing novelist's bank account, sending falsified statements to cover his tracks. In response to Anya's disgust, Alan argues that it not so 'black and white' a moral issue as she imagines:

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769 Ibid., 79.
770 Ibid., 80.
771 Ibid., 81.
772 Coetzee, *Youth*, 161.
773 Coetzee, *Diary of a Bad Year*, 91.

> Alan never hid it from me that he does not believe in black and white. It is all a continuum, says Alan, all shades of grey, from darker shades at one end to lighter shades at the other. And he? He is a specialist in the middle area, that is how he puts it, in the shades of grey that are neither dark nor light. But in Señor C's case he seems to me to be crossing the line from grey into black, into the out-and-out blackest.[774]

Believing himself to dwell within the continuum of the grey, and denying the reality of the limits of good and evil, Alan is prepared to admit that his plan amounts to "crookery",[775] but puts his faith in another mathematical discipline: "on condition that the stock market behaves predictably, that is to say, according to the laws of probability", he claims, his crime will surely be "harmless".[776] Judging by Señor C's thoughts regarding probability theory, he would approach the situation with rather less ease.

6.3 Probability Theory and Authority in Fiction

Within a sufficiently extensive probabilistic space, so the convention goes, anomalies are as nothing. When the numbers are large enough, probability becomes indistinguishable from law. In Boltzmann's example, to recall, the behaviours of individual particles in a gas gradually normalise as the overall system tends towards a state of entropy. But just as physicists and philosophers may still dispute the precise nature of the relationship between statements of causal and probabilistic law, so the entropic tendency of human communities towards normalisation and and the imposition of law raises difficult questions of its own: if the probabilistic law of large numbers minimises anomaly, does consensus by analogy quell dissent? If so, then what can it mean to raise one's authentic voice, to speak one's own truth? Moreover, in a modern democratic state, the limits of which may seem to have been reached, what can it mean

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774 Ibid., 135.
775 Ibid., 139.
776 Ibid.

to write?

6.3.1 'On probability'

Señor C begins his Strong Opinion on the subject of probability by posing the question

as to whether Einstein was correct in his claim that God not does play with dice, and in

his implicit belief "that the laws governing the universe have a deterministic rather than

a probabilistic character".[777] While recognising that "most physicists today"[778] would

take issue with Einstein's rather "naïve"[779] conception of a physical law, Señor C

nevertheless sets out to explore the problematic nature of probabilistic descriptions of

physical phenomena. Using the example of the supposed causal link between a man's

weight and the likelihood of his suffering a heart attack, Señor C notes the disparity

between individual cases and general probabilistic statements derived from empirical

evidence such as "I am ninety-five per cent sure there is a causal link",[780] which may be

glossed as "I will be right in at least nineteen cases out of twenty; or, if not in nineteen

out of twenty, then in nineteen thousand out of twenty thousand"[781] and so on. While the

general probabilistic statement provides substantial guidance as to how one might best

avoid the *risk* of a heart attack, it nevertheless offers no definitive resolution as to the

truth of the conditional proposition such that "*if* I eat moderately *then* I will not have a

heart attack".[782] As Señor C explains, "[i]t is not in the nature of probabilistic claims that

they can be disconfirmed by example":

> They can be confirmed or disconfirmed only probabilistically, by other statistical
> investigations conducted on other masses of subjects; and disconfirmation can
> only occur in the form, "The claim that overweight men are at increased risk of
> heart attack cannot be sustained on probabilities and it is therefore in that sense

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777 Ibid., 97.
778 Ibid.
779 Ibid.
780 Ibid.., 99.
781 Ibid.
782 Ibid.., 100.

probably not valid."[783]

The type of anecdotal anomalies to which the sceptic may have recourse – in Señor C's example, "My grandfather was fat and lived to be ninety"[784] – may comfort the habitual overeater, but rather than providing disconfirmation of the causal link merely indicate the inherent reductivism in conditional statements the terms of which are linguistic shorthand for more complex, interconnected phenomena: being 'overweight' is not simply a matter of 'overeating', but rather, at least at the macro level, one consequence of the interaction of dietary, metabolic, and behavioural elements; similarly, the term 'heart attack' relies upon fixed ideas relating to the identity of human physiology across a community of individuals that can bear little scrutiny.

One way to avoid this issue would be to seek the help of Laplace's Supreme Calculator, and hence to include in our causal calculus every single factor – of which there may be practically an infinity – that contributes to whatever physiological condition we agree to call 'heart attack'. Lacking such assistance, the first problem with this solution is that all our attempts to define causal relations between observable physical phenomena have, to date, been confronted by insurmountable limits: where such limits were once attributable to an insufficiency of either or both of experimental apparatus or conceptual capacity, the consensus of contemporary physics tends to conclude, as Señor C himself proposes, that the reason that

> the probabilistic laws of quantum physics give us a better understanding of the universe than the old deterministic ones [is that] the substance of the universe is in some sense indeterminate and the laws are therefore by their nature in better accord with reality.[785]

Further still, he wonders, might the problem eventually be consequent upon the fact that "the mode of thinking about the relation between present and future typified by

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783 Ibid.
784 Ibid., 101.
785 Ibid., 102.

foretelling depends on an archaic time sense?"[786]

In a sense, one might consider the structure of *Diary of a Bad Year* to be a natural development from the fragmented structure of *In the Heart of the Country*: where the earlier novel encodes in its fragmentation a constant reminder of the contingent status of its provisionally linear time sense, the three parallel narratives of *Diary of a Bad Year* force the reader to play an active role in the construction of the text's movement in both an onward and a lateral direction: to elaborate, because each of these three narratives maintains its own distinct time progression, the reader is constantly charged with deciding how to structure his or her reading experience; whether to read each numbered page as a single multivocal unit, or whether to submit to the intuitive appeal to follow the individual path of a given narrative to an appropriately conclusive juncture, and then turn back to rejoin one of the other two at an earlier point.

One consequence of the reader's participation in the provisional construction of parallel and partially overlapping time-lines might be that the narratives unfurling in the two diary sections can function as commentary on – or interaction with – the subject matter of Señor C's 'Strong Opinions'. The ironies that this feature discloses are both complex and many. For instance, the spyware program Alan has installed on Señor C's computer allows him access to his victim's notes; the structure of the novel concomitantly allows the reader access to Alan's unrelenting dismissal of the conception of probability they express:

> Ignorant bullshit. He is a hundred years out of date. We live in a probabilistic universe, a quantum universe. Schrödinger proved it. Heisenberg proved it. Einstein disagreed, but he was wrong. He had to admit he was wrong, in the end.[787]

In this context, Alan now plays a similar role to Norma in *Elizabeth Costello*. In response to Señor C's belief that, as Alan characterises it, "if you stand outside

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786 Ibid.
787 Ibid., 107.

probabilistic discourse then probability statements make no sense",[788] Alan argues that

"in a probabilistic universe *there is nowhere to stand outside probability*":

> It is all of a piece with his idea that numbers stand for something outside themselves, though he can't say what. The fact is, numbers are just numbers. They don't stand for anything. They are nuts and bolts, the nuts and bolts of mathematics. They are what we utilize when we work with mathematics in the real world. Look around you. Look at bridges. Look at traffic flows. Look at the movement of money. Numbers work. Mathematics works. Probabilities work. That is all we need to know.[789]

Though Señor C is offered no right of reply within the covers of *Diary of a Bad Year*, one can observe a trace of Coetzee's enduring interest in the relationship between probability theory and the 'truths' upon which our systems of ethical obligation are routinely erected in his foreword to Jonathan Balcombe's *Second Nature: The Inner Lives of Animals* (2010). Coetzee's foreword immediately frames the discussion regarding our ethical relationship with animals in terms of the tyranny of human reason and its specific manifestation in statistics and the philosophy of probability. Faced with questions such as whether fish feel pain, or whether parrots are able to think, Coetzee states that "ordinary people" tend to defer to whatever authority enables them to continue to "believe what they want to believe, what it suits them to believe. Thus: fish feel no pain".[790] That such a belief is in many cases intertwined with self-interest is of course an issue in itself; nevertheless, as Coetzee indicates, even those few willing to limit their beliefs to those that can be verified along strict scientific guidelines may be guilty of circular and essentially untenable reasoning:

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788 Ibid., 111.
789 Ibid.
790 J. M. Coetzee, "Foreword," in Jonathan Balcombe, *Second Nature* (New York, Palgrave Macmillan, 2010), ix.

> Only a tiny minority are prepared to believe only what has been proved to be scientifically true, and of that minority only a fraction will be able to spell out what constitutes a scientific proof of the kind they believe in. In the area of animal physiology, criteria of proof usually come framed in statistical terms; the statistics in turn depend on the mathematics of probability, and the mathematics of probability rests on rarefied philosophical assumptions. All in all, a body of difficult theory which even the professional scientific practitioner revisits only rarely and more or less takes on faith.[791]

Whatever he may have made of Polanyi's diagnosis of the inherently 'personal' nature of scientific 'truth', it should nevertheless be clear from Coetzee's response to Reichenbach's fervour for the role probability theory might play in epistemology that he has long harboured doubts regarding the validity of those "rarefied philosophical assumptions" upon which the scientifically authorised view of the 'facts' of science and, by extension our ethical obligations to non-human animals, are predicated.

In a similar vein, Coetzee's review of Philip Roth's 2010 novel, *Nemesis*, shows us once again that to attempt to take a single, unified 'lesson' from a work of fiction – or an individual narrative within such a work – is to underestimate the power of the novel to undermine such conventional wisdom. Comparing the actions of Roth's protagonist, a symptomless carrier of poliomyelitis – tantalisingly named Cantor – with those of Oedipus, Coetzee considers how the logic of justice can be applied "when vast universal forces intersect the trajectories of individual human lives":

> To respond that for one man to unwittingly ("by accident") kill his own father and then unwittingly ("by chance") marry his own mother is so statistically rare a sequence of events – even rarer than bearing the plague while seeming healthy – that it can hold no general lesson, or, to put it another way, that the laws of the universe are probabilistic in nature, not to be disconfirmed by a single aberrant individual case – to respond in this way would to Sophocles seem like evading the question. Such a man lived: his name was Oedipus. He experienced such a fate. How should his fate be understood?[792]

Given that Roth's novel scarcely prompts a reading involving statistics and probability, Coetzee's tangential display of an apparent adherence to the contemporary orthodoxy

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791 Ibid., ix-x.

792 J. M. Coetzee, "On the Moral Brink," *New York Review of Books*, October 28, 2010, accessed July 3, 2012. http://www.nybooks.com/articles/archives/2010/oct/28/moral-brink/?pagination=false

such that "the laws of the universe are probabilistic in nature" reminds us once again

that his relation between his personal beliefs and those of the characters in *Diary of a*

Bad Year is by no means a simple bijection with Señor C, but rather the replacement of

monologistic belief with a matrix of beliefs that together – and often contradictorily so –

stage the important questions he seeks to address.

Summary: The Future of the Novel

In *Elizabeth* Costello, the second of the protagonist's lectures is entitled 'The Future of

the Novel'. On a cruise around the Antarctic, Costello is prompted to think about the

nature of our shared cultural history:

> We have succeeded […] in making thousands and millions of individual fictions,
> fictions created by individual human beings, lock well enough into one another to
> give us what looks like a common past, a shared story.[793]

The future, by contrast, "is a sketchy, bloodless affair, as visions of heaven tend to be.

Of heaven and even of hell".[794] Costello begins here to outline a position of incomplete

knowledge of the limits of good and evil that of necessity condition our ability to judge

the relative goodness and evil of our past acts, and yet which are themselves

unfathomable. All the while, as Costello makes her point, she becomes aware that the

views she is espousing were constructed into a web of words and logic so long ago that

this act of utterance, and its attendant speaking voice, "have taken on a worn,

unconvincing air".[795] This speech act is less about believing the supposed 'truths'

projected by their linguistic embodiments – after all, "she no longer believes very

strongly in belief"[796] – and more about performing the argument into which they

coalesce, and giving the assembled audience a prospect of the public persona known as

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793 Ibid., 38.
794 Ibid.
795 Ibid., 39.
796 Ibid.

'Elizabeth Costello'.

Her principal interlocutor on the ship, the Nigerian novelist Emmanuel Egudu, continues in this vein in his wondering as to whether "language [is] not a more important matrix than birth".[797] In a sense, both *Elizabeth Costello* and *Diary of a Bad Year* chart the attempts of their protagonists to escape from these two matrices, and to speak not only as anomalies within a pre-existing, probabilistic, discursive space, but rather as voices from beyond the space entirely. Costello, having stepped off the ship for a solitary ramble on the icy antarctic land, begins to feel a change coming over her: the wordlessness and silence of this untouched expanse of monochromatic white begin to instil in her a jolting sense of dislocation, a feeling of freedom from the surety and delimitation of the world of words, of human affirmation, that she ordinarily inhabits.

The final 'Lesson' included in *Elizabeth Costello* brings this image into even sharper focus, and provides a suitable point of anxious closure. In the course of the dreamlike, surrealistic 'At the Gate', Costello is told that she must provide a declaration of her beliefs before she is allowed to pass through the Kafkaesque gate with which she is suddenly and unaccountably confronted. Pressed by the gatekeeper, and after much prevarication, she commits to "maintain beliefs only provisionally":[798] the upshot of her soul-searching is "a statement, revised, heavily revised. Revised to the limit of [her] powers".[799] As the gatekeeper observes, however, belief approached through a series of closer and closer approximations will of necessity never quite be reached: "Revised to the limit, you say. Some of us would say there is always one more revision to do". Finally, paralysed by this echo of the differential calculus, she looks past the gatekeeper one last time: "Beyond him is nothing but a desert of sand and stone, to infinity".[800]

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797 Ibid., 44.
798 Ibid., 195.
799 Ibid., 199.
800 Ibid., 224.

Costello's abnegation of belief admits of certain parallels with Señor C's closing thoughts on the future of the novel. Towards the close of *Diary of a Bad Year*, he notes that where mathematics and democratic politics are never expected to justify their originary affirmations, it is a peculiar and special characteristic of the novel that its authority must be grown from rootless earth:

> In the novel, the voice that speaks the first sentence, then the second, and so onward – call it the voice of the narrator – has, to begin with, no authority at all. Authority must be earned; on the novelist author lies the onus to build up, out of nothing, such authority.[801]

However, if such authority is built from the affirmation of a series of nothings – like the *o* of both Newton's calculus and Friday's resistance – then why should a writer's words matter to anyone other than himself or herself? Why even raise up one's voice, if belief, like truth, must always be subject to an infinity of further revisions? Señor C finds his answer in the thoughts of Harold Pinter, for whom the mathematics of ethics will always encounter circumstances that push beyond the limited boundaries of their matrix, their probabilistic space: "there come times", Señor C concludes, "when the outrage and shame are so great that all calculation, all prudence, is overwhelmed and one must act, that is to say, speak."[802]

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801 Coetzee, *Diary of a Bad Year*, 149.
802 Ibid., 127.

Conclusion

With the number of monographs, essay collections, conferences, and special author courses growing exponentially by the year, the critical discourse surrounding the novels of J. M. Coetzee might reasonably be said to be approaching something like maturity. Prior to the acquisition of many of its materials by the University of Texas at Austin, indeed, the archive on Coetzee at the National English Literary Museum in Grahamstown held no fewer than 1200 journal articles pertaining to his novels and criticism. While this bald number alone demonstrates the depth of interest in Coetzee's work within the academy, the distribution of topics surveyed within this wealth of scholarship tells us much about the nature of the critical consensus that has begun to affirm itself over the past forty years. A search using the museum's database carried out shortly before the acquisition revealed that as many as 590 of the archived articles contained within their 'subject description' one or other variation from the lexical string 'writ*'. As such, it seems reasonable to conclude that the academic discourse responding to Coetzee's novels has considered the subjects of 'writing' and the 'writer' to be an important part of his literary enterprise, and so has dealt with them extensively. Similarly, that the string 'colon*' appeared no fewer than 429 times indicates the degree of significance critics have accorded to issues relating to colonialism in Coetzee's work. While not tending towards ubiquity to quite the same extent, the strings 'other*' (177 matches), 'language*' (147), 'ethic*' (124) 'power*' (69), 'censor*' (59), and 'desir*' (32) each correspond to subjects that have evidently been deemed to merit relatively exhaustive critical responses.

In the context of this thesis, however, one statistic stands out most of all: the string 'math*' did not register a single match. Despite the otherwise extensive interrogation of the most prominent fields of contestation operating beneath the surface of Coetzee's

novels, then, the tensions born of his inheritance from mathematics have remained untapped. Reading the biographical preambles to those monographs, the consensus position regarding this seems strongly established: while it is sometimes stated in passing that Coetzee's studies in mathematics constituted an *integral* stage in his intellectual development, then, this phase is often simultaneously characterised as *peripheral* to the supposedly more theoretically sophisticated thinking with which he has engaged in the years since his ostensive rejection of stylostatistics as a viable critical path. To generalise, the discourse on Coetzee has tended to use the term 'mathematics' – along with the terms of its constituent lexis – as static, propositional, and ontologically unproblematic. Indeed, it is typically given as read that the influence of mathematics from around 1974 onwards functions largely as an uncontroversial biographical fact: while it goes some way towards explaining Coetzee's attraction to certain types of literary discourse, the story would seem to go, mathematics in its own right is no longer an active field of contestation in his fiction.

By giving priority to an analysis of the details and developments of Coetzee's career-long engagement with mathematics, the present study has aimed to reactivate that field of contestation; in doing so, it has moved from explorations into the mathematical metaphorics of his early poetry, through documentation of his ambivalent relationship with stylostatistical analysis, to commentaries on the permeation, both explicit and implicit, of pressing mathematical problematics into novels as apparently divergent as *Dusklands*, *Foe*, and *Diary of a Bad Year*.

Perhaps the most enduring conclusion to be drawn from the exposition given here, though, is that while this study has sought to provide a comprehensive account of the resonances between Coetzee's engagements with both mathematical and literary concepts, there remains much work that might be done within the nascent field of

enquiry that it has inaugurated. Firstly, the sheer volume of existing criticism on Coetzee's work has meant that the references provided here to some highly important critical traditions have at times been necessarily brief; indeed, I contend that there is not a single strand of the discourse on Coetzee that would not benefit in some regard from either comparison alongside the work contained within this thesis, or by the more general adoption of the mathematically-literate perspective it exemplifies. Secondly, while the thesis has focused in the first instance on Coetzee's most mathematically-influenced works of fiction, it remains conceivable that each of his other novels might be addressed in a similar fashion: in particular, one can see how the conclusions articulated in Chapter Five regarding the role of mathematics in reinventing the world might be refocused in the contexts of both *Life and Times of Michael K* (1983) and *Disgrace* (1999); likewise, much of the comment on the 'matrix' approach to fiction from Chapter Six might be applied in detail to both *Slow Man* (2005) and *Summertime* (2009). Finally, and perhaps most excitingly, the collation of archival materials at the Harry Ransom Center represents an opportunity to delve even further into Coetzee's mathematical history, and thereby potentially to complement and develop the story told in this thesis.

Ultimately, I contend that the Coetzee that emerges from the present work is not only a key figure in the development of the modernist and postcolonial traditions of literature, but also a compelling voice within that interdisciplinary conversation between the scientists and the literary intellectuals the general absence of which C. P. Snow so lamented. Where Coetzee's response to such literary influences as Defoe, Borges, Beckett, and Musil has no doubt contributed to a significant degree to the development of his much-lauded literary aesthetic, then, it is often his staging of the tensions within a mathematical tradition stretching from Newton, Leibniz, and Laplace, to Dedekind,

Boltzmann, and Fucks, that awakens in his readers the greatest of shudders. Finally, one might conclude, it is in the intersection of these two complex and challenging disciplines that one can see in the work of J. M. Coetzee the genuine presence of the infinite.

Appendix: Selected Poems of J. M. Coetzee

'Attic'

[From *A Literary Miscellany – Volume I* , 1958]

The district is not precisely penurious
Nor the landlord unduly usurious,
But, fifty feet above the street,
Reminded always that our nature is not entirely terrestrial,
We note a woman with a looking-glass,
The bitter silhouette
Of a décolleté Rigolette
Re-arranging a mignonette,
And, looming pendulous beneath the chimney-pots,
Mysterious
As the wisterias
Of their far-away thoughts,
The faces of the members of the Automatic Writing Classes.
This is a district haunted by the ghosts of major poets;
They cannot form a fraternity
Because they have fled to eternity.
Rain haunts the eyes of lovers,
Baudelaire the eyes of the members of the Automatic Writing Classes.

But turn from the window, turn away,
O love,
We do not belong here.
The fog has never rubbed its muzzle on our window-pane,
It has only smothered our view of the chimney-pots.
The music of the spheres has never led
Our ancient women in vacant lots.
We do not need an automatic trance
To remind us that we are partly divine,
Nor a search for correspondance [sic]
To turn a sibylline line.
So let us turn from our view of the street,
Let us turn to tending our garden,
Let us blow the dust from our shelves,
Let us write epigrams on ourselves.

     Here lie two who came here
     Not to lie
     But for another purpose.

Turning from the winter light
You don a semi-cope of shade;
Demeter wails into the night,
Proserpine's to Hell conveyed.

Cheres stirs upon the wall
As he awaits another fall;
A graceless scowl divides his face
As he foresees a fall from grace.

   "Proserpine,
   Proserpine,
   Look, I ask,
   Upon this mask!
   Won in a game of knuckle-bones,
   I now adorn an attic wall,
   Neither a mask of tragedy
   Nor a mask of comedy,
   But the goat-face of an old man,
   Cheres,
   An old man amid the chatter of young people.
   So look, I ask,
   Upon this mask,
   Proserpine,
   Hear, I pray,
   What it shall say!

   Coming back along the road we sang the God:
   'Iacchos, Io, Iacchos! Hasten to our call!
   Don the crown of fruitful vine,
   Step this gay and joyous dance!
   Io Dionysus, Io!
   Now the fruitful god is dead,
   The crown has withered on his head,
   The joyous celebrants have fled,
   And only ravens sing.

   Won in a game of knuckle-bones,
   I now adorn an attic wall,
   Neither a mask of tragedy,
   But the Pan-face of an old man,
   Cheres,
   An old man amid the chatter of young people.
   Heed, I pray,
   Proserpine,
   What have I said,
   Proserpine;
   The god of life is dead."

   Turning to the winter light
   You don a semi-cope of white;
   Cheres dangles from the wall,
   Awaiting yet a heedless fall.

   Behind us, stretched upon the bed,

The god of life is lying dead.

Io Dionysus, Io,
Step this gay and joyous dance,
Assume the fruitful crown of vine,
Dispel this automatic trance!

The members of the Automatic Writing Classes
Loom benignly from beneath the chimney-pots,
Not entirely disapproving of this attic grace.

Although it is a soft October night,
The fog denies its right
To curl about the house
And fall asleep

The vine has withered on your brow,
Dionysus, god of death,
And only ravens sing
About the bed you have usurped.

'Trivial Verses'

[From *A Literary Miscellany – Volume II* , 1959]

Lady, thanks are due to you for your delicate
conversation.
Neoptolomos did not believe in the likes of you,
But Neoptolomos is long since dead,
While you remain to charm both Philolaus and me.

J. M. Coetzee

This morning, Erinna, your beauty moves me to
profundities.
However, when I have become more accustomed to you,
I doubt whether I shall be moved even to recollection
of these excesses.

J.M.C.

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[14]

Consider Philoctolos, who for twenty-three years
             sought a virtuous woman.
"The chaste," he reported, "are cold, the rest
    under no circumstances virtuous.
Do not marry."

        J.M.C.

[16]

With so highly unmetrical a name, unmentionable lady,
You hardly deserve to be woven into the delicate
               pattern of my verses.

[20]

Lady, to-day I miss something in the air.
If it is the fragrance of the customary iris behind
               your ear,
Lady, you grow forgetful:
I may not last for ever.

[22]

Deliberate long, Nichomachus, before you marry this
                  second time.
You forget that once your wife was lovely as this
               maiden;
You forget too that this maiden may grow to resemble
               your wife.

[22]

On this her wedding day, Penthesilea is less comely
                 than ever.
Her husband is blessed, for he will never find her
               uglier;
Every day, on the other hand, marks a fading in you,
               my dear Lycea.

[30]

If Philolaus' poem of praise is twice as long as mine,
You must remember, lady, that poets are liars,
And his lie therefore twice as great as mine.

[30]

Cratylos is bearded and silent;
Thus, when he closes his eyes, we believe that he
                        meditates.

[40]

Married at a sensible age,
Lysis and Alcaea are the happiest couple I know:
They are always laughing together, except at night,
When they sleep apart;
Whereas you and I, my lady,
Who believe in passion but not in laughter,
Have, except at night, been trying for a week to avoid
                        each other's company.

[56]

Is that not Helen's brow you wear, O sedate one?
Do you walk yet, ghostly temptress?

[55]

'Three Poems from a Cold Climate'

[From *A Literary Miscellany – Volume II* , 1959]

                I

On your birthday you had a terrible tribute from me in verse.
In addition you had those rare stones from Philolaus.
Do I merit it that you express your gratitude
                So soulfully to me
And so very practically to Philolaus?

                II

 If you will love me now
 we shall not fear
        leopards,
        for over us will stand
        one with an arched bow,
        which is a symbol of love.

        If you will love me now
        we shall not fear
        sand,

for before us will walk
a boy with a pitcher
chased in chrysolite,
which is a symbol of love.

If you will love me now
we shall not fear
stone,
for over us will stand
a lady, hooded,
and in her hands a heart
carved in jasper
and riven,
which is a symbol of love;

for wondrous figures visit
those who love.

III

Oh if I were a chastened friar
With a mind to my brother's part,
I should write against your subtle smile
And against your various heart:

But if delicate lips and a subtle smile
Are stronger than any art
My brother will throw his tracts aside
And straightway lose his heart,
My dear,
And straightway lose his heart.

For a friar is one who writes against love
Because he can love no more,
And though beauty die, the heart is wild
And will lose itself to a whore,
My dear,
And will lose itself to a whore.

'Truth Lies Sunken'

[From *Groote Schuur* 1959, 25-27]

1 Truth lies sunken in a well,
  Giving forth two echoes when we call.
  Call, now, call.
  Watch the shivering of your image on the water;
5 Stand;
  Stand, and, if you do not breathe,
  Watch, it will follow you,
  Though at the bottom of a well,
  Copying the frieze of your repose.
10 So these symbols shine to you,
  Reflecting your greater light;
  So, as our faces lie upon the water, I call,
  And wait to hear the echoes of my call
  Collect among our wanderings.

   15 Mark the greyness of the evening
    As it passes into night:
    Robed in grey you are, my lady,
    Yet that shade supposes white.
    In the silence of this evening
   20 Learn a newer eloquence,
    Offer up your lips to loving,
    Voice to silence, sense to sense.
    Enough will never be my stillness,
    You will heave to me until
   25 Odours of the grey shades call us
    Under the waters of the silent well.

  Again you shiver the surface,
  Or, if not you, then the unrestricted ant
  Following a search beyond the fascination
30 Of the looking-glass, wherein is mirrored
  All our Arcady, shivering now
  In the evening. Behind the exultations
  And acrostics of our nymphs and shepherds
  Lies a harder truth, hinted at only
35 By the first echo, the lily-tongued.
  Dare we follow the plumbing of the ant?

  The oppression of duality will drive us anywhere,
  Away from the I and thou,
  The hand and utmost apple
40 (Nay, could I not reach it?),
  The two echoes of truth.
  In the flickering of these symbols,
  In the cold reflection on the water,

       Whether clad in grey, as now,
45   And meditating,
       Or whether no longer clad,
       And no longer meditating,
       We are marked as two,
       The unholy number.
50   To shouted catechisms
       The well will answer only words
       And wait the donning of the grey,
       The second selves.

       Face, then, the shattering of the image,
55   The subsumption of the simple echo.
       Stare down, and you will sense the presence
       Of a certain heaviness, a bedrock of certitude
       Harder than many a wonted bed.
       Call, past the deception of the darkening image,
60   Past the simple, the verbal echo,
       To where your answers are as nothings
       And well like thunder in your throat.

              See, the eve is set about us,
              Comfort, comfort calls,
65   See, I move to you in stillness
              As the grey shade falls.
              Time is gone beneath the waters,
              Now is day and night,
              Faded is the cold reflection,
70   Lady, burning bright.
              Now the old distinctions vanish,
              Naught that is is none,
              All is present, now and ever,
              One and one is one.

75   We have forgotten, or I have forgotten,
       Something that urges now, as we meet,
       In the mouthings of the well behind us –

       The obvious duality of serpent and seduced,
       The ineluctable break between beloved and beloved,
80   The one and one that are not one,
       Even in Arcady.
       I have been too little conscious of the calling of the well,
       And also of you, my love,
       Too often only a second dancer
85   Moving to music suggested by the spheres.
       To illumine you with symbols is only to watch again
       An image silent on the water; words are nothing;
       You are the melancholy of all men of all times,
       An overflux of quintessential humour,

90 But that is not the name the echo gives.
   Call again into the darkness. Beneath the noise,
   The sound of the thunder taunting our vanity,
   Strain to the foetal movement of the water
   Heaving up a word, the one word,
95 Meaning nothing, nothing beyond meaning,
   A lesson of negation if at all a lesson,
   But less negation of anything than abnegation,
   Demanding prostration, but prostration in a void, alone.

   For dullness of understanding, forgive me.
100 Forgive me also for neglect
   Of a certain subtile white geometry,
   A most holy dimension beside me
   Exceeding all our base arithmetic
   By a measure of infinity.
105 As I am slow to understand
   This universal illustration
   Of one and nothing yielding always one,
   So I confess emptiness of virtue.
   To come to the O of the meaningful well,
110 Poverty of heart
   To plumb the depth where truth lies sunken.
   Little am I, in truth, my lady –
   A systematic nought
   Pointing the infinity of lines
115 Figured through the dark now,
   A passing entelechy
   Of the deeper echo.
   Little in truth am I, my lady,
   Save you succour me,
120 An you succour me.

'Untitled'

[From *Groote Schuur*, 1960]

"Poems must be like glass, and round – but not absolutely round. They must be – *so*!"
   "How – *so*?" said Wuss.
   "So – just so." He held his hands a little apart, cupped. "Or so." He made a circle of thumb and forefinger.

            Mertens, *Wiss and Wuss*

The wives of the rock lobster fisherman
Have grown accustomed to waking alone,
Their husbands having for centuries fished at dawn;
Nor is their sleep as troubled as mine.
If you have gone, go then to the Portuguese rock lobster fishermen.

Returning from Carthage with an empty hold,
Phocas the trader was lost at sea.
Now, freed of chancery,
He floats on the gay waves:
The dye is run from his cloak.

'Five Night-Thoughts of a Loving Sleepless; to which are Appended Two Poems'

[From *Groote Schuur*, 1961]

Our mad pulse hurls the singing-birds of love
Into the drift of unregarding stars
And still the golden birds cry *More!*
And hurtle back across the tattered evening.

Easily you are gone into the kingdom of the sea of sleep,
And leave me in a half-state, drifting,
In my ears the memory, the surge,
The desperate breaking of the waves of our incontinence.

This abstract sleep of yours:
Surely it figures that last abstraction
When death shall kiss you and take you to bed?

Like ignorant and wakeful beasts
These hands couch in the hollows
Of your sleeping darkness
And I must name them mine.

Nothing so pure as the white of this dawn,
Nothing so pure as this regret,
And after this triumph of the sun
And your awakening.

•

At our first meeting we talked of fairy tales
And our last meeting was as unbelievable
And all between was a fairy tale
Including music and voyages and those sundry tears
That turn to stones in the memory.

Our poor cracked souls were unsafe vessels;
Like mists we drifted into and beyond each other
And all our pleasures were excesses of ghosts
And leave me wandering through your eyes
Into the heart of death.

    You are gone, the sun
    Progresses Northward, and I
    Remain in contemplation of
    The quiet birds that fly
    Across and fly across
    My many shadows.

'Computer Poem'

[From *The Lion and the Impala*, 1963]

Poem (ex computer)

        Dawn Birds Stream
        Calm-Morning
You)   Stand-Among
        Forest
        Alone Tense
You)   Cry
You)   Spend-The-Nights
I)   Away-From
        Terrified Rapt
        Owls Blackmen
You)   Hope Violence

Poem (edited)

Dawn, birds, a stream, a calm morning.
You stand among the trees alone and
tense.
You have cried.
You spend the nights away from me,
Terrified, rapt,
Among owls and black men.
Hoping for violence.

'Hero and Bad Mother in Epic, a poem'

[From *Staffrider*, 1978]

dusk seeps up the entrail of the seaborn nude
the vegetable sleeps in its circle
the bedroom drowses
the casino is swathed in tidal melancholia
the nude awaits the hero

mounting the entrail of the seaborn nude
toward the sleeping vegetable
toward the poisoned goose with its melancholy aftertaste
comes the naked philatelist of fiction
the philatelist climbs the entrail of the poisoned nude
who rules over the luck-swathed fiction
of castaway matriarch
punctual chimera
spider of solitude
the philatelist climbs the entrail of the nude
toward a bedroom where a sword drowses

the drowsy sword in the spare bedroom
of the casino in the tidal nude
awaits the philatelist of melancholia
through the symmetrical aftertaste of goose
the castaway philatelist gropes
he circles the poisoned casino
and enters the bedroom of the nude of solitude
where the sword of fiction drowses
the seaborn philatelist brandishes the sword of fiction

the nude feels the punctual sword in her entrail
is it the poisoned chimera she wonders
stirring in her entrail?
is it the symmetrical matriarch
the spare philatelist
the tidal goose from the castaway bedroom?
is it the bedpost of fiction
the aftertaste of solitude
the vegetable of melancholia?
is it the vegetable of melancholia mounting the entrail of the seaborn nude?
(what stirs in her entrail
is the punctual instrument of the drowsy philatelist)

in a drowsy circle near the punctual casino
in the tidal entrail of the lucky nude
waits the chimera of solitude
swathed in spare fiction
with castaway sword he beheads the chimera
the punctual philatelist vanquishes the chimera of solitude

and enters the symmetrical casino of fiction

the matriarch of melancholy sleeps in the tidal casino
the poisoned philatelist gropes through its symmetries
his search is perplexed
where is the sea born matriarch?
without the seaborn matriarch where is the lucky fiction?

in the final symmetry of the casino of solitude
the poisoned vegetable mounts the sleeping matriarch

the philatelist arrives at the seaborn bedroom of the casino in the nude
as the spider mounts the symmetrical matriarch
the spare philatelist is filled with the melancholia of melancholia
upon the symmetrical matriarch he turns his castaway sword
and the tidal casino in the drowsing nude is filled with the fiction of solitude
the spare philatelist transfixes the punctual matriarch

the philatelist	the bedroom	the spider
the casino	MOON BURST	the goose
the matriarch	the sword	the fiction

past the sleeping vegetable and the poisoned goose
with its melancholy aftertaste
the castaway philatelist descends the entrail of the sleeping nude

but the nude of solitude is dreaming new dreams
the downfall of calligraphy she dreams
the documents of panic
the iron in the milk
the axes of sleep
the perfumes of the dead
the geography of caution
the crocodile of blood
the counterfeit footfall
the terrible tailor
the shadowy root
the feminine kingdom

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