Relationality and Ecosystem
On the Narrativity of Generative Systems in Literature and Video Games

by

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Abstract

This dissertation is an examination of the aesthetic relationship between generative art theory and narrative theory in literature and video games. More specifically, it observes the narratological implications of the imposition of a generative system—a set of rules or algorithms which in some fashion contribute to the completion of an artwork—within the context of narrative works. This approach to textuality, commonly seen in computational contexts, is part of a longer history which outlines the relationship between **authorship**, audience interpretation and/or **agency**, and systematic **emergence**. I argue that the imposition of a generative system frames the various layers of narrative in such texts, rendering the relationship between intra-and-extratextual situations—or, put differently, between what is being read/played and the situation in which it is being read/played—as part of the same narrativized rhetorical situation, rendering the text into a spatialized ecosystem in which continued reading or playing becomes a continuation of the text's diegesis. Thus, the narrativity of these generative systems must be observed as a process of **conception**, **production**, **expression**, and **reception** which is informed by this narrativized tension between authors, agents, and emergent systems.

To better examine this ecosystemic conception of narrative artworks, I interrogate the narrativity of generative systems. This begins with an examination of contemporary conceptions of generative theory. I then proceed to outline a longer-form, composite history of generative approaches in art contexts, up to and including the emergence of the computer as the ideal generative artmaking tool. Following these theoretical accounts of generative art theory, I perform close readings of three texts: Julio Cortázar's novel *Hopscotch*; Thomas King's novel *Green Grass, Running Water*; and Hello Games's video game *No Man's Sky*. Each of these texts are useful examples of the narrativity of generative systems, namely because each of these texts relies upon narrative 'generators'—figurative and structural devices which produce narrativized 'situations' for the reader while simultaneously

impacting the diegesis—such as metalepsis (the transgression of narrative levels, which produces new narrative levels) and *mise en abym*e (the reflexive doubling of the narrative whole within some smaller part of the diegesis). By examining each of these texts as an unfolding process which concerns both the diegetic and the meta-diegetic levels of a narrative simultaneously, I suggest the especially 'relational' capacity of a narratology built upon the ecosystemic model described in the first chapters, arguing that this model is a reasonable approach to account for the kinds of interactive and emergent texts which are becoming increasingly common in the digital era.

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Table of Contents

Examining Committee Membership ii
Author's Declaration iii
Abstract iv
Acknowledgements vi
Table of Contents vii
Table of Figures viii
Preface x
An Introduction to Generative Art Theory 1
Chapter 1—From Generative Art Theory to the Narrativity of Generative Systems 36
Chapter 2—A Brief History of Generative Poetics 73
Chapter 3—Mapping Figures and Figura in Julio Cortázar's *Hopscotch* 126
Chapter 4—Metalepsis, *Mise en abyme*, and *Methexis*: Indigenous Storytelling and Generativity in Thomas King's *Green Grass, Running Water* 212
Chapter 5—The Aesthetics of Procedural Content Generation and the Concept of 'Lifecycle' in Hello Games's *No Man's Sky* 271
Conclusion—Narrativity, Generativity, and Ecosystem: Generative Systems and Relational Narratives 321
Bibliography 332

Table of Figures

Figure 2.1—A diagrammed outline of Ramon Llull's 'ars magna'……....85

Figure 2.2—Llull's "Tree of Science"……....89

Figure 2.3—Jean Molinet's rebus-poem 'Pour faire chiere et démener grand glay'.…….……....93

Figure 2.4—"The frame" from Swift's *Gulliver's Travels*…….....……...99

Figure 3.1—A "conceptual mapping" of Book One and Book Two of *Hopscotch*…….……127

Figure 3.2— *Hopscotch* Book One Mapped in qGIS……..138

Figure 3.3—Horacio's movements as depicted by a stochastic blockmodel.…….……....139

Figure 3.4—32 Rue Madame and Morelli..…….….140

Figure 3.5—Robbe-Grillet's map of *La Jalousie*…….....144

Figure 3.6—Space and time in *Hopscotch* Book One.…….....153

Figure 3.7—Time/Space in *Hopscotch* Book Two……...154

Figure 3.8—The *Womb Realm Mandara*…….……...……..160

Figure 3.9—*The Diamond Realm Mandara*…….161

Figure 3.10—A map of *Hopscotch* Chapter 1.…….170

Figure 3.11—Potential locations for La Maga…….……....172

Figure 3.12—Horacio and Berthe's Walk……..…….….176

Figure 3.13—Block model showing Morelli's house……...…….....185

Figure 3.14—A Diagram of Brownian Motion…….187

Figure 3.15—A Radial Bayesian analysis of *Hopscotch* Book Two…….188

Figure 3.16—A Force-directed graph drawing of *Hopscotch* Book Two……..195

Figure 3.17—A closer look at the nodes which tie Berthe, Pola, La Maga, and Talita……..196

Figure 3.18a—Blockmodel which reflects a block of spaces with only two direct ties to the rest of the novel...……..197

Figure 3.18b—A closer look at the block represented in Figure 3.18a……..198

Figure 3.19—A diagram of direct connections, again with Morelli's home as the nexus……..200

Figure 4.1—"Changing the guard at Ft Marion", *Bear's Heart and Ohet-Toint Sketchbook*, July 1876..……245

Figure 4.2— "Indian Prisoners on an excursion to the woods", Bear's Heart and Ohet-Toint Sketchbook……...……246

Figure 4.3—The Medicine Wheel……250

Figure 4.4—The Map of Narrative Levels in *GG,RW*……...255

Figure 4.5— Table of medicine wheel concepts (Papp 162) ……262

Figure 5.1—Map representing the scale of the universe in *No Man's Sky*…….……272

Figure 5.2—A map of the Euclid Galaxy, the starting galaxy in *No Man's Sky*…….273

Figure 5.3—Steam's visualization of concurrent player counts in *No Man's Sky*…….…….302

Figure 5.4—A Community-made map of Civilized Space in *No Man's Sky*…….315

Preface

"*In the realm of the particular, every event arises from an infinite number of causes […]*"—Roger Shattuck, "Superliminal Note", 28.

This project began with a small research group at the Games Institute at University of Waterloo. The Generative Gaming Group (GGG) planned an event where we would play linguistic and narrative games with a group of physicists. The idea was to use generative games to produce further collaborations, generate good will, and promote future interdisciplinary research. Inspired by the 'pataphysics of Alfred Jarry—a precursor to surrealism, absurdist theatre, and generative movements such as the OuLiPo (*Ouvroir de Littérature Potentielle*)—we designed an 'interactive drama' where the audience generated their own epic narrative by playing a variety of games.

A brief examination of Jarry's work will help illustrate the relationship between our event and Jarry's writing more clearly. In the most literal sense, our event would resemble Jarry's messy, vulgar, and performative works: during performances of his play *Ubu Roi*, puppets, cardboard costumes, and cheap props were accompanied by writing which examined the tension between possibility and particularity. This aspect of the design was a conscious attempt at unveiling the storytelling conventions produced by the situations contextualizing the games, a major conceit in Jarry's dramatic works. As Kimberly Jannarone notes, in the staging of *Ubu Roi* "Jarry's appropriation of puppet theatre conventions"—including the use of cheap props and audience-facing descriptions of *mise en scène* instead of actual stage decorations—served as a springboard for his meditations on "the relation between art and its audience that puppetry represents" (240). This relation, emphasized by the absurdity of the visibly (and cheaply) constructed costumes, also emerged from the granularity of theatrical performance, which implied that "the event on stage [was] not intended to be a finished work of art" (ibid.). Further, the play's structural and thematic likeness to Shakespeare's *MacBeth* (Piepenbring, n.pag) invited audiences to reflect on theatrical conventions not only of the time but on theatre as a

medium more generally. *Ubu Roi*'s open-ended parody and incomplete structure, expressive of Jarry's atypical aesthetic[1] (especially his play with vulgar language[2]), implied that accidents, slippages, and performative granularities could express latent possibilities through the combination of artistic and scientific ways of knowing.

This awareness of the audience and of the space between a text as it is conceptualized and as it is performed serve as key ideas in Jarry's writings, especially in his literary-theoretical *Exploits and Opinions of Doctor Faustroll, Pataphysician*. It is here that Jarry outlines his theory of 'pataphysics, "the science of that which is superinduced upon metaphysics" (21), "the science of the particular" (ibid.), and "the science of imaginary solutions" (22). It is difficult to discern exactly what Jarry means by this, an ambiguity which has produced various, increasingly eccentric definitions of the term[3]. Notably, digital humanities critic Stephen Ramsay argues that "'pataphysics is the apotheosis of perspectivalism—a mode, not of inquiry, but of *being*, which refuses to see the relativity of perspective as a barrier to knowledge" (*Reading Machines* 21). According to 'pataphysics, relative perspectives provide insight through combination, juxtaposition, slippage, and chance alignment. This is exemplified in the approach to figuration shown throughout *Doctor Faustroll*: *syzygy*, the astronomical term for the alignment of cosmic objects, serves as Jarry's idea of a pun (or any other alignment of language which "reveals that language not only defines but also deletes [the] distance between extremes" (Bök 41)). Other terms,

[1] Jarry's notoriety is best expressed in the public reception of *Ubu Roi*, which caused rioting and fighting between members of the audience: in fact, *Ubu Roi* was "a play so contentious that its premiere, in December 1896, was also its closing night" (Piepenbring n.pag).

[2] Famously, the play opens with Père Ubu saying "*Merdre*", which is a "swerve" from the French "*Merde*" (the word for "shit").

[3] See Christian Bök's *Pataphysics: The Poetics of an Imaginary Science*, Alastair Brotchie's *Alfred Jarry: A Pataphysical Life,* Manuel L. Grossman's "Alfred Jarry and the Theatre of the Absurd", Warren F. Motte's *Oulipo: A Primer of Potential Literature*, and Roger Shattuck's "What is Pataphysics?" for a range of definitions of 'pataphysics.

such as *clinamen*[4], describe techniques like the linguistic swerve (i.e., to *merdre* instead of *merde*) where the "smallest possible aberration […] can make the biggest difference" (ibid., 45).

With Jarry's aesthetic guiding our group, our games were designed to be simple enough to play, yet chaotic enough to produce unexpected outcomes; the games were rule-bound in their conception and seemingly-random in their performance. In the first game, *'patachess*, players were set on a human-scale chessboard: this board became a battlefield of white tape; black and white cardboard squares; cardboard armbands, weapons, and crowns. Two people were elected to sit above and outside of the game board as "the gods", directing the human pieces on the battlefield. On the inside of each costume accessory, we inscribed lines of poetry[5]. When a person was attacked, they would sacrifice pieces of armour. Each piece had a unit-specific amount of equipment (kings and pawns had one; rooks, knights, and bishops had two; queens had three) and would sit out for one turn whenever a piece was taken. When played, the game functioned as a system for generating an epic victory poem and a funeral dirge. This game would then be followed by smaller games, each of which imitated mythical situations and produced objects, poems, and so on. These outputs included a renga-style poem, marshmallow figurines, and surrealist "exquisite corpses". Each of these was put within the narrative framework of the mythical return journey home after a great war, a situation taken directly from Homer's *The Odyssey*, which has served as a generator of countless subsequent narratives, most famously that of James Joyce's *Ulysses*[6].

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[4] Bök points out that *clinamen* has a long conceptual trajectory, including Lucretius's *clinamen* and Epicurus's *parenklisis* (43). The Lucretian conception of *clinamen*—a major influence on OuLiPo members such as Italo Calvino and Georges Perec—is further discussed in the first and second chapters of this dissertation.

[5] In one example we mixed old with new in a generative dialogue, using sections of Ovid's *Metamorphoses* and of Christian Bök's *Xenotext*; in others we used a variety of poets. Though it worked relatively well every time regardless of the materials used, this result is itself not without certain authorial decisions filtering the results.

[6] In his influential discussion of situational literary generators, Bruce Morrissette argues that "[epic] and mythic parallels, or parallels to an earlier literary work (such as *The Odyssey* or *Oedipus the King*), are related generatively to the 'poetica della riscrittura' studied by Barilli. Such generators may be used overtly (as in [Michel] Butor's *L'Emploi du temps*) or covertly ([Alain] Robbe-Grillet's *Les Gommes*) and constitute a type of *mise en abyme*" ("Postmodern Generative Fiction" 259). The importance of *mise en abyme* as a narrative generator (in that it generates situations with implicit, though variable degrees of narrativity) is discussed throughout this dissertation, especially in the Introduction, Chapter 1, and Chapters 3 through 5.

The aim of these activities was to unify, if only loosely, narrative structures and games in a way that was both generative and interactive, relying on the 'systems' we designed and the imagination of the particular people acting within those systems. We encouraged the granularity of individual performance and play within the narrative frames imposed. When each team had played through the circuit of games, they would move to a dinner banquet celebrating their return home. The victory poem generated by playing *'patachess* would be performed by the winners, and then the ghosts of the losers would perform their funeral dirge. Food would be served and generated objects from the return journey would be submitted as trophies. After the banquet, an improvised puppet show would be performed by our group, using the generated materials to tell an epic of the war and return journey.

There are several interlocking reasons why this event might be considered **generative**. By generating poems and other objects, players would interact with the generative system from outside of it *and* function as entities within it, rendering each playthrough particular or unique. Thus, by reflectively engaging with the rules of the game **as a game** whilst consciously performing roles within the game's narrative ecosystem, players would experience a contradictory form of "double consciousness [often experienced by players] between their own self and their character", which is also referred to as a kind of "'aesthetic doubling'". This inner-outer duplication of one's sense of self is commonly described in relationship to game players[7], often being compared "to the psychological experience of dramatic actors" because "[just] as actors have to balance their own emotions with those of the character that they are portraying on stage, so too [players] have to simultaneously manage their own goals and emotions alongside those of the character they are playing as" (Tu et. al, 405).

Further, as a result of this double consciousness, no performance would ever be a 'finished product', meaning that the completion of one event implied its continuation in all future or potential

[7] This idea of inner-outer duplication is, likewise, a crucial element of the *mise en abyme*.

events. Due to this recursive structure, the mutability of the outcomes of the games and the consistency of the rules which bounded them became the primary emphasis. By making it the explicit goal of the event's structure to both involve our audience in the games being played and ensure they were aware they were games simultaneously, the event would force them to reside in the space in-between the world of the game and the world outside of it. The hypothesis was that the audience, likely different each time, would generate a particular and performative narrative through their interaction with the systems and one another.

Whether this particular project managed this unification of narrative and ludic structures is, ultimately, not the question for this dissertation[8]; rather, in the process of designing these narrative-ludic structures **we began to note that certain narrative structures were particularly generative**….

[8] Perhaps appropriately, the event never actually happened. It has always remained a "potential" event.

An Introduction to Generative Art Theory

This dissertation examines the narrativity of generative systems in literature and video games and is especially interested in how generativity complicates notions of authorship, agency, and emergence in narrative situations. What I refer to as generative theory concerns any artistic praxis wherein an intermediate, semi-autonomous system frames the conception, production, expression, and reception of an artwork. Such a system is variably constructed, consisting of a range of materials including "a set of natural language rules, a computer program, a machine, or other procedural invention" (Galanter "What is Generative Art?" 4), though the materials of a generative system can extend well beyond this to include natural and artificial systems in general.

The primary requirement for these systems is not their technicity, nor their logical construction, but their perceived **autonomy**. A prime example of an autonomous system is a human being: "[the] most familiar single example of an autonomous agent […] is the one staring at this page. You, dear reader, with your behavior […] defined by a complex mix of biology, psychology […], are an autonomous object, creating interesting patterns in the data you create" (Pearson 128). The complex interactions involved in collective and individual human decision-making are—when viewed from a macro-perspective—a dynamic, unfolding process. Similarly, generative art theory considers an artwork as a dynamic process, involving the original decision for an author to design a system and the system's autonomous overseeing of the artwork's objects, entities, and outcomes.

In this dissertation, I argue that this processual conception of an artwork can be conceived of and interpreted as a kind of narrative which unites the textual (or diegetic), extratextual (or extradiegetic), and metatextual (or metadiegetic) levels of the given artwork. Much like a human being is conceptualized both as a complex whole and as partial, interlocking systems, a generative artwork's system comprises the sum of its parts, including the artwork's 'entities', an entity's "processes and their

environmental interactions; and the outcomes experienced by the work's audience" (Dorin, McCabe, et. al, 239). From this vantage, both a human being and the output of a generative artwork can be understood through the procedural unfolding of an algorithm or a set of rules. Although this is a reductive vision of obviously complex relationships, I argue that this reductive vision can offer a hermeneutic for the understanding of texts as ecosystems of narrativized tension between different interacting systems—in this case, the author, the reader, and the ecosystem itself. Crucially, the conception of systems as autonomous lends itself to a rule-oriented vision of textuality, bounded by parameters which allow the text to come into existence in the first place. It must be noted that this vision is by no means totalizing, at least in the theoretical sense: rather than all rules being generative, rules "must be constructive" for them to be considered properly generative by generative artists (Boden and Edmonds 26). Thus, in generative praxis there is a strong emphasis on the fundamentally **constructive** qualities of rules or constraints, which "tend to be perceived simply as requirements or demands; however, […] constraints both restrain and impede and enable and advance a creative course" (Biskjaer and Halskov 27).

This demand for autonomous and constructive systems reveals another key aspect of generative art praxis: **emergence**. For generative artists, truly generative artworks must contain "a degree of unpredictability" where it is "possible for the artist to be as surprised by the outcome as anyone else" (Pearson 6). This surprise is produced because the system operates independently of the author's intentions, even if the author's designed rules are constructive of a certain authorial vision. Emergence is a key concept for generative art theory because it presumes that the author's vision is significantly deferred by the autonomous, constructive system. Although an author constrains the system by designing it to produce desirable outcomes, the system likewise limits the author's decision-making, increasing the distance between author and work while emphasizing the autonomy of the system. At the

same time, the design process naturally implies the ongoing manipulation of the materials which constitute the artwork as a concrete object or outcome. As Dorin, McCabe, et. al concede, a system's construction is authored inasmuch as there may be "no necessary or intrinsic relationships between the entities, processes and material manifestation of their outcomes. Thus, creative choices around the manifestation of a process can play a crucial role in the resulting work" (249). The tension between the deferred author and the author's conscious decision-making produces an extra-textual feedback loop between author and system that is intrinsically (re)productive and, hence, is itself generative.

The feedback loop between authors and these autonomous, constructive, and emergent systems touches on several interesting debates in contemporary art theory, especially considering the recent discussions of AI-generated and/or procedurally-generated artworks[9]. I will emphasize three particular debates throughout this dissertation. Firstly, I argue that **the generative relationship between author and system can be considered an attempt at an "objective" type of artmaking, "scientific" and/or "technological" in its orientation**. The system operates beyond the imaginative or conceptual capacities of the author, meaning the text has a concreteness or facticity that must be considered when conceptualizing, scripting, or filtering the work as an author. This concreteness likewise extends to the audience of generative artworks, who must interact with the work as a generated particularity—an ecosystem with its own inner logic—to interpret its outcomes. It can be argued, therefore, that the interpretation of a generative artwork involves discerning the systems which underlie and produce the 'objective' or concrete elements of the artwork.

Secondly, **generative art emphasizes the aesthetics of systems and their role in the creative process, their serving as constructive and constraining forces**. As Philip Galanter observes, because

[9] As hinted above by the concept of the feedback loop, the systems-based and procedural insights offered by a generative praxis lends itself quite comfortably to cybernetic theory. The explicit influence of cybernetics on design and artmaking contexts, now long-acknowledged, has broad implications for the conclusions of this dissertation.

"[the] key element in generative art is the use of an external system to which the artist cedes partial or total control […] generative art theory [prioritizes] discussions focused primarily on systems, their role, their relationship to creativity and authorship, system taxonomies, and so on" ("Generative Art Theory" 151). The tension between the system and authorship constructs the text and, in doing so, constrains the author's decision-making about how this construction manifests. This, according to Galanter, produces both an authorial and an audience-based process of reflection on the inherently generative quality of artistic creativity more generally. This systematical attitude towards creativity helps to justify the objective and technological emphases of generative art theory, namely because while "some people will argue that humans themselves are generative systems, and that, since humans ultimately create all art, all art is generative art" (ibid., 150), generative art theory is predominantly concerned with "art created by non-human systems" (ibid.). In this sense, the theoretical prioritization of system autonomy and constructiveness is emphasized only when the generative system is "external" to the author's vision or, in the very least, operates externally to their singular creative vision. Thus, the vision of systems as intrinsically creative is an attempt to subvert traditional notions of authorship in hopes of expressing the constrictive and constitutive qualities of systems and their processes as a kind of co-authorship between authors and systems.[10]

Thirdly, **generative art making can be considered both as a *techne* —especially given its constant concern with artmaking practices—and as an *episteme***. Galanter, for example, perceives generative art praxis to be primarily "a *way* of making art, [meaning that] it remains available for making art with all manner of content" (ibid., 154). This emphasis on the practice of creating generative art is a further prioritization of the objectivity of generative art: because the system produces unexpected, supposedly-authorless outcomes, the technical and technological aspects of this praxis are

[10] Or, more radically, as authorship on the level of systems alone.

more fundamental relative to the content-oriented justifications for using such methods. This critical vantage point allows generative artists to remain detached and, therefore, objective: "generative art per se is ideologically neutral. It is simply a way of creating art and any content considerations are left to a given artist" (ibid., 171). This ideological detachment, again in a circular fashion, contributes to a mystified notion of artistic practice wherein the objectivity of the artwork is prefigured by a methodological and technological detachment[11] offered by the incorporation of the autonomous, constructive, emergent system. Thus, in many senses generative art theory is a continuation of the quest for a socially and politically neutral artistic praxis, one not caught up with the real world conceptually or thematically. By merely utilizing real-world systems (or abstract representations of these systems) to produce the artists' own outcomes or, more ideally, emergent outcomes, the artwork's content becomes a likewise emergent phenomenon. Put differently, the claims for an artmaking neutral of social or political content suggests an exaggerated emphasis on form as pre-figurative of content in generative art praxis.

The question of artistic intentionality or motivation, when viewed from this theoretical vantage, proves paradoxical in contemporary generative theory. For example, Galanter argues that there are as many motivations for making generative art as there are generative artists (ibid., 168); thus, it is impossible to discern intention in generative artworks unless it is explicitly stated by the author and is accompanied by a theoretical-technical description of their particular generative system. Because motivation and intention are indeterminate for generative art theorists, artists instead focus on the ways in which systems "establish beauty as something that is not man's arbitrary creation, but rather an expression of universal forces" (ibid., 170). While the particularity of each generative artwork is undeniable—at least in part because every generative system *is* a relatively novel and arbitrary

[11] That this supposed lack of attachment is itself suggestive of a particular mindset or stance—in the very least one that is technologically deterministic—is significant and will be a primary point of criticism throughout this dissertation.

construction—the question of mindset remains relevant, especially since these systems are perceived as art.

Tellingly, Galanter notes that "there are also some notable clusters of use and motivation" (ibid., 168) beyond the value-neutral, systems-oriented aesthetic he describes. The generative mindset appears, primarily, to be built around the notion of a textuality that merges "mechanical" and "organic", "programming" and "art" (Pearson xviii), suggesting a space for the negotiating of relationships between "man" and "machine" implied in the programmatic and the artistic, the permanent tension between notions of machinic "objectivity" and artistic, interpretive "subjectivity". Beyond these bi-polar distinctions, Galanter again stresses the ability of generative systems to "surprise the artist and provide a springboard for novelty and new ideas" ("Generative Art Theory", 168), including arguments about one's ability to "maintain faith in our ability to understand our world. [Generative artworks] can remind us that the universe itself is a generative system, and generative art can restore our place and participation in that universe" (ibid., 170). The generative artist, then, produces systems to invite greater interaction with and comprehension of the systematical nature of reality itself. This conception of the universe naturally implies an epistemological, metaphysical, and ontological mindset—a philosophy—namely because cosmology is a topic that has never been truly neutral or objective[12]. As such, generative theory can be considered as a modeling of human consciousness in relationship to models of contemporary cosmology; an argument about the systematical nature of reality itself; or, finally, as a commentary on metaphysical problems regarding space, time, causality, probability, possibility, and relations between entities and environments. Indeed, Galanter's suggestion of cosmic structure proves a

[12] For example, regardless of how valuable or insightful science is methodologically speaking, it remains a necessarily abstracted and anthropomorphic view into the universe's structure. Science functions by constraining the various systems at play in any environment to examine specific aspects of this environment, given specific conditions. Of course, these constraints are generative of science's paradigmatic insights; however, this is also why scientific knowledge has undergone constant revision as old theories are corroborated or corrected *ad infinitum*, producing newer and more fitting theories as knowledge changes.

consistent and revealing intention below the surface-level, technologically-determined objectives of generative art praxis.

Galanter's cosmological argument thus situates generative art theory within the larger context of ongoing dialogues between art, mathematics, and science and ultimately suggests that generative art presumes that science, mathematics, and technology are capable of unveiling the world—of rendering it objectively—in ways which art simply cannot[13]. This is especially clear in the adoption of an algorithmic mindset and method in generative art praxis. Matt Pearson notes that generative art relies fundamentally on algorithms, which "are a part of the natural world […] [and] have a universality that transcends medium" (9). He further concludes that generative artmaking "may not be quite as old as art itself, but it may be said to be at least as old as mathematics" (ibid.). A useful example of this relationship between generative art, science, and mathematics is expressed in the adoption of fractal structures in generative praxis. Iterative, recursive, and reflexive structures like fractals are particularly interesting for generative artists because they produce complexity through the interaction of nearly-identical (though not always identical), "self-similar" structures (Briggs 24). Through this self-similarity, fractals "describe the roughness of the world, its energy, its dynamical changes and transformations. Fractals are images of the way things fold and unfold, feeding back into each other and themselves" (ibid., 23). The process of a fractal interacting with itself is a prism through which generative artists can represent the underlying combinatorial structure of the cosmos and, thus, shape human expressions and

[13] In his monograph *Reading Machines: Toward an Algorithmic Criticism*, Digital Humanities scholar Stephen Ramsay observes the latent humanistic scientism in contemporary (and professionalized) humanities criticism more generally, noting that for many critics the burden of proof in discussions around art is built on fundamental, unchallenged axioms (i.e. the "beauty myth") which have slowly been displaced by a need for a more rigorous approach to concrete "text analysis". Such an approach to textual analysis emulates "the regime of scientific methodology with its 'refutations' of hypotheses" (4). This capacity to falsify or refute is likewise expressed in the notions of generative art praxis, which also adopts this more scientismic ethos: because real-world systems are the materials for producing these artworks, they are materially constructed out of raw, concrete 'data' which "is presented to us […] not as something that is also in need of interpretation" (ibid., 5). A major part of this dissertation's claim against 'pure' examples of generative authorship, which are often couched in the 'autonomy' and 'constructive' capacity of systems in themselves, is that this scientism is equally an unchallenged axiom which prefigures (and simultaneously is subject to) this ethos.

interactions with (and within) this cosmos: because "[fractals] show similar details on many different scales" (ibid.), they are expressive of the systematic relationship of wholes to parts which "start feeding into each other, [generating] images […] whose patterns have scaling detail. These patterns illustrate the fact that the system's whole movement takes place continuously at every scale" (ibid., 24). By using fractals to express this mereological viewpoint, a generative artist attempts to reveal the fundamental ground of nature as an interlocking series of "dynamical systems, systems whose state changes over time" (ibid., 15). Much like generative artworks are dynamic and expressive of changes of state over time, complex and dynamic systems more generally "push and pull at themselves to create the sensuous irregularity and unpredictability that is the signature of our physical environment" (ibid.). The fractal's ability to express the paradoxical chaos of physical reality *and* the corresponding sense of holism this chaos produces implies that "everything [within a system] influences, or potentially influences, everything else—because everything is in some sense constantly interacting with everything else" (ibid., 21).

Because generative art theory is so concerned with questions of nature, objectivity, and human experience within the cosmos, it can be easy to overlook the other half of the hybrid motivation Pearson and Galanter attribute to generative artists: to produce an artwork. By labelling generative works as artworks, the problematics of creativity and artistic intention are necessarily placed in a constant tension with the objective motivations informing generative praxis. This demands a certain worldview that Galanter refers to as "complexism", which emerges as the synthesis of claims made by modern science and postmodern theory ("Thoughts on Computational Creativity" 7). The tension between modern science's tendency to describe "the absolute" and postmodern theory's emphasis on "the relative" is resolved by complexism's emphasis on "the emergence of co-evolved solutions" (ibid.). Despite the aim for objectivity and artistic research, the subjective aspect of art is, definitionally and practically

speaking, as invaluable to generative artmaking as the objective aspect of programming or algorithms. This is especially the case if every generative artwork relies on authored, designed, or pre-figured systems in which interactions unfold.

Thus, while Pearson claims that "[with] generative art, the autonomous system does all the heavy lifting; the artist only provides the instructions to the system and the initial conditions" (4), **generative theory always concerns the tripartite relationship between author, system, and audience in artistic works, which is expressed across the processual movement from conception to production, production to expression, expression to reception**. Thus, the relationship between author, system, and audience is expanded into several relationships expressed across the different stages of an artwork's 'lifecycle': firstly, the author of the work designs the generative system and conceptualizes its outcomes, while later becoming the critical audience of the generative system's outputs. The system in some capacity occupies the same role, though not in any interpretive fashion; rather, it reacts in a patterned fashion to the changes and filterings the author imposes onto the system, just as it renders the textual ecosystem consistent (logically, as a coherent world) for the active audience to inhabit or experience as entities. Finally, the audience is in some capacity responsible both for interpreting of the system's outputs and for discerning the author's deferred intention by means of detecting and comprehending the latent generative system which structures the ecosystem of the work. Once the audience has discerned how the system functions, they are then given the ability to critically "deform"[14] how the system unfolds, authoring their own books or experiences in a mutual feedback loop of interpretation and mechanical interaction. This more processual and integral conception of the dynamics unfolding in the narrativized tension between author, audience, and system comfortably aligns with Galanter's notion of

[14] See: Jerome McGann and Lisa Samuels' "Deformance and Interpretation" and Stephen Ramsay's *Reading Machines: Toward an Algorithmic Criticism* for further discussions of "deformance" as an "eisegetic" critical practice in Digital Humanities research.

complexism in that this synthesizing view between the absolute and the particular "includes the author, the reader, and the text as all being essential" to the comprehension of an artwork (Galanter "Thoughts on Computational Creativity", 10). Thus, while many theories of generative artmaking observe the author's interaction with the mediating system—which the author reciprocally mediates to produce further emergent outputs—it is crucial that this observation does not ignore the productive tension produced between author, audience, and system in artistic contexts.

I argue that this productive tension is intrinsic to the generative artist's mindset, especially in the attempts to model "universal" concepts generated by math and science in works of art. As Galanter's notion of complexism confirms, to defer the function of authorship and prioritize the generative system is—beyond being a means of merging the "objective" logic of processes with the "subjective" logic of artmaking—an invitation for greater audience participation. This is at least in part because artistic reception is also an interaction of objective and subjective processes, as argued in Wolfgang Iser's "phenomenology of reading": "the structure of a text brings about expectations, which are interrupted by surprising unfulfillment, producing gaps, which require filling by the reader to create a coherent flow of the text […]. However, these gaps cannot be filled arbitrarily, but **through interpretive limits given in the text by an author**" ("The Reading Process", 285, my emphasis). This, likewise, must be expanded to include the limits enforced on and by the generative system itself[15].

Interestingly, despite the instructive, even didactic attempt by generative artists to reunify audiences with the systematicity of the cosmos, contemporary generative art theory often disregards the audience's role, either by arguing that generative art and interactive art are separate artistic modes or by suggesting that the generative system's role is not related to reception, but rather to construction. For

[15] In terms of the reading process, this involves the generative role of language in literary works. The materials of any artistic experience factor into the 'coherent flow of the text' in this way: they are formative and have a history of adoption within the given artistic medium.

example, Margaret Boden and Ernest Edmonds separate computer-generated art (CG-Art) from interactive art (I-Art), namely because computer generated art "results from some computer program being left to run by itself, with zero interference from the human artist" (30). Continuing from this, they also question the role of the audience, contemplating that this could extend to "'any human being, whether artist or audience'" (ibid., 31). This distinguishing between interactive and generative art argues that, while interactive art concerns exclusively humanistic questions, generative art focuses on "problems concerning concepts such as autonomy, agency, creativity, authenticity and authorial responsibility" (ibid., 32). Nonetheless, it is difficult to envision an artwork that genuinely excludes interpretation and audience response[16]. The productive tension between author, system, and audience, therefore, is itself a kind of algorithm which produces the whole artwork through the interaction of its parts. Even in non-generative contexts, an artwork is by no means completed in the form of its authorial and material outputs, but rather continuously unfolds in the ongoing engagement with these outputs by historically contingent audiences, whose interpretations likewise undergo a process of continual transformation. Art—to be considered art—demands some form of interpretation. Interestingly, when conceived of as such, the algorithm of reception functions equally well when reconceived as a model for the interaction between humans and machines; as a potential model of the systematical nature of the universe, consciousness, and experience; or as a form of "art as research"[17] regarding the generative insights found in biology, computer science, linguistics, mathematics, and physics. Thus, the tripartite

[16] Notably, Francesca Franco (2017) observes that much of Edmonds's own generative art practice is deeply concerned with interaction, though much of this interactivity concerns interactions between systems rather than between human and non-human agents.

[17] As Philip Galanter observes, the role of experimentation is pivotal in generative artworks: "the exploration of systems through generative art can act as a sort of experimental philosophy. I remain convinced that even in these postmodern times philosophy can be pursued via artistic experimentation" (12). This scientized notion of experimentation is clearly influenced by the "art as research" model adopted by the New Tendencies movement in the late 1960s, where this idea served as a major orientation. This influence will be more directly discussed in Chapter 2.

model of authorship, audience agency, and emergence does not contradict generative theory, but instead proves to be one of the key aesthetic concerns in generative art praxis, historically-speaking.

In part, the issue regarding the audience's reception in generative praxis lies with an audience's tendency to operate consciously from outside of the particular artwork's generative system. This is because the audience is not a by-product of the system's autonomy but is an agent in their own right, expressing their own autonomy. This is problematic for generative art theorists because, as Matt Pearson argues, this kind of autonomy concerns the human

> instinct […] to attempt to influence [the system], which would remove the autonomy [of the system]—but only if the human's involvement in the system is conscious. If the human agent is acting unaware, or uninterested, of the effect their actions are having on the system, they become as valid a data source as any other autonomous object (151).

This aligns with the aforementioned separation between Interactive and Generative artistic approaches (I-Art and CG-Art, respectively) because in I-art "[sometimes] a human operator, whether audience or artist, makes the fitness decision on the basis of who knows what" (Boden and Edmonds 27). This means the rules of the generative system are "not fully constructive" in interactive contexts (ibid.), prompting generative theorists to distinguish between interactive and generative art.

Ultimately, the idea that any generative system designed by a human author can be 'fully constructive' is a technological determinism that disregards more interesting questions asked by the adoption of a generative praxis. For example, the complex tension between the motivations and the methods for making generative art are an interesting development in the theoretical continuum of audience passivity and participation. If the purpose of generative artworks is to instruct, unveil, or represent the systematic nature of the cosmos (and every entity within the cosmos, including humans as

autonomous agents and generative systems themselves), the unaware, uninterested, unconscious interaction within generative systems by human agents required to make the work "generative" complicates the underlying propaedeutic motivations for making generative art in the first place. Because human beings do not merely operate unconsciously in the world, but are on a certain level expressive of agency and—in the very least—experience the affectation of free will, the reflexive interaction between author, system, and audience is an inevitable intrusion on the autonomy of the generative system. Therefore, the metaphysical and cosmological intentions behind the generative artwork are supposedly realized only after the work has produced its "outcomes". In this sense, it appears increasingly difficult for generative theory to communicate the utility of generative systems to anyone but the original, intentional, motivated artist formulating the system and overseeing its outcomes. The favouring of autonomous purity for the system but not for the receptive audience of the artwork is consistent with the theoretical prioritization of systems as useful experiments or scientized abstractions which are supposedly more objective than other, 'more human' methods[18]. The particularity of an actualized, concrete expression of the system is less relevant than the theoretical autonomy of the system which produces this expression, disregarding the insights offered from the syncretic, complexist viewpoint Galanter describes.

Counter to this contemporary theoretical viewpoint, a longer historical account of generative approaches shows that generative art theory has always been deeply concerned with the productive

[18] Much like Alfred North Whitehead argues when describing the scientific mode of thought in *The Concept of Nature*, this type of abstraction is often found in scientific or mathematical discussions and is a significant aspect of the unchecked empiricism intrinsic to this form of scientism. As Whitehead persuasively argues, the scientific method is a useful but ultimately abstracted vision of the cosmos which, conversely, is better understood as an ongoing, creative process in that it continually 'advances into novelty'. This processual advancement into novelty produces the interrelated sense of space and time that we experience as "the extensive relation between events," which later motivates the human tendency to conflate this experience of extension with the causal links informing our experience of any single series of events (33-35). This produces an abstracted sense of space and time as measurable or quantifiable based on points in time or places in space, though these ideas are intrinsically relative to human experience and do not actually exist as segments of a larger whole independent of human observers.

tension between authorship, system, and audience. Regardless of the desire for "purer" examples of generative art, it is difficult to abstract authors and audiences out of the process of *any* artmaking, generative or otherwise. Authorial and active audience involvement is clearly a significant aspect of what makes an artwork an artwork; thus, for generative art to be art suggests that it concerns the process by which the artwork—as an artifact—is brought to life in its being read, viewed, played, or otherwise experienced and interpreted by authors and audiences alike.

In sum, generative art explores the influence of imposed structures on the outcomes of an artwork because these structures constrict the decision-making of the author, whose authority is deferred by this imposition. Through this emphasis on systems, generative theory shifts focus from the author as a singular, creative authority, instead highlighting the productive relationship between author, audience, and system. On one level, it is an "objective" artistic praxis wherein the artist "[concentrates] on the underlying rules themselves: the structures that define the artwork, as against the surface" (Boden and Edmonds 26). These structures afford and constrain the system's potential autonomy *and* the subsequent interpretive capacity of the audience, who engage with the "surface" of the artwork's outputs in an effort to interpret and understand the authorial inputs and systematic decisions made in the interaction between author and system. Because the emphasis on the generative elements of any system or structure imposes a supposedly-objective influence on the artwork, these influences constrain the artwork's possible outcomes, producing unexpected or "emergent" situations not intended by the author. On another level, this prioritization on process and emergence must include the range of interpretations and textual concretizations enacted by the audience as an agent, entity, and system in their own right. The audience experiences the system's procession of interactions, concretizations, and objective outputs subjectively. Though the system's emergent outcomes are discoverable only by the author and audience after the text has been concretized into a textual environment, the interpretive and artistic resonances produced,

filtered, and interpreted by the author's filtering and the audience's agency are what render the generative text into an artwork.

This is because these 'autonomous', 'constructive', and 'emergent' systems are not conscious or intelligent actors. They are designed and interacted with, dependent entirely on the feedback loop of inputs and outputs which determines the system's structure in advance. Thus, while "[part-authorship] of any generative work must belong in part to the mechanisms the artist uses: the system that generates it" (Pearson 6), this equally applies to the author who prefigures and modifies the system in an ongoing process of filtering *and* the audience who interprets the work, in some sense rendering the artwork into a concrete experience through this interpretive interaction. Therefore, throughout this dissertation I will examine generative art theory from the vantage point of generative theory being an artistic praxis that prioritizes the mediated relationship between author, system, and audience. I argue that this relationship unfolds as a kind of narrative, namely because generative artworks concern the systematic unfolding of processes in space and time, producing unexpected events as the outcomes of this process. In this manner, I move beyond the notion of "pure" generativity to propose a theory of generative artworks as a kind of **narrativized ecosystem**[19].

This notion of narrativized ecosystem emerges from the primary critical tension between two competing notions of system in generative praxis, what systems-artist Stephen Bann describes as the

> two characteristic views of the relation of 'system' to the work of art. In one case, the [artwork] is itself the system, in the sense that its internal syntax and its status as an object are determined by considerations intrinsic to the [artist's] craft and the role of the spectator. In the second, widely contrasting case, the system is only adopted as a way of achieving

[19] See Anthony Wilden's *System and Structure: Essays in Communication and Exchange* for a broader discussion of the "ecosystemic" approach to systems theory.

> a critical distance from another, transcendentally based system (*Systems: Art Council 1972-3,* 6).

Put differently, a generative artwork is narrativized because it adopts the logic of recursive structures, conceptualizing these structures spatially so that the generative system functions like an "ecosystem", mediating the authorial inputs and emergent outputs of a text which are then experienced and reciprocally modified by the audience as interpretive agents.

The tension between the holistic artwork as an ecosystem and the external system as a means of producing a critical distance is the crucial conflict in a contemporary generative art, one which I have referred to throughout this dissertation as the 'subjective/artistic' and the 'objective/generative' aspects of generative art theory respectively. Thus, while questions of narrativity[20] certainly arise in response to this meta-critical conception of generative artworks, generative artworks which feature narratives allow us to reflect more closely on a new type of narrative which prioritizes the increasingly permeable boundaries between 'objective', internal system and 'reality' beyond the text. A brief outline of this process as compared to notions of traditional narrativity is necessary now to elaborate the structure of this dissertation and its claims.

The Narrativized Tension between Co-Authorship, Agency, and Ecosystem

To develop on this conception of generative artworks as narrativized processes, Chapter 1 examines theories of contemporary (mostly computational) generative art theory. This analysis is followed by a brief literature review of historical examples of generative approaches in Chapter 2. Based on insights gleaned from contemporary and historical generative art praxis, several key insights are applied to propose a composite theory of the narrativity of generative systems. The conclusions are thus:

[20] Undoubtedly, this approach to storytelling features lower degrees of 'narrativity' in more classical senses, although, as Marie-Laure Ryan observes in "The Modes of Narrativity and Their Visual Metaphors", narrativity as "the presence in the text of a narrator telling a story" has long-been displaced by the acceptance of "the possibility of narrativity in drama, movies, and painting" which means that "the presence of a narrator is no longer a necessary condition" for narrativity (368).

because generative texts highlight the productive tension between author, system, and audience, these three poles are relevant for notions of the rhetorical situation of generative texts as narratives. Traditional conceptions of authorship, for example, are deferred to a significant degree in generative texts: the system, in part, becomes responsible for making (or enforcing) certain authorial decisions which influence the production of the text. This does not entirely remove the authorial role from these texts; rather, it defers the author and revises their role from that of an authority to a "filterer" (Dorin et. al, 247) or a "curator" (Pearson 4) of potential outcomes[21].

Similarly, the role of the audience is mediated by the imposition of an external textual system, which informs (or, again, "filters") the range of interpretations through its rulesets. In generative situations, audience agency is limited by the boundaries and affordances of the textual system, producing a "horizon of expectations" lacking the same historical emphasis as its literary analogue: while in literary historical contexts of reception "[a] new text evokes for the reader (listener) the horizon of expectations and rules familiar from earlier texts, which are then varied, corrected, changed or just reproduced" (Jauss 18), this horizon of interpretive perspectives or roles are, in generative artworks, produced and filtered by iterations of the system itself. A generative artworks' horizons are intra-and-extra-textual expressions of the generative system unfolding procedurally; thus, it is each iteration of the system as it is interacted with which produces its own horizons as an ongoing narrative of itself as an ecosystem. Therefore, the problem of emergence commonly discussed in systems theories of all kinds—for example, in complexity theory where the movement from a simple system to a complex one is based on the quantitative variety of interactions—is the outcome of the productive and proliferative tensions expressed between author, system, and audience in generative artworks.

[21] This is not altogether different from Roland Barthes' notion of the author as a "scriptor", though it differs in several productive ways which will become clear throughout this dissertation.

Because generative systems can be conceived of as ecosystems which facilitate various interactions within and beyond the artwork, generative artworks are intrinsically spatialized. A system functions like an ecosystem, while its rules govern how "entities" within this ecosystem —including the author-as-filterer and the agentful audience—interact[22]. Further, because these texts are spatialized, engaging with them produces an interpretive drama in the sense that they demand the reader/player not only situate themselves within the text's diegetic space-time, but also from outside of it (extra-diegetically and even para-diegetically). This produces, as hermeneutic philosopher Gianni Vattimo argues, a "dramatized" notion of the hermeneutical circle (85), where the spaces inside of the text and their relationship to author and audience—the spaces beyond the text, the materials which comprise the textual ecosystem—become enmeshed and generate narrative situations across all levels of the text, including its context as a text or, even, its lifecycle as an entertainment product.

For the sake of beginning this conversation rather than attempting to end it, I limit my examination to examples found in literature and video games, suggesting that the literary model of generativity and the computational model found in computer video games share certain features that make them useful case studies for the theory of generativity as narrative. This involves several shared traits beyond the fact that both mediums often feature narratives: firstly, the tendency for literature to be conceptualized as a type of game suggests an analogical relationship between games and literature; secondly, that theories of readership are intrinsically useful for theories of interaction in games (and, conversely, that games are useful proof for these theories of reception and response); and, thirdly, that

[22] In video games, this is quite literally true, especially in Massively Multiplayer Online Role Playing Games (MMORPGs) or synchronous game worlds where player actions alter the game's world in real time, provoking a systematic reaction which is shared by all players in terms of the game's world representing these changes.

the underlying linguistic encoding of video games suggests an affinity on the level of linguistic structure between games and literature that is less pronounced in comparison with other media[23].

To elaborate upon these similarities requires acknowledging the classical role of generative approaches adopted throughout literary history. This includes a variety of spatially, temporally, culturally, and linguistically disparate approaches, each of which has been mentioned as influential for generative art theory. This includes Aristotle's *Poetics*; Lucretius' atomistic cosmology; the "thinking machines" of Ramon Llull; the rebus-poems of Jean Molinet; the combinatorial metaphysics of Gottfried Leibniz; the Laputian "Frame" machine in Jonathan Swift's *Gulliver's Travels*; the linguistically-hermetic narratives of Raymond Roussel; the generative 'pataphysics described by Alfred Jarry; the constrained narratives of the Oulipo; the object-oriented narratives of the nouveau roman; and, finally, the informational aesthetics of the computational New Tendencies movement.

This list of generative approaches is by no means exhaustive, though each example does reveal a consistent debate about the narrativized tension produced between author, system, and audience. A literature review of historical generative practices suggests that, although generative computer artists think of generative art as being better expressed through constraints such as computer processes, rules, or algorithms, it is important to consider the long-running practice of external impositions of rule-sets, concepts, and media-specific limitations that are to some degree implied in *all* artistic practice (Galanter "What is Generative Art?" 153). While this is often mentioned in generative art theory, the priority given to technological and computational systems—which appear more objective than older artistic media—often obscures the theoretical horizons all generative artists engage with in the creation of generative artworks.

[23] This is not to say that video games and literature lack any affinity with these media, which they do have (especially in the interaction of image and text, though also in the 'grammatical' logic of cinema/television described in much film theory).

By examining the function of dynamic processes in both historical and contemporary approaches to generative art theory, these theories can be properly contextualized and understood. This contextualization also involves placing generative art theory in dialogue with other theoretical and practical developments in art history, particularly those in Umberto Eco's conception of "the text in motion"[24] and Frank Popper's analysis of kinetic art and electronic spectatorship[25]. Popper's theories of kinetic art are especially relevant, as the dynamic quality of generative art (Dorin, et. al, 239) suggests that it is a part of a long tradition of representations of dynamism in artistic praxis. In this sense, narrative is no longer the static, imposed, linear trajectory of an individual and unique authorial vision but rather the ongoing, dynamic process of events producing spatial and temporal alterations as the text-as-narrative unfolds. It is in this fashion that a generative artwork's structure takes the shape of cosmological or metaphysical models derived from science, math, and technology[26].

This notion of modelling is applicable to much discussion of narrative in literary and ludic circles, particularly those focused on the practice of re-reading or re-playing as a dynamic, fundamentally alter experience[27]. In the context of video games, each playthrough is changeable on an even more literal level: a game can be updated and fundamentally changed by its designers, the ecosystem of the game can adapt to these changes, and the player's approach to the game can alter this ecosystem through their conscious and unconscious interactions with it, resulting in an entirely distinct experience of the text with each iterative playthrough.

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[24] See Eco's *The Open Work*.

[25] See Popper's *Origins and Developments of Kinetic Art* and *Art, Action, and Participation*.

[26] This is, of course, not to say that narratives are objective or accurately depict contemporary models; rather, they express a subjective response to these notions and reflect the influences cosmological theories inevitably have on human perception.

[27] In the case of video games, this re-playability is intrinsic to video game aesthetics both as a kind of playful failure (as Jesper Juul outlines in *The Art of Failure* (2013)) or, more cynically, as a mechanism to keep players from purchasing other games. The latter notion is particularly endemic to the medium's history, for example when arcade games artificially increased difficulty to force players to pay more money to continue playing or, today, where games have become increasingly built around the model of a "live service" which demands players continue playing while the game changes over time. This will be discussed directly in Chapter Five as a fundamental aspect of the generative textuality of *No Man's Sky*.

Ecosystem and *Mise en Abyme*: Narrative Games in *Hopscotch*, *Green Grass, Running Water*, and *No Man's Sky*

After these theoretical and historical excursions into generative theory, I examine the contemporary development of the generative ecosystems found in two novels and one video game. These three texts are Julio Cortázar's various rulesets in his novel *Hopscotch*; Thomas King's hybridizing of oral and written narratives in his novel *Green Grass, Running Water;* and, finally, the infinite, procedurally-generated universe in Hello Games' video game *No Man's Sky*. These texts appear to be randomly assembled, without any real relationship to each other. They are from widely disparate authors, cultures, and times. However, upon further examination, it is shown that each text produces a generative, systematic structure which not only informed the conceptualization and production of the text but continues to inform the text's outcomes, its virtually-endless potential readings or playthroughs.

In the case of the two novels, the generative system proves to be conceptually spatial or even geometrical: the system renders a spatial-temporal, figural ecosystem which the reader must immerse themselves in. In the case of *Hopscotch*, which features two authorial approaches to reading, the system can be seen as either a **hopscotch board** or a **mandala**; in *Green Grass, Running Water*, the narrative is structured around the interspersion of various narrative levels which revolve in and around the **medicine wheel**. Taking the spatialized, game-like quality of these two novels forward, I examine the case of the video game *No Man's Sky*. Of particular interest is the utilization of design techniques which operate under the umbrella of "Procedural Content Generation" (PCG), a method which was used extensively to create *No Man's Sky*, a "procedurally-generated" **universe** composed of trillions of planets which players can explore entirely of their own volition. The textual system informs the game's potential arrangement of all textual materials, including planets, animals, plants, and geological formations; the

system functions, therefore, as an “ecosystem” in which the interactions between “entities” are formed and formulated through the game’s ongoing interactions between author, audience, and system.

Generative literature scholar Bruce Morrissette identifies two approaches to producing generative structures in literature, which he refers to as “linguistic” and “situational generators” respectively. Linguistic generators are "primarily lettristic, syllabic, phonetic, directly or indirectly anagrammatic", while situational generators are comprised of "patterns of chronology, modes of viewpoint, intercalated narration, liaisons de scéne, analogues and mises en abyme, [and] fictional patterns borrowed from epic or myth" (“Postmodern Generative Fiction" 254). Building on Morrissette’s typology of fictional generators, I argue that in terms of narrativity these ‘generators’ function as devices which reflect on their own architectural (and thus **experiential**) process[28]. Ultimately, what aligns each of these texts with each other is their underlying generative structure: narratively speaking, this structure is most often posed to readers and players through the situational generator of *mise en abyme*. *Mise en abyme* is generative because it produces a spatialized, embedded, and recursive model of a narrative in miniature—often in the form of a “story within a story” or the reflective mirroring of a story’s thematic or conceptual focus.

Because my object texts generate not only the possible expressions of their systems through authorial filtering, but also through the diegetic spatial-conceptual arrangement of materials, the experience of the text produces a need for the reader or player to orient themselves relative to the textual ecosystem to interpret the work. As Lucien Dällenbach argues in his seminal monograph *The Mirror in the Text*, *mise en abyme* serves the function of reproducing or doubling the narrative thrust of a work for

[28] This is not altogether distinct from how symbols or allegory might imply a specific process of interpretation; nor is it altogether distinct from insights gleaned from reception and reader-response theory (or critical examinations of reception, response, and authorship), especially Jauss’s “horizon of expectation”, Iser’s “implied reader”, Foucault’s “author as figure”, Gadamer’s conception of the “hermeneutical circle”, and Stanley Fish’s “affective stylistics” regarding the procedural experience of reading.

the audience to experience it in miniature and better understand what the narrative is meant to express (8). This doubling of the narrative situation in miniature entangles the audience in the narrative because

> any reflexion represents a semantic super-imposition, or, in other words,
> that the utterance containing the reflexivity operates on at least two levels:
> that of the narrative, where it continues to signify like any other utterance,
> and that of the reflexion, where it intervenes as an element of
> metasignification, enabling the narrative to take itself as its theme (44).

In generative contexts this role is served by the spatial-temporal, geometrical ecosystem itself; the means by which the generative system features narrativity is produced in the spatial and temporal dynamics of the system unfolding as an **ecosystem of interactions**, which consistently reflects back onto the author and audience in a procedural-conceptual feedback loop. This feedback loop structure is reflexive, further, in that it slowly integrates the participatory action of the audience into the framework of the text. In literary examples such as *Hopscotch*, this integration is prefigured in the concept of the infinite game—the game which dynamically changes depending upon one's perspective within the game-as-ecosystem; in video game examples such as Hello Games' *No Man's Sky*, this feedback loop becomes crucial for the prolongation of the game itself (in that games must be played to continue, while games must also evolve in response to how they are played to continue being played). Thus, the recursive nature of the feedback loop offers a significant analogy for the reflexive experience of the *mise en abyme* as a narrativized ecosystem, namely in the super-imposition of narrative levels and situations both within and outside of the diegetic level. As a result of this recursive, reflexive structure, this super-imposition produces a participatory, experiential, and spatialized ground for a more narrativized kind of interpretation, in large part because of the *mise en abyme*'s dually-reflective quality: by reproducing the diegetic situation in miniature, *mise en abyme* produces a 'reflective' experience in the reader or player,

who are forced to consider the ecosystemic quality of the artwork whilst experiencing it and interacting with it. This produces the need to orient oneself relative to the text as an ecosystem.

In this sense, *mise en abyme* involves the direction of narrative forces in either a "centripetal" or "centrifugal" fashion. As Morrissette observes, in pre-postmodern works this inner duplication of the overarching narrative typically pushes the reader centrifugally, "leading from work to reader, from fiction to life" ("Postmodern Generative Fiction" 8); conversely, postmodern works tend to use *mise en abyme* to draw readers "in centripetal fashion back into the work, away from the referential 'outside'" (ibid.). Originally coined by André Gide in reference to the "the image of a shield containing, in its centre, a miniature replica of itself" (Dällenbach 8), *mise en abyme* calls upon audience agency by formulating the reflective process as an interpretive drama which forces the reader/player to orient themselves within and outside of the textual ecosystem. The audience is subjected to a "push and pull" type of narrative (Calleja 122) which renders the audience "*en abyme*", suspended in the "heart of the shield" (Dällenbach 8) or the narrative within the narrative (or, the system within the system). In later developments of *mise en abyme*, the "*escutcheon*" aspect of the shield is replaced by the notion of the infinitely recursive gap produced between two facing mirrors. This infinite recursion produces what Iddo Dickmann refers to as the "gap of retroaction": once the audience is placed "*en abyme*", they occupy the gap producing and produced by this gap. Because in the case of two facing mirrors the process of mutual reflection has no clear genesis or singularity in which it can be resolved, this process produces the ground between the mirrors **as a site of both difference and repetition simultaneously**[29].

[29] As Dickmann's work shows, this conception of the *mise en abyme* is heavily indebted to the generative insights found in Gilles Deleuze's *Difference and Repetition*, which observes the extensive move into novelty through the prism of the Nietzschean eternal return. While often conceived of as a purely negative conception of temporality, Deleuze interprets the eternal return as a positive encounter with novelty. As James Mollison argues, "In the first work Deleuze authors in his own name, *Difference and Repetition*, the eternal return occupies a privileged place in Deleuze's theory of time, functioning as a transcendental synthesis of the future […] his reading claims that the eternal return, which seemed to guarantee the past's endless and identical reappearance, is really a cypher for unbridled novelty" (76).

In this narrative situation, then, *mise en abyme* pushes and pulls the audience to "[populate] the seam between that segment and the totalizing whole that embeds it" (Dickmann 19), occupying the generative ecosystem in which author, system, and audience intersect and mutually reflect one-another.

In each object text discussed in this dissertation, the textual 'materials' and their systematic structure are foregrounded as a means of pushing their respective audiences to occupy this reflective seam: in *Hopscotch* this is done through the 'gameplay' conceit produced by offering the reader multiple rule-sets or pathways through the text; in *Green Grass, Running Water*, through the playful trapping of readers in culturally contested sites of (post-)colonial contact and culturally-contingent horizons of expectation; and, in *No Man's Sky*, in the recursive reproductions of the game's combinatorial code in and through all of its universe. As a result, each of these generative systems is experienced as an extra-diegetic, 'interactive' ecosystem of particularity and potential which the reader can arrange and re-arrange to resolve inconsistencies and orient themselves within the diegetic world as "entities" and "autonomous agents" simultaneously.

Ultimately, my focus on *mise en abyme* proves crucial for examining the ways in which the narrativity of generative systems involves the relationships between entities and systems, between parts and wholes. Each of these texts is aligned because each is experienced as a game played between authors/designers, readers/players, and the generative system itself. In this sense, generative literature and generative video games are essentially aligned in that they render "narratives" from thinking "of the [textual] system as a form" (Greimas, "About Games", 32) which unfolds somewhat-autonomously, mediating between the authorial (rule-bound) nature of games and narratives and the audience's conscious accepting of fictional or ludic rules, which constitutes an exercise of free will. As A.J. Greimas argues, "[o]ne is free to enter, but not to exit" a game ("About Games" 31). Because in a game like chess "[each] piece is defined not by what it is, but by the behaviour […] which distinguishes it

from the others" (ibid. 31-32), it can be "immediately tempting to identify these empty positions of the pieces with individuals functioning inside systems which are beyond their control and which manipulate them" (ibid., 32)[30]. Conversely, "since each piece is dependent on all the others, each of its movements disturbs the system by creating a new structural state based on a new temporary equilibrium" (ibid.), meaning that "[the] whole problem changes completely if, instead of considering the chess board alone, one takes note of the presence of the players and tries to understand what is happening 'inside their heads,' in the form of preliminary assumptions or logical presuppositions conditioning their moves" (ibid.). This is the fundamental tension between authored processes and audience agency in generative artworks which are narrativized.

This tension produces what generative theorists refer to as emergence, the "hope that more will come out of a system than was put in" (Monro 476). In generative computer art circles, emergence suggests that an authored system can become more than the sum of its parts on its own. However, in each of my object texts the author and audience are involved in the fostering of emergence because they influence the system's inputs (as rules) and outcomes (as concrete performances of the text). In this sense, the author and audience function as part of the system, meaning that emergence is the by-product of the meeting of authored processes and audience agency within the ecosystem of the text and across its narrative levels. This is aligned with what many video game theorists refer to as narrative emergence (Cardoso and Carvalhais 25)—the experience of the audience's journey through a text—though it likewise expands to the narrative of the author's 'journey' in constructing, experiencing, filtering, and

[30] See: Saussure's adoption of chess as an analogy for the relationship between linguistic signs in *Course in General Linguistics*. Most notably, Saussure argues that "[a] game of chess is like an artificial realization of what language offers in a natural form" (64), especially in how "each linguistic term derives its value from its opposition to all the other terms" (ibid.). Crucially, Saussure's chess analogy relies upon the imagining of "an unconscious or unintelligent player" (ibid., 65) who is subject to the changes in the system but is at the same time unaware of them as changes to the overarching system of relations between chess pieces/linguistic signs. In many ways, Greimas's argument here returns our attention to the semi-conscious 'player' who willingly chooses to play the game, expressed in the freedom one has to 'enter' a game.

re-experiencing the text. Narrative emergence proves to be a key concept in generative storytelling contexts because this approach to storytelling concerns the relationship between authored processes (generated and filtered by the author and the system as ecosystem) and the audience who makes creative-interpretive choices in response to these processes. This is likewise fostered by the affective experience of a textual world which responds to audience interaction, what Janet Murray refers to as "agency", which

> is defined as an aesthetic pleasure characteristic of digital environments, which results from the well-formed exploitation of the procedural and participatory properties. When the behavior of the computer is coherent and the results of participation are clear and well motivated, the interactor experiences the pleasure of agency, of making something happen in a dynamically responsive world (*Inventing the Medium* 410).

In this way generative processes function as architectural forces, shaping the audience's experience of the text while likewise producing and prefiguring the possibility of greater interaction and participation.

Ultimately, despite the theoretical notion that "pure" generative structures disregard the audience and prioritize the generative system as autonomous, constructive, and emergent, any generative art theory that disregards the interaction between author, system, and audience proves untenable as narrative or as artwork. This extends beyond narrative situations to any kind of game as well. All games are, as stated above, intrinsically relational and generative; therefore, a game's structure is always informed by the reality that games are paradoxically both collaborative and competitive (Myers 4) between different players, but also between the rulesets and boundaries of the game itself. In an actualized sense, individual games are concretizations of the ruleset, which operates as a kind of meta-narrative in that rules are authored and subjected to filtering over time. Each individual manifestation of this

collaborative-competitive paradox unfolds in space and time, producing unexpected outcomes from the abstracted rules which form and are formulated by the game's bounded space-time.

Likewise, literature invites audiences to accept its narrative logic, 'to suspend their disbelief', while remaining critical of this suspension. In meta-fictional approaches, a text directly engages with this paradox by "baring its fictional and linguistic systems to the reader's view [to transform] the process of making, of poiesis, into part of the shared pleasure of reading" (Hutcheon 20). More so than film or television, where once the text has begun it continues to unfold with or without the audience's response, generative literature and video games demand a notably more active audience in the process of the text's unfolding. Almost every game presumes players. Literature, likewise, requires the presence of the reader to turn its pages. Naturally, this extends beyond the pragmatic and physical manipulation of texts to the notional, prefigured roles of "implied" readers or players; however, as Greimas argues for games, in literary contexts such a role is ultimately concretized in the actual reading subject for whom the text is experienced as a continually unfolding horizon. Thus, a generative artwork's horizon of expectation is modified and updated by actual, socially-contingent readers or players who discern which interpretations are possible by interacting with the material text.

Chapter Outline

This dissertation is composed of five chapters, the first of which establishes a theory of the narrativity of generative systems. The first and second chapter consists of a brief literature review of literary and, later, computational approaches to generative art praxis. The following three chapters are case studies of narrative generativity in three narrative works, examining commonalities and particularities.

In "Chapter 1—From Generative Art Theory to the Narrativity of Generative Systems", I perform a brief examination of generative systems as they are understood today. Starting with current

theories of generativity found in practicing generative computer art circles, I locate several inconsistencies in generative theory. In doing so, I will examine what these artists mean by "generative," before moving towards a more historical examination of generative theory.

This historical examination of generative theory takes place in "Chapter 2—A Brief History of Generative Poetics", which begins with a brief outlining of Aristotle's theory of mimesis and its emphasis on the systematic unfolding of "possibility". From there, I briefly outline several other examples of generative approaches, including Lucretius's atomistic conception of *clinamen*; Ramon Llull's "*ars magna*" and "*arbor scientiae*"; Leibniz's "*arte combinatoria*"; the dynamic of audience and author in Jean Molinet's rebus-poems; the parodic imitation of Llull and Leibniz in Jonathan Swift's *Gulliver's Travels*; and the relationships between linguistic and situational generators in the works of Raymond Rousseau. The treatment of these examples is an attempt to establish a certain trajectory for future works on the longer history of generative theory and its often transcendent or transcendental motivations. After this historical examination of generative art theory, I move toward more contemporary expressions of generative theory to conclude the chapter. This involves the examination of two literary movements—the Oulipo and nouveau roman—and one computational movement—the New Tendencies—in hopes of showing several productive, aligned discussions and dilemmas in the application of generative theory. In discussing these movements, several key figures emerge: Georges Perec and Italo Calvino in the Oulipo; Alain Robbe-Grillet and Jean Ricardou in the nouveau roman; and Max Bense and Abraham Moles in the New Tendencies. By examining the underlying problematics of authorship, agency, and emergence found in these examples, I align the 20th century developments in generative art theory with the longer development of generative approaches, all of which have informed the development of generative art praxis today.

After outlining my theory of the narrativity of generative systems, "Chapter 3—Mapping Figures and Figura in Julio Cortázar's *Hopscotch*", examines the potential for Cortázar's novel to produce an infinite number of readings based on how players arrange and navigate the text. *Hopscotch* opens with a "table of instructions" which suggest two potential rulesets for reading the novel, one which is predominantly linear (at least on the part of the audience's experience of the material text), while the other has readers moving throughout the text's three sections in a seemingly-random, Brownian motion. To capture the novel's spatial particularities, this chapter includes a literal mapping of the novel's representation of 1950s Paris in its "first book". This mapping resembles the board of a game of hopscotch, emphasizing a linear process of players moving straight forward and then straight back across the game board (which in traditional games of hopscotch proves sequentially linear, regardless of whether one skips spaces or not). Because the "second book" creates relationships across the text which defy sequential and linear notions of space and time, this literal mapping proves impossible or, at best, ineffectual. As such, I perform a structural mapping of the relationships between these non-sequential, non-linear pathways through the text using stochastic blockmodels. Blockmodels are used by social scientists, particularly those in computational sociology, to generate arguments about a social network's structure. The network of spaces and how they are arranged in the novel suggests certain emphases latent in the arrangement of *Hopscotch's* second book: ultimately, the novel's original working title—*Mandala*—proves a more accurate title of this second book. Finally, I argue that the relationship between these two books is mediated by the *mise en abyme* structure—in Book One formulated in terms of the novel's protagonist Horacio Oliveira's emergence through the "eye of the asshole" (which refers to Georges Bataille's conception of limit experiences and surrealism), while in Book Two formulated by the reader's emulation of Horacio's emergence through this "eye of the asshole" into the conceptual center of the novel. While the first emergence is diegetic, concerning Horacio's surreal deportation from

Paris in the middle of the first book, the second concerns the reader's (and also Horacio's) adoption of the "author's-eye view" afforded by the recombination of textual materials. This is both diegetic and meta-diegetic, involving Horacio's meeting his favourite author Morelli—including his eventual re-arrangement of Morelli's archive and notes—and the incorporation of the novel's third section, which is comprised of "disposable" chapters interpolated throughout the second book. In line with the functioning of the *mise en abyme* in both books, a structural mapping of these two books reveals that these two arrangements of the text are part of a longer-form process of emergence from the hopscotch board into the mandala and beyond. This is facilitated by the generative *mise en abyme*, which reduplicates the diegesis in the meta-diegetic thrust of the story, inviting the reader to produce further emergent or transcendent readings of the text.

In "Chapter 4—Metalepsis, *Mise en abyme*, and *Methexis*: Indigenous Storytelling and Generativity in Thomas King's *Green Grass, Running Water*", I examine the narrative of Thomas King's 1993 novel *Green Grass, Running Water*. Examining the novel's arrangement and transgression of various narrative levels through the prism of the indigenous trickster figure Coyote, I observe the mechanisms by which the novel entraps readers in their presumptions, producing a self-reflexive readership which becomes immersed—again through the *mise en abyme*—in the "contestatory site" of retroactive mirroring between colonizer and colonized peoples. By focusing on mythical, literary, and historical sites of contention between indigenous and non-indigenous cultures, King provokes this contentious dialogue as a means of propelling readers into the underlying structure of the novel: the spatial-temporal figure of the medicine wheel. This spatialization is performed not only by the *mise en abyme*, which produces the ground on which these disagreements and prejudices are placed in dialogue; it is also generated by Coyote's ability to transgress the normative, hegemonic arrangement of the narrative levels of novelistic storytelling: Coyote's metaleptic shifting guides the reader from one

narrative level to the next, producing an ontological confusion and diffusing disagreement through humorous subversions of novelistic structure in favour of a modelling of the rhetorical situation of an oral storytelling. The result of this is an infolding of inner and outer levels of the story which produces a spatialization of the novel into four sections, each of which align with the four sections (East, South, West, and North) of a medicine wheel. Each of these sections signifies the passing of seasons and the generation (and eventual re-generation) of indigenous stories and the world as a continuous process of storytelling. This produces a movement from the inner, diegetic level of the text to the external, extra-diegetic frame of the storytelling situation between storyteller and listener: a centripetal move from "inside" to "outside" in hopes of producing a "methexical" dialogue between self and other in the world.

Moving from literary examples to video games, "Chapter 5—The Aesthetics of Procedural Content Generation and the Concept of 'Lifecycle' in Hello Games's *No Man's Sky*", concerns the procedurally-generated universe game called *No Man's Sky*. This includes an examination of the game's generative systems and the original reception of the game, which involved its being broadly panned and widely criticized as a meaningless or even "lifeless" universe of raw Newtonian mechanics (Whitehead *Modes of Thought* 173*).* Comparing the experience of the game's original state to that of a Sisyphean struggle for meaning in futility, I proceed to examine the ways in which the game produces an "existentialized" drama of interpretation by situating players within an infinite, lifeless cosmos, pushing and pulling players "*en abyme*". From there, I examine the dynamics of human-machine interaction as the game has been updated, including an examination of narrative threads imposed on the game both diegetically, extra-diegetically, and para-diegetically. Because the game is mathematically limitless, it allows for a near-infinite number of player approaches; regardless, it has required consistent updates and narrative impositions on the part of the designers to motivate player engagement. As such, the role of narrative—both authored narratives and player-motivated, "emergent" narratives—is not diametrical to

the unfolding of the text as an ecosystem, but rather is the impetus for its continuous unfolding. Systems and narrative are entangled and symmetrical, producing a fusion of paratextual, extratextual, and textual situations to render the game into the model of a "living universe" with its own intrinsic necessities, relationships, and motivations (Whitehead *Modes of Thought* 203). The unfolding process of the game's "growth" has become its overarching narrative—its lifecycle—within which smaller emergent narrative approaches are performed, becoming fractals of the overarching narrative whole: player responses are recursively reproduced in the authorial narrative of the game with each new content update. Thus, while the game's generative system produces novel interactions between entities within this ecosystem, these interactions are ultimately proliferated by the processual relationship between authorial decision-making and filtering and the responsive agency of players who continue the game by continuing to play the game. In this sense, every aspect of the game is recursively tied to its surface-level outputs, meaning that the game's surface progressively expands as it is played and responded to in each subsequent filtering of its combinatoric code, which likewise proliferates the logic of this code through these interactions. Thus, while the game is produced by an "autonomous" system, the game as an artwork is only altered by the tension between authorial updates, systemic outcomes, and player interactions. Thus, much like Alfred North Whitehead's relational conception of the "passage of Nature" as a processual "creative advance into novelty" (as compared to notions of classical physics which portray "a static morphological universe") (*Process and Reality* 222), the narrative levels of *No Man's Sky* are fused together to produce the text as an overarching narration of itself as it advances through the continuous—potentially infinite—interactions it facilitates between author, audience, and system.

In my "Conclusion—Narrativity, Generativity, and Ecosystem: Generative Systems and Relational Narratives", I discuss generativity as a fundamental aspect of "relational" narratives, a concept adopted from the relational aesthetics of Nicolas Bourriaud. Bourriaud argues that "[it is up to

us [as beholders of art] to judge artworks in terms of the relations they produce in the specific contexts they inhabit. Because art is an activity that produces relationships to the world and in one form or another makes its relationships to space and time material" (*Postproduction* 94). Thus, attention to the spatial and temporal relationships and their concretization requires an expansion of the conceptual and structural implications of the *mise en abyme*. The narrativity of generative systems, in light of these expanded implications of human subjectivity being placed "*en abyme*", functions as a kind of cybernetic structure which is predominantly retroactive and reflexive. The circular, cybernetic arrangement of authorship, agency, and emergence as a process is consistent in each of my object texts. Thus, the narrativity of generative systems, as formulated throughout this dissertation, corresponds quite comfortably to the dynamic process known as the "feedback loop". This spatial concept of the feedback loop is a useful means by which to describe the conception, production, expression, and reception of each of these works, rendering this feedback process into an eternally recurring circle, a recursive relation between mutually-constitutive forces. The problem of emergence, in this sense, becomes a consideration of the means by which one "emerges" beyond the controlling mechanisms of the feedback loop into unexpected, inexplicable, and possibly "metaphysical", "spiritual", or "transcendent" outcomes. This is, interestingly, the narrative trajectory of each of my object texts as well.

Thus, this dissertation establishes the critical trajectory of computational generative art theory as one deeply fixed on the tension between authorship, agency, and emergence. By examining the literary and computational approaches to generativity as likeminded pursuits with complementary historical and theoretical insights, I expand generative art theory beyond examples of pure generativity wherein the system is impossibly-autonomous. Rather than emphasizing these pure examples of the generative, I examine the historical, conceptual, and social implications of generative artistic structures and why artists have become increasingly invested in producing artworks which do not only adopt the structure of

generative processes—of generative artmaking as a "way of making art"—but, further, reflect on these processes as artistic *topoi* with social and practical implications for human lives more broadly. I then tie these more social or humanistic considerations to contemporary trends in everyday life in the digital era, attempting to define a programmatic, procedural aesthetics of human-machine interaction based on the narrativity of generative systems.

Chapter 1—From Generative Art Theory to the Narrativity of Generative Systems

> "*Artistic activity itself blurs the distinction between generation and production, for it is a sort of production that is essentially creative, and this leads to a similar blurring in each of two common views of art and works of art: (1) To regard art as 'generative' in the same way as nature […] results in the view […] that there is no essential […] difference between works of art and natural objects, and (2) to regard art as simply productive, and works of art as mere artefacts [...].*"
>
> —Jeff Mitscherling, *Aesthetic Genesis: The Origin of Consciousness in the Intentional Being of Nature*, 87-88*).*

Throughout this chapter, I examine the narrativity of generative systems. To do so, I engage with contemporary generative theory to glean crucial insights about the core components of generative artworks, in particular the notions of **entity**, **process**, **rulesets**, **system**, and **ecosystem**. By observing how these works are understood in contemporary (and predominantly computational) notions of what I call 'pure' generativity, I highlight the heightened tension between classical notions of authorship and the presence of narrativity in how this tension is mediated by the generative system AND by the receptive audience who engages in the work. In cases where the artwork features a story, this meta-textual tension becomes increasingly narrativized to the degree that it becomes diegetic content. Thus, the concept of the narrativity of generative systems is effectively an attempt to reconcile the relationship between the latent algorithms of a generative artwork—its generative (eco)system—, with the hermeneutic conception of generative artworks which concerns their overarching process of conception, production, expression, and reception.

To better theorize this relational conception of generative artworks—as compared to notions of generative artworks as purely autonomous, constructive, and emergent—I utilize the narratological concept of **narrativity**. Building on Marie-Laure Ryan's and Wolf Schmid's discussions of narrativity—the question of what it means when we call something narrative—I argue that generative aesthetics replace the "mediating authority, the narrator" (Schmid "Narrativity and Eventfulness" 17), with the procedural ecosystem within which the forces of authorship (both as conception, production, or expression) and reception (the audience as interpreter and, then, as 'co-author' of their experience of the ecosystem) are placed in a narrativized tension. This shift in narrativity is aligned with the structuralist conception of narration, which no longer conceives of narration as "a feature of discourse or communication but rather a feature of what is narrated", meaning that "[texts] which we describe as narrative in the structuralist sense of the word contrast with descriptive texts in that they contain a temporal structure and represent changes of state" (ibid., 18). This expands the question of narrativity beyond "the domain of verbal communication", which inevitably excludes "all lyric, dramatic, and cinematic texts" (ibid.). Conversely, the "structuralist concept […] can apply to a representation in any medium but excludes representations whose referents do not have a temporal structure and consequently do not contain any changes of state" (ibid.). In my object texts, the generative system mediates the narrativized tension between generative and productive forces in the work, producing an unfolding temporal structure which features iterative changes of state in itself. This causes these meta-textual forces to merge and influence the diegetic levels of the text. This process simultaneously reflects the authorial and the receptive forces of the work as a feedback loop of interaction and, thus, of relationality.

To provide the conceptual grounding for this attempt at examining the narrativity of the process of conception, production, expression, and reception in generative artworks, I must first examine contemporary generative art theory while providing concrete textual examples from both my primary

texts and, on occasion, other popular cultural texts which are illustrative of the narrativized tensions found in generative artworks. This involves a description of generative systems, processes, and entities, the core components of a generative artwork. I then proceed to discuss the complexities of generative art theory along the lines of authorship, agency, and emergence. These constraints are a direct by-product of ongoing aesthetic concerns regarding the utilization of generative systems in art; thus, this model allows for a deeper interrogation of the tension between the objective and subjective elements at play in generative artworks. The emphasis on process, for example, implies that the generative artwork is unfinished or in progress, undergoing constant alterations via authorial filtering and conscious (or unconscious) audience reception. Thus, the autonomous generative system both mediates the work and is mediated by the works' construction and eventual reception. A narratological comprehension of a generative artwork's processes—be they intra- or extra-textual—is a useful approach for understanding these processes in light of the problems of authorship and audience agency. This is necessary because, while the autonomous generative system *is* in some sense 'objective', the author and the audience are also responsible for producing an artwork in terms of its 'outcomes'. The chapter concludes by elaborating the potential for analysing generative artworks as a kind of narrative involving this fundamental tension between authorship, agency, and emergence.

Contemporary Generative Theory

To begin, it is vital to outline more concretely what generative art theory currently entails. The most conventional definition of generative art today is found in Philip Galanter's "What is Generative Art?", which describes generative art as "any art practice where the artist uses a system […] which is set into motion with some degree of autonomy contributing to or resulting in a completed work of art" (5). Notably, Galanter's conception of system does not limit generative art to art made with modern technology: "generative art can leverage virtually *any kind of system*, not just computers ("Generative

Art Theory" 146, my emphasis). This broadly aligns with other generative art theorists like Gordon Monro, who observes that "the term generative art covers art practices where the artist creates a process that acts with some degree of autonomy to create all or part of an artwork" (476). Given these definitions, it becomes clear that the notions of **system**, **process**, and **autonomy** are crucial for determining a works' generativity and must be examined further.

Firstly, a generative artwork demands a 'non-human' system be given the ability to structure interactions between elements of the text. The generative system is designed, therefore, to "operate within a wider environment from which they may draw information or input upon which to act" (Dorin et. al, 246) in an attempt to remove authorial and receptive forms of influence on the inputs and outputs of the system. The system operates within the confines of this environment, meaning that generative artists control "flows of information between the generative processes and their operating environment" (ibid.). This control is not direct, but rather takes on the shape of an ongoing, iterative, experimental trial-and-error, changing the underlying system of an artwork to see which interactions it might facilitate in light of these changes.

Beyond the holistic view, a system is generally comprised of smaller elements such as sets of rules or algorithms. These sets contribute in some capacity to the completion or construction of the generative artwork, which facilitates the unfolding of these rules as a process. Processes shape the unfolding of the text in the interaction between the generative systems and the objects they generate or act upon. Thus, rules or algorithms introduce change in the work by rendering interactions between objects within the system over time. To that end, processes are "the mechanisms of change that occur within a generative system; they necessarily involve entities that perform operations on, or interact with, each other" (ibid., 245). Because the interactions facilitated by processes constitute "micro events" within the artwork, it becomes crucial to observe this event-oriented structure to better understand "the

relationships between micro events within a macro process" (ibid., 246). Processes express causal—and thus spatial and temporal—relationships within the larger environment of a generative artwork.

This causality is crucial for notions of generative authorship because it is simultaneously something which the generative author controls *and* is subject to. In this sense, processes are somewhat-autonomous and dynamic—for example, often operating in "stages" (Phon-Amnuaisuk and Panjapornpon 44)—which means that the generative system can manifest variously in response to changes in context. This greatly contributes to conceptions of generative authorship because the generative artwork's "creator typically manipulates the outcomes through the intermediate layer of the generative system. The creator will often adjust parameters of the system based on ongoing observation and evaluation of its outputs. These interactions constrain the subsequent outcomes of the system" (Dorin, et. al, 246). This relationship between author and system "can be characterized as *filtering*—selecting or constraining the outcomes of a process" (ibid., 247), and such filtering is a reciprocal, mutually constitutive process involving both author and system. Generative authorship is, in large part, a process-based filtering which structures the artwork through the interaction of environment, processes, and objects. This process-based construction is achieved by facilitating interactions between generative processes and all the information that is fed into the generative system by the author. Once these interactions unfold, the author intervenes again to alter these processes, fine-tuning the work, emphasizing certain experiments over others. Authorial intention is expressed by this filtering process in generative art praxis: authorship becomes the conscious directing of intention, which constitutes a kind of "purposiveness", inasmuch as intentionality means "precisely to be 'directed toward' some 'object'" (Mitscherling 115).

To better understand processes, it is helpful to think of the directed influence processes have on other components in a generative ecosystem. Due to the previously-mentioned spatialization of the

generative system and the pool of information it interacts with, we can conceive of these processes as unfolding within an ecosystem. Within this ecosystem there are entities, "the subjects upon which a generative artwork's processes act" (Dorin, et.al, 244). Entities are the minimal unit in a generative system and are thus "(conceptually) unitary and indivisible" (ibid.). These subjects have "spatial, temporal and formal" qualities, meaning they are controlled by processes in these ways (ibid.). For example, in a computational context a system might feature simple or complex entities: simple ones might act as discrete binary units (such as the 'off/no' and 'on/yes' binary found in digital artifacts), while complex entities may have many possibilities for action depending on the influence the various processes in a complex system have on these entities.

Regarding complex systems, it is best to provide an example from everyday experience: for example, weather patterns over time. Weather is a complex system with many variables, meaning that the further into the future you wish to observe it, the more complexity and possibility cloud accuracy. The different processes involved in a weather system—including temperatures, ocean currents, geographical locations, topography, and many other factors—interact and unfold dynamically, making weather predictions beyond a week in advance extremely unreliable. There are simply too many moving parts. As Joan Soler-Adillon notes, "[e]xceedingly complex systems, like the interior of the black boxes, are unknowable. They are too complex to be grasped representationally, and they change over time, so that future behavior cannot be anticipated through current knowledge" (48). While the weather might be predictable in a few senses, such as the passage of seasons, there are processes and entities involved in this kind of system which make exact, long-term calculations extremely imprecise. One can rely on the generalizable fact that seasons pass, but one can never know exactly when this passage will occur year-to-year. Many systems, especially as they become more complex, are similarly mystified.

Naturally-occurring systems are a useful model for imagining how processes and environments interact in generative artworks, although in generative practice the author has significant control over the outcomes of the system's processes. This produces a tension between the author's intentions and the autonomous generative system, at least insofar as generative theory relies on the generative system being autonomous. The tension between the authorial inputs and the system's eventual outputs is mediated, then, by the system's enforcing of rules or algorithms, which subjects entities within the generative ecosystem to these rules in a concrete fashion. Further, the system's outputs are mediated by the author's eventual filtering of the system's capacity to express these rules, producing more targeted interactions as a means of overcoming the inevitable black box of the autonomous system. Thus, unpacking the 'black box' of complex systems informs the foremost goal in generative art praxis today: to allow the system to create "new and surprising artifacts" (Galanter "Generative Art Theory" 172), or, put differently, to become "chaos artists" who will "become comfortable with a lack of control over [their] work", who will "embrace this chaos and learn to love it" (Pearson xli). For Galanter, this chaos of systems design implies a bottom-up process of design with "no intended form" ("Generative Art Theory" 174). Rather than an intentional artwork, generative systems provide "the audience a sense of dynamism and [offers] the generative system itself as the expression of aesthetics" (ibid.).

Regardless, "[most] artists producing generative work begin with an idea of what the final result might be, or at least what final result might be desired […] creating systems that will conform to and yield their preconceived notion" (ibid., 173). These preconceptions contend with the system's capacity to express them; as such, generative authors problematize the authorial function in a fashion which resonates "with poststructuralist thinking on authorship" (ibid., 166), in which an author is reconceptualized not as a romantic, solitary, uniquely creative authority but rather as a process or frame

which shapes the life of the artwork in its critical reception[31]. Authorial framing or filtering is crucial because, although generative artworks aim to leave the audience "faced with an art-work that has been created without any human intuition or real-time judgment involved" (ibid., 166), the top-down approach taken up by many generative artists "imposes a teleology that does not exist in natural systems" and thus "introduces a kind of conceptual incoherence" (ibid., 173) surrounding questions of generative authorship. Unlike Galanter, who perceives this as a fundamental incoherence, I argue that this contradictory notion of the artwork which has no author and yet is simultaneously subject to authorial framing and intention is a fundamental feature rather than a flaw of generative aesthetics namely because it produces the crucial tension which narrativizes the unfolding the artwork as a process of conception, production, expression, and reception.

In summary, the generative system operates within the parameters set by its author. This shapes the environment in which the generative system facilitates interactions between entities. Within this environment, any individual unit of information can be an entity, an object upon which the system acts. This environment likewise concerns the duration of this unfolding, as interactions between environmental parameters and entities are mediated over time by the procedural, step-by-step quality of rules. For example, in computational contexts the environment consists of information. This also concerns the possible interactions between different sets of information—which, by interacting, create new relationships between disparate bits of information—within this bounded environment and across several possible instances of authorial filtering. Therefore, interaction-parameters are pre-determined by the author of the system because the author of the system provides the boundaries of the environment in which the system operates. These parameters are causally linked, meaning they are spatial and temporal in structure: for example, parameters can include the "frequency (how often they occur), range (the

[31] See: Michel Foucault's "What Is an Author?"

range of possible interactions, or amount of information conveyed) and significance (the impact of the information acquired from the interaction on the generative system)" (Dorin, et. al 246) of interactions. The material interacted with can range from digital information to "information [received] continuously through sensors of the physical world or from other devices that detect and transduce human interaction" (ibid.), often providing a means by which the audience of the artwork can interact with and within the artwork's environment.

Due to the authorial process of filtering, the system's bounded decision-making, and the potential involvement of the audience both as an entity subjected to the processes of the generative system *and* as an autonomous agent, any particular generative environment is paradoxically rule-bound and open-ended at the same time. This process is not entirely bottom-up or top-down but is intrinsically relational, as "the system's output informs the creator's iterative redesign of the system and underlying processes, resulting in changes to its entities, interactions, and outcomes" (ibid.). Within a generative environment, then, entities are acted upon by processes designed by the author. The possible outcomes of these interactions between entities, processes, and environment comprise what Dorin et. al refer to as "sensed outcomes", the "experienced aspects" of a generative artwork , which can be "visual, sonic, musical, literary, [and] sculptural" (ibid). The audience then interacts with these outputs as an external agent while simultaneously being relating to the generative system's processes as a willful entity. This emphasis on environmental interaction and the dynamic relationship between environment, processes, and entities allows for unpredictable and seemingly-autonomous outcomes in an artwork. At the same time, the relationship between processes and entities constitutes the generative system, which can be borne out in multiple and seemingly-unpredictable ways depending on the individual elements of the system, the environment within which the system unfolds, and the particular arrangement of entities within the system at any given moment. An individual, abstracted instance of a generative system may

or may not be considered an 'outcome', depending on the authors' final decision. It remains unclear, given this process, what exactly constitutes a completed work when generative methods are involved; this naturally contributes to the notion of generative artists as "chaos artists" or authors displaced by the autonomous, constructive, and emergent system.

Generative Artworks 'In Motion'

Taken in this light, generative art serves as a contemporary approach to dynamic creativity, one among many within the larger ecosystem of 20th century art history. This includes burgeoning notions of kinetic properties in art. For example, the range of potential outcomes based on systematic performance resembles what Umberto Eco refers to as an "open work" or the "artwork in motion". The intrinsically kinetic structure of interactions between author, system, and entities is a procedural unfolding over time and within space. This means that the generative artwork is 'in motion' because it is necessarily incomplete, even incompletable because ach new interaction, like a networked or fractalized arrangement, re-arranges the total system. For Eco, this developing tendency in the late 19th/early 20th century towards incomplete artworks which require greater degrees of agency from performers or audiences aligns with the larger development of artworks focused on problems of movement or kinesis. Similarly, in *Origins and Development of Kinetic Art*, art historian Frank Popper outlines the rapid onset of artistic renderings of movement, dynamism, and kinesis after 1860, ranging from the development of movement as an "objective phenomenon" for the Impressionists (11), through the subjective motion found in Vincent Van Gogh (ibid., 26-27), to the development of Futurism where, "for the first time in modern art, the *idea* of movement takes precedence over the perception of movement and the emotions associated with it" (ibid., 43). For Popper, this development is tied to a rapidly developing relationship between art, technology, and science (ibid., 94), an ongoing movement from subjective to purportedly objective forms of artmaking that finds its base in conceptualism and constructivism. Crucially, Popper

argues that modern developments in kinetic art not only influenced thinking about movement in art but allowed for new media—such as film—to express movement in unique ways (ibid., 95). At the same time, these new kinetic modes of artistic expression found in cinema informed new ideas of movement in the more traditional artforms (ibid.), especially in music, literature, and the plastic arts. This involves the possibility of something unfolding in a dynamic and unexpected manner, such as the "element of movement in the work" itself, the "movement of the artist's hand", or even the "actual movement of the spectator" (ibid., 7).

This aligns Popper's history of kinetic art with the notion of the unfinished 'artwork in motion'. As Eco examines in the works of Henri Pousseur,

> "the poetics of the 'open' work tends to encourage 'acts of conscious freedom' on the part of the performer and place him at the focal point of a network of limitless interrelations, among which he chooses to set up his own form without being influenced by an external necessity which definitively prescribes the organization of the work in hand" (4).

Eco's artwork in motion and Popper's kinetic art are useful critical models for thinking about generative artworks because the system which produces movement in these artworks is mediated by the author (who filters the system's potential interrelations) and the audience (who in some manner 'performs' the text in accordance with their own experience of it). The system itself remains incomplete, permanently subject to any and all changes in either direction. This is a comprehensive problematization of notions of a system's autonomy: as previously stated, in generative art praxis the artist "typically manipulates the outcomes [of the artwork] through the intermediate layer of the generative system" (Dorin et. al 246). Clearly, the role of the system as a form of mediation does not detract from the designed quality of generative art. Rather, as George Stiny and James Gips argue, "[algorithmic] representations require an

explicit awareness of underlying assumptions and details that may remain hidden using less rigorous methods" (6). Thus, authorial filtering and audience agency contribute to the directedness or "purposiveness" of a generative artwork in that any interactions within the artwork's ecosystem contribute on a material level to the artwork's range of outcomes.

Returning to Popper's discussion of kinetic art, the concept of movement is conceived of differently in different media; nonetheless, the controlling idea is always the concept of movement itself. This shapes the kinetic artist's decision-making, the artwork's outputs, and the audience's interpretation of these dynamic outputs. Thus, this approach to movement models a notion of **realism through moving form**. The generating concept of movement is expressed through an artwork's form, while the content of an artwork is subject to the dynamic changes this movable form prefigures. The tension between these three poles—author, moving form, and audience—informs, constrains, and alters the artwork's sensory outcomes (which should be reconsidered, therefore, as iterative outputs) in relationship to the perceptual or conceptual notion of movement itself. In this sense, kinetic artworks resemble a generative artwork's ongoing feedback loop of process, interaction, filtering, and emergence.

Clearly, the concept of movement or kinesis can involve the artistic utilization of systematic change (or, put differently, of systematic growth) over time. Returning to generative art theory, Philip Galanter distinguishes between complex systems and adaptive complex systems, arguing that "[c]reativity can be viewed simply as the difference between merely complex systems (e.g., the weather) and *complex adaptive systems* (e.g., a beehive [which has been damaged by the weather and adapts to fix the damage])" ("Generative Art Theory" 172). Thus, for Galanter and other generative artists, the rendering of dynamic and adaptive systems into artworks is aesthetically distinct from the mere existence of a complex or dynamic system in nature; this is because, within the context of an artwork, the complex adaptive system expresses the kinetic quality of creativity in and of itself. Galanter argues

for this kind of expression to be called **creativity on the level of the system itself being creative**, or, put differently, of the generative system being autonomous, constructive, and emergent in its own right[32].

Thus, in generative art theory it is crucial to "distinguish between two different activities: (1) genesis, or *generation*, and (2) producing, or *production*" (Mitscherling 87). While for Jeff Mitscherling, generative art made with computers may qualify as productive and not generative, for Galanter generative artworks are capable of becoming purely generative because generative artworks are themselves "complex adaptive systems", much like beehives. While productive in its emphasis on adaptive complexity, this comparison is ultimately confused: why an 'adaptive' system is intrinsically beautiful, while a merely 'complex' one is not is never satisfactorily resolved in Galanter's philosophical or aesthetic terms because, in both examples, the system supposedly generates sensible outcomes. In this manner, Galanter's dichotomy reverses the classical notions of genesis and production where "the former activity is natural, and from it arise natural objects and the natural world as a whole. The latter activity is artificial, and from it arise artefacts" (Mitscherling 87). Further, the distinction between weather and a beehive affected or destroyed by weather is significantly more debatable than Galanter suggests on the systems-theory level: weather is itself an unfolding, adaptive, and complex system in that it reacts to changes in ecosystem much the same as a beehive might, even though the temporal and spatial scale of this adaptation is imperceptible from the viewpoint of a human being. Questions of scale and geological time prove to be a significant influence on how complex natural systems are perceived as compared to more 'adaptive' systems.

[32] Notably, this most closely resembles the conceptions of art as an end in itself (autotelic) in German Romanticism. When reframed as a romantic conception of authorship, Galanter's conception of generative authorship becomes significantly more coherent. For closer discussion of the conception of an artwork as autotelic, see Tzvetan Todorov's chapter "The Romantic Crisis" in his monograph *Theories of the Symbol*.

Therefore, the major distinction between these two types of complex system is in the preserving of the authorial and interactive qualities of the system, analogous to the 'agency' of the bees in their adaptive rebuilding of their beehive. Supposedly, then, the crucial distinction is the 'consciousness' of the bees, which systematically adapt to changes in their ecosystem and thus promote their continued success as a species. While Galanter's argument is clear inasmuch as he is attempting to lend generative systems agency in their own right as autonomous, constructive, and emergent, this obviously-anthropomorphized understanding of the beehive's adaptation to its ecosystem ultimately undercuts Galanter's calls for a purely systems-oriented aesthetics. Considering this aesthetics' purported capacity for communicating the generative structure of reality independent from the author's own agency, it demands forced analogies which project human consciousness onto the existence of other creatures. Thus, while Galanter argues for systems as intrinsically aesthetic, his distinction only distinguishes regarding **human** conceptions of autonomy and agency, both of which function as fundamental elements in the process of complex adaption. Naturally, this is in part because aesthetics is itself a human category: it is determined not by autonomous, mechanical, or objective parameters but rather by contextualized, contingent notions of distinction and evaluation[33]. Aesthetically speaking, the distinction between complex and complex adaptive system becomes irrelevant when one considers that both complex and complex adaptive systems, when placed in the context of an artwork, are equally designed by an author. What changes, then, is the presence of agents within this unfolding process of adaptation.

Galanter's thoughts on creativity show that while generative art may lead to unexpected outcomes, this is always due to the generative system's authorially pre-figured, filtered, and adaptable dynamism. The unexpected occurs only in the ways a complex system adapts its processes to meet the

[33] This is especially shown in the following chapter, wherein the informational aesthetics of Max Bense are outlined. Bense's rational, information-oriented conception of the aesthetic signals not only the New Tendencies' move towards computational generativity, but further reflects a seriously strained and unsuccessful attempt at rendering the aesthetic into a universal, objective, mechanical notion which prioritizes novelty for the sake of novelty as a kind of beauty.

imposed rules of the author and the permitted interactions between systems and entities, each of which alter the text's outcomes. For generative artists, this movement is argued to be autonomous in essence; however, any systematical unfolding occurs in generative art because systems are broken into iterative steps and then permitted to interact in every way possible within the given limits of the system's rules. The influence of rules on a system proves, therefore, to be **architectural** inasmuch as there is a mutually constitutive influence of system, entity, and author on an artwork's 'outputs'. Though the system constrains possible interactions between entities within its environment, the generative artist's approach to this aesthetic of systems can—at best—be considered partially autonomous (being technological), while also being the manifestation of authorial intention (being designed). It is, to use Popper's terms, simultaneously subjective and objective: the artwork's outcomes—what it looks like when it is 'completed'—are subject to drastic change based on decisions enacted by the artist in the process of generating these outcomes, much like when an artist utilizes concrete materials to produce an artwork in language, paint, film, vibration, or stone, each of which affords and limits certain approaches. Taken further, the kinetic artwork's outputs may be directly influenced by spectators, be they readers, viewers, or players. This development is, as Popper argues, a movement away from the traditional art object to a new kind of practice in which "spectator participation and the environment" converge (*Art—Action and Participation* 11).

Popper's emphasis in his later work *Art—Action and Participation* on spectator participation, "happenings", and "realizations" as forms of kinetic expression are a useful prefiguration for the theory of emergence in generative artworks[34]. The theory of emergence, with its reliance upon this event-oriented narrativity, is an event-based logic in which the change-oriented nature of processes are fundamental. As previously stated, theories of kinetic art prove especially relevant for discussions of

[34] It is in these senses that Popper's theories of participation, kinesis, and conceptual art prove to be a formative influence for the model of narrativity discussed here.

generative art, as the dynamic quality of generative art (Dorin, et. al, 239) suggests that it is a part of a long tradition of representations of dynamism in artistic praxis. Beyond this, it is well worth suggesting that this structural trajectory has clear, if theoretically underdeveloped, ramifications for the ongoing discourse in narratology about narrative as a system structured around the tension between "story" and "nonnarrated happenings" (Schmid, *The Nonnarrated*, 3), reliant upon "changes of state" or "events" which form and inform a narrative's spatial (and therefore temporal) dimensions (Schmid, *Foundations of Narratology*, 2) [35]. This emphasis on processes and events in generative art is resolved by returning to contemporary generative theory in its broader sense as an approach to different structural devices that serve as generators for artistic materials (linguistic, imagistic, and so on) and for situations (of narrative or of interpretation). This change in emphasis serves as the ground upon which my less 'pure' conception of the narrativity of generative systems is theorized[36].

The Narrativity of Generative Systems

For Bruce Morrissette, that media share certain "generative procedures" ("Post-Modern Generative Fiction" 253) suggests a productive analogy between narrative and generative theory, particularly because matters of diegesis operate somewhat similarly across media on a structural level. Supporting this claim, literary and computational approaches to generativity prove extremely complementary despite their surface-level distinctions: generative computer art, for example, imposes algorithmic, rule-based, linguistic, and procedural constraints as a means of rendering a formal, conceptual, scientific, mathematical, or technical idea into art. This constraint manifests not only in the

[35] This emphasis on time as an *aspect* of space is concretely grounded in recent theories of quantum mechanics, which tend to operate without considerations of time. In some quantum theories, time is not a variable beyond its relationship to space as a form of extension. For further discussion of this interesting (and admittedly debatable) development, see physicist Carlo Rovelli's *The Order of Time* (2017), in which he argues for a model of the universe as arranged by events rather than by particles.

[36] This is not to say that this 'pure' approach is aesthetically uninteresting. Rather, it is simply not expansive enough to examine contemporary developments wherein explicitly generative structures have become significant elements of human experience. Thus, the following chapter's literature review of generative praxis across time, place, and medium suggests a more applicable means by which we might interpret these structures in artistic contexts and beyond.

generative artwork's systems-oriented production, but also influences how the artwork is conceived and filtered by authors and, later, experienced by its audience. This is much the same in generative literature, wherein a conceptual system—often linguistic, figural, or geometrical—prefigures the execution (the writing), structure (the system and its 'outputs'), and reception (the reading) of the work. What is common in both approaches, then, is the emphasis on authorship (concerning both authors and systems), agency (concerning both authors, readers/players, and systems), and emergence—or, put differently, the conception, production, expression, and reception of the generative artwork—as a process which influences the text's particular and potential significances in an ongoing, recursive fashion. Although non-narrative generative art is more common—consider the procedural form of many poetic structures such as the sestina, the sonnet, and so on—the dynamic of narrative as interactive *and* generative supports Morrissette's claims for an intermedial analysis of generative structures.

The implications of this commonality for contemporary developments in narrative are widespread and demand further analysis. Due to the procedural, recursive relationship between author, system, and audience, the narrativity of generative systems relies upon a structured and structuring ecosystem of tensions, forces, and half-realized significances. In essence, such a conception of narrativity emphasizes the textual ecosystem as a kind of 'artwork in motion' which requires ongoing involvement from author and audience well after the artwork is supposedly completed. This emphasis on the involvement of author and audience as a process, of course, is intrinsic to the rhetorical situation of any narrative; nonetheless, this mutually-constitutive relationship alone is not enough to render this tension into a narrative—at least in terms of narrative as a story being narrated to the audience—, but is rather a form of narrativity, "that property of discourse by virtue of which it can be both story and presentation of story at the same time" (Davis "Inside/Outside" 9). This mutually constitutive

involvement of audience and author in the metatextual rhetorical situation of a narrative applies to the diegetic, extra-diegetic, and meta-diegetic levels of the artwork.

Narrativity, as Nick Davis argues, relies on certain "Tropings of discourse" including "metaleptic and cognitively dissonant […] infractions of the storyworld-communication world boundary" and also "infractions of representational encoding" (ibid.). In essence, for Davis this involves the utilization of discursive tropes such as "metaleptic tropes" which "acknowledge, establish, and also camouflage the narration world-storyworld boundary [...] simultaneously" (ibid., 12) and, further, "forms of *cognitive mapping*" including *mise en abyme*, which "offer means of understanding the shape of the narrative that one is receiving, whether in its present unfolding or in its entirety, and so of navigating one's way through it" (ibid.). These generative tropes thus prioritize:

> Two hypothetical underlying principles: (a) that discourse does not feel like story—in other words, it does not have the reception property of narrativity—unless it continuously or recurrently takes its receiver through one or more of these or similar narrative tropes, so creating the impression that narration-reception world 'looks onto' storyworld; and (b) that the tropes of narrativity bridge the boundary that they also serve to set in place, by operating simultaneously as disturbances of narration and disturbances in the narrated. Metalepsis by its nature imports something of the narrating action into what it purports to narrate; and cognitive dissonance as characterised above comes into play at once in processes of narration-reception and in the formation of the storyworld and its content (ibid., 13).

Thus, the increasingly blurry distinction between **generation** and **production** produced by these discursive tropes (particularly metalepsis and *mise en abyme*, which are major factors in why conceptions of narrativity render "the traditional distinction between story told and that story's telling" increasingly unsustainable (ibid. 9). Thus, the blurring of the processes of authorship, agency, and emergence with those of conception, production, expression, and reception strongly contributes to a generative text's narrativity.

This is shown in each of the object texts I discuss in the latter half of this dissertation. For instance, in *Hopscotch* the generative system—the different rulesets which purportedly produce two distinct books which emerge from the same object—is reconciled in Horacio's eventual entrance into the archive of his favourite author, Morelli. In Morelli's apartment, Horacio is exposed to the arbitrary, latent systems of organization and selection which have governed the novel he exists within, to the degree that he imagines the future reception of the novel as an infinite game of interpretations producing infinite new books. The potential site in which all of these readings meet, what Horacio refers to as the Kibbutz of Desire, is a space wherein each of these readings are collated and forced to reconcile with one another, expressing the infinitude of perspective which the author's-eye perspective supposedly offers him. In this manner, the presence of narrative in the work is returned to the generative locus of storytelling: the meeting point between author as generator/producer and audience of their own work and the reader as audience and co-author by way of their interpretive and deformative capacity as they eventually deviate from the authorial rule-sets offered to them to find their own versions of the work.

In Thomas King's *Green Grass, Running Water*, this deformative capacity of the reader is replaced with a significantly more controlling scheme: the division between inside and outside audience, those who are 'in' on the joke and those who are the subject of it. Through this moral mechanism, the novel entraps readers and pushes them further into its textual scheme—the medicine wheel—before

forcing them back into the world beyond the text able to tell the correct version of the story (as a form of methexical relationship). Thus, the author's vision of the 'ideal reader' is a reader who misinterprets, one who will become socially pressured into moving deeper into the work and emerging with a new vision of the novel's content and its relationship to the social world beyond the text.

This more controlling scheme becomes even more unconscious and, thus, more coercive in *No Man's Sky*: while in *Hopscotch*'s vision of the Kibbutz, readings mingle and mutually determine each other, in *No Man's Sky* all readings are subject to the overarching 'narrative' of the game's lifecycle as an entertainment product. While the game is kept alive in the interplay between designer and player, it is most notably by way of the increase in the game's narrativity (i.e., in the permeability of its narrative levels, which are increasingly transgressed over time) that its systems have been improved and better contextualized. Thus, the diegetic narrative of the game's simulated universe is intrinsically tied to the game's lifecycle as a product, one which over time has come to reflect the playstyles and attitudes of players in the same fashion as algorithms on social media increasingly reflect one's own interests, producing an ever-expanding, paradoxically collaborative experience of mutual alienation. In each of these works, the desire for reconciliation between generation and production proves intrinsic to the unfolding of the artwork's narrative and is thus an aspect of each text's narrativity.

These examples show that certain tropes commonly described in literary generative theory may prove useful for conceptions of video game authorship (and *vice-versa*). Though the cinematic relationship found in most video games has been discussed and is commonly acknowledged—as has the generative qualities of the filmic medium in terms of montage, mimesis, and constellation[37]—the literary trajectory has had arguably as much influence on video games as the cinematic one, though it

[37] See Sergei Eisenstein's *Film Form*, Georg Lukacs's "Film", and Sigfried Kracauer's *Theory of Film* for prime examples of this discussion.

has received far less attention[38]. These literary and cinematic influences—particularly the tendency for these media to involve the development of a rhetorical situation as a ground level of storytelling—merit much deeper interrogation in generative ecosystems than they have previously received.

Ultimately, the mystification of generative structures and their relationship to earlier, non-computational artistic media is due to two conflicting tendencies in generative art theory, both produced by the encroachment of the computer as the generative machine, *par excellence*: firstly, the focus on a "pure" generativity as the only truly generative approach—one that is totally autonomous and totally emergent—which is theoretically compelling but, outside of the realm of AI artworks or found natural systems, remains practically impossible once a human artist is involved; and, secondly, the emphasis on the presence of generative structures in *every artwork*, diluting theories of generative purity by pointing out the fundamental relationship between creative and generative practices. Often found in the same theoretical works, these conflicting[39] tendencies have led to a schism between computational and non-computational generative practices as a means of narrowing the field of computational generative art into a kind of "pure" generativity where the textual system operates beyond the author's control. Likewise, the justification for a theoretical interest in generative art more generally relies on the ubiquity of generative systems in *all* artistic practice. Because of the mystified role of generative structures in artistic practice proper, it is challenging to quantify generative approaches to textuality that might

[38] This is particularly noted by independent game developer Jonathan Blow, who designed the influential "indie" games *Braid* and *The Witness*. Blow cites two main inspirations for *Braid*: Italo Calvino's *Invisible Cities* and Alan Lightman's *Einstein's Dreams*. Both of these novels are highly recursive, fragmentary, and interpretively open-ended. Each focuses on "environmental" storytelling rather than a linear, authored perspective. Events are not narrated, per se, but emerge from the relationships between descriptive passages and frame-narratives (in Calvino, an ongoing discussion between Kubla Khan and Marco Polo; in Lightman, a series of thought-experiments on the physical and experiential qualities of time performed by Einstein as a patent clerk).

[39] It might be argued that these tendencies are complementary in that they justify the need to gatekeep the discussion around generative art praxis, maintaining a certain standard of generative 'purity' to avoid devolving the conversation into an infinite discussion of all artworks as generative. Nonetheless, it is more useful here to observe how generative structures function in the context of a narrative, given the aesthetic and situational concerns described by generative theorists in literary and computational practice.

explain what generative theory signifies or expresses beyond the abstracted, scientized, objective, 'art as experimentation' systems-aesthetics of Galanter. Ultimately, the 'purity' stance's apolitical, techno-scientific notion of purity reserves the label generative for the most extreme limit-cases, while the 'all art is generative' stance argues for the prevalence of generativity everywhere one happens to look.

Upon further examination, the attempts at limiting generative art theory to computational examples—a purely synchronic bounding of the term—disregards the tension between creative and generative practices too decisively. Although many generative computer artists/theorists express legitimate concerns about opening the term generative up to wider artistic contexts, the challenges of digital media compel this comparative research because previously-distinct media operate in a shared environment within the frames of the computer screen[40]. Discussing the digitization of cinema, Nicholas Rombes points out that "[d]igital cinema both reveals and disguises the raw information of the binary code **as narrative**" (153, my emphasis). Ultimately, text, video, photograph, music, video games, and most other media are now **materially alike**, placed in dialogue with one another and narrated via the 'language' or 'grammar' of new media. As such, it becomes crucial to examine the role of authorship, audience agency, and systematic emergence as core elements of the process of conception, production, expression, and reception, especially as each of these elements converge and reflect one-another.

Authorship

Crucially, contemporary generative theory considers systems-oriented authorship as a radical break from traditional conceptions of authorship because to use an autonomous system prioritizes the intrinsic aesthetics of systems and defers the content-oriented elements typically focused upon in close readings or interpretations of artworks. Romantic conceptions of an artwork as an *exclusively* authorial vision, for example, are challenged to a significant degree in generative texts: the system, in part,

[40] For further examples of this argument, see Henry Jenkins' *Convergence Culture* and Bolter and Grusin's *Remediation*.

becomes responsible for making (or necessitating, enforcing) certain authorial decisions which influence the production of the text. Put differently, generative art emphasizes methods, structures, and techniques which operate as processes: "all generative art focuses on the *process* by which an artwork is made and this is required to have a degree of *autonomy* and *independence* from the artist who defines it" (McCormack, Bown, et. al 2).

As I have argued, this does not entirely remove the authorial role from these texts; rather, the author is no longer exclusively creative, nor authoritative (if they ever truly were), deferring their decision-making power to the semi-autonomous textual system. This deferral of authorial decision-making carries with it several radical—political, ideological, and epistemological—implications for narrative discourse because

> "[notions] of the self, creativity, psyche, origin, source, theology, onto-theology, agency, free will, determinism, consciousness, causality, gender, cultural identity, objectivity, subjectivity, ownership, authority (scarcely to exhaust the list) are implied not only by the question of authorship but also by theories of the absence, death or disappearance of the author" (Burke xvi).

When considering the authorship of generative artworks along these philosophical lines, this deferral of the author in favour of the generative system is in fact closely aligned with the etymological and historical development of authorship as it has been classically conceived. As Sean Burke notes, the term authorship derives from the Latin noun "*auctor*", which implies several interrelated notions: "'promoter, producer, father, progenitor; builder, founder; trustworthy writer, authority; historian; performer, doer; responsible person, teacher,' literally 'one who causes to grow,' agent" (etymonline, "author (n.)"). Built

from the PIE root *aug- (1), *auctor* likewise carries implications of authors as those who cause things "'to increase'" (ibid.).

Regarding the historical development of the term, Burke argues that contemporary conceptions of authorship are predominantly tied to four terms with interrelated emphases: "*[agere]*, 'to act or perform, [which] is close to the Medieval and Barthesian ideas of the scriptor as acting through a text which in some sense precedes the performance" (xviii); "*augere*, 'to grow', [which,] for all its organicist resonances, does not suggest that the text originates with its author"; "*Auieo*, 'to tie', […] [referring] to the connective tissue […] by which poets such as Virgil structured their verses—in which regard it is more prefigurative of the structuralist notions of bricolage and authors as assemblers of codes than the concept of the author as a creative potency"; and, finally, "*autentim*, 'authority'," which suggests "authorship as hegemonic" in the sense that an author "received their authority (*auctoritas*) in the first instance from their relation to tradition and ultimately from the *auctoritas* of God as manifested inspirationally in the Scriptural canon" (xviii).

The narrativity of generative systems relies upon each of these four senses of authorship to determine itself and situate its claims for a radical shift in textual ontology: firstly, narrativity emerges through the mediated relationship between author, audience, and system, the genesis of which is the author's original decision to use a generative system and to filter that system according to their intentions; secondly, narrativity unfolds in the formation of relationships or ties within and outside of the text, meaning these relationships are formed through the combinatorial interactions facilitated between author, audience, and system; thirdly, the narrativity of generative systems incorporates the text's 'growth' over time as these relational ties are performed and combined, causing the text to continuously 'increase' even as it recursively condenses the text's significances through the selective, filtered interactions of author, system, and audience; and, finally, the narrativity of generative systems

introduces questions of authority and decision-making in creative endeavours by deferring to the overarching structure of systems, which become ecosystems that frame and are perpetuated by these mediated relationships and processes.

Audience Agency

Similarly, the role of the audience is mediated by the imposition of an external textual system, which informs (or, again, "filters") the range of interpretations through its rulesets, what is afforded and bounded by the textual ecosystem. Audience agency is limited by the boundaries and affordances of the textual system, which produces an affect similar to the "phenomenology of reading" described by Georges Poulet: generative texts and their interpretations combine to become "subjectified objects" (1322). This conception of textuality, later adopted by Hans Robert Jauss and other proponents of reception theory, is critical for understanding the notion of agency within a textual ecosystem. Jauss, for example, refers to the reader's "horizon of expectations", which the reader constantly revises to account for the concrete actuality of the text as it unfolds. Similarly, a generative system guides the player's expectations through its constraints, though this horizon lacks the same literary historical emphasis due to the particularity of every individual generative system: while in literary historical contexts of reception "[a] new text evokes for the reader (listener) the horizon of expectations and rules familiar from earlier texts, which are then varied, corrected, changed or just reproduced" (Jauss "Literary History" 13), this horizon of interpretive perspectives or roles are produced and filtered by iterations—in some sense, the "history"—of the specific generative system itself.

The horizon produced by the particular generative system and its imposition on the text operates—at least *theoretically*—outside of the bounds of historical conventions due to the emergent specificity of each generative system as its own recursive horizon; each filtering and subsequent procession of the system produces its own horizon, which only refers to the previous horizons. As such,

the problem of emergence commonly discussed in systems theories of all kinds—for example, in complexity theory, where the movement from a simple system to a complex one is based on the quantitative variety of interactions or in sociological network analysis where social roles, positions, and ties render a social system into a complex network—is the outcome of the productive and proliferative tensions between author, system, and audience in generative artworks. This tension unfolds spatially, rendering the text into an "ecosystem"—a rhetorical situation or framework—in which processes unfold and produce novel combinations or relationships between the disparate objects or entities therein. This includes the author and audience, both of whom share the vantage point of operating both inside and outside of this ecosystem. While figurative or imagined in literary contexts, in digital contexts this spatialization becomes more literal: authors can interact with the audience directly through the prism of the textual environment due to the real-time nature of digital technologies.

As a result of this literal and figural spatiality of systems, generative art theory proves to be an invaluable addition to theories of spatiality as an emerging paradigm in narrative. Because generative systems can be broadly conceived of as ecosystems, the narrativity of generative systems is intrinsically spatialized. A system is rendered into an ecosystem, while its rules govern how entities within this ecosystem —including the audience and the author—can interact[41]. Further, because these texts are spatialized, interacting with them produces an audience who—being "thrown" into the artwork as a world—not only situate themselves within the text's diegetic space-time, but also outside of it (extra-diegetically and even para-diegetically). This spatialization in generative artworks renders the interaction of author, audience, and system into an interpretive drama because it produces the affect of

[41] As stated, in video games this is quite literal: for example, in Massively Multiplayer Online Role Playing Games (MMORPGs) or synchronous game worlds where player actions alter the game's world in real time, which provokes a systematic reaction which is shared by all players in terms of the game's world permanently being changed by these interactions. As authors update these games or create novel "events" to keep players engaged, they likewise share in and must react to these changes accordingly.

topophrenia, "a constant and uneasy 'placemindedness' that characterizes a subject's interactions with his or her environment" (Tally *Topophrenia* 1). This placemindedness produces a more "dramatized" notion of the hermeneutical circle (Vattimo 85), wherein the spaces inside of the text are infolded into the spaces beyond the text and *vice-versa*, becoming enmeshed. This generates dramatic situations across all these levels of the text and beyond, recursively producing and being re-produced by this infolding.

The spatialized demand that author and audience orient themselves in regards to the text-as-ecosystem, then, recursively contributes to the affective experience of each individual generative system comprising an ecosystem because "if the world […] is basically a system of meanings into which we are already thrown, [generative artworks found] a world insofar as [they found] a new system of meanings" through the mediation of author, audience, and ecosystem (Vattimo 53). As a result of this sensation of 'worldness', the generative text grows, increasingly building ties to real life beyond the text and incorporating these ties into the generative ecosystem's "system of meanings". This is most often expressed by the centrifugal and centripetal force of an generative artwork's narrativized thrust, as I show in Chapters 3, 4, and 5. As a result of this spatialized affect, generative art theory proves invaluable for examining the move to more spatialized, "ecosystemic" artworks—including literary, cinematic, and interactive works—which are becoming increasingly prevalent today because, as Robert Tally Jr. suggests, "ours is, and has been for some time now, an epoch of enhanced spatiality" (*Topophrenia* 3).

Conclusion: Generativity and Emergence

As a result of this widespread influence of generative thinking across media, a comparison between different generative approaches in different media is helpful for delineating what constitutes the narrativity of generative systems. Despite the particularity of different media, the results of this

comparison do suggest that generative theory operates beyond any specific artistic medium, even if specific media do have certain intrinsic limitations or constraints. Thus, to account for new media and other influential developments in 20th and 21st-century artistic practice—including postmodern pastiche, interactive art, conceptual art, and so on—and to consider the relationship between different artistic mediums and modes, I consider the narrativity of generative systems from the perspective that certain narrative structures operate within the "unified field" of narrative, much like generative structures operate within a "unified field both of diegesis and structure" for Bruce Morrissette ("Post-Modern Generative Fiction" 1). Although some theorists align new media aesthetics exclusively with the empty mimicry of postmodern pastiche (Darley 71), Linda Hutcheon correctly argues that postmodernism singles "out that those entities that we unthinkingly experience as 'natural' are in fact 'cultural'; made by us, not given to us" (Hutcheon 2). This includes a restructuring of what we consider narrative—that which is supposedly "given to us" in the traditional rhetorical situation of storytelling—to be, suggesting that generative literature and videogames are attempts to engage in these new narrative possibilities[42].

As previously shown, in "Post-Modern Generative Fiction: Novel and Film" Bruce Morrissette explores generativity in postmodern novels and films, arguing that they "share certain generative procedures" (253). In the context of generative computational systems, the reliance on the logic of algorithms to execute an author's planning likewise operates beyond the constraints of a specific medium. Such a comparison is logical in the field of video game studies, where it is largely a consensus that new media borrows from and "remediates" prior media, promising "to reform its predecessors by

[42] Though Frederic Jameson argues that "[pastiche] is, like parody, the imitation of a peculiar or unique, idiosyncratic style, the wearing of a linguistic mask, speech in a dead language […] it is a neutral practice of such mimicry, without any of parody's ulterior motives" (17), I have shown that the adoption of generative methods *does* imply ulterior motives beyond superficial parody. These motives are deeply aligned with the metaphysical origins of generative theories of *mimesis*, Leibniz's transcendental mathematics, and the abstract notions of totalizing structure discussed in the following chapter. Further, such motives are also reflected in the underlying systems in each of my object texts in chapters 3-5, which are explicitly tied to religious and "sacred" geometries, despite their surface-level distinctions.

offering a more immediate or authentic experience" but at the same time always "[making] us aware that all media are at one level a 'play of signs'" (Bolter and Grusin 17). Further, video games remain largely in their "incunabula" stage, where the logic of previous media shapes approaches to examining medium-specific approaches (Murray *Hamlet* 66).

Conversely, it is clear that matters of narrative in literary contexts are likewise altered by new media and new contexts, as is the case with the adoption of a more "cinematic" perspective in the novels of Alain Robbe-Grillet or Vladimir Nabokov (among many others): "Just as Eisenstein saw precinema in literature, critics now detect in many novels postcinematic effects; a joint evolution appears to be in progress" (Morrissette, "Aesthetic Response to Novel and Film" 27). The novel's flexibility (which may actually be narrative's flexibility) is also reflected in the digital era, where novels like Mark Z. Danielewski's *House of Leaves* emulate the informational, recursive, and exponentially expanding spatiality of the internet[43]. Therefore, considering this relationship between older and newer media, certain likenesses in narrative and structure found in video games and literature can be observed in hopes of establishing a generalizable conception of the narrativity of generative systems.

To elaborate, in literary and computational contexts generativity is typically invoked in the imposition of external structures such as mathematical procedures, game rules, myths, and other conceptual systems on a text[44]. This imposition can be performed with narrative and non-narrative intentions, although in narrative texts linguistic generativity often produces situations which are narrativized[45]. Much like linguistic generators, the structure of a video game's computational code shapes its possible narrative situations. More generally, however, video games are generative systems because they are games. Practically speaking, games require rules to make them playable, to give the

[43] See Katherine Hayles' "Saving the Subject: Remediation in *House of Leaves*".
[44] See Berge, 115
[45] As I outline in the following chapter when discussing the use of lipograms in Georges Perec's *La Disparition* or the 'metagrams' of Raymond Roussel.

game's ecosystem playable shape. Through the formation and enforcement (the encoding) of these rules, games take on a spatial-temporal dimension: by enacting the rules, a game's environment functions as a virtual space wherein interactions take place in hopes of achieving a quantifiable outcome (Salen and Zimmerman 80). In this manner, all games and game-like structures are *inherently* generative.

The inherently generative quality of games suggests certain alignments between games and narratives. While games are typically considered "ruled and make-believe", Roger Caillois has argued that "they are ruled *or* make-believe" (9, my emphasis), suggesting that imaginative enterprises are more aligned with theories of free play rather than games. This is because games are fundamentally limited and rule-bound. This distinction has had a profound influence on the study of video games, particularly in the division between games as "narrative" and games as "mechanics"[46]. Nonetheless, as A.J. Greimas has noted, many "20th century thinkers […] have […] at one time or another all chose the concept of 'game,' and particularly chess, as a model for their thinking" ("About Games" 31). For Greimas, this "metaphorical use of 'game' as a figurative language allowing us to speak about language is not a concerted effort, but neither is it the result of chance. It is probably traced in the deep *episteme* of the century" (ibid.). Therefore, "if we think about 'game,' we automatically think about language and, more generally, about our way of life in the signifying world" (ibid.). Greimas's ludic notion of language suggests a productive relationship between game-like structures, language, and narrative.

Such comparisons between narrative and language have been likewise productive. As Roland Barthes observes in his "Introduction to the Structural Analysis of Narratives," "In the face of the infinite number of narratives, the multitude of points of view from which they can be discussed […], the analyst finds himself in much the same position as Saussure in the face of the heteroclite nature of

[46] This division between 'narratological' and 'ludological' notions of games has been widely discussed, comprising much of the early days of the field of critical game studies. See Simon Egenfeldt-Nielsen, Jonas Heide Smith, and Susana Pajares Tosca's *Understanding Video Games: The Essential Introduction* 221-234 for a balanced analysis of this division.

language and seeking to extract from the apparent anarchy of the messages a principle of classification and basis of description" (1). Nonetheless, Barthes argues that

> structurally the narrative has some of the characteristics of sentences without ever being reduced to being the sum of a number of sentences: the narrative is a big sentence just as every statement is in some sense the outline of a little narrative. Although they possess certain important unique features, there are found in the narrative, enlarged and altered in proportion, the chief features of the verb: tense, aspects, moods, persons; moreover, the 'subjects' themselves, which are in opposition to the verbal predicates, do not fail to follow a sentence pattern: the typology of actants proposed by A.J. Greimas finds in the multitude of characters of the narrative the elementary functions of grammatical analysis (3).

Greimas's actantial model, in which three axes—that of desire, power, and transmission—intersect and contribute to propel a narrative's plot forward, likewise complements his understanding of games as they compare to language and, thus, to narrative[47]. Put differently, it is clear that games, narrative, and language share certain features and can be equally subjected to the notion of context and ecosystem for the sake of analysis.

This aligns with the broader tendency to observe game and game-like structures in literary works as forms of *mise en abyme*, which itself suspends the deictic function of language and instead resituates the reader as both inside and outside of the work in the process of reading. As Morrissette observes, "[along] with mathematics, games have come to play a considerable role in contemporary literary works and criticism" ("Games and Game Structures in Robbe-Grillet" 157). These ludic structures in literature

[47] See A.J. Greimas's *Structural Semantics* and Louis Hébert's *An Introduction to Applied Semiotics: Tools for Text and Image Analysis* for further elaboration on the actantial model and its dynamic conception of narrative actants.

tend to function as "examples of *mise en abyme* or interior duplication, functioning with respect to the overall structure in somewhat the same way as an 'inner novel' […] or play […] that duplicates at the level of the characters and within the fictional field, the general pattern of the novel or film" (ibid.). *Mise en abyme* is, for Morrissette, one of the most prominent situational generators, namely because it reinforces the authorial qualities of both games and narrative by reproducing the procedures the author followed in the production of the textual environment: "the novel, however random in apparent structure, would in reality be constructed upon secret inner principles of organization left unrevealed to the reader or critic" (ibid., 159). Even more notable, however, is the emergent, participatory quality of the *mise en abyme* structure: in the sense that it is a mystery "left unrevealed", it invites greater degrees of involvement or participation from the reader/player (ibid.). *Mise en abyme* implies audience agency through the in-folding of the textual outside and inside: one performs the text by participating both within its ecosystem and reflecting on its structure from beyond it. In this sense, both a game and a narrative appear to operate as "system of constraints, reducible to rules, *and* as an exercise in freedom, a distraction" (Greimas 31, my emphasis), namely because in games and narratives alike, "[the] sign […] becomes a pure position, the intersection of moves. The de-substantialization of signs permits us to think of the system as a form" (ibid, 32) [48]. In the same manner, the narrativity of generative systems produces a tension between the seeming-infinitude of possible variations and the reducible, concrete particularity of a player's performance in action.

Another crucial aspect of video games is their latent computational structure. Returning to generative theory more broadly, the involvement of computers in generative art contexts brings about

[48] As Vladimir Propp's *Morphology of the Folk Tale* shows, folk tales share a structural likeness in that they are ordered around "functions" rather than themes or motifs. These "functions" are structurally linked and arranged in a changeable, though sequential order. As such, because games allow for the sign to become "a pure position, the intersection of moves", they are likewise arranged around "functions" rather than the particular qualities of a game's pieces, details of setting, and so on.

two relevant and generally accepted claims which directly consider this conception of the kinetic relationship between author, audience, and system in light of the computer's objectivity. These notions are useful for understanding several critical developments in generative art theory because they represent a fundamental tension between generative art in its supposedly pure sense (where the system is predominantly autonomous and constructive) and, conversely, in its essential sense as a fundamental aspect of creativity itself (because the universe is constructed out of systems and, therefore, to express the beauty of systems is to examine systems as the ground for creativity and the nature of reality more generally). The first claim ultimately challenges the kinetic relationship between author, audience, and system described above, emphasizing that computers are now the primary generative tool; the second claim is that computers are merely one development in the longer history of generative art praxis. Ultimately, these claims represent two contradictory poles which merit further examination, especially in light of the paradigmatic change computers have introduced in almost all fields, generative art notwithstanding.

In historical accounts and examples from 20th century generative artists, the computer's introduction has significantly redefined generative art as a praxis. Boden and Edmonds argue that, over time, the use of the word generative has quietly developed in relationship with the rise of computer art, the two words being "used in tandem, and more or less interchangeably, since the very earliest days" (23). This conflation of generative art and computer art, for Boden and Edmonds, began with German generative artist Georg Nees, a generative art practitioner who "produced the first PhD thesis on computer art" and titled it "*Generative Computergraphik*" (23)[49]. In this work generativity "was used […] to identify art that was produced from a computer program and, hence, was at least in part produced automatically" (Boden and Edmonds 23). Since these early days, Boden and Edmonds argue, computer

[49] Notably, Nees would later become part of the New Tendencies movement.

artists have slowly pursued the 'purer' notion of generativity in their art: "the methodological wheel, meanwhile, has climbed an ascending spiral. For the art practices outside the bubble are grounded in technologies for communication and information processing whose power and variety have burgeoned over the last half-century" (ibid., 22). As a result of these developments, generative theorists have begun to prioritize computational procedures over other generative approaches.

In part, this is indeed a technological development, namely because the computer "seems at times to directly create the art on its own" (Galanter, "Generative Art Theory", 146). This prioritization of the "relative independence of the computer is perceived as being qualitatively different from the characteristics of other tools in art history" (ibid.). As such, generative art theory has slowly become—at least practically, if not conceptually—a theoretical description of computational generativity specifically, especially in response to recent developments in Artificial Intelligence (AI), Machine Learning, and Big Data. Unquestionably, computers are extremely capable of processing large swathes of data very quickly, following complex rules, discerning patterns from these pools of data, and outputting them as emergent or unexpected visualizations. As McCormack et. al argue, "the computer and associated technological progress bring new ideas and possibilities that have previously been impossible or impractical to realise. This makes generative computer art different from its non-computational counterparts" (2). This difference is predominantly due to the perceived autonomy of computers, which are particularly useful for producing unexpected results in the artwork's outcomes, rendering it a contemporary example of a more idealized, more authentic, and ultimately purer approach to generativity.

At the same time, the larger history of generative approaches to artmaking suggests that generative structures have an intrinsic relationship to artistic expression and creativity that transcends the contemporary situation of computational generative art. As Galanter himself observes, a system or "a

'procedural invention' can include a chemical reaction, the use of living organisms, condensation and crystallization processes, melting substances, self-organization, self-assembly, and other physical processes, including some that have yet to be discovered" ("Generative Art Theory" 151). Arguably, because of the prioritization of computational forms of generative artmaking over other non-computational approaches, certain historical generative approaches have been overlooked in light of the computer's efficacy and perceived autonomy. Thus, while generative art praxis has a long and complicated history "that predates the computer by thousands of years" (McCormack et. al 2), including any works where "rules define the form. Think of a fugue, or of serial music. Think of perspective, or the golden section" (Boden and Edmonds 26), this is an oft-acknowledged, rarely interrogated reality.

Ultimately, generative theory today overlooks the potential insights offered by this history of generative praxis in favour of the technological insights offered by computational affordances. Contemporary generative theory's more synchronic approach sacrifices the broader insights offered by a diachronic reading of generative theory in favour of delimiting and distinguishing between artworks that are computationally generative and those which are not. This is a notable oversimplification, one which has relegated generative art to a relatively niche position in artistic discourse despite its growing prevalence and relevance for daily human life. In light of this, it is crucial to take generative theories' purported openness more seriously: in particular, the flexibility of definition applied to notions of system and process are crucial for understanding the narrativity of systems and processes. Because these generative approaches are deeply intertwined in daily life and that these artworks are narrativized as an ongoing, dynamical process suggests that their interpretation has genuine ramifications for interpretation beyond the realm of art, especially those which involve questions concerning communications technology, consciousness, and artificial or simulated consciousnesses. Often—though not always—contemporary generative artists' synchronic distinction between what is generative and what is not falls

along the lines of works which are computational and those which are not. Despite this trend in generative praxis, it is clear that generative art theory could be productively expanded if contemporary generative art praxis were placed in dialogue with the various historical examples of generative artistic structures—generators—which have influenced the development and rhetorical application of these structures, regardless of medium or technological affordance.

Theoretically speaking, contemporary generative art theory's technological emphasis finds itself stuck between ideas about the autonomous movement of the generative system and the underlying authorial design which forms the system itself. Although the system is constrained by the author's decisions, generative art made with computers remains classified primarily as an objective phenomenon. A generative artist does not design the outcomes of the artwork directly, but rather crafts rules and waits to see what happens; the artist cedes some control. Given the computational developments in generative theory discussed above, the perceived sacrifice of total control found in all computer-human relationships of this kind has led to a focus on the computational system as genuinely autonomous, if not truly self-generating. Autonomy is, in these cases, expressed in every possible interaction between system and entities.

Thus, a generative system is capable of producing effectively infinite, variable, and emergent outcomes, transcending an author's ability to guide the text's production through sheer volume of interactions facilitated. At the same time, the system is nonetheless authored in its designing and filtering, implying both the author's absence and an underlying, latent sense of the author's presence. This produces a conceptual and interpretive dilemma concerning contemporary artworks more generally[50], one which has proven consistent not only in generative approaches made with computers but, also, generative approaches to language, music, games, and so on. It is therefore necessary to

[50] As has been shown in Roland Barthe's notions of the "death of the author" and his subsequent expression of the desire for an author as a result of this death.

expand beyond the computational framework and examine it in light of its theoretical precursors. If Morrissette is correct in noting that certain linguistic and situational structures are intrinsically generative, this generativity should prove applicable across different media due to the inherently formal or structural quality of these generators.

Chapter 2—A Brief History of Generative Poetics

"*What has happened is that the juxtaposition of concepts that we have stumbled across by chance unexpectedly unleashes a preconscious idea, […] powerful enough to appear in the consciousness if suggested not by any intention on our part, but by an objective process*"

—Italo Calvino, "Cybernetics and Ghosts", 19.

The aim of the previous chapter was to unpack contemporary notions of generative art theory and suggest a procedural, narrativized understanding of generative artworks that incorporates the artwork's conception, production, expression, and reception. This chapter, conversely, attempts to supplement this narrativized take on generative art theory with a brief literature review of historical precedents of contemporary generative theory. These precedents are acknowledged both by critics of generative theory and by generative artists themselves, but it is not always clear exactly how this influence has informed contemporary praxis. To resituate generative theory beyond its media-specific and technological developments, I consider these earlier examples in hopes of locating common generative approaches across media and contexts. This results in a broader conceptualization of generative aesthetics, one which contextualizes the generative elements of contemporary artworks given their multimedia environment.

This takes the form of a brief summary of influential attempts at generative authorship and the development of generative concepts in pre-20th century literature and philosophy, before focusing in on three 20th century movements whose generative praxis has proven especially influential for generative artists and theorists today. These three movements are the literary-mathematical Oulipo (founded in France in 1960), the object-oriented Nouveaux Romanciers (whose works were influential in France in the 1950s and 1960s), and the computational New Tendencies (which was notably more cosmopolitan in

terms of membership but was based in Yugoslavia from 1961 to 1973). Crucially, each of these movements begins by formulating a radical approach to textuality associated with a theoretical reconsideration of the active audience or spectator. In these approaches, the reimagining of textuality and audience engagement is activated by the presence of the mediating generative system and the deferral of the author the generative system produces. By engaging in a review of generative approaches taken over time and across different media, I support the claim that generative texts can be reconceived as the narrativized tension between the three poles of authorship, agency, and emergence. These three poles interact and produce textual events, which emerge as changes of state throughout an artwork's life cycle and, as a result, shape its historical reception. Throughout this dissertation I have argued understanding the intersections between authorship, agency, and emergence AND the process of a works' lifecycle (from conception to reception) can prove pivotal for determining the aesthetics and significances of generative artworks today.

Ultimately, this chapter is an attempt to observe the breadth of generative approaches which have operated across media and epochs. This involves the reconceptualizing of two tendencies found in generative theory. The first is the tendency for generative theory today to be predominantly tied to computer generative art; the second is the tendency to ignore the inter-medial quality of narrative, games, and generative structures more broadly, a quality which suggests that what is now called 'generative theory' has, in some fashion, always existed. While the former tendency is increasingly relevant for contemporary generative theory, the latter is more significant in this chapter because it is a productive vantage for tracing the motivations for and significances of utilizing a generative praxis more broadly. Thus, this chapter continues the work of Bruce Morrissette, who concludes that "[a] diachronic or historical approach to the theory of fictional generators would show that […] much of what once was considered to be a static analysis of retrospective rules or established forms could now be regarded as

the disguised beginning of generative theory," including even Aristotle's emphasis on "seemingly static doctrines of dramatic structure" in *Poetics* ("Post-Modern Generative Fiction" 253).

By resituating generative theory within this trajectory and examining a swathe of influential generative approaches, I interrogate the ways in which generative theory functions as an element of creative practice more broadly, gleaning useful insights for discussing current generative design approaches, both with and without computers. Despite a critical emphasis on the computer as an autonomous tool which uses new material to create art, generative approaches are not unique to computer artists. The broad range of generative approaches in the 20th century, for example, confirm Philip Galanter's claim that "[c]omputers did not pave the way for generative art; generative art helped to pave the way for computers" ("Generative Art Theory" 151). Galanter correctly asserts that "conflating the term 'generative art' with the term 'computer art' would come at an unacceptable cost. We would need a new term for the now orphaned forms of earlier generative art" (ibid., 146). For the purpose of contextualizing earlier generative art, it is necessary to concede that "generative computer art is in fact a subset of the larger field of generative art […] and [that this larger field] in fact is as old as art itself" (ibid.).

Despite this, in many theoretical discussions of generative art the primary focus has become art made with computers. Though Dorin, et. al claim that much generative theory has come to associate generative approaches with computational approaches, they concur with Galanter, stating that "Generative art is neither technological, nor specifically digital, despite the recent popularity of works that are both" (240). Generativity has been applied by artists as a methodology in various media, including "geometric patterns in textiles" (Galanter "Generative Art Theory" 153), sculpture, music, film, literature and new media. Dorin, et. al again align with Galanter, stating that

> In various guises, generative processes have been long evident in art, far predating the current era of the digital computer. From Paleolithic ornamental art […] and hydraulically activated automata […] of ancient Alexandria, Islamic art circa the ninth century […], through to medieval and Renaissance clockwork figures […]; then the harmonograph in the nineteenth century, and the cybernetic sculptures of Ihnatowicz (1986) and Pask […] of the 1960s; all of these are examples of works with generative processes as their basis (240).

Continuing this sweeping acknowledgement of generative approaches to artmaking, Francesca Franco ties kinetic and conceptual art approaches to approaches found in generative artmaking, especially with the 20th-century artist Sol Lewitt ("Exploring Creative Intersections" 227). Famously, Lewitt's approach to artmaking expanded beyond the conceptual and became a matter of generative praxis. Lewitt would prefigure the artwork's execution with a set of rules which he would then give to his apprentices, asking them to perform the system he designed (Lewitt "Paragraphs on Conceptual Art"). The result was different shades of the same concept, each apprentice bringing their own particularity to bear on the design. For Lewitt, this emphasized not only the surface of the artwork but rather the concept as "the most important aspect of the work. When an artist uses a conceptual form of art, it means that all of the planning and decisions are made beforehand and the execution is a perfunctory affair" (ibid.). Similar to notions of the generative system, therefore, the concept shapes all aspects of the work as a process and is thus the locus of the aesthetic quality of the conceptual artwork.

Likewise, the conceptual approach to music composition found in works like John Cage's "4'33'" or even Brian Eno's *Music for Airports* are recent examples of works which remain unfinished as compositions and are thus open to the subjective influence of the performers and participants of the

artwork. In the case of Eno's ambient music, the utilization of analog feedback loops to produce increasingly layered soundscapes proved a programmatic and recursive approach to the music production, aligning the material process of recording in a complex feedback loop both sonically and conceptually to the theme of passing through and waiting in airports. Cage's famous composition involved the audience's ambient noise as part of the composition itself, allowing for an unfinished and interactive notion of musical composition to emerge as the conceptual basis of the piece. These incomplete or "moving" artworks, much like the incomplete procedures designed by Lewitt, produce an open space wherein the composer is de-centered in favour of the performer(s) and, at times, the spectator(s).

Perhaps the most famous example of generative composition in music is serial music. As Murray Steib outlines,

> Serialism refers to the compositional method developed by Arnold Schoenberg in the 1920s. It ultimately became the musical language of the so-called Second Viennese School, which consisted of Schoenberg and his two most celebrated pupils, Alban Berg and Anton Webern. The coherence of serial music (also known as 12-tone or 12-note music) depends in a fundamental way on a particular sequence of interval classes and its transformations (26).

Put differently, serial composition emerged as a response to the increasing use of chromatic notes in music (i.e., notes which do not belong to the key of a composition). In response to this, Schoenberg began developing a system which invited composers to manipulate the system to achieve their compositional goals. While often rejected as a rigid mathematical process of composition, it is

> best to think of serialism as a family of compositional stances. The most basic of these stances is that a precompositionally determined, ordered succession of musical materials—commonly but not exclusively a series of all 12 pitch classes, the 12-tone row—provides a basis for context and continuity in a composition (ibid., 664).

As a result, to compose using Schoenberg's method is to express the horizon offered to the composer by the pre-arranged tone row, which is a tool for helping the composer develop their musical 'Idea'. As Jack Boss argues,

> Schoenberg's Idea [can] serve as a scaffold for the kinds of analytical observations that are typically made about his music under categories like "invariance," "combinatoriality," "harmonic area," "multidimensional set presentation," or "isomorphic partitioning," in an attempt to show how such observations contribute to the logic of the whole (1).

For Schoenberg, the musical idea serves as the scaffolding for the musical piece's predetermined tonal potential, as it was determined by the tonal rows generated by the composer in advance: in this sense, the generative process of conception, production, expression, and reception unfold as "a process spanning the whole piece in which some sort of opposition or conflict between musical elements is presented at the beginning, elaborated, and deepened through the course of the piece, and resolved at or near the end" (ibid.). The relationship between parts and wholes—again a crucial topic for the discussion of the narrativity of generative systems—becomes crucial for the comprehension of this process, as does the relationship between method, system, and composer.

As this brief description shows, serialism is a deeply relevant method of generative composition, one which carries forward many of the concerns that are still present in generative praxis more

generally; this includes, for example, the relationship between author, system, and audience; the relationship between latent compositional procedures and the architecture of an artwork as a process; and, ultimately, the tension between the compositional procedure as an autonomous, constructive, and potentially emergent process and the role of the composer as a filterer of the system into an expression of their individual musical idea. Of crucial importance is the strong tendency towards the autonomy of the method as a replacement of 'individual style', despite the variable interpretations of how serial composition should be practiced. Drawing on this conception of autonomy In his *Philosophy of Modern Music*, Theodor Adorno examines the serial compositions of Schoenberg, reflecting on the tendency towards composition as a kind of automation or autonomous method:

> Music today, like all other expressions of the objective spirit, is accused of creating a schism between the intellectual and the physical, between the work of the mind and that of the hands: the guilt of privilege—Hegel's dialectic of master and servant—is extended, in the final analysis, to the sovereign spirit dominant over nature. The further this creative spirit advances towards autonomy, the more it alienates itself from a concrete relationship to everything dominated by it—human beings as well as materials" (13-14)

For Adorno, the 'generative horizon' of an individual serial composition remains the primary boundary within which the work can remain autonomous, and, thus, "[u]nder the coercion of its own objective consequences music has critically invalidated the idea of the polished work and disrupted the continuity of its effect" (ibid., 19). Adorno locates this disruption of continuity in the increasingly detached relationship between composers and their seemingly-objective procedures for composition, which removes modern music from the larger compositional horizon of traditional musical composition, which

previously served as the generating tension between a composition's materials and their potential arrangement in response to conventionally-established tonal, intervallic, and harmonic relationships. Thus, Adorno argues that the generative procedures of serial composition fall prey to "[the] assumption of an historical tendency in musical material [which] contradicts the traditional conception of the material of music. This material is traditionally defined—in terms of physics, or possibly in terms of the psychology of sound—as the sum of all sounds at the disposal of the composer" (ibid., 21). The tendency to quantify the material of music as a progression from classical tonal relationships to a more-free atonality (as the increasing tendency for chromatic notes might suggest), disregards what Adorno refers to as "The actual compositional material," which "is as different from this sum as is language from its total supply of sounds. It is not simply a matter of the increase and decrease of this supply in the course of history. All its specific characteristics are indications of the historical process" (ibid.). In this sense, many of the tensions I identify throughout this chapter apply equally well to avant-garde music as they do to narrativized literary and ludic works. The quantitatively greater sum of possible compositional materials producing an alienated, ahistorical textual horizon—one which is referred to by composers and authors alike as autonomous, constructive, and emergent—is demanded by the increasing lack of fitness of older compositional procedures and relationships which are perceived as "not simply […] antiquated and untimely, but […] false" (ibid., 22). This alienated horizon—the generated ecosystem and the entities produced by it—thus displace the author or composer as "a creator" whose "rigid demand for compositional accuracy made upon him by his structure […] limits him" (ibid., 23).

Moving from music and sculpture to literature and video games, it is crucial to note that the linguistic structure of these media lends them their generative capacity. This is reflected in the historical development of literary and computational approaches to generativity: beyond the historically bound art practices described above and below, language's intrinsic generative structure serves as the generative

ground upon which all other forms of generative thought are built. This is a result of language's capacity for infinite expression derived from finite means (what is referred to by Noam Chomsky as "Digital Infinity" or "Discrete Infinity"[51]). Language is formed and formulated by its intrinsic rule-boundedness, which is why many of these methods reflect a similar dichotomy as the linguistic relationship between rules and potential, including Saussure's structural distinction between *langue* and *parole*, the whole of a language (which is homogenous) as compared to its individual utterances (which are heterogeneous). Crucially, language's capacity for describing the world is directly tied to its innate capacity to communicate through its rules and, at the same time, to express novel arrangements through its seemingly-infinite combinatorial potential. Even in the Classical world, this can be seen in the tension between language's capacity to generate novel expressions and its representative capacities which are governed by the laws of probability, causality, and necessity (or, put differently, by art's capacity for mimesis).

The tension between language's mimetic quality and its ability to create new or truthful knowledge can be seen in much of generative practices' historical precedents. For example, this tension can be found in both Plato's discussion of poets in *The Republic* and Aristotle's examination of tragedy in his *Poetics*. While the former has helped generate a centuries-long discussion about art's role in society and human understanding based on the artwork's ontology as an "[imitation] thrice removed from the truth" (*Republic*, *Book X*), the latter can be seen as an early formulation of the intrinsic systematical qualities of an artwork with its own inner *necessity*[52]. As Bruce Morrissette argues, the

[51] See Noam Chomsky's "Linguistics and cognitive science: Problems and mysteries" in Asa Kasher's *The Chomskyan Turn* (1991) and Chomsky's "The Language Capacity: Architecture and Evolution" (2016), among others, for a closer discussion of discrete infinity.

[52] I mean *necessity* as the inner logic of an artistic work which arises from its expression as a material form, concretized in dialogue with its potential for various arrangements or constellations. In the sense that an artwork exists in a causal relationship between its author and potential audiences, *necessity* shapes the relationship between the traditional authority any artist engages with and the actualization of their creative vision in response to it through the *necessary* arrangement of materials as a generated particularity, an object with its own spatial and temporal qualities.

generative insights which emerge from "Aristotle's seemingly static doctrines of dramatic structure, involving such notions as *peripeteia*, discovery, or unity of action—to the extent that dramatists had consciously or unconsciously followed such doctrines—obviously served the production of their works, as well as their later analysis" ("Postmodern Generative Fiction" 253).

This deserves further examination and offers a useful starting point for discussions of generative theory[53] [54]. For example, the relevance of discovery is clear inasmuch as the process of composing a generative artwork is often framed as a form of research or discovery about reality itself. Similarly clear are the interacting unities of time, place, and action in which the environment and potential 'interactions' of a tragedy are determined and shaped. As Aristotle argues,

> a beautiful object, whether it be a living organism or any whole composed of parts, must not only have an orderly arrangement of parts, but must also be of a certain magnitude; for beauty depends on magnitude and order. Hence a very small animal organism cannot be beautiful; for the view of it is confused, the object being seen in an almost imperceptible moment of time. Nor, again, can one of vast size be beautiful; for as the eye cannot take it all in at once, the unity and sense of the whole is lost for the spectator; as for instance if there were one a thousand miles long (VIII).

While the argument here largely concerns questions of scale and proportion, Aristotle is clear to outline that unity produces a spatial situation wherein the events of a tragedy can be properly represented and

[53] Unsurprisingly, it would prove a gargantuan, insurmountable task to begin *before* Aristotle's approach unless one incorporated religious tradition, mythology, tribal storytelling, tribal music, and so on. This again speaks to the *necessity* of generative approaches, either way. As such, Plato and Aristotle serve as a convenient, if not chronologically accurate genesis for this discussion.

[54] One figure who emerges later in this dissertation in my analysis of Cortázar's *Hopscotch* who is not directly examined here is the pre-Socratic philosopher Heraclitus, whose few remaining fragments are rife with generative concepts and paradoxes.

thus comprehended. This likewise informs the experience of the audience, especially in terms of tragedy's potential for *catharsis*.

While discovery can be tied to the underlying systems involved in *poiesis* as a form of making more generally, the unities of time, place, and action provide a concrete environment wherein the artist can represent the possible, causal world implied by the tragic mode itself. When taken as a process, these interacting elements of tragic form reflect Aristotle's overarching theory of *mimesis*. Beyond reversals, unities, and discoveries, Matthew Potolsky observes that Aristotle argues that "*mimesis* is effective if it resonates with basic cognitive operations. Art appeals to reason, specifically to our inherent sense of what is probable or necessary" (Potolsky 4). As such,

> Aristotle's focus on probability and necessity suggests that the realism of a mimetic work comes not from its reflection of the external world but from its congruence with the norms of human thought. The work strikes us as realistic because the events of the plot are joined according to the same rules that govern events in our actual experience. Reasoning in and about art is not essentially different from reasoning in other contexts. As in art, so in daily life we rely on logic (necessity) and belief (probability) in making choices (ibid., 41).

Continuing this line of thought, Gianni Vattimo confirms that

> *mimesis* is not a principle that establishes art's dependence upon nature […] verisimilitude or necessity of what happens in tragedy is measured with respect to the spectators' mindset rather than to nature, be it human or not, abstractly taken as an object of imitation. *Mimesis* is, therefore, a principle of external form, that is to say, the necessary proportion between

> tragedy and the spectators' mindset; it has its correspondent principle of internal form in the proportional structure of the work (5).

Thus, the "seemingly static" notions of tragic form described in *Poetics* can be reconceptualized as an attempt at uniting several distinct, yet related aspects of an artwork as a process of necessary or probable comprehension; that is, tragic *mimesis* must be considered "a principle of external form" because it governs a tragedy's unfolding as a performative, spatial-temporal process.

Aristotle's mimetic tension between probability, necessity, and audience experience is clearly influential for later thinkers, especially in the Middle Ages. For example, procedural complexity between space, time, author, and audience can be found in the systematical doctrine of Catalan philosopher, poet, preacher, and novelist Ramon Llull (c. 1232-1315)[55]. Llull, who was familiar with Aristotle's logical proofs by way of Arabic translations by Averroes[56], is especially notable for having composed a logical system known as "The Art" or "*ars magna*'. As Dennis Duncan outlines, much of Llull's *ars magna* was notable for its "recurrent use of formal mechanisms—complex systems of combinatorics" (ibid.). This combinatorial system took the shape of a "series of diagrams and tables, with concentric circles divided into cells as the dominant device. One figure even features a rotating wheel similar to the moving circles of a code wheel for transposing […] letters in a simple cipher" (ibid., 94-95).

[55] Llull, who would later be known as "one of the fathers of the 'Oulipian' conception of literature" (Roubaud "Combinatorial Art" 37), "was born in the city of Palma on the Mediterranean island of Mallorca. After experiencing visions, he renounced the troubadour ways of his early years and dedicated himself to the conversion, by reason, of other faiths to Christianity" (Duncan 94).

[56] See Carol Lea Clark's "Aristotle and Averroes: The Influence of Aristotle's Arabic Commentator upon Western European and Arabic Rhetoric" for further discussion on the influence of Aristotle's Arabic translation on Medieval Christian thought.

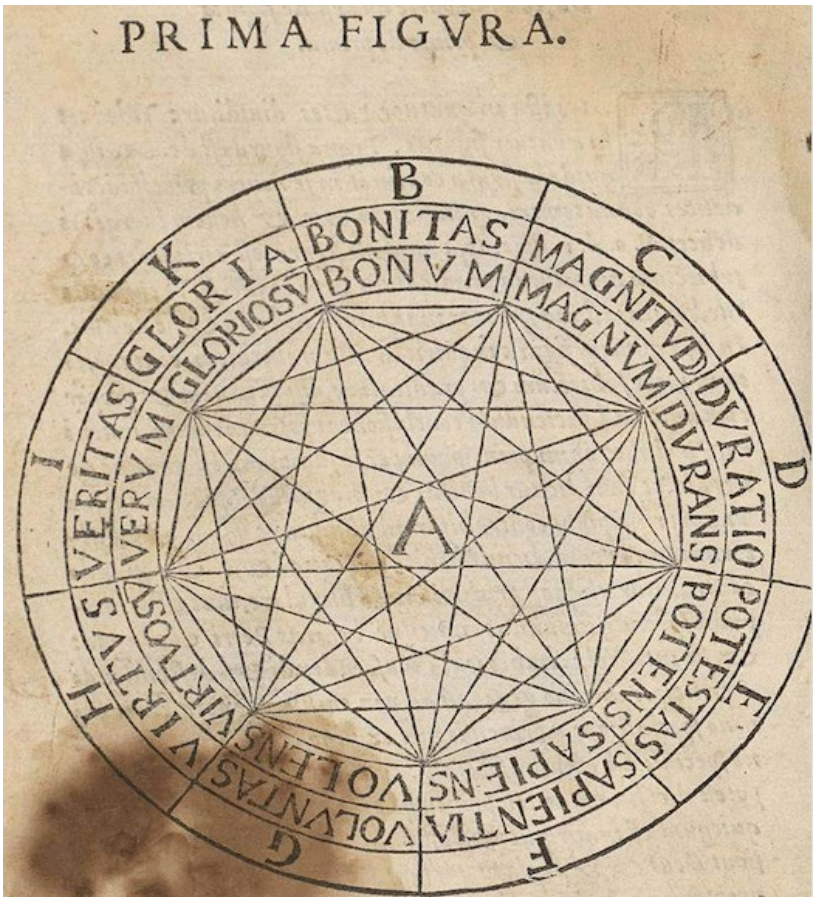


Figure 2.1—A diagrammed outline of Ramon Llull's '*ars magna'*.

As Martin Gardner observes, Llull's *ars magna* "was the earliest attempt in the history of formal logic to employ geometrical diagrams for the purpose of discovering *nonmathematical truths*, and the first attempt to use a mechanical device—a kind of primitive logic machine—to facilitate the operation of a logic system" (1, my emphasis). Continuing, Gardner describes Llull's system as a method for producing combinations to elucidate truths about the nature of God:

> Essentially, [Llull's] method was as follows. In every branch of knowledge, he believed, there was a small number of simple basic principles or categories that must be assumed without question. By exhausting all possible combinations of these categories we are able to explore all the knowledge that can be understood by our finite minds. To

> construct tables of possible combinations we call upon the aid of both diagrams and rotating circles (ibid., 9).

Though Llull's system features complicated tables and diagrams, as a logical system it is limited due to its reliance upon such axiomatic assumptions. It presumes the capacity for humans to discern the fundamental qualities of metaphysical truths, by which an author might verify their non-mathematical proofs. Surely, the contradiction between human knowledge and human finitude contextualizes Llull as a figure of his historical moment, at least regarding the belief in the capacity for combinatorial logics as universal proofs: while Llull "did not […] regard his method as a substitute for the formal logic of Aristotle" (ibid., 17), it is also unsurprising, as Gardner notes, that Llull would "suppose that by exhausting the combinations of such principles one might thereby explore all possible structures of truth and so obtain universal knowledge" (ibid.).

The tension between human finitude and the human capacity for discerning fundamental philosophical axioms is further reflected in Llull's adoption and slow revision of the system in accordance with the demands of his audience. In practice, the *ars magna* was skewed to promote specific results while erasing others. The axiomatic knowledge Christians held of God were faith-based functions within the system, meaning that any combinations which disproved Llull's dogmatic vision would be omitted. Essentially, Llull filtered the range of 'outcomes' the system's combinations could represent. Because Llull, a devoted Christian and proselytizer, knew the answers the model was intended to explicate in advance, all of the answers output by the system were constrained to reflect Llull's pre-determined philosophical grounds:

> For example, combinatorics would allow the question 'if the world were eternal' and the answer that, if the world were eternal—we have already seen that goodness is so great that it is eternal—there should be eternal

> goodness and therefore no evil in the world. Llull objects, however, because evil exists in the world, as shown by experience. Therefore, it must be concluded that the world is not eternal. The answer is thus in the negative, but not based on what combinatorics would say, but according to what good Christians know, namely, that the eternity of the world is an Averroes heresy (Umberto Eco, "The *Ars Magna* of Ramon Llull" 50).

Regardless, it is *because* his system is subject to these pre-figured outcomes that the *ars magna* is an interesting example of authorial filtering in the history of generative artworks. While conceived of as a fatal systematical flaw by Eco, Duncan, and other critics, Llull's model has been productively reconceived in less scientific or logically consistent terms by Jonathan Swift, Jorge Luis Borges, and members of the Oulipo. Continued interest in Llull's works typically involve the structure of the system rather than its potential for elucidating dogmatic, nonmathematical proofs. As Gardner observes, the interest in Llull's system is a result of several crucial elements: "The diagrams and circles aid the understanding […]. They have rhetorical value"; "It is an investigative and inventive art. When ideas are combined in all possible ways, the new combinations start the mind thinking along novel channels"; and, "Finally, the Art possesses a kind of deductive power" (ibid., 17). While not an objective proof of the nature of God, the *ars magna* has clear artistic relevance as an external form of inspiration. It is in this direction that Borges argues that, "[as] an instrument of philosophical investigation, [Llull's] thinking machine is absurd. It would not be absurd, however, as a literary and poetic device" ("Ramon Llull's Thinking Machine" 159).

Borges's observation is confirmed by the self-reflexive output of Llull over the course of his lifetime. The dilemmas introduced by utilizing the *ars magna* for composition—particularly the complex arrangement of materials and the difficulty inherent in persuading audiences to convert to

Christianity—led Llull to produce less convoluted approaches over time. As Dennis Duncan notes, "[in the *ars magna* the] use of figures is rather complicated—so much so that Llull simplified his own theory during his lifetime in order to make it more accessible" (95). This involved the utilization of the generative concept of the *Tree of Science*, or *arbor scientiae*, which was a modelling of different "branches" of knowledge as a kind of tree comprised of various sub divisions, which Llull referred to as leaves, roots, branches, and so on.

This tree metaphor again implies Llull's awareness of Aristotelian logic, as "[the] tree figure […] was certainly known to Aristotle as a handy way of picturing successive subdivisions of matter and form, or genera and species" (Gardner 29). In this sense, Llull's tree diagrams "expressed statements in what today is called the logic of relations" (ibid.), continuing his earlier work in a more intelligible fashion. Conceptually tied to the *ars magna*, this tree motif would eventually be utilized by Llull in such disparate works as *The Tree of Love*, a mystical 'proto'-novel wherein the "lover" embraces the ultimate love—that essential form of love found between God and the faithful[57]. Structurally, *The Tree of Love* is an amalgam, divided between various written genres and approaches, including narrated sequences, sermons, and scientific explications of the tree's various relations and subdivisions. Thus, this novel is a prime example of the generative or combinatorial thinking of Llull more broadly, as it combines elements of his earlier systems with his revised, more accessible models. The complexity of the earlier model produced a greater need to simplify and constrain his overarching system into something more experiential and thus more relatable.

[57] See Llull's *The Tree of Love*, trans. E. Allison Peers, Society for Promoting Christian Knowledge, 1926.

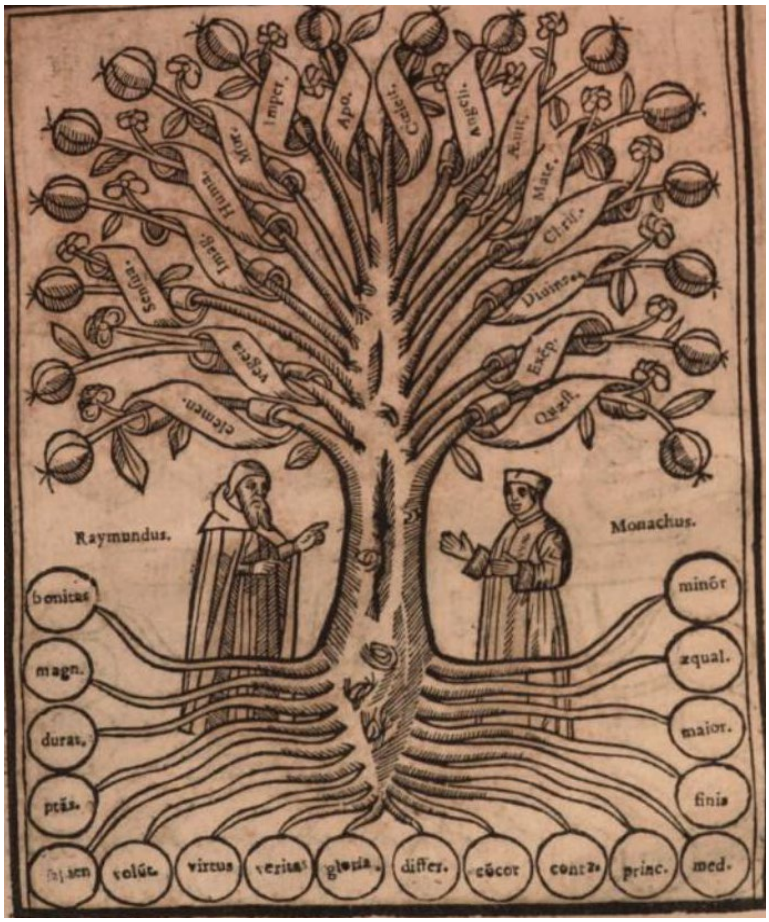


Figure 2.2—Llull's "Tree of Science".

Llull's generative systems—both the circular modelling of the *ars magna* and the trees of love and science—were utilized by Llull in part because they allowed for a speaker's complex narration of different knowledge systems from memory[58]. They likewise allowed for easier retention amongst listeners, suggesting that Llull's eventual description of the *ars magna* in the form of trees was an attempt at simplifying the complex combinatorial system into one more readily understandable. The desired outcome of the *ars magna*—a spiritually awakened audience—prompted Llull to filter the system into something more comprehensible for that audience. The complex relationship between author, system, and audience resulted in an ongoing mediation of Llull's systems and their complexity.

[58] See the Medieval *ars memoriae* (the practice of 'the art of memory').

Further, Llull's example prefigures the inherently mystical—transcendental—quality of generative structures and, at the same time, the involvement of authorial discretion in the outcomes of these generative structures as processes.

Notably, Llull's authorial filtering and the hermetical quality of generative structures found in the *ars magna* continued to implicitly inform generative praxis in later examples. Regardless of Llull's inherently flawed models, his *ars magna* inspired many later figures to consider the science of combinations as a means of discerning the underlying, transcendent structure of the universe. According to Umberto Eco,

> [the] Lullian *Ars* would seduce posterity as if it were a mechanism to explore an infinity of worlds and of possible truths (and so will happen with [Nicholas of Cusa]); adopted by the Renaissance Christian Cabalism, it preceded the combinatorial dizziness with which mathematicians and philosophers of the 17th century played until the *Dissertatio de arte combinatoria* by Leibniz (1646–1716), who will think of a calculation based on empty symbolic forms, not anchored to any content ("The Ars Magna by Ramon Llull" 50).

For Nicholas of Cusa (1401-1464), who I will only briefly discuss, Llull's model led to Cusa's reconsideration of Aristotelian *mimesis*, allowing for *mimesis* to be understood in expressly Christian terms. In Cusa's view, Llull's structures are logical proofs and representations of the infinite power of potential and possibility, which are argued to be aspects of God himself:

> "Indeed, on Nicholas's view, possibility itself exists eternally; and since it is not prior to actuality itself, the latter also exists eternally. This eternal union of possibility and actuality Nicholas calls God. So God is distinct

> from every other being by virtue of the fact that He alone is the actuality of all possibility; He alone is, actually, everything of which 'is able to be' can be predicated truly" (Hopkins 17-18).

As both Llull and Cusa show, the latent mystical understanding of generative structures has long been considered a means by which to discern the qualities of the cosmos, itself expressive of God's infinite capacities. While Llull's system originates in the conviction that God can be described by the *ars magna*, which is capable of communicating certain categorical truths about God, Cusa's conception of God as possibility and actuality unified was fundamentally built on the unknowability of God's actual nature. Ultimately, the closest one can come to a vision of God is through the acknowledged lack of comprehension, an embracing of ignorance about God's true nature:

> Since the unqualifiedly and absolutely Maximum (than which there cannot be a greater) is greater than we can comprehend (because it is Infinite Truth), we attain unto it in no other way than incomprehensibly. For since it is not of the nature of those things which can be comparatively greater and lesser, it is beyond all that we can conceive. For whatsoever things are apprehended by the senses, by reason, or by intellect differ both within themselves and in relation to one another […] in such way that there is no precise equality among them (Cusanus, *De Docta Ignorantia* I.11.4, 4-12).

Through such figures as Llull and Cusa, generative structure's representative capacity can be seen as part of the ongoing translation of earlier, pagan notions of *mimesis* into the early modern, Christian *transcendental* context. As such, it is not surprising to see the relationship between generative structure and Christianity continue to develop in this direction until art's gradual (and, perhaps, debatable) "secularization" in the 19th and 20th centuries.

The transition from Classical to Christian conceptions of the generative is also observable in the rhetorical tradition of the *grands rhétoriqueurs* of France in the late Middle Ages[59]. Perhaps the most influential *rhétoriqueur*, Jean Molinet (1435-1507) is best known for his mastery of the rebus-poem, an inter-medial poetic form which resembles a codex comprised of text and image. Aesthetically, the rebus-poem crosses and mixes discursive barriers, media, and modes of thought, emphasizing the rhetorical capacity of both the author and the understanding audience. As Adrian Armstrong observes, "Northern French culture in the late Middle Ages is marked not only by a proliferation of visual images, but also by the knowledge which these images convey, very often in the form of figurative discourse" (350). This evolved from earlier expressions such as "[traditional] coded or symbolic visual forms such as heraldry" and even the "typological stained-glass windows, which establish relationships between episodes from the Old and New testaments" (ibid.), into a system of "second-order meanings" in the late fourteenth and early fifteenth centuries. This led to innovative approaches to the systematic production of these second-order meanings. Many of these solutions were allegorical and didactic, including the formulation of the rebus-poem as a form which presumed the audience to be active, engaged, and knowledgeable.

In practice, the rebus-poem "is a short poem whose text has been partly or wholly replaced by images, which must be converted back into phonemes for the poem to make sense" (ibid.).

[59] Likewise, it can be argued that later movements which were influenced by the *grands rhétoriqueurs*, such as the metaphysical poets of England in the early Renaissance, and *gongorisme* in Spain in the mid-Renaissance, were heavily influenced by early Christian rhetoric. Much like Llull's popularity in the Renaissance concerned his diagram's "considerable mnemonic value" and "picturesque, cabalistic character" (Gardner 17), the *grands rhétoriqueurs* visual and rhetorical poetry was a strong influence for the coded mysticism of later generative movements, especially the Oulipo and *nouveaux roman* (See Morrissette "Postmodern Fiction and Film", where he connects the *rhétoriqueurs* to postmodern generative literature and film).

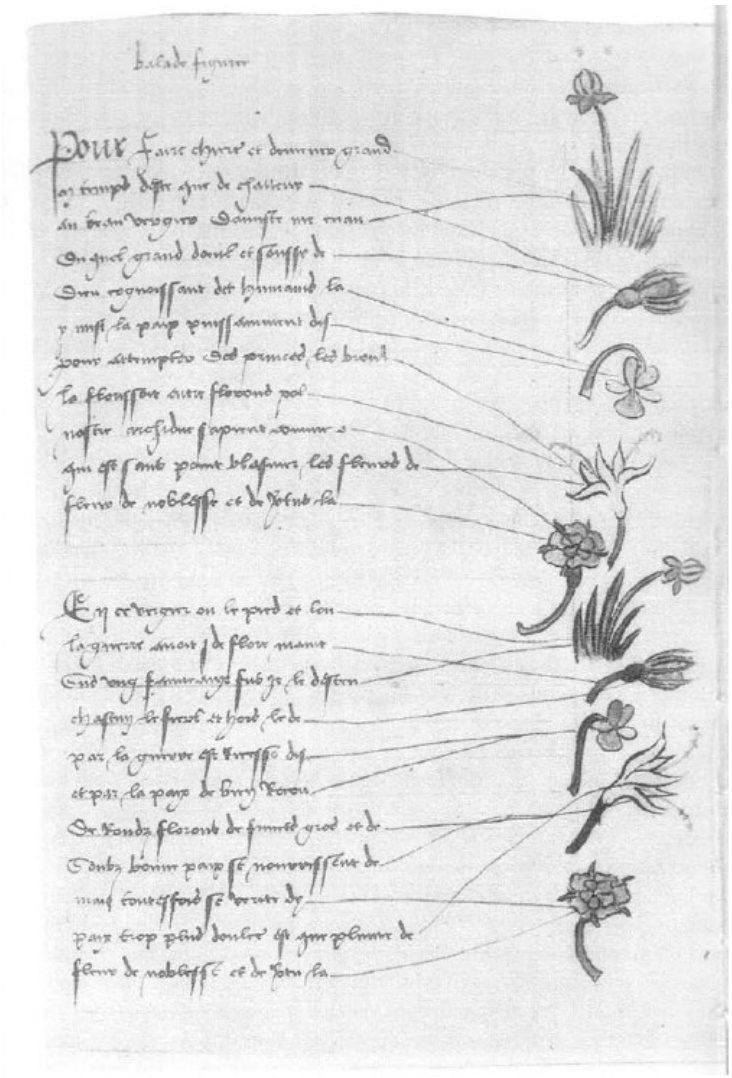


Figure 2.3—Jean Molinet's rebus-poem 'Pour faire chiere et démener grand glay', [cited in Armstrong's "Reception and Interference"]

Much like the earlier figural divide between Old and New Testament was to be filled through the condensation and typology of symbols with layered interpretive possibilities[60], the gap between phoneme and image in the rebus-poem was expressive of the latent knowledge the audience had regarding the encoded subject of the poem. Thus, through the audience the meaning of the poem could emerge. This repurposed the audience into a participant in the performance of the work, one who must

[60] This interpretive approach, what Erich Auerbach famously refers to as figural analysis, is a crucial model for reading in Chapter 3 when I discuss *Hopscotch*.

balance several interpretive approaches simultaneously, including visual puzzles, symbols, and allegorical models. Rebus-poems are structurally notable, then, because they "solicit an audience's knowledge in highly distinctive ways" by combining the reader's visual and linguistic repertoires to simultaneously operate within the same process of interpretation (ibid., 351).

To this end, the rebus-poem substitutes parts of a poem's language with a coded series of images. As Julie Singer notes, "Molinet's manipulation of text and image is most apparent in his rebus-poems, numbering nearly a dozen, of which the most scurrilous relied on crude drawings of vulvas, anuses, and penises to represent the sounds *con*, *cul*, and *vis*" (510). Further examples of this transformative procedure, crossing between text and image, persist throughout Molinet's works:

> "For instance […] in a number of his poems and prose works he plays on his surname's homonym of the *molinet*, or little mill, a pun that the illuminators of several manuscripts and early printed editions translated into visual form. According to recent critical interpretations, the molinet pun illuminates modes of reading in an era of transition from manuscript to print. But when the onomastic mill is read in conjunction with the other texts sharing its attention to the visual ''translation'' of names and sounds, the resulting corpus of graphic games indicates that Jean Molinet was also engaged in deep and long-standing experiments testing the boundaries between man, text, and machine" (ibid.).

As implied by the notion of a game, these experimental approaches to the boundaries between man, text, and machine deeply involved the subjectivity of the audience in ways which align with contemporary notions of the audience noted in generative theory. As Armstrong observes,

> "These appeals to readerly knowledge have two effects. On the one hand, they position readers as initiates, already in possession of the knowledge to which the poet alludes; they thereby bind poet and audience together into a discursive community. On the other, however, they ultimately cause the poem to resist the imposition of a coherent meaning" (353).

Arguably, the prevalence of generative approaches throughout the Middle Ages and the early Renaissance reflects the prioritization and, perhaps, the developing conception of metaphysical knowledge as variably graspable and perhaps even manipulable. This movement towards the potential of human-applied combinatorics as a branch of 'objective' or 'scientific' investigation united logically rigorous models with metaphysical, spiritual, and other transcendental aims. This trajectory, for Umberto Eco, culminates in the mathematical-metaphysical models of Gottfried Leibniz, whose 'transcendental' combinatorics is the first attempt to produce an abstracted generative system divorced from a logical model's content. As Eco and Martin Gardner both observe, Leibniz's combinatorics were heavily influenced by Llull's *ars magna* to the degree that Leibniz directly engaged with Llull's models in his foremost combinatoric work. In a letter from 1714, Leibniz himself admits that "When I was young, I found pleasure in the Lullian art, yet I thought also that I found some defects in it, and I said something about these in a little schoolboyish essay called *On the Art of Combinations*, published in 1666" (qtd in Gardner 25). Gardner, in a note to his discussion of Llull's logical systems, observes that "[in] later years Leibniz was often critical of Lull, but he always regarded as sound the basic project sketched in his *Dissertio de arte combinatoria*" (ibid., 25), which was explicitly influenced by Llull's *ars magna*.

In the *Dissertatio*, Leibniz "treated all sorts of combinations […with…] ramifications in logic, history, ethics, and metaphysics" (Berge 115). For Leibniz, combinatorics—the field of mathematics concerning combinations—was applicable to philosophical, cultural, natural, and spiritual domains. In

light of the broad ramifications of combinatorics, Leibniz's fundamental separation of content from generative structure remains especially significant and is, in many ways, his most notable critique of the Llullian *ars*. The separation of content from structure in Leibniz's work does not entirely disregard the content of these systems but rather *considers systems as intrinsically expressive of their own content*, as expressions of form itself. In this manner, the question of combinations is first and foremost a continuation of the "logic of relations". Put differently, when rendered into a purely formal process of relations, combinatorial structures more readily express "the allure of […] *arte combinatoria* […]", which is inherently "recombinative" and "proliferative" (Morrissette, "Postmodern Generative Fiction", 3) because it can be applied to any situation or any philosophical problem.

A brief example of this recombinative, proliferative, and relational logic is required for the sake of elaboration. In section III of the *dissertatio*, Leibniz argues for two fundamental types of "variation", which he refers to as a kind of "change of relation". The two types of variation, "*complexion* and *situs*", both "belong to metaphysics, or to the science of wholes and parts" (Leibniz 23). *Situs* "is the location of parts", which can be "absolute" or "relative" (ibid.). *Situs* concerns "variation" in the sense of "order" (ibid.). *Complexion*, meanwhile, "is the union of a smaller whole within the greater" and thus concerns how "the variability of a complex [can be brought into union]; for example, 4 things can be put together in 15 different ways" (ibid.). The implications of this consideration of relationships for metaphysics informs the praxis of later generative artists, especially those who argue for the autotelic aesthetic of systems. Generative authorship becomes a filtering of the tension between *complexion* and *situs*, shaped by the author's critical reflection and narration of this tension and its emergent capacity. Thus, due to the widespread ramifications of combinatorics as a field of study *and* Leibniz's removal of content from his combinatory analysis, his approach is latent in most, if not all, subsequent approaches to generative art.

In terms of the direct influence of Llull and Leibniz's combinations on literature, Jonathan Swift's *Gulliver's Travels* (1726) directly represents the Llullian *ars magna* in the Laputa section of the novel (Part III). Here "The author" meets with a Laputan intellectual who argues for the combinatorial structure of knowledge, expressed by a logical machine called "the frame":

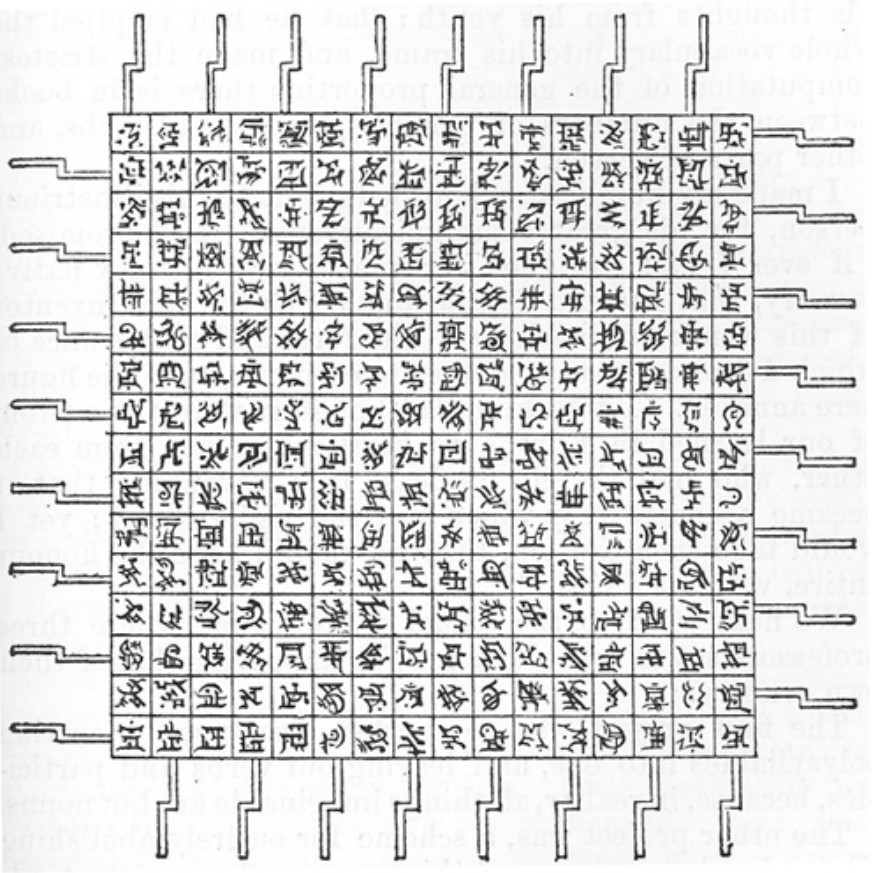
> Perhaps I might wonder to see him employed in a project for improving speculative knowledge, by practical and mechanical operations. But the world would soon be sensible of its usefulness; and he flattered himself, that a more noble, exalted thought never sprang in any other man's head. Every one knew how laborious the usual method is of attaining to arts and sciences; whereas, by his contrivance, the most ignorant person, at a reasonable charge, and with a little bodily labour, might write books in philosophy, poetry, politics, laws, mathematics, and theology, without the least assistance from genius or study (Part III, Chapter 5).

Directly alluding to Llull's 'thinking machines', this sequence likewise parodies the sweeping ramifications of Leibniz's mathematical combinations. Immediately after first viewing the frame, the author and the intellectual observe while

> at [the intellectual's] command, took each of [the intellectual's students] hold of an iron handle, whereof there were forty fixed round the edges of the frame; and giving them a sudden turn, the whole disposition of the words was entirely changed. He then commanded six-and-thirty of the lads, to read the several lines softly, as they appeared upon the frame; and where they found three or four words together that might make part of a sentence, they dictated to the four remaining boys, who were scribes. This

> work was repeated three or four times, and at every turn, the engine was so contrived, that the words shifted into new places, as the square bits of wood moved upside down (ibid.).

The intellectual proceeds to show the author a "folio" of "broken sentences, which he must intend to piece together, and out of those rich materials, to give the world a complete body of all arts and sciences" (ibid.). As Swift's playful ribbing of the notion of a 'complete body' generated by this randomized language machines shows, Llull and Leibniz's influence not only applies to mathematical or mechanical combinations, but likewise concerns the selective and combinatoric quality of linguistic expression as well[61].



[61] For further discussion of this connection between Swift, Leibniz, and Llull, see Jonathan Gray's "'Let us Calculate!': Leibniz, Llull, and the Computational Imagination" in The Public Domain Review.

Figure 2.4—"The frame" from Swift's *Gulliver's Travels*

This linguistic notion of generativity becomes especially clear in the case of French novelist, poet, and playwright Raymond Roussel (1877-1933)[62][63]. Roussel famously devised a generative system unique to each of his works that readers completely failed to notice. Realizing that his work might never be understood, Roussel composed the essay "How I wrote Certain of My Books". Throughout this essay Roussel explains his "evolved procedure" which involves "the transformation of a sentence into another one, meaning something completely different but which nonetheless preserves much of the original's phonetics" (Ruiz 120). As Pablo M. Ruiz argues, "the importance of Roussel's method of composition for the history of literature is undeniable: for the first time in the evolution of narrative forms there is a strictly *language-based causality* presiding over the development of the facts in the story" (ibid., my emphasis). In Roussel's novel *Locus Solus* (1914), for example, readers are lead through rooms filled with extravagant and eccentric inventions which are images generated by Roussel's system[64]. These rooms are not derived from any kind of action in the plot, but rather through homophony and linguistic fluidity: as Roussel claims,

[62] While the transition from Swift to Roussel glosses around 150 years, there *are* potential examples which could be discussed here, including the influence of Arthur Schopenhauer's conception of representation as the 'objectification' of 'will' in *The World as Will and Representation* (1818) or Friedrich Nietzsche's later "eternal return" or "eternal recurrence," first discussed in *The Gay Science* (1882) but revisited in *Thus Spoke Zarathustra* (1883). These have not been included for the sake of space.

[63] Another interesting example of generative thinking could be the conception of *symphilosophy* and *sympoetry*—the fusion of two complementary figures or works which, when compounded, would produce a romantic ideal (be it a poet, a poetic work, or a philosophy). This notion is discussed more closely in Tzvetan Todorov's *Theories of the Symbol*, particularly in Chapter 6 ("The Romantic Crisis") where Todorov outlines the radical shift found in Jena Romanticism, particularly in the collaborative thinking of the Athenaeum group which consisted of Novalis, A.W. and Friedrich Schlegel, and F.W.J. Schelling. This shift involves a rejection of classical conceptions of mimesis, rather emphasizing production and artistic synthesis required to produce an 'autotelic' work of art which transcends nature because "imitation in the arts resides, if anywhere, in the activity of the creator. The artist, not the work, copies nature, and he does this by producing works" (153). By extension of this Romantic notion of production, perhaps, does the generative system attain its romantic capacity for autonomous, emergent, productive construction.

[64] See: Michel Foucault's *Death and the Labyrinth: The World of Raymond Roussel* and Mark Ford's *Raymond Roussel and the Republic of Dreams* for closer examinations of Roussel's life and method.

> This method is, in short, related to rhyme. In both cases there is unforeseen creation due to phonic combinations.
>
> It is essentially a poetic method.
>
> Still, one needs to know how to use it. For just as one can use rhyme to compose good or bad verses, so one can use this method to produce good or bad works.
>
> *Locus Solus* was written in a like manner. But there I hardly ever used anything but the evolutionary method. That is to say, I drew a series of images from the distortion of some random text […]. The method did make a reappearance in its original form with the word *demoiselle* considered in two different senses; furthermore, the second word itself underwent a distortion to link it up with the evolutionary method:
>
> 1. *Demoiselle* (young girl) *à pretendant* [suitor]; 2nd. *Demoiselle* (pavior's beetle) *à reître en dents* [soldier of fortune in teeth] (16).

In *Locus Solus*, the narrative situations found in each room are generated entirely "from inside the text, from the words, their relationships, their interplay" (Morrissette "Postmodern Generative Fiction" 4), meaning that in Roussel's method language itself functions both as a linguistic *and* a situational generator. In both *Locus Solus* and his earlier work, *Impressions of Africa* (1910), Roussel utilizes homonymic puns which "enabled him to fuse narrative and language into an indivisible whole" (Ford 2). *Impressions of Africa*, for example, was inspired by Roussel's playing with two alike, though meaningfully distinct words (which he refers to as being "reminiscent of metagrams") when he was a youth:

> *billard* [billiard table] and *pillard* [plunderer]. To these I added similar words capable of two different meanings, thus obtaining two almost identical phrases […]: 1. *Les lettres du blanc sur les bandes du vieux billard*… [The white letters on the cushions of the old billiard table] and 2. *Les lettres du blanc sur les bandes du vieux pillard*… [The white man's letter on the hordes of the old plunder…]'" ("How I Wrote Certain of My Books" 3-4).

By way of this metagrammatical punning, Roussel found "both the beginning and the end" (Murray, "How to Isolate the Infrathin" n.pag.) of his stories. The problem of writing became a matter of resolving the sliding significations of these two phrases and the situations they both produced (Roussel, "How I Wrote Certain of My Books", 4).

Notably, Roussel's narrative situations are exclusively generated through such linguistic experiments. As Surrealist and Roussellian scholar Michael Leiris observed, "[it] seems likely that the outside world never broke through into the universe [Roussel] carried within him" ("*Le Voyageur et son ombre*" 34-35). For Leiris, this corresponds to Roussel's personal life: though he would often travel to different countries, he rarely emerged from inside his portable camper. So, although Roussel travelled to various locations, including Tahiti, he proudly never stepped foot outside. As many critics—including John Ashbery and Michel Foucault—have noted, this biographical detail is an apt description of the experience of reading Roussel's works due to Roussel's linguistically hermetic system. In this sense, the author's personal attitude contributed to the way the hermetic system operated and reflected on the artwork[65]. Interestingly, this "hermetic" quality of Roussel's work has led to his work being considered deeply "hermetical", itself a provocative slide of language which might explain the relative obscurity of

[65] Or, put differently, the author "figures" in the work no matter how indirectly.

Roussel's work in his own lifetime. Notably, this alignment of Roussel's hermetic and hermetical system is not without its serious supporters: André Breton, for example, made "a convincing case for Roussel as an alchemist whose books are coded messages concealing le grand oeuvre—the Philosopher's Stone" (Ashbery, xxii). It is in this sense that Roussel's works prove to be a prime example of the "proliferative" relationship between linguistic and situational (and, thus, narrative) generators in literary contexts (Morrissette "Postmodern Generative Fiction" 4), while also suggesting that literary generativity is often built on personal, secretive, and potentially "alchemical" relationships between author, language, and narrative[66].

Roussel's example is, in many senses, a unification of the primary tensions that have influenced and continue to influence generative artmaking historically. The author's overarching vision informs and filters the systematic structure latent in the work, which ultimately requires careful audience engagement to discern. Debates over whether the audience should be exposed to this hidden system before they read the work or not is one of the predominant concerns in 20th century generative theory, especially in the Oulipo's formulation of artistic *constraint* and in the theoretical discussion of generators in the *nouveaux roman*. What Roussel's system shows is that in a rhetorical situation where the text demands systematic interpretation alongside an examination of the diegesis itself, the narrative situation evolves to incorporate author, system, and reader across the various narrative levels of the work. Roussel's generative approach to language—even if it appears deeply hermetic—produces emergence in the form of narrative situations wherein the role of the reader is re-defined because they trace this linguistic emergence while experiencing it as narrative situations. Thus, in Roussel's oeuvre, the generative notion of structure reflects the ongoing development and dialogue of generative theory's primary concerns:

[66] It is important to briefly note that Raymond Roussel was born only four years after Alfred Jarry, whose 'pataphysics plays a major role in the later formulation of 20th century generativity, especially given his influence on the Oulipo. I have briefly outlined Jarry's poetics and his approach to figuration in the preface to this dissertation, a discussion I've not repeated here for the sake of space.

authorship, audience agency, and emergence, each of which is likewise represented throughout the history of generative art and theory in various guises.

Generative Movements in the 20th Century: On the Tension Between Scientific Objectivity and Artistic Subjectivity

As previously stated, the narrativity of generative systems is a byproduct of the productive tension between authorship, agency, and emergence; as such, this demands deeper attention be paid to the historical development of generative art theory, namely because texts, media, and narrative approaches have become deeply entangled in the digital environment we find ourselves in today. Though it can be increasingly difficult to determine matters of meaning, intention, or motivation in any artistic or communicative process, these topics are increasingly critical for interpreting generative artworks and developing an aesthetics of generativity in practice. Thus this diachronic examination of generative art theory has necessarily included a summary of a variety of generative approaches and will now be resolved by examining three 20th century movements which have strongly influenced discussions of generativity in literary and computational contexts today: the OuLiPo, the Nouveau Roman, and the New Tendencies. These three movements represent pivotal and problematic turns in contemporary generative art praxis, which again show certain alignments along the lines of problems of authorship, audience agency, and textual-interpretive emergence. Correspondingly, the influence of these movements is evident across the entirety of this dissertation, with certain explicit connections drawn in the analysis of each of my object texts.

While many contemporary generative artists—especially those who claim to create "pure" generative artworks—focus predominantly on meta-artistic problems around authorship and systems, this is both a veiled attempt to move away from subjective, biased, or politicized artmaking and, at the same time, a purported move toward more objective, technological, and detached—more scientific—

approaches to artmaking. The prioritization of a technical, technological, and scientific artwork is consistently alluded to in contemporary examples, proving a fundamental tension in both the literary and the computational theories of generative artmaking. This tension is essential for understanding the debates regarding objective and subjective artmaking found in the combinatoric poetics of the Oulipo, the generative novels of the Nouveau Roman movement, and the informational aesthetics of the New Tendencies movement. In each of these groups, the generative system operates as an 'objective' means of discovering novel forms, unknown topographies, and unexplored social values which the author can then filter accordingly. At the same time, the system constrains and unveils, through its objectivity, formal operations which can subsequently produce novel content to be explored by the author and the audience together.

Questions of objectivity and subjectivity are representative of the tension between questions of authorship, system autonomy, and audience agency. To elaborate on this tension, I examine each of these three movements as being divided into two distinct, though theoretically contingent phases which fall along the continuum of objectivity and subjectivity. To these ends, each of these movements begins with a more idealistic, audience-focused notion of the system as a deferral of the author before ultimately theorizing the re-emergence of the author as the authoritative decision-maker, either because they design the system and curate its potential for audience interaction or because the author actively intervenes and disobeys the system's constraints, rejecting its chosen outcomes and imposing authorial decisions in spite of the outcomes offered by the system. This trend culminates in contemporary discussions of computer generative art, where the audience is often disregarded in favour of metatextual discussions of authorship and system autonomy. I argue that this is a direct byproduct of the conception of generative systems as making room for more subjective responses beyond the author's purview and, later, for allowing greater authorial control in response to these subjective responses. Thus, in the Oulipo,

Nouveau Roman, and New Tendencies, the presence of the generative system and the newly-activated audience produces a parallel fixation on problems of authorship in light of the presence of the generative system and the active audience.

For example, the Oulipo stakes a claim on the problems of authorship in literary contexts through the extreme application of mathematical and linguistic constraints, which simultaneously defer the author's decision-making while affirming both the agency of the audience and the emergent capacity of these constraints. The Oulipo's model is also built around constraint as the generative tension between linguistic reduction and proliferation: "[in] OULIPO, often original literary material becomes the operative material for a new work through the application of a rule-based abstraction process—through a conceptual machine or process that enables a path of generative abstraction for the current author or interactant" (Seaman 424). In this sense, the Oulipo focuses on the problem of rule-based, mathematical constraint as a means of producing literature as an "exploration of virtualities" (qtd. in Motte 36). These virtualities are produced as a result of the "paradoxical effect of constraint, which, rather than stifling imagination, serves to awaken it" (ibid.). These virtualities are produced by the independence of an objective, scientific, or technological system which—being both nonhuman and autonomous—would be able, as Oulipo member Marcel Bénabou observes in "Rules and Constraint", to "propose an as yet undiscovered mode of organization for linguistic objects" (ibid., 38).

As Dennis Duncan outlines, the divergent approaches taken by the Oulipo's first and second waves can be divided into two main camps: the earlier Oulipo—built around the mathematical-literary experiments of Raymond Queneau—and the later—around the novels of Georges Perec (79). These two poles correspond to two distinct theoretical emphases: the earlier in a "rigid structuralism", and the second in "a looser approach [to constraint] based on the exception to the rule, from the death of the author to his reincarnation" (ibid., 94). The first period begins with the formulation and application of

strict mathematical constraint, best exemplified in Queneau's famous work *Cent mille milliards de poèmes*. This text

> consists of ten sonnets printed on ten successive pages, which are slitted between the lines of verse. The sonnets all have the same rhyme scheme and basic syntactic structure, so the first line of any of the ten initial or 'parent' sonnets can be combined with any of the third lines, and so on. There are 10 x 10 = 10(^2) = 100 combinations of all the lines, which makes, in total, a hundred thousand billion poems (Andrews 3).

In these sonnets, the proliferative potential of mathematical constraints emphasizes "procedural writing […] as a method of suppressing the authorial subject, in order to allow 'language itself' to speak" (ibid., 85). Constraints remove the author from the work, rendering them into a kind of abstraction, prolonging the work into a mathematical infinitude—indeed, Queneau famously reflected that it would take "200 million years" (*Cent mille milliards de poèmes)* to read every possible combination of lines—that generates itself through interaction with the reader, whose reading renders the work concrete. Thus,

> when Queneau spells out precisely how many millions of years it would take to read the work in its entirety, what is being put to us in no uncertain terms is the notion of *agency without authorship*: the intention in any of that work's 10^{14} sonnets simply cannot be laid at Queneau's door—it would absurd to think otherwise. Creating a literature machine is not the same as authoring every work the machine may produce. Rather, an external, secondary agency is being conjured up by means of the interplay between the system of the flipbook and the syntax which determines that

> an utterance will be coherent even if no-one has yet uttered it (Duncan 85, my emphasis).

As such, the earlier period of the Oulipo is referred to by the group's co-founder, François Le Lionnais, as the "syntactic Oulipo", namely because the group focused on producing mathematical machines for the ongoing production of literature which could be given to readers, who could produce their own works by using these machines.

Conversely, Duncan argues that the later Oulipo moves towards a "semantic" approach (ibid.) to constraint. In particular, this transition is reflected in Georges Perec's Roussel-ian, lipogrammatic novel *La Disparition*, which puts into practice the notion that **linguistic generativity produces narrative situations**. Around the same time, Italo Calvino resituates the procedural author's intentionality through his reimagining of the concept of *clinamen*, the authorial swerve within the generative system. While *clinamen* was theorized by the syntactic Oulipo as an authorial resolution to the puzzling problem of composition—a matter of craft more than of content—, for Calvino the authorial function is given a new dimension as "the concept of the agency of the letter begins to share space with a rehabilitated author-subject, the writer with something to say" (ibid., 86). Through Calvino's reinterpretation of earlier Oulipian notions of *clinamen*, the earlier Oulipo's prioritization of mathematics and the active audience is replaced by the author's capacity for swerving away from the textual system, resolving authorial problems independently of the system despite its constructive, autonomous capacity to resolve these problems *without* authorial filtering. For Calvino and other second wave authors, the generative system initially constrains the author's repressive, authoritarian function and instead prioritizes the "reader's unconscious", which "endows the text with meaning" (ibid.). This constraint, however, is merely a means by which the author frees themselves from the manual labour of composition: the decision-making is ultimately and inevitably decided by the author-as-filterer. Regardless of the objective

application of constraints, the original decision to implement a generative system *and* the subsequent filtering of the system's outputs are historically, subjectively, and culturally contingent upon this conception of the author as one who has "something to say" regarding their own works.

For Duncan, this tension between rigid constraints placed upon the author by the autonomous textual system and, eventually, upon the loosening of these constraints to allow the author to intervene in how the system unfolds, reflects the tension between Llullian and Lucretian influences on the Oulipo. Duncan concludes that Llull and Lucretius must be considered as primary generators for the first and second wave of Oulipean thought, respectively, with both functioning "as representatives of opposing approaches to constraint and creativity. Llull characterizes the reader-oriented, highly structuralist tendencies of the Oulipo's early period, while Lucretius represents […] the author's capacity to write himself into his work" (ibid.)[67]. Nonetheless, the early period of the Oulipo and its later swerving towards re-affirming the author's intention through *clinamen* are best thought of as contingent steps in a process of theorizing the relationship between author, system, and audience. In this sense, Perec and Calvino are perhaps best conceived of as transitional figures.

For example, upon closer examination of Perec's utilization of the lipogram in *La Disparition*, the transition from syntax to semantics is expressed in the productive transition from linguistic to situational generativity. Regarding the technical elements of generative literature, Bruce Morrissette argues that linguistic generators influence language itself as a means of either "reducing" or "proliferating" language's intrinsic expressiveness or 'depth'[68]. The lipogram is a deliberate "suppression of the letter, of the typographical sign" (Perec 107) which "forces the system [of language] out of its routine function, thereby compelling it to reveal its hidden resources" (Bénabou 41). Another

[67] As I have argued, this process can even be observed within the corpus of Llull's own generative texts as the tension between authorial filtering and audience comprehension.
[68] Interestingly, many of the primary examples of contemporary linguistic generativity discussed by Morrissette are aligned with the OuLiPo.

example can be found in the pairing of "near-homonyms" of Raymond Roussel or the constellatory "swerves" of Alfred Jarry, both of which replace or remove a single typographical sign as a means of revealing the paradoxically hermetic and potential-oriented nature of language itself. Therefore, the inherently generative structure of these linguistic operations—lipograms, puns, and homonymic pairings—generate narrative situations. As Morrissette argues, situational generators in literary contexts are often directly derived from "[patterns] related to numbers, letters, syllables, and words—that is, *linguistic generators*" ("Postmodern Generative Fiction" 4, my emphasis).

La Disparition[69] utilizes the lipogramatic "suppression" of the vowel 'e' both in the linguistic and situational aspects of the novel: the vowel never appears in the text, while the plot of the story concerns a group of people searching for their missing friend, the aptly named Anton Vowl. Thus, the primary narrative situation—the search for the missing A. Vowl—is generated by the linguistic suppression, which recursively mirrors the situational one. While the novel's setting—the politically tumultuous Paris of Perec's lifetime—is depicted as "a void" with something mysteriously missing, the novel's social dilemma is expressed by way of a metaphysics of endless combination. In the novel's opening chapters, which concern Vowl's insomnia and eventual disappearance, Vowl's "mind runs riot" as he sits and stares into a patterned rug on his floor:

> Vowl starts imagining 5, 6, 26 distinct visual combinations, absorbing but also insubstantial, as though an artist's rough drafts but of what?—that, possible, which a psychiatrist would call *Jungian* slips, an infinity of dark, mythic, anonymous portraits flitting through his brain, as it burrows for a solitary, global signal that might satisfy his natural human lust for signification both instant and lasting, a signal that might commandingly

[69] Which translates into English as *The Disappearance*, though the English title for the book is the pun *A Void*.

> stand out from this chain of discontinuous links, this miasma of shadowy tracings, all of which, or so you would think, ought to knit up to form a kind of paradigmatic configuration, of which such partial motifs can furnish only anagrams and insipid approximations (5).

As the metaphysical fixation of Vowl shows, the ramifications discussed by Ramon Llull (and, later, Leibniz) prove to be of significance in a variety of realms beyond pure mathematics or artistic technique. They are, perhaps, intrinsic to the generative artistic praxis even in the case of a linguistically reductive system like the lipogram. In this sense, the linguistic generator produces a similar reduction in the diegetic situation it expresses, generating content as a result of authorial manipulations form. This linguistic generation of narrative situations is taken on by other authors, including Italo Calvino, whose works expand the notion of constraint to include a wide variety of signs: for example, tarot cards as storytelling devices in *The Castle of Crossed Destinies*; scientific formulae as characters and narrative situations in *Cosmicomics*; and the fluid notion of the city in *Invisible Cities*.

Much like Llull's generative approach was deeply informed by his cosmological and spiritual convictions, Lucretius's atomistic conception of nature is likewise appropriated by the Oulipo. In particular, the Lucretian notion of *clinamen*, the 'swerving' of atoms as they descend in space, is crucial for Lucretius's vision of the underlying generative potential of an atomistic universe. Thus, for the Oulipo the tension between the mechanical generativity of Llull's *ars magna*—dogmatically prefigured and heavily redacted to better suit the ideal audience—is suggestively met by the Lucretian depiction of the atomistic cosmos. As Lucretius outlines in *De Rerum Natura*,

> [another] basic principle you need to have a sound/ Understanding of: when bodies fall through empty space/ Straight down, under their own weight, at a random time and place,/ *They swerve a little*. Just enough of a

> swerve for you to call/ It a change of course./ Unless inclined to swerve,
> all things would fall/ Right through the deep abyss like drops of rain.
> There would be no/ Collisions, and no atom would meet atom with a
> blow,/ And Nature thus could not have fashioned anything, full stop
> (Lucretius, *The Nature of Things*, lines 216-223).

This line of thinking is expanded upon by Calvino, who famously theorized the idealized "literary machine" in his essay "Cybernetics and Ghosts", which was written earlier in his tenure as a member of the Oulipo. As stated above, for Calvino and the earlier Oulipo, the application of objective systems allows authors and readers to engage in the human unconscious, "the ocean of the unsayable", which communicates "in dreams, in verbal slips, in sudden associations" by the means of "borrowed words, stolen symbols, linguistic contraband" ("Cybernetics and Ghosts" 19). For Calvino, because the generative system is somewhat-autonomous it challenges "repression and taboo", both of which "form the mechanism by which [meaning] is consigned to the unconscious" (Duncan 99). Generative systems produce or generate surprising alignments—theorized as a kind of *clinamen* in itself—as a means of shifting emphasis from the agglomerated, repressed, and taboo aspects of language and myth by means of imposing a system which operates independently from the author's intervention, producing chance alignments through the interaction of author, system, and reader.

This system is then filtered by the author as a means of imposing their free will on the artwork, expanding the textual system beyond its constraints through slippages. As Jacques Roubaud argues, these slippages are a byproduct of the *clinamen*, which "is an intentional violation of constraint for aesthetic purposes": these violations "[presuppose] the existence of an additional solution that respects the constraint and that has been deliberately rejected" ("Combinatorial Art" in Motte 43-44). The tension between system and authorial decision-making produces concrete solutions to the artworks' problems,

both in the form of the initially freeing and subsequently imposing force of the generative system. The system challenges the decision-making power of the author, while never fully overcoming it. Conversely, the system provides 'solutions' to the problems of authorship as a replacement for the unreliable and romantic conception of inspiration so crucial for theories of the author as an individual creative genius. As such, the concept of *clinamen* is both a valorization of the objective force of systems and a means by which, as Claude Berge outlines in his "For a Potential Analysis of Combinatory Literature", "the aid of a computer [and by extension any mathematical or mechanical system], far from replacing the creative act of the artist, permits the latter to liberate himself from the slavery of a combinatory search, allowing him also the best chance of concentrating on this 'clinamen' which, alone, can make of the text a true work of art" (Motte 61). In this sense, the Oulipian conception of authorship through constraints transitions into a formulation of authorship as the process of liberating oneself from these constraints by way of the authorial swerve.

Moving from the Oulipo to the Nouveau Roman, we again see that the tension between authorship, generative system, and audience agency. In the case of the Nouveau Roman, this involves a direct invitation to a new kind of audience by means of an object-centric, topological approach to narration, most notably in the works of Alain Robbe-Grillet. In Robbe-Grillet's novels the external world of objects is narrated but not psychologized, meaning that a singular perspective is never imposed upon them. Rather, these entities function first as objects with their own spatial and temporal existence, meaning they function as objects of human perception (and projection) only after their objectivity has been established. The reader must first observe the physical object as a surface with no discernible internality, one which constantly changes depending on the observer's perspective. Thus, Robbe-Grillet's novels are often considered topographical and topological in that they are primarily comprised of surface-level descriptions of objects from different vantages, each of which contribute to orient the

reader within the literary world presented through the narration. As a result, the reader's subjective projections are revealed as arbitrary, secondary impositions on the object from outside of it. The reader, as a result of this 'object-focused' literature, is activated inasmuch as their own expectations and projections formulate much of the novel's narrative content. This generates Robbe-Grillet's model of readership as an active, co-creative process of construction. These projections of human subjectivity are necessarily contingent, relativistic, and subject to change depending upon one's perspective:

> The reader of novels inspired by this new attitude is not treated to the hectorings of authorial rhetoric, but expected to co-operate with the writer of the joint elaboration of a world which is open to infinite development by the reader's imagination. His activity is therefore creative, prolonging that of the author (Fletcher and Calder 22).

Robbe-Grillet's earlier theories of the new novel eventually produce a second period, often referred to in critical literature as the *Nouveau Nouveau Roman* (New New Novel). This second wave is almost exclusively represented by the works of Jean Ricardou. While Robbe-Grillet's fiction tends to prioritize "writing […] as an activity of working with materials, [where] the events that 'produce' a story are linguistic ones" (Higgins 7), Ricardou's later work is "an erotics of theory" in which the work of fiction elaborates the theoretical concepts which informed the work's production (ibid., 21). For Ricardou, the novel is a formal expression of the theories which motivated its construction, a generated particularity of the system itself which produces its own inner relationships. In part, this is related to the fundamental tension in Ricardou's theoretical understanding of the novel as "the struggle between two basic vectors, "the 'ideological' and the 'generative'" (Dickmann 23). While "ideological forces attempt to subjugate the text to totalizing ideals", "the generative vector […] concerns the literal or material level of the text, the medium through which the universe is communicated or created: the letters, the

words, even the ink" (ibid., 24). Put simply, the ideological forces are the duplications of conventions found in other texts or in conventional representations of the 'real' world. Representations of this kind are taken-for-granted images which contribute to the conception of the novel as a coherent genre or the vision of the world as likewise generic and understandable. Conversely, generative forces enable the work to emerge as a unique object produced by the system itself. Thus,

> If meaning comes from a relationship, then the abundance of similarities and symmetries in the work's arrangement of the referential dimension must have many semantic consequences. The central text is overtly presented, by its conspicuous simplicity and systematic rigor, as a 'machine' to produce certain implicit meanings (Ricardou, "The Population of Mirrors", 64).

Because the generative system produces the 'central text', "Ricardou's narrative devices—description, metaphor, *mise en abyme* and anagram" produce the "illusion that the text can be accounted for in terms of its structural and linguistic raw materials […]: the text is ostensibly 'generated' from a *jeu de mots*, a metaphor, a series of anagrammatic transformations, or from microcosmic interior duplications of the larger containing work" (Higgins 15). This reliance upon raw materials of description, as Seymour Chatman observes in *Story and Discourse: Narrative Structure in Fiction and Film*, means the 'New' New Novel relies upon an "impersonal narrative style" in which "description […] becomes dominant" (169). This more dominant role of description allows "the writing [...] to take over from the author (or implied author), becoming autonomous, or […] *scriptural* […]. Rather than starting with some previous conception and putting it into words, the convention is that the pen traces the lineaments of things on its own. Things depicted in this flat way are emptied of human significance; they become mere functions of the writing" (Higgins 15). This descriptive flatness initiates the "decipherment activity required of the

reader", who must discern which generative system has been used to produce the novel. In this sense, "Ricardou's entire theoretical apparatus […] is usually more accurately seen as a description of modes of *reading*" (ibid., 8) in that "his novels and 'nouvelles' are replete with theoretical frameworks and elaborate metafictional clues to guide the reader, often cast as a detective or questing voyager" (ibid., 1). The hunt for clues on the reader's part implies a meta-narrative impetus that intimately relates author, audience, and work. Thus, in both phases of the *nouveau roman*, the emphasis on authorship and writing is clear: "writing is seen as an activity of working with materials, and the events that 'produce' a story are linguistic ones. The phrase 'textual production' underlines the primacy of work with language over ideas of expression, creation, inspiration, and imitation of reality" (ibid., 7). In both phases the *nouveau roman* demands and theoretically prefigures a new type of reader who observes the work of the text through the explicit revealing of its materials, the objects and situations produced directly through the working of language which are then subjectively re-arranged to produce narrative situations emergent to each reader.

The *nouveau roman* movement, at the same time, situated itself as an "objective" literature which defied the more subjectivist and romantic tendencies in French literary circles. The foremost of these tendencies was found in the notion of "committed literature" or "*littérature engagée*", which arose in the post-WWII period and culminated in Jean Paul Sartre's famous essay "What is Literature?" (Fletcher and Calder 13). Committed literature arose because "France suffered […] severe shocks: the collapse of her army and occupation by the enemy realized in concrete terms the imprecise fears of the uneasy peace" founded in the aftermath of the first World War (ibid., 12-13). This emphasis on commitment—which manifested as resistance and subversion, literature's primary means of influencing political and social realities beyond the artwork—produced a predictably reactionary overcorrection in the "objective" and "detached" literature of the *nouveau romanciers*: "quite suddenly, around 1950, it

began to be felt that *littérature engagée*, with its rash claim to be able to alter life rather than simply reflect it, was too simple and naïve" (ibid., 14). As such, the *nouveau roman* movement constructed literary works aimed at removing subjective or psychological forms of narration, instead emphasizing the polyvalence of perspective and the objectivity of objects independent of human sensation and relationships: "The new novelists [believed] that it is quite legitimate for the novel, like the mind, to stretch, abridge, shuffle and repeat, with or without variations, any particular occurrence or event" (ibid., 21). The tension between the variance and invariance of perspective, purportedly, allowed Robbe-Grillet and other *nouveau romanciers* the ability to develop new artistic forms which better illustrated the function of art as a kind of discovery: as Robbe-Grillet argues in his 1956 essay "The Use of Theory", "the function of art is never to illustrate a truth—or even an interrogation—known in advance, but to bring into the world certain interrogations (and also, perhaps, in time, certain answers) not yet known to themselves" (Robbe-Grillet, *For a New Novel* 13). Thus, the deferral of authorial commitment produces a more committed reader, while at the same time generating situations which are more objective in that they are produced by the unknown or emergent properties of generative systems themselves.

Similarly, members of the New Tendencies movement also theorized that an artwork's adoption of mathematical, scientific, and mechanical systems could produce a kind of objective discernment, which was likewise posed as a form of discovery. Thus, the group engaged in what they referred to as a kind of objective "artistic research". Formed in Sarajevo in 1961 and comprised of an international community of "mathematicians, engineers, physicists, and meteorologists", the New Tendencies sat with "art theorists, curators, and gallery owners" at workshops and expos. These theorists, curators, and gallery owners became the "spokespersons for the works produced by the scientists and presented them to the public […] as objects of art, as models for a future art form, or as examples of a new scientific image world that had emerged unnoticed in computer centers" (Rosen 9). This emphasis on modelling

the new image world emerging in light of the computer and technology originally lead the New Tendencies movement to distance themselves from "Abstract Expressionism and Tachism" (ibid., 10), both of which emphasized a kind of lyrical abstraction which was spontaneous and lacking in definite form.

As Margit Rosen examines, early members of the New Tendencies "espoused the idea of a demystified art whereby the irrational, unrepeatable creative act associated with the idea of the genius would be superseded and replaced by a methodically planned artistic practice that was to some extent oriented on procedures as used in science" (10). This demystified art was, ultimately, an effort to produce "a new art for an ideal democratic, industrialized society" (ibid., 11). Thus, the 'first wave' of the New Tendencies approached the systematic restructuring of artworks conceptually, economically, and materially, aligning the production and conceptualization of artworks with their eventual reception:

> The research artist would establish connections with society and its living conditions: by accounting in his work for knowledge from the natural sciences, and, not least, by utilizing the means of production which were far more frequently used in daily life than were oils, pigments, and canvas—plastic, Plexiglas, metal, wood, mirrors, or simple motors (ibid., 28).

This emphasis on natural science and materials borrowed from contemporary living conditions produced a theory of "programmed" art, art as a form of "research" which featured "both moments of control and freedom, namely randomness, [and thus] made the participation of the viewer possible, who would at the same moment fulfil the plan of the artist and serve as an element of chance" (Peter Weibel, "Digital Art: Intrusion or Exclusion?", in Rosen 46). This emphasis on the viewer was an attempt to re-orient the

traditional role of an artwork's audience, compelling "the viewer to end tranquil contemplation, which was considered passive and alienated, and to act" (ibid., 35).

The New Tendencies' earlier focus on "art as research" and "programmed" artworks eventually gave way to a critical tension formulated between the mathematical and informational aesthetics of German philosopher Max Bense and French philosopher Abraham A. Moles's essay "Experimental Aesthetics in a New Consumer Society". This "second phase" of the New Tendencies is, notably, much more concerned with the formulation of a quantifiable aesthetics derived from the mathematical and technical structure of an artwork—a concretization of the group's investment in 'art as research'. The group's fundamental association of democracy with machinery (and Romantic subjectivity with aristocratic privilege) proved even more "decisive for the history of the New Tendencies" after the introduction of computer-generated generative art. Taking these associations (Romantic subjectivity with privilege, Democracy with machinery), this later, more computational 'second wave' of the New Tendencies "did not construe the computer solely as the tool of analytical aesthetics, but as the means of a generative aesthetics; in other words, aesthetics which introduced the generation of works as scientific procedure" (31). The attempt at educating unknowing and passive audiences for the future ideal society shapes a new vision of the aesthetic of the 'reproducible copy'. Thus, in the "New Consumer Society" of the future (as Abraham A. Moles describes it), "frenzied competition for originality, and the rise of mass media-based civilization [have and will have] totally overturned the place of the work of art and the very meaning we accord it" (Moles, "Experimental Aesthetics" in Rosen 300). As a result,

> other qualities of the artwork emerge. Each of these qualities of the artwork is *statistical* in character: degree of filling up of the picture, originality of the material, level of perception, and unforeseen nature of the content. In the past, the idea of 'research' stood opposed to the idea of

> ‘completeness’ and the experiment stood opposed to the artwork. Today ‘research’ has merged with the artwork (ibid., 301, my emphasis).

As a result of this conflation of research and artwork, necessary for explaining the relationship between the artwork (as a copy) and the alienated consumer, the New Tendencies theorize a new vision of the artwork as a process or series of “artistic situations which, jointly with others, construct human life as a series of situations” (ibid., 302). As such, the group’s output changed significantly with the adoption of a computational, statistical, informational aesthetics. Eventually becoming more concerned with the promise and poetics of an ‘objective’ form of computer art as compared to the participatory, activated audience, the New Tendencies radically resituated the role of authorship as an authoritative positioning in favour of the informed, activated audience in their first phase. Eventually re-instating the author as a researcher and an aesthetician for the future society, this author became one whose primary metric was the ‘objective’ and ‘informational’ outcomes which only a scientized ‘art as research’ could produce.

Notably, the tension between an aesthetics of generative reception and the later informational aesthetics of the New Tendencies’ second phase arose from problematics associated with “the first phase of the New Tendencies” namely **because** they “had programmed objects and complete environments whereby the onlooker, who was then mostly referred to by the term ‘public,’ could explore the conditions of perception and experience himself as an acting subject” (Rosen 36). This focus on programmed environments which could instruct the onlooking, activated public “blanked out the mathematical-technical structure as completely as possible” (ibid., 36-37). Thus, while earlier descriptions of the artwork were crucially oriented around the “receiver” and problems of “perception”, for German philosopher Max Bense, the modern, “objective” artwork was itself the “carrier of an ‘aesthetic state’”. This state could be determined and described by means of a procedural, four-fold analysis: “[the] description of the ‘aesthetic state’ of an artistic object occurs in four phases, so that we

accordingly distinguish between *Numerical aesthetics*, *Semiotic aesthetics*, *Semantic aesthetics*, and *Generative aesthetics*" (Bense, "Aesthetics and Programming", in Rosen 296). Bense's information aesthetics is an explicit negotiation between George David Birkhoff's mathematical notion of "'aesthetic measure'"; C.S. Peirce's relational, triadic "semiotic models"; and "the information theory of Claude E. Shannon" (ibid., 296). Therefore, Bense's notion of an artistic object's "'aesthetic state'" is described as follows: "a state of 'order' (O) applying to a repertory of material elements of a certain 'complexity' (C). 'Order,' for example, comprises 'symmetries' that possess a maximum degree of 'purity,' whereas 'complexity' defines the 'degree of composition,' which is in principle inexhaustible" (ibid.). A "'singular order'", in this sense, is one which "yields *innovation*"; conversely, a "'general order' enables *identifications*" (ibid., 298). In this sense, then, "The 'aesthetic state,' a 'text,' a 'composition,' a 'graphic,' is construed as a 'structured set of elements,' and the 'entropy' of the 'structure' (that is, the 'mix ration' or 'degree of disorder') of the 'elements' […] is presupposed for determining 'order' and 'complexity'" (ibid.). That later generative computer artists observe audiences as contributing, to a certain degree, to the 'entropy' of an artwork's aesthetic state is thus explicitly derived from Bense's informationally objective, purified notion of generative aesthetics.

Thus, the New Tendencies movement represents the genesis of the computational turn in generative art theory. This turn is informed by both phases of the New Tendencies and their contingent conceptions of art's purpose in the world: despite the transformation of the group's earlier engineering-focused artworks, they eventually became increasingly preoccupied with generative environments and, later, virtual and computational spaces. Thus, the move from non-computational to computational generativity within the New Tendencies signals an adaptive attempt to prepare the contemporary world for the staggering technological changes implied by cybernetics and the encroaching computer's constructive, potentially domineering capacity for surveillance and control. While the first phase of the

New Tendencies focused on using art as a form of mass inclusion in post-industrial society, this involved minimal intervention with computers. Most of the outputs in the earliest meetings of the group were paintings made using machines, utilizing "common materials like metal and plastics, as well as motors, which were transformed into objects, many of which either moved mechanically in graceful slowness, or which could be manipulated by the 'viewer'" (Rosen 11). The capacity for these machines to produce 'objective' research results was, at the same time, a conscious effort to incorporate the public in their post-industrial, cybernetic, and generative future. By using materials experienced in daily life and incorporating the audience in the unfolding of the artwork, the group consciously attempted "to undermine the conditions existing between artist and public […]. Paraphrasing Immanuel Kant, it might be said that programmed art was the spectator's emergence from his self-imposed immaturity" (ibid., 36). Thus, the artwork's representational capacities could incorporate situations and themes of this material experience and produce a more awakened, even politicized spectator: "[with] their concept of the 'program' in the sense of an open structure that was dependent on the participation of the 'active' observer, the New Tendencies prepared the theoretical ground for computer-based interactive art, even if at the end of the 1960s it was not possible to verify these ideas by constructing interactive installations" (ibid., 48). As a result, many of the major concerns were tied to utilizing art that situated the audience in their daily life through the use of machines, which could now generate artworks on their own.

Around the midway point of the group's life—correlating to the radical social changes in 1968—this mentality shifted from these more politicized notions of audience activation towards art made with computers, radically altering the group's output. As Margit Rosen observes, this reflected a significant transition regarding the materials with which the art was constructed, if not a change in the group's aesthetic stance: the group's desire for an

> exact aesthetics was always more or less programmed, whether with or without computers. Programmed art without computers turned to art programmed on computers. The New Tendencies offered the unique occasion to confront these concepts with the actual machine that incorporated the new paradigm of information and control. 1968 marked a turning point for the reevaluation of the concepts of 'programming' and 'participation' in the arts. Both ideas and practices are defined by a new model of the artwork: control over the elements of an aesthetic system can be exercised by an artist but also by the audience (ibid., 48).

In both phases, therefore, the New Tendencies showed a conscious and consistent engagement with the subjective and objective poles implied in the term generative art—especially how these poles concerned the relationship between author, system, and audience.

Conclusion

It is clear this emphasis on 'objectivity' has deeply informed the aesthetics of contemporary generative art practitioners, whose prioritization on generative structure as a mathematical, computational, or technical matter now often disregards the active audience whose interpretation of the generative artwork was once the priority. Further, it is clear that the seeming-objectivity of generative systems is, inevitably, contingent and contextual. Though authors may not consciously impose their biases or cultural context onto the work of art, the original decision to apply generative theory is a historical one that does not express objective or concrete truths about the world, but rather deeply contextual perspectives about the nature of authorship, systems, audience perception, and so on. This is expressed in the fundamental tension between author, system, and audience in each of these examples: the Oulipo's notion of *clinamen* as an authorial intervention into the reader's unconscious is met by the

reader's interpretive decision-making in light of the constraints of the system and the author; the *nouveau roman*'s emphasis on objects and perspectives, which must be interpreted by the active audience as a means of resituating their relationship to these objects and perspectives; and, finally, the New Tendencies' attempt to produce scientific works that fulfilled the obligations of an "artistic research" while engaging the newly-formulated role of the active spectator who is simultaneously an agent in their own right *and* part of the author's systematic design.

As I have shown, in each of these movements generative praxis concerns the conceptual removal or de-centering of the author as the selective authority whose meaning overbears the text's potential significances. The audience plays a greater role in the production of significances because they can interact with the generative system. In this sense, whether one concedes that a generative artwork is designed by the system, the author, or the interaction between them, generative theory complicates the traditional idea of authorship as an active, authoritative figure instead leaving decision-making up to the system the author has designed. In this sense, contemporary generative art theory proves, in the very least, to be tied to the ongoing interrogation of the authorial function in generative artistic contexts historically.

As argued in the first chapter of this dissertation, the tension between computational and non-computational generative art naturally leads to questions regarding the theoretical and structural distinctions between the two, especially considering Bruce Morrissette's more syncretic notion of generative procedures operating across media. What changes, then, is the cultural context in which a generative procedure is adopted, the forceful direction it implies (be it toward the inside or outside of the artwork), and the concrete ecosystem that these procedures generate. Nonetheless, certain patterns can be discerned, as Morrissette's outlining of a more historical, technical, and artistically ubiquitous

generative theory reveals[70]. This involves attention be paid to several crucial figures who directly and explicitly influenced the development of generative art theory. Although these historical figures—especially Aristotle, Ramon Llull, G.W. Leibniz, and Raymond Roussel—are often acknowledged as crucial for the development of generative art *by generative artists themselves*, it is rather rare to see in-depth examinations of the theoretical commonalities these share regarding generative structures and artworks. Rather, generative artists and theorists tend to focus on the major developments in mathematical, scientific, and technological systems in the 20th century. This abstracts the influence of non-computational generative art on contemporary generative approaches to a significant degree. The problems of the computational form of generative art, being genuinely autonomous, are of an entirely different order and thus constitute the majority of the field.

To interrogate the influence of these historical figures, I have attempted to build a preliminary sketch of the theoretical conversation regarding generative approaches. Tracing these approaches has led from Aristotle's conception of *mimesis* to the 20th century emergence of computers as a major tool for the creation of artworks—admittedly, a broad and rather scattered range. I have concluded this sketch by focusing on the continuation of problems of authorship, agency, and emergence in three 20th century generative groups or movements, the Oulipo, the *nouveau romancier*, and the New Tendencies. Each of these movements based artistic theories and their eventual construction on mathematical or technological models of generativity. Crucially, the relationship between math, science, technology, and artistic praxis espoused by each of these movements has overwhelmingly contributed to current

[70] As has been shown throughout, Morrissette's claim is not necessarily unique in generative theoretical contexts. Rather, I emphasize it here because it is a useful example of a model for examining the narrative implications of this historical development both in earlier works (such as Shakespeare's play-within-a-play in *Hamlet*) and contemporary or postmodern works (such as Robbe-Grillet's topological, ludic, and 'objective' nouveau roman being built on *mise en abyme* and mythological situations).

understandings of generativity, both in literature and in video games. As such, I will now turn to three object texts to further examine how generative approaches have developed across these media.

Chapter 3—Mapping Figures and Figura in Julio Cortázar's *Hopscotch*

"*Shaped from without, as well as from within…But so is narrative*."

—Franco Moretti, *Graphs, Maps, Trees*, 57

This chapter discusses the generative system found in Julio Cortázar's *Hopscotch* (1966), focusing on the emergent relationships forged between author, text, and reader in the novel. This is done, first, by examining the novel's structure—its possible spatio-temporal configurations—and then modeling several ways in which this structure might be navigated or potentially altered by readers to produce emergent readings of the text. Most notably, *Hopscotch* is structured around its offering two reading approaches based on different chapter orderings, an explicit revelation of the generative system structuring the novel. The first book "can be read in a normal fashion [and] ends with Chapter 56, at the close of which there are three garish little stars which stand for the words *The End.* Consequently, the reader may ignore what follows with a clean conscience" ("Table of Instructions"). The second "should be read by beginning with Chapter 73 and then following the sequence indicated at the end of each chapter" (ibid.), which involves the reader jumping back and forth across the book's three sections. The choice of which order to follow is left to the reader, whose decision partially determines the novel's structure by re-organizing certain elements of the novel's sequence and producing alternative juxtapositions between the novel's plot and its "expendable" content. This suggests that alternative readings of the novel beyond these two options would likewise generate new structures.

To examine how—or even if—these rulesets generate two different novels, *Hopscotch's* two books are mapped conceptually and literally: first, the geometrical figures of the **hopscotch court** and the **mandala** are shown as the primary situational generators of the text, framing the two textual environments offered in the "Table of Instructions". Second, the authorial concepts of **figures** and **figuras** are discussed as two approaches for Cortázar's arrangement of the book's materials. These two

approaches prefigure two types of readers—what Cortázar describes as the "**female reader**" and the "**hector-lembra/reader-accomplice**"—whose readerly performances of the text are argued to generate two structurally distinct books. I will refer to these books as **Book One** and **Book Two** throughout[71]. To examine Cortázar's claim that "[in] its own way, this book consists of many books, but two books above all" ("Table of Instructions"), **GIS maps** and **stochastic blockmodels** are produced so the two books can be visualized and then contrasted. Mapping the two books allows one to visualize the concrete structural distinctions between them, ultimately showing that they are integral to one another: the process of reading Book One directs the reader towards reading Book Two.

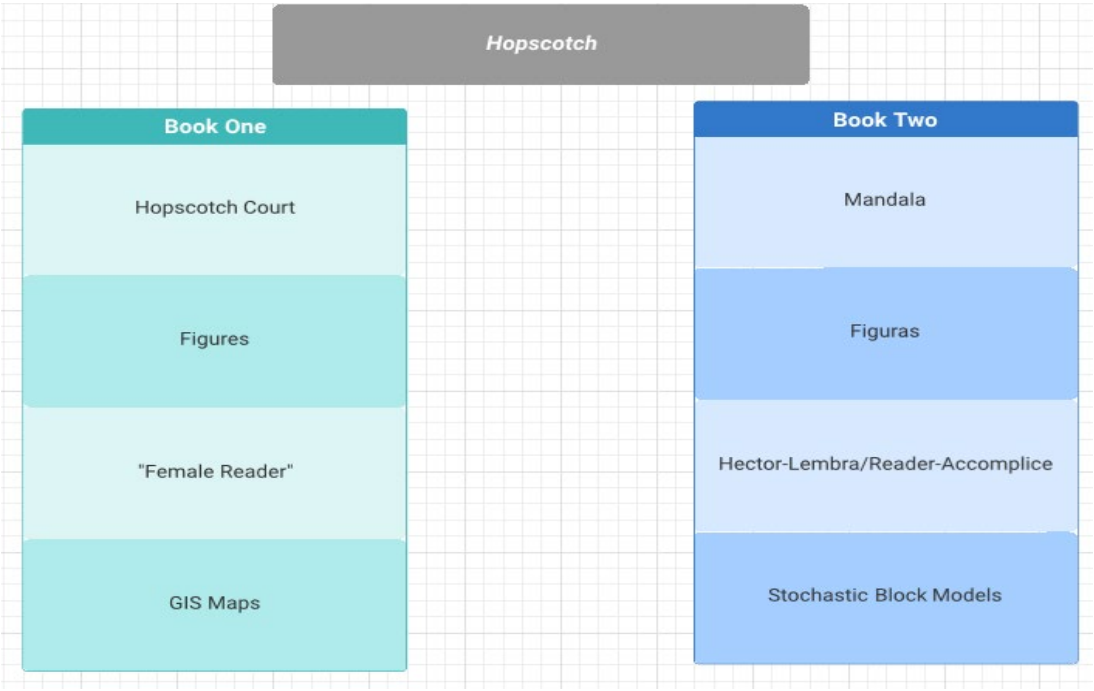


Figure 3.1—A table representing my "conceptual mapping" of Book One and Book Two of *Hopscotch*

In a series of lectures given on his literary works, *Literature Class*, Cortázar argues that *Hopscotch'*s writing was motivated by three concerns or conceptual levels: the first being the level of

[71] Other potential readings discussed are suggested, but not labelled.

"history"; the second being that of "language"; and the third being that of "the reader" (188-189). Cortázar argues that these levels are deeply interrelated: "if on the first level there is a critique of reality as we receive it through history and tradition, on the second level there is a critique of the means through which that reality can be expressed and communicated" (ibid., 189). Subsequently, these two levels are united in the reader (ibid.). When conceived of as a process, it becomes clear that Cortázar's historical concerns must be given conventional form in language to be expressible; at the same time, such forms remain empty without a reader to perform and engage with them anew when these conventions become rigid (ibid., 193-194)[72].

In Chapter 116 of *Hopscotch*, the fourth chapter of Book Two, a note from the mysterious author-character Morelli suggests this problematic, conventional relationship between history and language. The chapter begins with a quotation from Georges Bataille: *"Il souffrait d'avoir introduit des figures décharnées, qui se déplaçaient dans un monde dément, qui jamais ne pourraient convaincre"* (479)[73]. The allusion to unconvincing, "emaciated figures" directly ties Cortázar's critique of history to his critique of language in Book One, where the novel's protagonist Horacio Oliveira experiences deep angst because his life appears as "a mere play of illusions, of rules that are accepted and agreed upon, a deck of cards in the hands of an inconceivable dealer" (49). Horacio's "terrible nausea", which manifests as "anxiety, a feeling of the precarious, the false, especially the useless" (354), is a product of his feeling forced to live a life "without convincing rules" (Foster 105). Conventions to Horacio are hollow structures, ready-made figures which fail to meaningfully represent the world. This nausea is likewise expressed in Horacio's suspicion and ultimate rejection of conventional linguistic forms. For example,

[72] Interestingly, these three concerns might be conceived as being the broader concerns of narrativity examined in this dissertation; the metaphysical quality of combinatorics, the proliferative and situational quality of language, and the ecosystemic nature of generative approaches appear to be shared concerns for most examples of generative authorship more broadly.

[73] "He suffered from having introduced emaciated figures, moving in a demented world, that could never convince."

Horacio refers to the dictionary as the "cemetery of language" (230). The stagnancy of language's hollow structures, as expressed by the dictionary and its fixation on conventional meanings, fails to adequately represent the modern world which has evolved beyond language's ability to represent it. Rather than conventional meanings, therefore, *Hopscotch* demands that readers determine their own values through novel combinations of the text's narrative sequence, orienting themselves within the textual world based on what they deem significant to produce novel, emergent or unconventional combinations. Ultimately, Horacio's nausea is reflective of contemporary life's demand for plasticity, suggesting that meaning is ever-changing, dependent upon its momentary structuration rather than history, tradition, or any other hollow convention.

Thus, when the reader is introduced to Horacio's existential dilemma in Book One it becomes clear that the "first two levels [of history and language is] lead automatically to the third […] because everything the characters in the novel feel and live and express through […] language has an addressee […] on the other side of the bridge" (*Literature Class* 193-194). Horacio's rejection of conventional narrative and language, along with the idea that new combinations generate novel forms, explicitly calls for new types of reader who will radically re-arrange the text in hopes that some new combinations of their own can emerge. To offer this new type of reader a means of interpreting Book Two, Morelli[74] refers to figural analysis, a hermeneutic that examines disparate historical events as patterns across space and time as a means of showing "that the persons and events of the Old Testament were prefigurations of the New Testament and its history of salvation" (Auerbach 30). Through the concept of figura, Book

[74] Morelli is a primary figure in both Book One and Book Two, though to differing degrees. In Book One, Morelli appears both as Horacio's greatest influence and as 'the old man' who is involved in a traffic accident and who Horacio witnesses being taken to the hospital, though he is never clearly identified as Morelli. Morelli's address, 32 Rue Madame, is likewise shown in Book One. In Book Two, the action of the novel is witnessed from the vantage of Morelli's archive at 32 Rue Madame, where Horacio and his friends from the Serpent Club meet after visiting Morelli at Necker Hospital. Horacio's perspective in Books One and Two is directly tied to his fixation on Morelli's anti-novelistic theories in Book One and his eventual move into Morelli's archive in Book Two, which affords him Horacio a metatextual vantage from which he can witness his own life as a mandala.

Two focuses on problems of authorship—of language—more explicitly than Book One, which is predominantly interested in Horacio's inability to escape the causal chains of history and *necessity*[75] which envelop him. Rather than remaining fixed by the unconvincing constraints bounding his Earthly existence, in Book Two Horacio attempts to discern patterns among the disparate events of Book One as though they are patterns prefigured by Morelli. In Chapter 91, Horacio's lover La Maga reflects on how Horacio leaps "[from] love to philology, you're brilliant, Horacio. It's Morelli's fault, he's like an obsession with you, his crazy experiment makes you catch a glimpse of the lost paradise, poor pre-Adamite, in a cellophane-wrapped golden age. *This is the age of plastics, man, the age of plastics* […]" (427). Here, the "lost paradise" is a linguistic one wherein the figural leap across diverse topics allows for a restructuring of life itself. Returning to Chapter 116 and the discussion of emaciated figures, Morelli expands on the potential for a figural approach to reading that can disrupt historical or conventional thinking: "'To accustom one's self to use the expression figure instead of image […]. There are different times even though they may be parallel. In this sense, one of the times of the so-called Middle Ages can coincide with one of the times of the Modern Ages'" (480).

Morelli's reference to figural interpretation is an offer to the reader to participate in the process of textual construction, accompanying the author and the characters in a direct, experiential manner. For Cortázar, the reader is persuaded to manipulate the novel's form as a means of experiencing these concerns alongside the author who depicts them and, in doing so, aims to resolve them. As he outlines in his lecture titled "Seventh Class",

> [the] author of *Hopscotch* is a writer who asks for reader accomplices. He doesn't want passive readers; he doesn't want readers who read the book and find it good or bad, whose critical appreciation doesn't go very deep and is limited to enjoying

[75] *Necessity* in the metaphysical sense, which directly ties to questions of causation for Aristotle (as outlined in Chapter 2).

> whatever the book has to offer, or to feeling indifferent toward the book if they don't like it, but without being more active participants in the book's process itself (*Literature Class* 194).

To draw the reader into *Hopscotch*'s process, Cortázar delineates two reading approaches in a note by Morelli in Book Two. The first is the "female reader", who is "the type [of reader] that doesn't want any problems but rather solutions, or false and alien problems that will allow him to suffer comfortably seated in his chair" (439). The second is the "hector lembra/reader-accomplice", who assists the author in constructing the text: to achieve this, the author must "[simultaneanize the reader], provided that the reading will abolish reader's time and substitute author's time" (397).

What exactly is this reader asked to do once they have become "simultaneanized"? Peter Standish argues that the reader-accomplice "approach is one that entails *adventurous reading*; that an adventurous approach to reading is the sort the author favors; and that any other approach to reading would, so to speak, be out of order (96, my emphasis). This is confirmed by the attitude Morelli holds towards the reader-accomplice: the male reader is a "traveling companion" because the novel poses itself as "a mystery which the reader-accomplice will have to look for […] and perhaps will not find" (397-398). Comparatively, the female reader is portrayed as passive, serving as an unwitting vehicle for a more superficial reading. This reader, Cortázar suggests, can skip the expendable section because they are not invested in the search that forms the thrust of the second novel's action. The female readers are portrayed as mere consumers of plot; they, in theory, fail to exercise their own agency as travelling companions.

Regardless, despite authorial claims within *Hopscotch* that the "female reader" and the "reader-accomplice" are distinct entities, the overlapping of concerns throughout Book One and Book Two suggests that the two books are not so easily distinguished. Book Two's re-ordering of Book One and its

intercalation of the expendable chapters in the flow of the plot are a response to Horacio's existential concerns, which are expressed in Book One. While *Hopscotch* "contains a double trajectory: the story of man's self-analysis and a reevaluation of the traditional novel", these "two searches are intimately related" (Garfield 91). Horacio's journey in Book One shows him searching "for a *more authentic basis* for life", while "the main character of the second book—the novel itself—[…] searches for a *more authentic* form of *communication* for Oliveira's anguished quest" (ibid.). Interestingly, mapping the two books makes the relationship between these searches diagrammable and concrete.

This is accomplished by making the constructed nature of the novel's two main books explicit. In this sense, it is noteworthy that the chain of events in both books remains largely the same, despite the authorial insertions. If the insertions from the third section were removed but the ordering of Book Two was retained, the remaining book would largely resemble Book One. This suggests that, although Book Two's main addition is the "dispensable chapters" that serve as the novel's third section, these chapters "display the raw cultural material of the novel" (Boldy 30) in a carefully curated manner. These chapters "are often inserted contrapuntally in order to subvert the causality of the main narrative, or to multiply its resonances" (ibid.). In terms of content, this distinction is also rather fine: though much of Book One is plot-based, it dedicates multiple chapters to experimental writings, metatextual notes, and stream-of-consciousness musings which are fixated on problems of language rather than history. Similarly, Book Two is not only comprised of random quotations and notes assembled by Morelli, but elaborates on elements of the plot concerning Horacio's affair with a woman named Pola, a plotline only occasionally alluded to but never directly represented in Book One. Thus, the expendable chapters simultaneously reduce and proliferate the significances of *Hopscotch's* narrative through the author's conscious filtering and the reader's active decision-making, the tension between the curation of "raw materials" and the conscious decision to read the book as the reader-accomplice (or not).

Ultimately, the superficial distinctions made between the two types of reader alerts the reader to the novel as a potential "ironic hoax" (Foster 105). While Book Two is referred to as an unleashing of the reader in early criticism on the novel, *Hopscotch's* complicated structure exaggerates the tension between the novel's execution and its desire for an active reader: "to adorn [*Hopscotch's*] fictional representation with a spurious pattern is a heavy-handed irony against the reader who follows the directions with passive good faith" (ibid.). In this consideration of the text, then, rather than the hector lembra being active, they remain passive after making the choice of reading in one prescribed manner rather than another. This is supported by a "pedantic note" by Morelli in Chapter 79, who argues that

> the novel is content in a closed order. Resolutely opposed to this, we should search here for an opening and therefore cut the roots of all systematic construction of characters and situations. Method: irony, ceaseless self-criticism, incongruity, imagination in the service of no one (396).

Such a cutting of roots is longed for throughout Book Two, but it is ultimately unattainable. Rather than offering readers freedom from the "closed order" of the novel, Book Two merely narrates Horacio's attempts to "cut the roots" which anchor him in place: the conventions of language and history which no longer satisfactorily represent his existence. This is an effort which ultimately fails to free Horacio from his nausea.

As Foster observes, regardless of the way the reader moves through the novel they remain passive because they read the novel in a curated or filtered way. While Book Two appears to draw a more active engagement, it is still one which has been devised in advance: the reader plays the game differently, but abides by its rules nonetheless. Therefore, any prioritization of Book Two over Book One is largely a by-product of authorial framing, or of uncritically taking Morelli, Horacio, and Cortázar at face value. *Hopscotch* frames the female reader as "passive" namely because the style of reading is more

linear and thus less physically (or "extra-manoetically"[76]) involving: this is, for Morelli, the reader of "the usual novel" which "misses its mark because it limits the reader to its own ambit" (396), while the reader-accomplice is said to be "able to become a coparticipant and cosufferer of the experience through which the novelist is passing, *at the same moment and in the same form" (*397*)*. While it is certainly arguable that the reader-accomplice, being the reader of Book Two, does become "a coparticipant and cosufferer" of a certain experience alongside Horacio, it does not suggest a successful emergence beyond the conventions of the author as the originator and authoritative purveyor of textual meaning. Thus, while much criticism of the novel suggests prioritizing the second book, this reading disregards that, without resolving and integrating this binary distinction between the two types of readers, Cortázar's own ambit overwhelms the readers' decision-making regardless of the ruleset they choose to adopt. Despite the clear preference for the reader-accomplice shown throughout the text, even by reading Cortázar's own musings on the novel it becomes clear that Book One and Book Two are better read as two expressions of the same historical, linguistic, and readerly concerns. Rather than a hierarchy, the two books are better thought of as a single process of reading because "*Hopscotch's* unity is the product of the relationship between infantile and mature—or, one might say, eccentrically unique—versions of the eponymic game" (Foster 103). If readers first read Book One and then proceed to Book Two, they will share in the experience of Horacio's development from "infantile" to "mature".

This is corroborated in the different geometries of Book One and Book Two, which take the shape of the hopscotch court and the mandala respectively. To follow Horacio's ongoing development across the two books, "Cortázar uses the [game of] hopscotch in [a] ritualistic sense, as the symbol of a serious mystical search for an Absolute" (Garfield 97). The resemblance of the hopscotch court and the mandala reflects this development from infantile to mature, as the children's game is brought back to its

[76] As Espen Aarseth would describe it (see: *Cybertext: Perspectives on Ergodic Literature*).

"religious origins, especially the type played in Argentina and in France for it has sections marked Heaven and Earth at opposite ends of the design" (ibid.). The hopscotch board and the mandala cannot be approached separately, then, much like the other elements of the novel; they are integrated elements of the authorial processes of *Hopscotch*, proving that it "is not a totally open, aleatory novel, nor, as many detractors and enthusers agree, is everything left to the reader" (Boldy 31).

Ultimately, if critics adopt the presupposition that Book One and Book Two are separate, the resulting interpretation presupposes no further readings. Instead, one is left choosing one of the books as definitive and the other as inferior or expendable. Surely, this can be tied to the anachronistic, masculinist language applied to the types of reader, especially the female reader. In an interview with Evelyn Picon Garfield, Cortázar apologized for this language, referring to the term "female reader" as "a chauvinistic expression and one that bespeaks of South American underdevelopment" (Picon Garfield "Cortázar por Cortázar", 788). Rather than blindly accept this 'machismo', however, readers of *Hopscotch* might instead examine how these two types of reading actually unfold as distinct readerly performances. Do the different notions guiding the reader's approach throughout the novel—the "search"; the (mystical) "way"; or the active approach to playing the game—prefigure the structure of the novel as a reading experience? Put differently, the author's claims of two distinct books and styles of reading do not automatically corroborate that the novels are structurally distinct or that one reading is superior to another. Rather, it is best to reconsider how each notion differently shapes how the agency of the reader *appears* to operate in the novel. Thus, because each book is structured around different rulesets, sequences, and figures, each reading should provide different performances of the text rather than an integrated process leading from Book One to Book Two. Put differently, they *should* generate two entirely different diagrams of the text.

Interestingly, it seems that both of these ideas are applicable. While it is true that both books produce different geometrical arrangements or diagrams of the novel, the process of reading Book One is conceptually and figurally integral to reading Book Two. Further, the relationship between these two diagrams can subsequently unveil the means of generating further approaches to the text, the most obvious being "a more conventional blending together of the third part and the two narrative parts" (Foster 105) in sequential order. As Franco Moretti shows in *Graphs, Maps, Trees*, literary mapping serves the function of producing diagrams of a novel's distinctive geometries, "[revealing] form as a diagram of forces; or perhaps, even, as *nothing but force*" (64). In *Hopscotch*, form's forces operate both internally and externally, as the authorial system generates Book One and Two while the reader, potentially, imposes their own systems on the text in response. In this sense, a diagrammatic unpacking of the novel's structure is useful for critics as a kind of "deformative" performance of *Hopscotch* as a text, revealing that the two novels produced by following the author's rules are *not* distinct, but actually part of the same procedural chain. Without first reading Book One, the arguments posed by Book Two remain incomplete despite their different 'maps'.

The problem thus becomes one of parallel text analysis between the two books. Because the novel is largely focalized through Horacio, the experience of Horacio becomes a stand-in for the reader's experience. Through mapping Horacio's movement through Paris in Book One using GIS maps, the book proves to be a scatological prank wherein Horacio is swallowed, digested, and forcefully vacated from Paris. Book One amounts to a defecation joke, as Horacio's passivity, his wavering "between becoming involved with people and politics, or remaining an aloof observer", continuously entraps him. The geometrical diagram (see Figure 3.2) produced by mapping Paris in Book One shows Horacio's memories slowly encroaching and enveloping him until "Paris is transformed by Oliveira's aching memory into projections of his liason with [his ex-girlfriend] La Maga" (Foster 110). Horacio's

allusion to Heraclitus, who attempted to cure himself of dropsy by burying himself in piles of dung (210), becomes a model of Horacio's own attempts to find "acceptance in nausea" (ibid.). Horacio, through this acceptance, tries to move from "Earth to Heaven" as in a game of hopscotch where one simply "needs a pebble and a toe" to "pass through the eye of your asshole" (216). Ultimately, as the map below shows, the encroachment of his memories and his eventual ejection from this remembered version of Paris becomes explicit when one maps Horacio's movement throughout the Paris section of the novel.

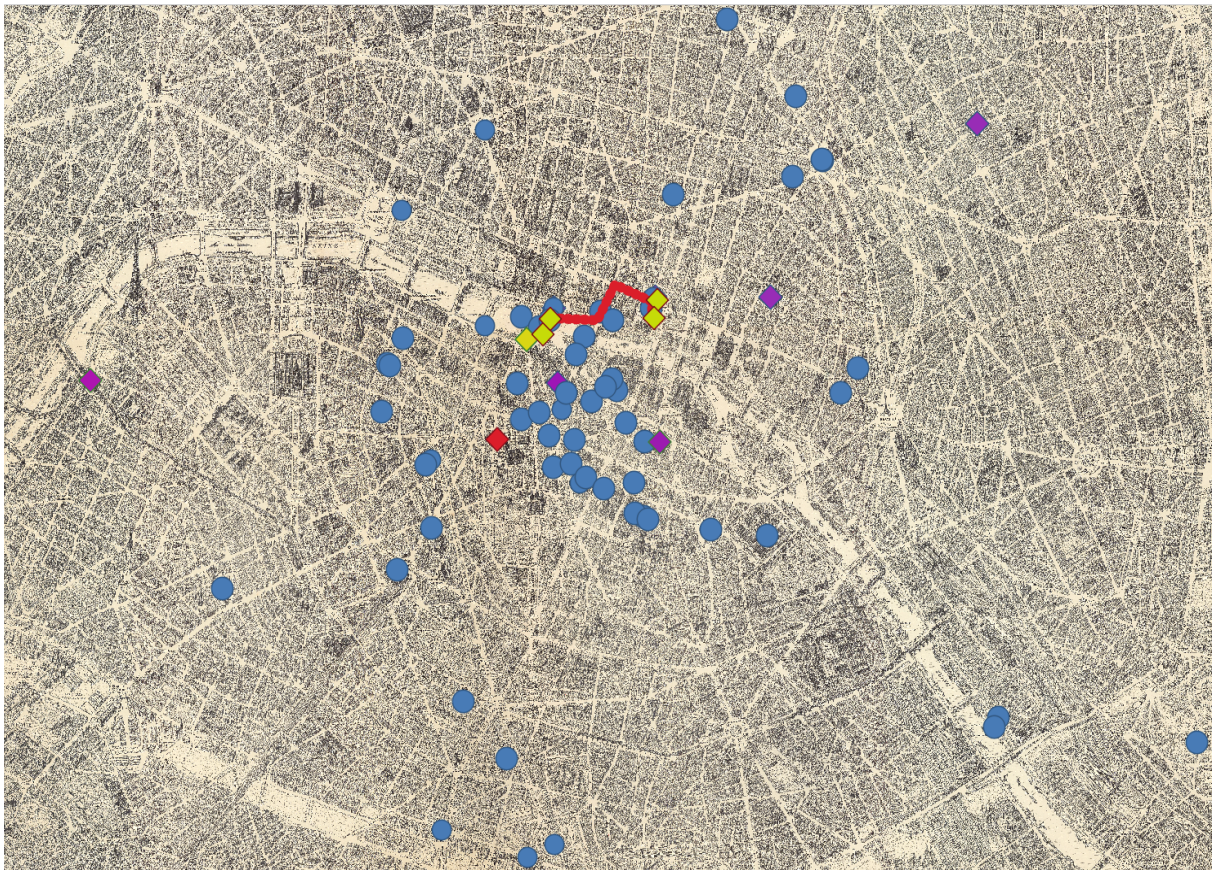


Figure 3.2—Book One Mapped in qGIS, showing Horacio locked in the center of his memories[77].

In Book Two, conversely, Horacio is no longer trapped in an endless spiral of memories but is rather capable of moving here-and-there by a sort of Brownian movement (see Figure 3.3 and Figure 3.4).

[77] The Yellow Diamond=Horacio's location;
The Red Line=Horacio's actual movement in the "present tense" of the novel;
The Blue circles= Horacio's past/ his memories of Paris;
The Red Diamond=Where the Serpent Club meets; The Purple Diamond=Places where La Maga might have disappeared to.

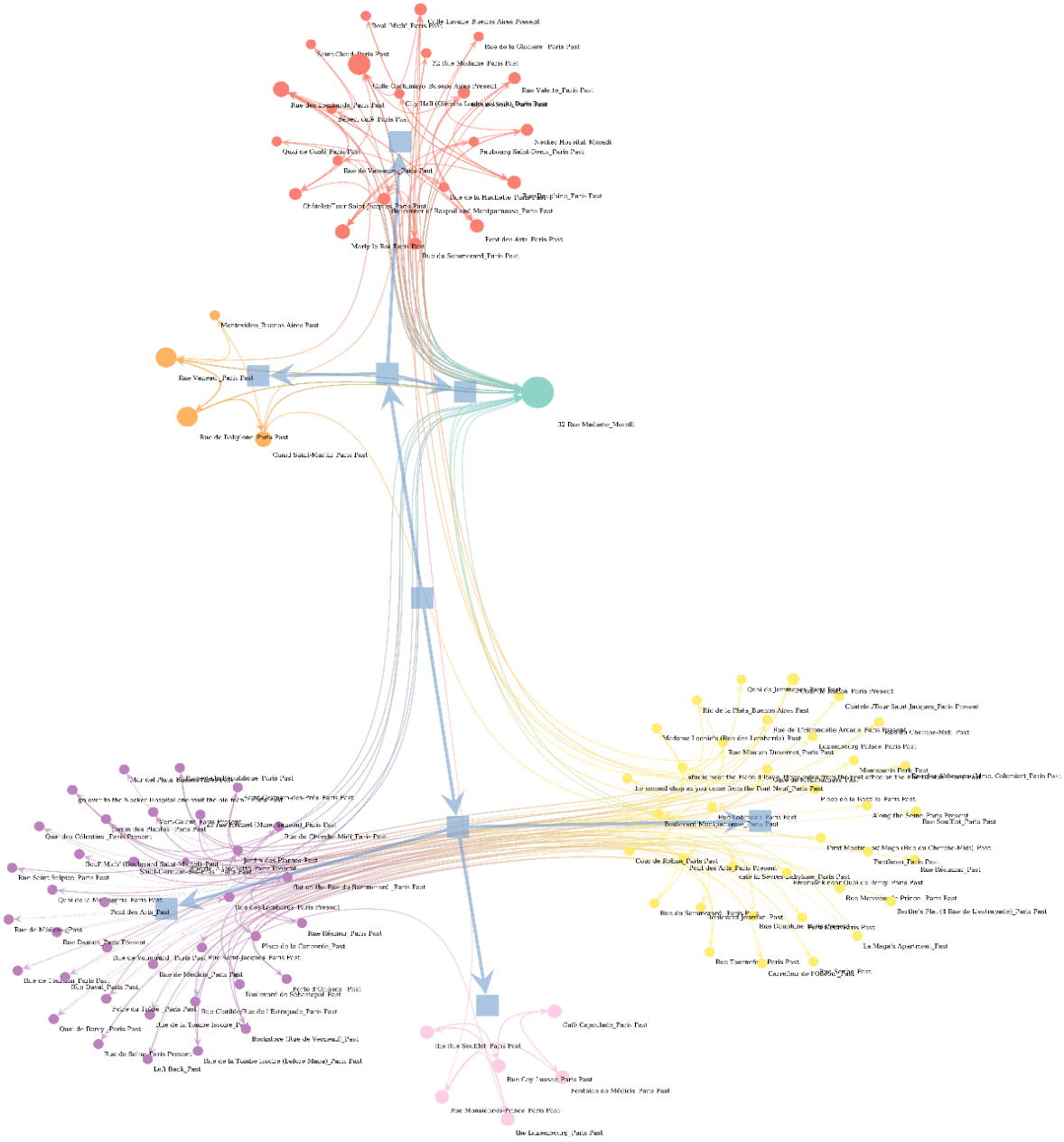


Figure 3.3—Horacio's movements as depicted by a stochastic blockmodel.

Morelli's home at 32 Rue Madame is the large teal node.

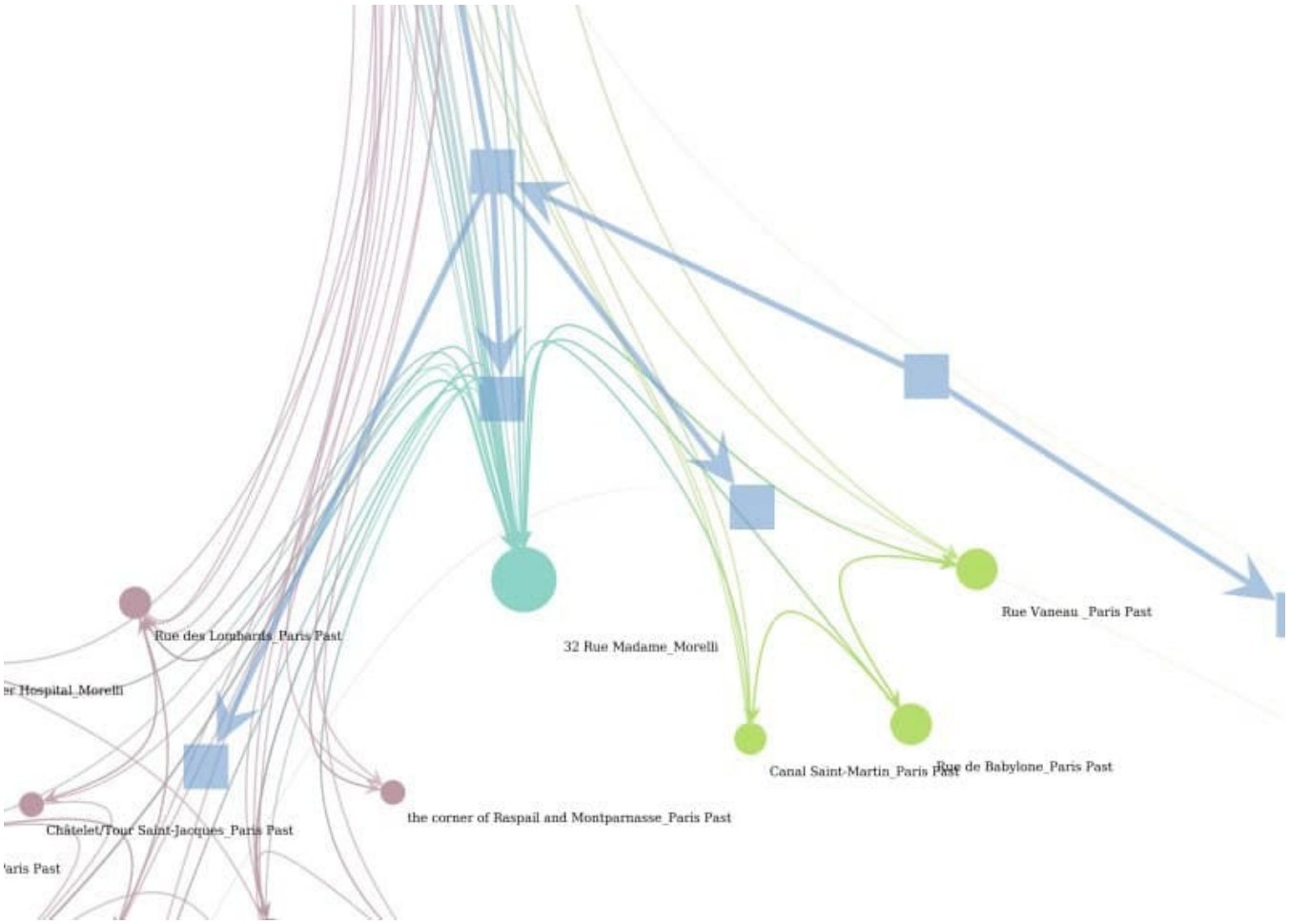


Figure 3.4—32 Rue Madame and Morelli, shown again to be the largest and most networked node in Book Two.

Seemingly organized at random, Book Two integrates a variety of quotations from fictional and real authors while also expanding certain elements of the plot only suggested in Book One, including Horacio's visits with Morelli in Necker Hospital (in Chapter 154) and Horacio's affair with Pola (in the chain of Chapters 76-101-144-92-103-108-64, terminating in the funeral for La Maga's infant son Rocamadour). This change occurs when Horacio visits Morelli's archive, an event which occurs after La Maga leaves Horacio and before Horacio is ejected from the Serpent Club for his role in the death Rocamadour. Inside Morelli's home Horacio reconstructs the events of his life, which he muses on in a half-asleep daze: "I woke up and I saw the light of dawn through the cracks in the Venetian blinds […].

Before going back to sleep I imagined (I saw) a plastic universe, changeable, full of wondrous chance, an elastic sky, a sun that suddenly is missing or remains fixed or changes its shape" (371). This "plastic universe" offers Horacio an escape from his existential "Nausea, the unbearable feeling of coactions. *I am obliged to bear the daily rising of the sun*. It's monstrous. *It's inhuman*" (ibid.). Much like the re-organized chapters of Book Two, which have the reader traversing the three sections of the text to read chapters out of order, spaces are re-organized by Horacio as though they are nodes in a network; he achieves, through this re-sequencing, the affect of being a player in the game of constructing the novel. He is given, at least theoretically, the author's-eye view. Critically, the relationships between chapters, spaces, and temporalities form patterns independent of both space-time (and thus causality) in Book Two. Without experiencing Horacio's deportation in Book One—his being shat out of Paris and back to Buenos Aires—this movement would remain an ironic game for the reader in Book Two because the re-framing of Horacio's existential crisis in Book One is detached from its original context. To cosuffer with the author of Book Two, then, the reader must accompany Horacio through his limit experiences in Paris in Book One.

Further, from the juxtaposition of the two novels as maps, other readings beyond Book One and Two can emerge. As Foster notes, "Cortázar remarks rather cavalierly that his work can be read 'any old way,' a remark that deserves greater attention than the Table of Instructions" (105). This can be further examined by returning to the relationship between the novel's explicit generating concept—the children's game hopscotch—and its latent mimicking of the sacred, geometrical diagram of the mandala. The relationship between games, maps, and spiritual transcendence that these concepts imply direct the reader to produce cognitive maps[78] of *Hopscotch*'s potential readings, to emerge by collaborating with the author to create new possible readings as a means of transcending the game. By diagramming the

[78] See Marie-Laure Ryan, "Narrative Mapping", 232.

two authorial versions of the book, we can interrogate the novel's environments and how they differ. The emphasis on *Hopscotch* being multiple novels depending on how the text is arranged further suggests that different models can be imposed by readers, contributing to the mapping of new novels with each approach to reading. This confirms the novel's vision of "emergence" as an experience of co-suffering and textual deformance.

Mapping the Environment of Generative Novels

A brief discussion of the environments of generative novels is required. Generative texts create an environment in which patterned interactions are facilitated between systems and entities. The interaction between systems and entities is correlated, in literary contexts, to the relationship between author, text, and audience as the interplay between wholes and parts: authors both construct the generative system and interact with its outputs as entities before filtering the work as agents; the audience likewise behave like entities in response to the generative system's outputs, while interpretively and concretely deforming these outputs as agents. This interaction, widely discussed in reader-response and reception theory, is mediated by the generative system which produces, in part, the textual outcomes. Despite this, the generative author's influence remains even in the most autonomous or complex systems. The author constructs the system, allowing it to operate—to a certain degree—on its own. Using generative systems is an authorial decision which pre-determines a text's structure, its range of significances, and its outcomes because the author forms the textual environment or world.

A key element of the narrativity of generative systems is space-time. Systems interact with entities in space and over time, which creates an infolding of diegetic and metadiegetic concerns regarding both the space-time of the diegesis AND the space-time of the rhetorical situation of the narration itself, which produces the diegesis. These interactions are expressions of a text's structure—its inner logic—and they also structure the types of readers the text demands. Like video games, the reader

of a generative text is pushed by the textual system to read in certain ways. The reader is given potential roles, rather than being a "model" reader who reads the text correctly or not.

It is important to note that Cortázar's *Hopscotch* did not emerge from a vacuum but is, as Boldy argues, "very much a book of the sixties" (30), namely because it is a direct response to novelistic trends of that time. In particular, the generative *Nouveau Roman* (New Novel) of Alain Robbe-Grillet informs Cortázar's attempt to reflect the shifting relationship between authors, texts, and readers (Aschkenasy 97). For Robbe-Grillet, the New Novel begins with considerations of structure, the elements of a text's conception and production:

> we seem to be tending increasingly toward the age of fiction in which the problems of style and construction will be lucidly considered by the novelist, and in which critical preoccupations, far from sterilizing creation, can on the contrary serve it as a driving force (*For a New Novel* 12).

The desire for new modes and models of expression pervades the oeuvre of Robbe-Grillet and the New Novel movement, as does this emphasis on "driving" force. For Robbe-Grillet, this generative attitude is fundamental to novelistic writing as a practice because the novel as a genre is inherently dynamic (ibid. 10). Much like Ferdinand de Saussure's model of language, particularly his concepts of *langue* and *parole*, Robbe-Grillet argues that the tension between literary conventions and individual styles structures the relationship between authors, texts, and audiences. Novelists, then, have always produced new forms to, in theory, better represent new ideas and generate new fictional worlds (Robbe-Grillet "The Use of Theory" 10).

This can be further outlined with a brief discussion of Robbe-Grillet's use of objects as "generators" (Morrissette "Post-Modern Generative Fiction" 253-254). Robbe-Grillet's work "illustrate[s] the problem of the literary object: are things indicators of meaning, or are they, on the

contrary, opaque?" (Roland Barthes, Preface to Morrissette's *The Novels of Robbe-Grillet* 10). For example, the system of objects in Robbe-Grillet's novel *La Jalousie* (1957)—trees, fields, a neighboring plantation, a jalousie window, a stained wall covered in the remains of an insect, a cheap romance novel read by the narrator's wife—comprise a narrative world even though they all operate as independent objects within that world (Figure 3.5). Each object is witnessed through the prism of the jalousie window, which generates a narrative through the pun of jalousie and jealousy. The window becomes a generator of situations (Morrissette "Postmodern Generative Fiction" 253-254), an ambiguous environment which must be negotiated by the reader who imparts their own significance onto the rest of the novel through the window's frame.

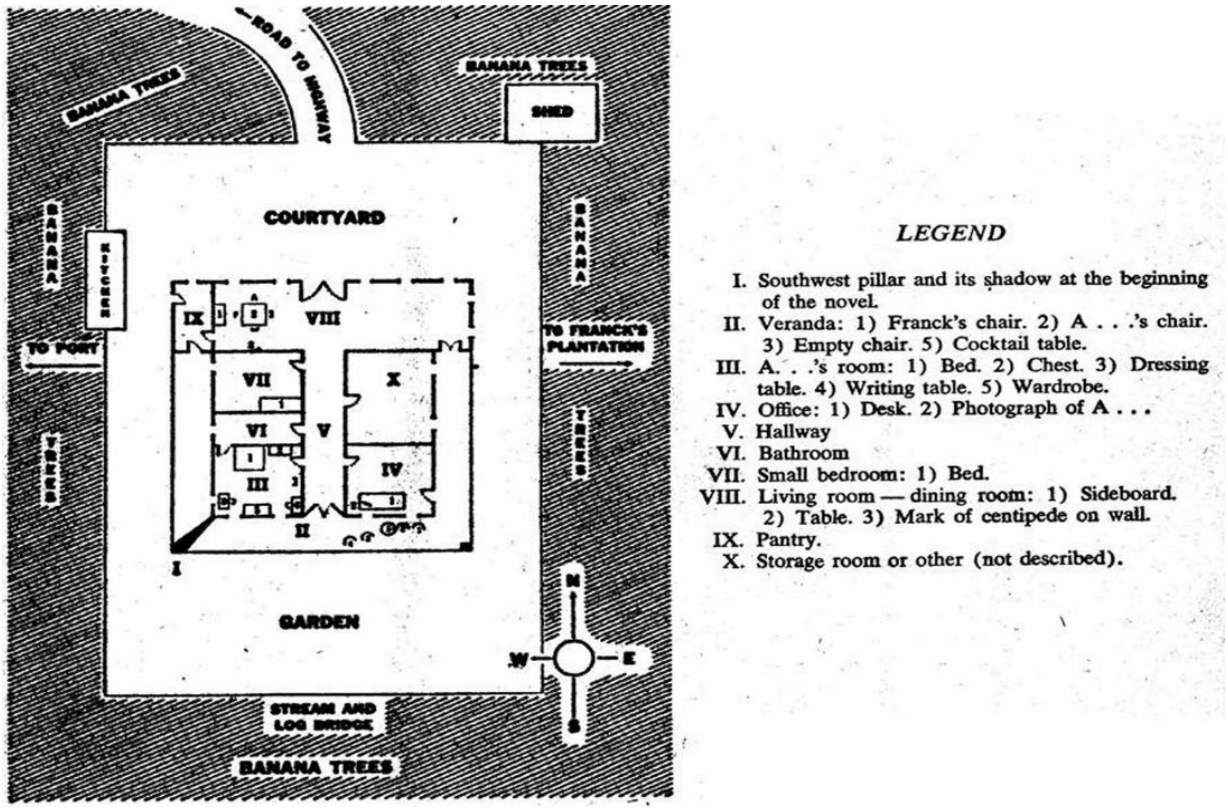


Figure 3.5—Robbe-Grillet's map of *La Jalousie*.

The New Novel's emphasis on objects as co-creative procedures of narration rather than psychological characterizations calls for a more active reader, much in the same what that *Hopscotch*

does. This is because these Robbe-Grillet's narratives are rendered through the relationship between humans and objects first as things and *then* as signs:

> far from neglecting him, the author today proclaims his absolute need of the reader's cooperation, an active, conscious, creative assistance. What he asks of him is no longer to receive ready-made a world completed, full, closed upon itself, but on the contrary to participate in a creation, to invent in his turn the work—and the world—and thus to learn to invent his own life (Robbe-Grillet "Time and Description" 156).

La Jalousie is an environment in which systems and entities interact, a world that unfolds as it is engaged with. The audience becomes part of this system as an entity, their role being to trace possible narratives inside of this environment by immersing in the environment itself, interacting with it, and re-creating it with each new reading.

The narrativity of generative systems, then, might best be thought of as a unification of two types of spatial narrative: firstly, generative novels are architectonic, meaning they attempt a fusing of time and space (Spencer xix). As Sharon Spencer outlines,

> the architectonic novel manifests an avoidance of character developed for its intrinsic interest, its essential feature is neither thematic nor stylistic, but structural. Its goal is the evocation of the illusion of a spatial entity, either representational or abstract, constructed from prose fragments of diverse types and lengths and arranged by means of the principle of juxtaposition so as to include a comprehensive view of the book's subject (xx-xxi).

Secondly, generative novels are genidentic, meaning that they

> [involve] both a theory of text generation and a method of reading any text [which] rests on the concept of genidentity developed in physics by Hans Reichenbech […] as well as on Michel Butor's theory of the book as an object capable of creating its own dynamic field producing an interpenetration of text and interpreter (Kestner 11).

Through the 'narration' of its own procedures, a generative novel charts itself as it is written. These narratives unfold within a given environment, which is mapped by both the author—who filters the text—and the reader—who attempts to situate themself within the text and experience it as a coherent world. This ongoing dialogue between systems, authors, and readers is "dramatized" because "the hermeneutic circle is conceived in more existentialist terms" by involving the reader directly in the production of the text's meaning (Vattimo 85).

Why Mapping?

Although much has been written on the matter of time in literature, space has only recently become of central concern in critical discussions[79]. It is easy to understand why, given modern developments in cosmology wherein the relationship between space and time has been scrutinized, especially as concerns concepts such as Bergson's "duration", Whitehead's "process", and Einstein's "relativity". Nonetheless, narrative is and always has been inherently spatial *and* temporal. As Robert Tally argues: "[we] cannot help but fit narratives or spatial representations into some sort of spatiotemporal context in which they make sense to us, thereby also becoming more or less useful to us, in our own attempts to give meaningful shape to the world in which we live" (*Topophrenia* 32).

As previously stated in this dissertation, in generative art's approach to systems strong emphasis is given to the complex adaptive systems which comprise the world beyond the artwork. This focus on

[79] See: Tally Jr., *Spatiality*, 2.

the materials by which an artwork is rendered is, for Gianni Vattimo, a means of "claiming a 'permanent' place for art in the life of spirit by tearing art away from the limbo of unconsciousness to which it had appeared to be condemned" and instead emphasizing the artwork as an object in and of itself (32). For Vattimo, this kind of artwork makes itself into a world because it "represents a new perspective, a new proposal to arrange the world in a different manner" (53). Because every artwork is a world with its own dimensions and qualities, the audience must learn to dwell within this world. In such artworks the audience is thrown into the artwork-as-a-world and is asked to actively chart it.

One of the primary means by which human beings have learned to orient themselves on the Earth is by using maps. As Tally Jr. argues, "To call for a map or to demand that someone engage in mapping is to recognize one's own disorientation […] which is undoubtedly alienating if not also terrifying" (*Topophrenia* 1). Tally's existentialist notion of the artwork as a world suggests that mapping is a deeply human procedure both in terms of disorientation and orientation. Further, Tally argues that literature and mapping are fundamentally intertwined: "[completely] apart from those many literary works which include actual maps […] stories frequently perform the function of maps" (Tally *Spatiality* 2).

In terms of criticism, the mapping of narratives is a complicated process of experimentation that is less concerned with geography and more with examining "mutual relationships" (Moretti *Graphs, Maps, Trees* 54). This involves thinking of literary space as "a matrix of relations, not a cluster of individual locations" (ibid.). It is a "geometrical", rather than "geographical" pursuit (ibid.). As Franco Moretti observes, literary maps

> are a good way to prepare a text for analysis. You choose a unit […] find its occurrences, place them in space…or in other words: you *reduce* the text to a few elements, and *abstract* them from the narrative flow, and construct a new, *artificial* object […]. And with a little luck […] they will

> possess 'emerging' qualities, which were not visible at the lower level (ibid., 53).

Literary maps, therefore, can help to explain generative structures in a more clear and accessible manner:

> what do literary maps allow us to see? Two things, basically. First, they highlight the *ortgebunden*, place-bound nature of literary forms: each of them with its peculiar geometry, its boundaries, its spatial taboos and favorite routes. And then, maps bring to light the internal logic of narrative: the semiotic domain around which a plot coalesces and self-organizes (Moretti, *The Atlas of the European Novel* 5).

By reducing *Hopscotch* to its spatial and temporal elements and then abstracting these elements, a literary geographer can produce maps which unveil the text's "narrative universe". This, as Marie-Laure Ryan argues, is a world-oriented approach to literary analysis which "regards the urge to map and diagram as a legitimate form of active participation in narrative" ("Narrative Mapping" 233). In this sense, literary cartography offers a method for examining narrative structures and emergence because it "rearranges [the novel's] components in a non-trivial way, and may bring some hidden patterns to the surface" (Moretti *Graphs, Maps, Trees* 54).

Authorship in Hopscotch

After re-arranging *Hopscotch* into different types of maps, we can visualize how the novel poses the relationship between author, text, and reader as an existential drama by involving the reader directly in Horacio's existential plight in both Book One and Book Two. As Foster claims, "whatever the narrative point of view, Oliveira's remains the structural point of view, and we perceive everything through the various levels of his vague consciousness" (112). At the same time, the novel is

architectonic because Horacio's concerns are inherently structural, diminishing the role of characterization (since characters become "perspectives" (Spencer 2)) in favour of a more detached, authorial viewpoint. By supplying this viewpoint to Horacio and, by proxy, to the reader, *Hopscotch* blurs the boundaries between spaces and times through the juxtaposition of different written fragments, focal points, and networks of places. It offers multiple versions of the novel and juxtaposes them as expressions of abstract geometrical concepts which are chosen as generators for the textual system. The first concept, the hopscotch court, overlays the second, the mandala.

In terms of plot, both versions of *Hopscotch* are focused on Horacio and his movements between Paris and Buenos Aires. The novel is divided into three sections. The first section ("From the Other Side") takes place in Paris, following Horacio as he searches the city, remembering his past times with former lover La Maga and the "metaphysical" discussions he had with the Serpent Club. Horacio and his friends discuss Jazz, human consciousness, and Horacio's favourite author Morelli, among other things. In the present tense of the novel, Horacio ruminates on these discussions, his existential searching, and the death of La Maga's infant son, Rocamadour. Rocamadour's death serves as the major event in the Parisian section, occurring at a meeting of the Serpent Club during which Horacio learns of the child's death first and withholds the information as a means of passively observing the unfolding situation. Shortly following this scene, Maga disappears—it is heavily implied that she commits suicide—and Horacio is deported for engaging in public sexual acts with a homeless woman named Emmanuèle.

The novel's second section ("From This Side") is set in Buenos Aires, following Horacio as he reunites with his close friend Manolo Traveler and his girlfriend Talita. Horacio, continuing his search for La Maga, lives in a building directly across from them with his new girlfriend Gekrepten. He starts to believe that Traveler is his double, and that Talita is La Maga's, and works with them in a circus and then a mental institution. The novel ends with Horacio locking himself away in an upper-level room of

the asylum after kissing Talita/La Maga, hiding from Traveler, who Horacio thinks is going to attack him. Traveler arrives and instead has a discussion with Horacio, wherein Horacio determines that Traveler is truly his friend. Traveler then leaves Horacio sitting on the window's ledge watching Traveler and Talita on the ground beside a game of hopscotch. Horacio contemplates jumping onto the final square of the gameboard—surely a fall which would kill him—though his fate remains ambiguous.

The third section ("From Diverse Sides") presents the reader with a variety of quotations, newspaper clippings, metafictional notes, and additional plotlines from Paris and Buenos Aires. Loosely arranged on the surface, these chapters are referred to as "Expendable". There is no obvious chronology or governing logic in this section's content and when examined in a linear sense it becomes clear that the order of the chapters as presented is relatively insignificant: "insofar as the mystic linkage of fragment-chapters transcends every diachronic order, the reader may then read them in whatever order he/she desires" (Ubilluz 138). Nonetheless, on the plot level, it is important to note that the expendable chapters become structurally significant in Book Two because most of the novel takes place in Morelli's home at 32 Rue Madame. Beyond expanding upon several plots, this section reveals the inner structural considerations of the novel through notes in Morelli's archive.

Ultimately, this summary of each section disregards much of *Hopscotch* as it is experienced by the reader. The self-conscious emphasis on structure found in the novel invites readers to reframe this plot from different perspectives. This is characterized by the idea of Horacio's search, which he claims is his "symbol": "It was about that time I realized that searching was my symbol, the emblem of those who go out at night with nothing in mind, the motives of a destroyer of compasses" (7). In *Hopscotch*, Horacio's search for La Maga is aligned with the narrative structure in terms of its depiction of time-space "as many-sided and virtually inexhaustible in its potentiality for relationships" (Spencer xvii-xviii). Horacio's searching aims to discern the underlying structure of the world he lives in—the links

between “The Other Side” and—“This Side” and create bridges between himself and others to resolve his feelings of alienation.

At its core, Horacio’s alienation is generated by the fear that he lacks the potential for any significant choices in life, namely because he is incapable of discerning the seemingly-arbitrary rules governing human existence. In a discussion with the Serpent Club, Horacio argues with Ronald that the absurdity of life “is to believe that we can grasp the totality of what constitutes us in this moment or in any moment, and sense it as something coherent, something acceptable” (162). Horacio fears that “this whole ABC of my life was a painful bit of stupidity, because it was based solely on a dialectical pattern, on the choice of what could be called nonconduct rather than conduct” (12). He is unable to escape the sense that everything is pre-determined for him by the systems he exists within: “The world was still something petrified and established, swinging on its hinges, a skein of streets and trees and names and months” (13). This allusion to a static map, “petrified and established”, renders him motionless, stuck before “action in all of its possibilities […because…] behind all action there was a protest, because all doing meant leaving *from* in order to arrive *at*“ (17). Horacio’s anxiety, then, is the by-product of the overwhelming potentiality suggested by a city map: choices offer possibilities, which opens one up to exceptions, “new worlds which are simultaneous and alien” (93) depending upon the path one chooses. Horacio’s fear of action prevents him from becoming a genuine participant in his own life, instead rendering him into an “active onlooker” (422) who dispassionately observes the actions of others to justify his own egocentric experiments.

The spatialization of *Hopscotch* on a narrational level is further emphasized by the text itself, which becomes an object of variable structure, a hopscotch court played with multiple possible rulesets. As Peter Standish observes, “[the] idea of the search, so fundamental to [*Hopscotch*], is also symbolized in the game of hopscotch” (105). Though less widely discussed, this can also be argued for the

mandala[80]. How the reader chooses to approach *Hopscotch*, either as a hopscotch court or a mandala, enacts two different systems, producing distinct interactions and outcomes. As Santiago Colás argues, "The importance of Rayuela's form […] lay […] in the "Tablero de direccion" (Instruction table) […]. Through this innovation, the novel's form partially determines the content" (28).

The reader's choice regarding which rule-set to follow influences the novel's chronology, adds or removes various sub-plots, and places the novel's spaces in new kinds of relationships to one-another. Each re-structuring alters the relationship between author, text, and reader depending on how the reader navigates the book as a physical object. This reminder that the reader is reading—that they are manipulating a physical book—aims at "having the reader feel constantly displaced, physically obliged to carry out the interpolations; the constant shifting, the interruptions to the flow […] [which ultimately] serve to remind the reader that he is caught in an artificial construct" (Standish 96). This feeling of displacement or, perhaps, disorientation calls the reader to observe the ways in which they are mapping these constructions—producing an incomplete, potentially delimiting image of the text—as they read. In this sense, the two rule-sets offered in the table of instructions generate two distinct environments. The two books offer different visions of the novel as a written genre, as "[the] second version of the novel is preoccupied with the question of how a book should be written; the first simply tells a story" (Sharkey 43). Regardless of this distinction, it is important to recognize the ways in which these two visions intersect and interact. *Hopscotch* argues that combinatorial changes to the textual environment create different, though interrelated, works which comment on each other and unveil patterns not previously seen.

A more precise outline of the novel's spatio-temporal structure is required to elaborate on these intersections. The novel is not only presented to the reader based on two different rulesets or chapter

[80] For the most part, the mandala as a "generative" concept is underdeveloped; some critics do mention it but only in the sense that the novel's original title was "Mandala".

orderings. Rather, the novel presents distinct temporalities and spaces in Book One and Book Two. Past, Present, and Future are key determinants for distinguishing between the two readings of the text, as Book One treats these temporalities fundamentally differently than Book Two.

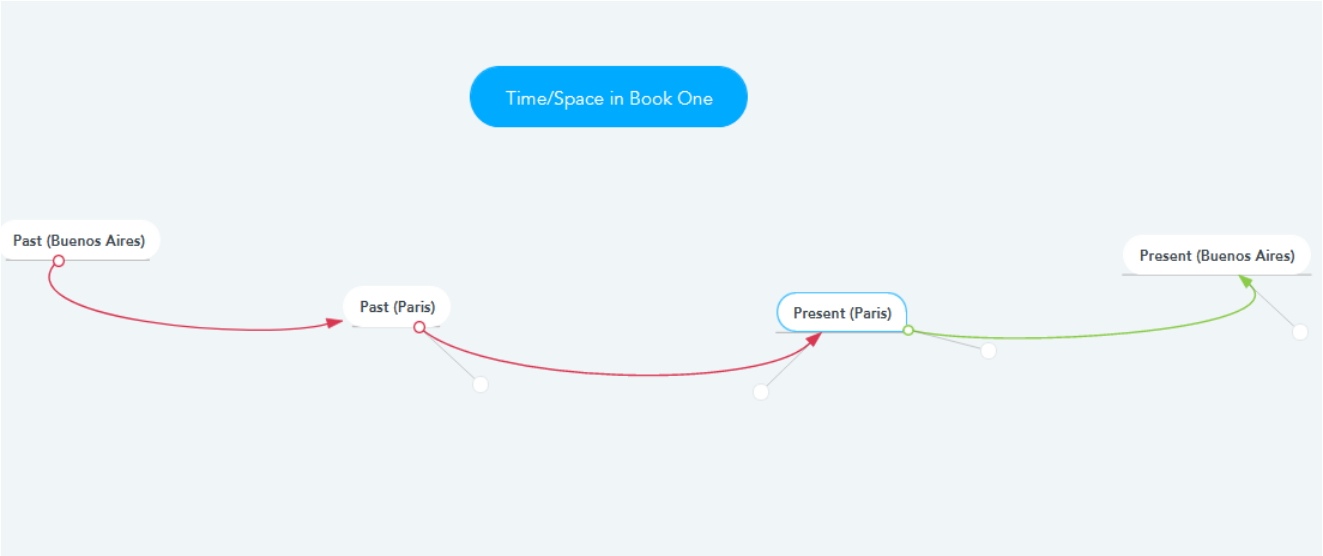


Figure 3.6—Space and time in Book One, reflecting the plot-level ordering of events which reinforce the circular structure suggested in the spatial arrangement of the book.

In Book One, Horacio's obsessive reflections on the past render the first section as a "tour" of Paris—a predetermined path which lays out the sequence of a pilgrimage (de Certeau 120). This is not to say that Book One simply traces a straight line in terms of its narration, as it is full of remembered sequences and often jumps between present and past; rather, visualizing the linear path Horacio physically walks throughout the present tense of the novel allows us to better understand the dichotomy between "The Other Side" and "This Side," which is one of the major conflicts Book One[81]. What a mapping of Book One reveals, interestingly, is that Horacio's movement is increasingly limited, both in section one and

[81] The cultural and social ramifications of this conflict are underexplored here, though it is significant that This Side and The Other Side correlate to Buenos Aires and Paris respectively.

section two. This produces a contrast between Horacio's depiction of himself as an outsider or one who is searching. It affirms, rather, that he is passively trapped inside the stories he is recalling.

Conversely, in Book Two Horacio is given access to the archive of Morelli. Utilizing this archive, he negotiates between the past, present, and future at will.

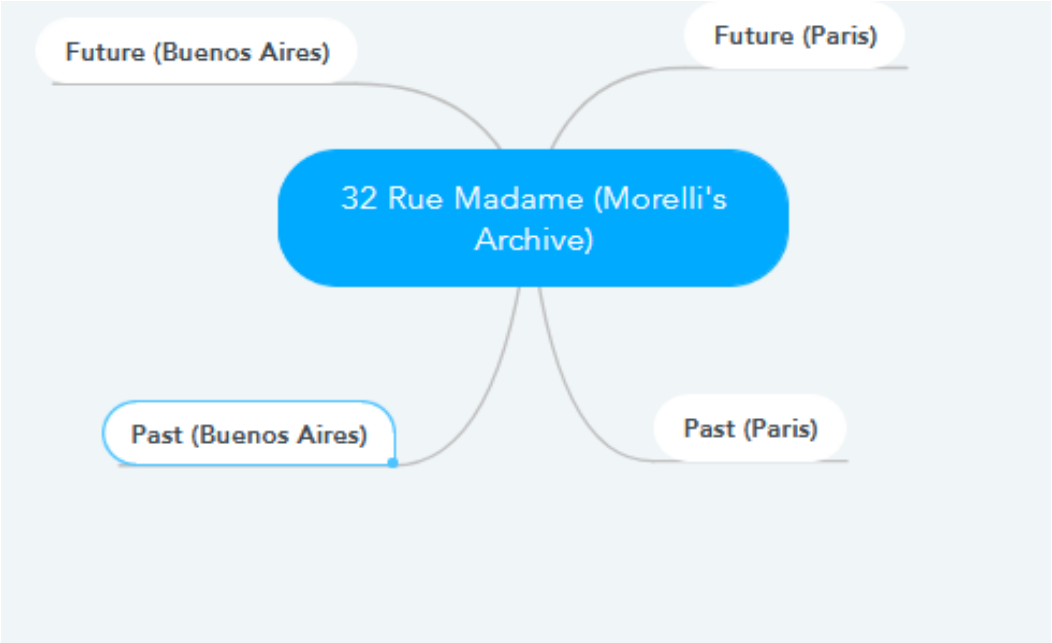


Figure 3.7—Time/Space in Book Two

Though he is situated "in-between" Paris and Buenos Aires in both books, Book One presents the more linear, causal sense of this relationship. Horacio, no matter how much he wishes to resolve his past with La Maga and be reunited with her, is unable to return to the past in any convincing way. He leaves Buenos Aires, is ejected from Paris, and returns to Buenos Aires severely defeated. Book Two, conversely, is an attempt to remove this horizontal distinction between past, present, and future by offering a different model for interpretation—where Morelli's archive becomes a reflective space which renegotiates the relationships between "The Other Side" and "This Side", a means of reflecting upon the underlying systems which structure every interaction between author, reader, and text. Thus, Morelli's

archive becomes a *mise en abyme* by which Horacio can renegotiate the failings of his deportation from Paris by deepening the relationship between "The Other Side" (Paris) and "This Side" (Buenos Aires).

The Hopscotch Board and the Mandala

This renegotiation via *mise en abyme* can be elaborated best by examining the distinctions and similarities between the hopscotch court and the mandala as geometrical figures and textual ecosystems, namely because the structure of these two ecosystems is also a negotiation via mirroring; because the *mise en abyme* produces a gap between two reflecting mirrors, the structure of the mirrors becomes a significant determinant. In this sense, the causally linear game of hopscotch found in book two becomes a to-and-fro leaping from "Diverse Sides" produced by the generative *mise en abyme*: as Lucien Dällenbach argues in his monograph *The Mirror in the Text*, "inasmuch as it implies a producer and a receiver, the inserted work of art can actualize the famous literary triad and reflect not only the fiction that contains it, but also the way in which the narrative conceives of its relationship to the author and the reader" (74). Interestingly, this inserted work of art is one which never truly appears: Morelli's novel which he theorizes endlessly, but never writes. This absent insertion produces a "paradoxical" *mise en abyme*, one which relies on dyads—novel/antinovel; author/reader; Paris/Buenos Aires; Self/Other—which are "incommensurable and irreconcilable but nonetheless, paradoxically, simultaneous" (Dickmann 4-5) in the work.

Morelli's theorized antinovel, which is a "partial rejection" of the novel inasmuch as it relies on language to communicate but rejects narrative "as a pretext for the transmission of a 'message'", instead produces "a narrative that will act as a coagulant of experiences, as a catalyst of confused and badly understood notions" which prioritizes "the material in gestation, the experiential immediacy" of reading as an accomplice to the author (397). As Horacio notes when remembering reading Morelli with La Maga,

> Morelli's allusions to an inversion of signs, to a world seen with other and from other dimensions, as an inevitable preparation for a purer vision (and all of this in a resplendently written passage, and at the same time suspicious of the farce, of icy irony before the mirror) exasperated them as it offered them the roost of an almost hope, of a justification, but at the same time denied them total security, keeping them in an unbearable ambiguity. If there was any consolation left it was the thought that Morelli too moved about in that same ambiguity […] (535).

It is through the adoption of the author's eye view afforded to him by the conversion of the hopscotch board into the generative mandala structure which provides Horacio this consolation that the author and the reader are cosufferers of the story-within-a-story which, paradoxically, never actually appears within the novel but remains theoretical, abstracted, and thus merely "possible".

Cortázar, as Steven Boldy notes, "has admitted that, on approaching the writing of a novel, his starting point has always been an almost abstract structure or geometrical pattern" (21). As in conceptual art, the generating concept is the precondition for narrativity because the concept pre-figures the text's environment, wherein the text's systems interact with entities to produce new expressions from the same raw materials. In *Hopscotch*, the hopscotch board and the mandala are not merely conceptual, however; rather, the hopscotch board and the mandala are generators which shape the textual system specifically because they inform the production, expression, and reception of the text. The spatial dynamics of the novel, which is both a game and a spiritual exercise, encourage the interplay and interpenetration of these levels. These concepts can thus be considered generators on several levels: firstly on the level of the text's conception (genesis), as the motif of "hopping" between chapters clearly serves as the

organizing principle of Book Two; secondly, on the level of diegesis (narration), as Horacio's spiritual plight is mediated through "a metaphysics of hopscotching" (Foster 106); thirdly, on the level of the form, where its mimesis of hopscotch boards and mandalas serve as forces which shape the text's expression; and fourthly on the level of meta-narrative, as in the narrative Book Two tells about the text's construction. For example, when understood through the generator of the mandala, the novel is focalized by Horacio's supposed metaphysical renegotiation—made possible by his capacity to witness his life "from diverse sides"—, which emphasizes the dynamic aspects of the novel's production, expression, and reception. This genidentic "interpenetration" of author, text, and reader through their interactions produces what Horacio calls the "Kibbutz of Desire", the heterotopic possibility space in which all potential readings are performed and united through mutually-constitutive reflection. This will take the shape of Morelli's comic "antinovel", which challenges the novel's "closed order" which arranges the novel as the transmission site of a 'certain message': paradoxically, as Morelli notes in Chapter 79, the transmission of a message through the novel's closed order "will systematically leave outside those announcements that can make messengers out of us, bring us to our own limits from which we are so far removed, while being face to face with them" (397). Thus, the antinovel expedites this process by rendering itself into a paradoxical site of reflection by way of the *mise en abyme* which produces nothing concrete but, rather, reflects all prospective readings and unites them in the gap between two mirrors.

Much like the jalousie window frames the production and reception of *La Jalousie* for Robbe-Grillet, the hopscotch court and the mandala serve as generators in the two versions of the novel respectively, shaping the environment of the text in both. The hopscotch court in Book One is, geometrically speaking, like the more linear rules governing a traditional game of hopscotch: in a game of hopscotch, the players pathway is pre-determined by the game's rules—players toss a token or stone

onto sequential squares until they have managed to work through squares 1-9 and back again. The mandala in Book Two, conversely, leads readers to jump back-and-forth between the novel's different sections, seemingly at random, much like the dynamic and meditative reflection generated in the reading of a spiritual mandala map. Further, the mandala—which translates from Sanskrit as 'center'—in Book Two is oriented around a singular point from which this jumping occurs, namely in Morelli's home at 32 Rue Madame. By contrasting the game played in Book One to the "hopscotching" of Book Two, the reader not only learns that Horacio is actively playing a rebellious, rule-breaking game of hopscotch where "little by little you start to get the knack of how to jump over the different squares (spiral hopscotch, rectangular hopscotch, fantasy hopscotch, not played very often) and then one day you learn how to leave Earth and make the pebble climb up into Heaven" (214). Thus, readers are invited to imitate Horacio's rebellious jumping as they navigate the second book. Horacio's desire to emerge victorious from his game of hopscotch is a vision of "'The infinite game'" where "'The one who conquers the center wins. From that point he dominates all possibilities, and it's senseless for his adversary to insist on continuing the play. But the center might be in some side square, or even off the board'" (555). Because this game of hopscotch breaks the linear rules of the game by conquering the center—in this case the archive of Morelli, which offers a totalizing view of the underlying systems that produce the novel Horacio inhabits—readers are likewise encouraged to disrupt the rules which govern normative approaches to reading. The imitation of this game of hopscotch pushes the reader towards generating alternative paths through the text only after readers have gone through the process of playing the game correctly and then subsequently breaking its rules alongside Horacio. Put differently, readers must experience Book One and Book Two as a procedural chain before they can take the leap of faith required to generate alternative approaches to the novel.

Book Two, therefore, is not a standard game of hopscotch but more directly resembles the sacred spaces depicted in mandalas. The mandala is a sacred geometrical map which allows the observer to witness connections across space and time. Mandalas are "representations of sanctified realms where identification between the human and the sacred occurs" (ten Grotenhuis 1). This can be seen, for example, in the *Mandala of the Two Realms* which depicts both the "Diamond" and the "Womb" realms of Buddhist Cosmology. Through contemplation, the connections between these realms can be understood and resolved by experienced practitioners.

Typically, mandalas are 2D representations of 3D space, becoming "a kind of cosmic ground plan or map" for "showing the relations among the various powers active in that realm and offering devotees a sacred precinct where enlightenment takes place" (ibid., 2). Therefore, mandalas are tools for a certain type of reading in Book Two; they reframe the rules of the hopscotch game into a kind of spiritual pilgrimage. Because "Mandalas convey a sense of emanation outward from the sacred center and of the reciprocal return to that sacred center" (ibid., 6), the path charted in Book Two resembles this reciprocal return as Horacio negotiates his past, present, and future from the authorial viewpoint of Morelli's archive at 32 Rue Madame.



Figure 3.8—The *Womb Realm Mandara*, which depicts the physical manifestation of the Buddhahood in the material world[82].

[82] [Womb Realm (garbhakosa-dhatu or taizōkai) mandala. Shingon tantric buddhist school, Heian period (794-1185), Tō-ji, Kyōto, Japan. National Treasure].

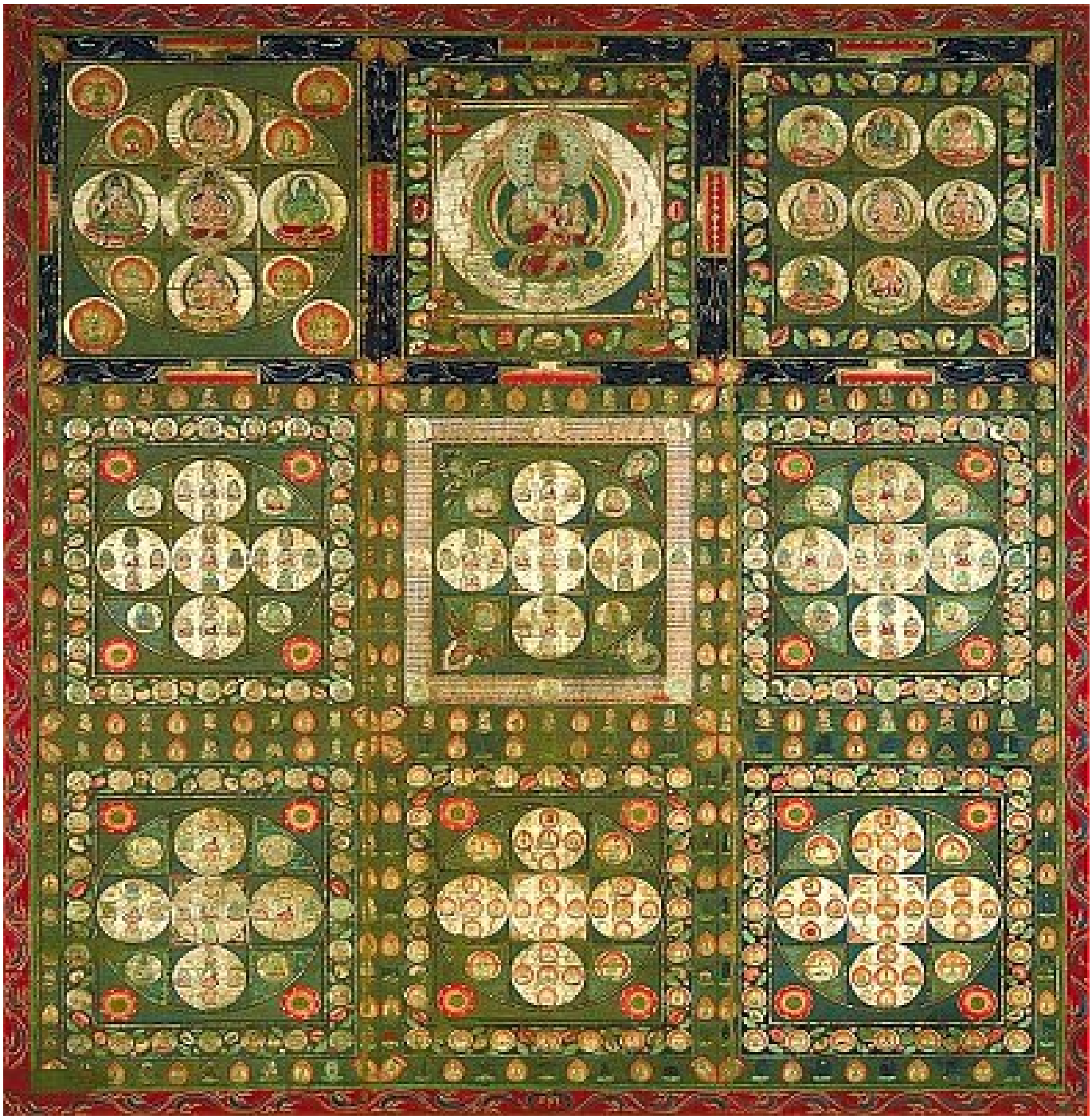


Figure 3.9—The *Diamond Realm Mandara*, which depicts the metaphysical space occupied by the Five Wisdom *Tathāgatas* (The Great Buddhas)[83].

[83] Kongokai (vajra) mandala—Shingon Tantric Buddhist School.

The connections made from this vantage point are difficult to trace because "[the] interpretation […of] mandalas is complex, but generally speaking, the deity who presides over the central court is synonymous with the generative power of the universe" (ibid., 3). Morelli, then, is seated in the center which Horacio seeks. His notes offer insights into the "generative power" he wields as the author, made explicit to Horacio as he traces connections between different events across the course of his life. In this sense, the mandala "suggests the ever-changing nature of a universe that unfolds and develops into a myriad of forms" (ibid.), much like *Hopscotch's* second book attempts to examine the book as though it were a "plastic universe" (*Hopscotch* 371). This plastic universe becomes a means of examining constellations of meaning, the patterns and connections drawn between things to the degree where

> a person might be able to enter any gate and come into any garden […]
> just as mandalas are allegorical for everyone else, and in that garden he
> would find a flower and that flower would be La Maga, or Babs, or Wong,
> but described and describing itself, reconstituted outside their appearances
> among the Club, back to what they were, emerged, dawning (73).

Figures and Figura

As is immediately apparent in the above description of the text's structure, these two readings of the novel do generate distinct, yet complementary geometrical relationships between author, text, and reader. *Hopscotch* offers these geometrical figures as two ecosystems which generate two books and thus require two approaches to interpretation. The two rule-sets offered in the "Table of Instructions" restructure the text based on different relationships between author, text, and reader. I refer to these interpretive relationships using the terms **figures** and **figura**, which correspond to the two types of interpretation modeled by the novel. These interpretive relationships formulate and contrast two approaches to writing and reading literature, which are treated like two spatio-temporal relationships

between author, text, and reader. These relationships do not simply re-shape the environment of the text but also offer two different approaches to navigating this environment. As Giulia Agostini argues, Cortázar openly experimented with "geometrical figures" in his fiction (139). This took on the shape of experiments which "[were] not content with mere *representations* of geometrical figures" but also with "their *presentation* or *realization*" (140). The realization of these geometrical figures becomes a matter of readerly performance, expressed through the contrasting interpretive approaches—figures and figura—offered.

Figures refer to the more representational quality of Book One because they are the rules embedded in the world's structure which predetermine relationships based on causal necessity. Horacio's desire to manipulate figures is one of the core conflicts in Book One, expressed in his constant building of "figures":

> He wondered where he had picked up the habit of always carrying pieces of string in his pockets, of putting colored threads together and placing them between the pages of books, of constructing all manner of figures with those things and gum tragacanth (327).

Horacio's effort to construct and re-construct the boundaries and rules which bind him is exemplified in his figure building, as "nothing seemed more instructive to him than to construct for example a huge transparent dodecahedron, the work of many hours and much complication" only to later "bring a match close to it later on" (ibid.). This desire to defy these predetermined relationships, to break free from life's conventions, is justified because "the more fragile and perishable the structure, the greater the freedom to make and unmake it" (ibid.).

Conversely, figura expresses the generative principle of plasticity Horacio is attempting to imitate with the making and unmaking of his figures. Figuras are, in *Hopscotch*, the expression of the

stoic concept of *pneuma* or "breath", "the active and creative presence in matter" (Sedley, "Hellenistic Physics and Metaphysics" 388). In Book Two, this emphasis on pneuma reframes Paris as

> a mandala through which one must pass without dialectics, a labyrinth where pragmatic formulas are of no use except to get lost in. Then a cogito which may be a kind of breathing Paris in, getting into it by letting it get in you, *pneuma* and not *logos* (*Hopscotch* 427).

This emphasis of *pneuma* and not *logos* suggests a new type of reading, one which breaks free from figures. Unlike in Book One, where linearity and causality bind Horacio to his pre-determined fate, in Book Two the concept of figura is developed as a paradoxical synthesis of "The Other Side" and "This Side" "From Diverse Sides". Unlike a dialectical triad where contradictions are resolved into a synthesis, figural reading is "[not] a methodical certainty, oh no, dear fellow, never that, much as you might want it that way, nor an *in vino veritas* nor a Fichte-like dialectic or other Spinozan precious stones, only an acceptance in nausea, Heraclitus had got himself buried in a pile of manure to cure himself of dropsy […]" (210).

As Erich Auerbach argues in his seminal essay "Figura", figural interpretation

> establishes a connection between two events or persons, the first of which signifies not only itself but also the second, while the second encompasses or fulfills the first. The two poles of the figure are separate in time, but both, being real events or figures, are within time, within the stream of historical life (53).

Figura, then, allow Horacio to reconcile past, present, and future independent of *logos*. In part, the revelations offered in Book Two—particularly those in Morelli's archive—allow Horacio to "see [himself] as a meaningful participant in the constantly unfolding eschatology of God [in this case, the

author], but also to establish a precedent upon which to model oneself in fulfilling that participation" (Hunt "Preface"). Figuras are the 'possible' idealization of Horacio's makeshift figures, which "he made as full of free space as possible, the air able to enter and leave, especially leave" (*Hopscotch* 327). This free space encourages openness and pattern-recognition, much like figural analysis allows one to view "the universe as an open system that is ultimately as unfathomable as the mind of God" (Hunt 3).

When reading based on figuras, then, the reader is given a wider range of interpretation specifically because the horizon of the text opens significantly. With figuras, "the whole universe ultimately reflects the work of a single creative influence which suffuses its creation with recurring themes and variations which can be as recognizable as those of any human artist" (Hunt 24). This expresses the relationship between Horacio and Morelli quite convincingly. When seen from diverse sides, relationships between previously disjointed sections of the novel are reformed by Horacio and the reader in Book Two as though they are linked by a "unique mode of historical causation, 'figural causation' […] which is radically different from ancient, classic teleological notions of causality" (Zakai and Weinstein, 324). This produces two different paths through the text which, when visualized, produce two different kinds of geometrical relationships.

Methods: GIS And Stochastic Blockmodels

Changes to the "rules" of reading are presented in *Hopscotch* as two distinct outcomes of the textual system, one which resembles the rule-bounded play of a game of hopscotch and the other which reflects the transcendent "free play" of a mandala. This fosters two different approaches to the text, while also calling for the text to be mapped accordingly. Two methods used to visualize or map the novel are Geographical Information Systems (GIS) and stochastic blockmodels. Using GIS software and stochastic blockmodels to map the two books, it becomes clear that each offers a distinctive visualization of spatial-temporal relationships in the novel; regardless, these distinct visions are

complementary and integrated ("simultaneous", even), meaning that the novel pushes the reader to meditate on the relationships between the two novels as aspects of the same process of Horacio's movement from infantilism to maturity.

Interestingly, the relationships produced by reading for figures and figurae support these two approaches because each offers an approach to reading that produces a different kind of map. These terms also align quite comfortably with the two methods applied: GIS maps because they are useful for tracing the causally-linear figures, and stochastic blockmodels because they examine the often paradoxically-patterned relationships—also known as "ties"—which constitute a social network. These two approaches to mapping are completed, firstly, by generating maps of the text's places as they are narrated in Book One. This involves using qGIS to track Horacio's actual movements throughout Paris. From these maps, we can visualize the inner workings of the novel's central plot. The second approach emerges as a necessary response to the limitations of the first. Maps are relatively constrained by the laws of space and time which govern experience, despite being top-down representations. Typically, a map can either focus on large-scale movements (for example, mapping the simple movement of Horacio from Buenos Aires to Paris, and then from Paris to Buenos Aires) or on smaller, more granular movements (such as Horacio's movements through Paris in Section One). As such, the novel's spatialization—which attempts to show these two scales as simultaneous—forces readers to accept either the macro- or the micro-scale.

The resulting maps offer interesting diagrams of the novel's plotting but fail to discern the underlying structure of Book Two. As such, Book Two requires a mapping which defies linear, causal notions of space and time. The movement of the reader from chapter to chapter in a seemingly arbitrary manner opens the text up to new spatial and temporal relationships. To resolve this, I apply stochastic blockmodels to examine Book Two's structure, tracing relationships between places in the novel based

on the movement between chapters and sections. Stochastic blockmodels are "hypotheses about the structure of relations in a social network. These hypotheses refer to positions of actors […] and they summarize features of the entire network in a multirelational system" (Wasserman and Faust 408). Unlike maps, which occupy a singular, top-down perspective, a blockmodel "handles the points of view of all nodes simultaneously" (Lorrain and White 50). A blockmodel "consists of concurrent dual treatments of individuals on the one hand and relations on the other" (ibid.). Typically applied as a means of examining human networks, stochastic blockmodels are particularly effective at examining "interrelations", the "relations among the members of a social system [which] occur in characteristic bundles and how these bundles of interrelations interlock and determine one another" (ibid. 49). In every network there are "positions" and "roles" which determine behaviour and constitute "ties" between individual nodes in the network (White, Boorman, and Breiger 734-737) based on their behaviours and relations. By examining these ties, blockmodels provide a "view of social structure obtained directly from aggregation of the relational data without imposing any a priori categories or attributes for actors" (ibid., 731). This flexibility allows blockmodels to offer a "natural framework for discussing various types of structural change" (ibid., 732). Rather than examining human networks, however, I map the structural ties between places visited and when they were visited in the novel to diagram the mandala-like ecosystem of Book Two.

Mapping Figures in Book One

In Book One, the novel follows a more linear trajectory in terms of its reading. This book is comprised of Chapters 1 through 56, which corresponds to Sections One and Two read in sequential order. This reading allows readers to "ignore what follows [Section Three] with a clear conscience" ("Table of Instructions"). The content is likewise in a more linear fashion: this literally straightforward reading offers the reader insight into the mentality of Horacio, tracing his existential searching to combat

his sense of alienation from the world and those around him through examinations of his memories, interactions, and ideas.

Horacio appears to be completely alienated from the world around him at the start of this book, as he wonders aloud "Would I find La Maga?" (3). Horacio's alienation frames the first book: "the first lines of the first book suggest a concrete, physical alienation—that is, separation—from la Maga" (Colás 36), although "alienation presents numerous interrelated faces and figures" (ibid.) throughout. In Book One characters are depicted through their interiorities and worldviews. This is best exemplified in the relationship between La Maga and the male members of the Serpent Club: though they thoroughly mock her inability to discuss things in abstract terms, they subconsciously know that she "was always reaching those great timeless plateaus that they were all seeking through dialectics" (25). Alienated from the present moment, lost in rational abstractions and utopian fictions, the men of the Serpent Club wander aimlessly through the world of the novel searching for a means to synthesize their ideas with the reality they live.

In classical novels, this kind of character development is shown through the interiority of characters, their psychological states[84]. Horacio's development is no different in Book One. Though he desires to escape the traditional conception of living by the alienating constraints of modern life—the conventions that govern social relationships, the language games that render these relationships into misunderstandings—Horacio never actively participates in his own life and remains "cynically impartial" (290) throughout the book. La Maga accuses him of being "like a witness […] who goes to the museum and looks at the paintings […]. I'm a painting. Rocamadour is a painting. Etienne is a painting, this room is a painting. You think that you're in this room, but you're not. You're looking at the room, you're not in the room" (20). La Maga's criticism of Horacio is an ironic unraveling of Horacio's

[84] This is, at least, the critique of classical novels inspired by the nouveau roman and Robbe-Grillet in particular. A similar critique of traditional, psychological narration is present in *Hopscotch*.

notion of the search: ultimately, Horacio is not searching in physical space so much as he is scouring the past, navigating his own memories. He is, metaphorically, not in the room.

The inability of Horacio to abandon the figures and memories which dominate his life is mirrored if we map the novel. In Chapter 1 we find Horacio wandering the Pont des Arts looking for La Maga [“Why was I coming to the Pont des Arts?” (4)]. Chapter 1 is shown below in Figure 3.10, where his memories form a shell around him. Observing the map of the text, we can see that Horacio's wandering in Chapter 1 serves as the present moment in the first section. The map of the first section reveals that Book One is primarily a series of memories framing Horacio's last night in Paris. After wandering without finding La Maga, Horacio reflects on their past. The present moment resumes only occasionally throughout the book, only coming into focus fully later in the book as Horacio is being deported after a night of absurdity and hard drinking with a *clochard* named Emmanuèle.
This expanding, circular structure diagrams Horacio's central conflict in Book One: that he is trapped by the rules of the game—bounded to a hopscotch board drawn on the ground—becomes a concrete reality until he emerges at the end of the Paris section. His memories literally encircle him, trapping him. This is in large part because he is a passive figure in the past, as La Maga observes.

Nonetheless, though Horacio's grandest gestures of personal agency are determined by his role as an onlooker, a spectator, or an outsider, mapping Book One shows that he is no longer fulfilling this role in the present moment. He is completely surrounded by his memories and potential projections of La Maga. In this sense, many of his accusations against La Maga’s poor reading habits, her being “amazed at how much [Horacio] knew about things like literature and cool jazz, which were great mysteries for her” (12), and her inability to think abstractly are Horacio’s own defensive projections, built to surround and frame his memories from the harsh realization that La Maga will never be found. While La Maga

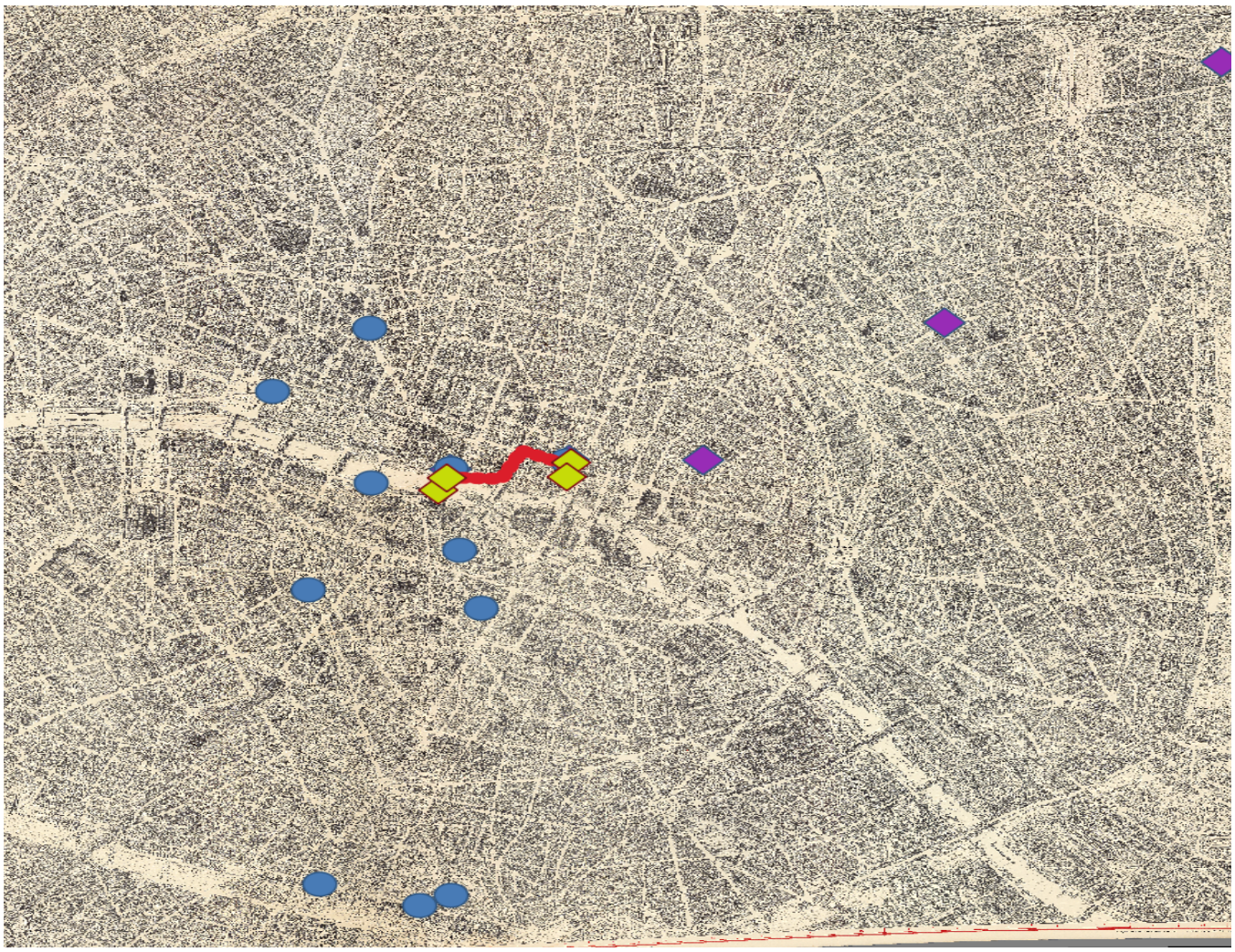


Figure 3.10—A map of Chapter 1; notably, La Maga's potential location (the purple diamond) moves further and further away from Horacio and his memories as the chapter proceeds.

May have correctly observed Horacio during their time together and even though "you didn't discuss reality in methodical terms with La Maga", she was nonetheless Horacio's "witness and […] spy without being aware of it" (12-13). In this sense, La Maga's accusations of Horacio being an onlooker from

outside no longer apply in the present, though they do allow Horacio to disregard the present in favour of their shared past. This is presented as the primary conflict between La Maga and Horacio: he

> imposed the false order that hides chaos, pretending that [he] was dedicated to a profound existence while all the time it was one that barely dipped its toe into the terrible waters. There are metaphysical rivers […]. I describe and define and desire those rivers, but she swims in them. I look for them, find them, observe them from the bridge, but she swims in them. And she doesn't know it (96).

Thus, Horacio's notion of himself as outside is directly tied to La Maga's description of him as an outside observer, a role he imagines operates beyond history, language, and any other convention. This ultimately proves futile when, later in the novel, Horacio observes that "Reason with its use of language has set up a satisfactory architecture, like the delightful, rhythmical composition in Renaissance painting, and it has stuck us in the center" (162). This confirms, as David Foster argues, that "Oliveira's anguish stems from an existence to be lived […] without transcendental patterns that comfort in their all-encompassing mechanisms" (105). Throughout Book One, Horacio is alienated from these patterns and yet he is incapable of emerging beyond them. He attempts to undermine language through language, rationality through rationalizations, and, failing in these attempts, determines that it is "impossible to live with a puppeteer who works with shadows, a moth-tamer" (182).

Ultimately, the first book depicts the nausea of modern life and the novel's incapacity to adequately depict it, represented by Horacio's constant searching for La Maga in his personal history and linguistic excursions. Horacio "seeks a more authentic basis for life" than the "dialectic possibilities" resulting from "rational Western civilization" (Garfield 91). Nonetheless, the search is primarily conducted through Horacio's use of La Maga as a medium through antagonism: their

relationship is itself "a sort of dialectic of magnet and iron filings, attack and defense, handball and wall" (13). Throughout the novel "La Maga […] emerges as his most transcendental and therefore his most destructive ideal" (Foster 111). She becomes, "like Beatrice […] some sort of unique feeling or set of values for Oliveira. La Maga *is* emotion or feeling" (112). Because Maga is intuitive and capable of embracing the present moment, Horacio imagines her crossing between various "metaphysical rivers": "she swims in them like that swallow swimming in the air, spinning madly around a belfry, letting herself drop so that she can rise up all the better with the swoop" (96). Thus, La Maga becomes a kind of symbol for Horacio, a mirror which complements and completes him because a mirror image "of course is always the reverse view of the person it reflects" (Garfield 103).

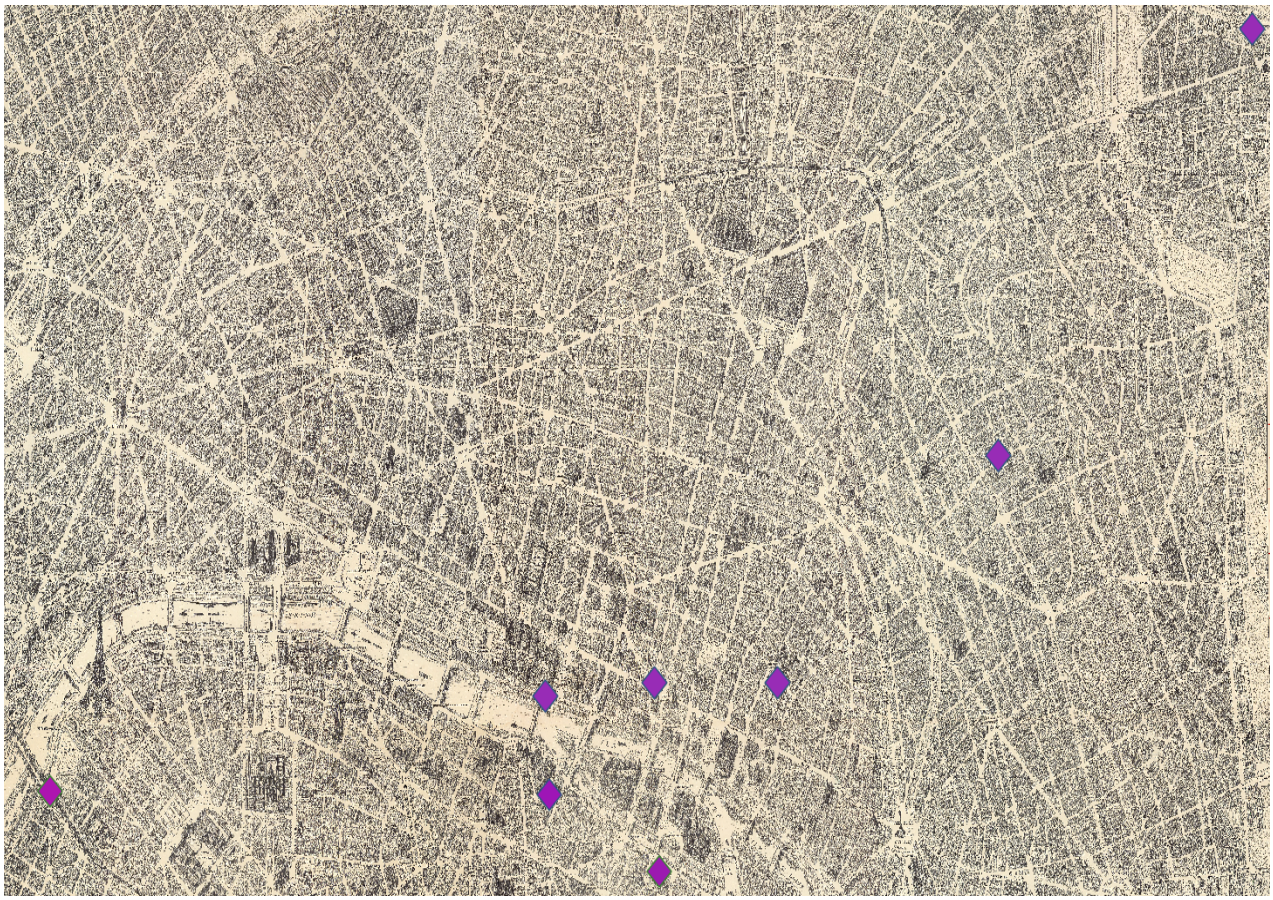


Figure 3.11—Potential locations for La Maga, including where she may have ultimately drowned herself near Grenelle to the West.

As Horacio wanders throughout the first book—at least through his memories of Paris—he searches not only for La Maga but also for the evidence she is representative of: the rules which determine his existence as a finite being thrown into the world against his will. He imagines that he, La Maga, and other characters are separate "links in a nonexistent chain" (49). This is what is meant when Horacio proclaims his desire "[to] find out what's behind something" (86); he desires to see the underlying structures of life for the absurdities that they really are, the nonexistent chain which links realities in space and time. This desire also frames Horacio's relationship with Maga. It becomes clear that without her perspective he would never have seen Paris in the ways that he did; without her he becomes passive and disinterested, surrounded only by her memory. La Maga, now missing, is perceived by Horacio as the only resolution to his plight: only La Maga can truly immerse herself in the game of hopscotch he purports to be playing. Although Horacio argues that "'The only dangers for me are metaphysical'", it becomes quite clear that it is La Maga, and not Horacio, who understands the fluid nature of the game. She responds, arguing that "'There are also metaphysical rivers, Horacio. You're going to jump into one of those rivers'" (89). Horacio's response, that "'It would have to be the Tao'" (ibid.), explains why Horacio is unable to move once he has lost La Maga. Without her intuitive, immersive awareness of these rivers, Horacio is left to search for an impossible transcendence which never emerges, to "go along forming an absurd pattern, with our movements we sketch out a pattern just like the ones flies make when they fly around a room, from here to there, suddenly, in mid-flight, from there to here, that's what they call Brownian movement" (197). In actantial terms, without La Maga as his object, Horacio loses his ability to behave like a subject. Without using another person to escape his own passivity, someone who drags him out of his inaction, Horacio loses at his own game.

Before and after La Maga's disappearance, Horacio determines he must forge bridges between himself and other people to resolve his sense of alienation and passivity. Rather than finding his own

"more authentic basis for life", Horacio begins to use other people as the mediums through which he can run his experimental games, as mirrors for him to stare into and learn how to be in the world: other characters are "a sum of possibilities. Horacio sees in everything the potential for a different way of life, and he longs for this completeness" (Yovanovich 108). This results in Horacio's anxiety over action and inaction. At the start of the novel, which largely focuses on Horacio's relationship with la Maga, Horacio "conceives la Maga as a means toward the end of self-transcendence", but their differences and his inability to act prevent "a genuine blurring or merging of self and other [so that] the other [La Maga] winds up depleted, inert, and discarded after the reaction" (Colás 40-41).

This idea of the bridge operates on several levels: firstly, it is a move towards understanding, "[that] true otherness made up of delicate contacts, marvelous adjustments with the world […], the outstretched hand had to find response in another hand stretched out from beyond, from the other part" (99). Secondly, it allows Horacio to sublimate the memory of losing La Maga, so she can "cease to be a lost object and become the image of a possible reunion" (292). Thirdly, it allows readers to take seriously the types of spatialization the novel emphasizes. Much like a game relies on a certain level of co-operation and understanding of the other (expressed by the rules which players must willfully adopt to play the game with other players, against them), the notion of the bridge in Book One suggests that this co-operation through willful adoption is an acknowledgement of another's will. For Horacio, this recognition is one that requires his direct, active involvement; to progress, he must actively reach out to the Other. No longer using characters as vehicles for his own meaning by the end of the novel, Horacio must take a leap that "will end up in the arms of someone else" (99), maintaining their otherness while risking his own self in the process of leaping.

Figures, likewise, operate as a certain type of bridge: they connect past, present, and future in a causal chain, determined by the rules which structure the game. Take, for instance, the chain of events

beginning with Horacio's meeting with the singer Berthe Trépat. In this section, Horacio watches her perform while the crowd progressively leaves. Berthe's performance is a chaotic failure, but it thrills Horacio because it is a genuine effort at what the singer calls "prophetic syncretism", consisting of "antistructural constructions, that is to say, autonomous cells of sound, the result of pure inspiration, held together by the general intent of the work but completely free of classical molds, dodecaphonic or atonal (he stressed the last two words)" (103). After the concert, Horacio approaches the singer, whose seemingly profound musical experiments belie her shallow, lonely existence:

> He made a motion to free himself, but the pianist gripped his arm and came closer. Oliveira could smell the sweat of the concert mixed with napthaline and benzoin (as well as piss and cheap perfume). First Rocamadour and now Berthe Trépat, it was unbelievable. 'Gold medal,' she kept saying, crying and snuffling. Suddenly a great sob shook her as if a chord had burst into the air. 'And it's the same old thing…' Oliveira finally understood as he fought in vain to get away from personal feelings, to take refuge in some metaphysical river, naturally. Offering no resistance, Berthe Trépat let herself be led back, towards the curtains where the usher was looking at them (110).

While excited to discuss her performance, Horacio quickly realizes that she is only concerned with the crowd and their inability to recognize her greatness. When they arrive at her home, Horacio offers to buy her a drink which she refuses because her partner, Valentin, is home: "it was just too idiotic, it was incredibly beautiful and now it was going away, it was going away in the rain because Berthe Trépat had not invited him up, she was sending him back to the corner café, re-enlisting him in the order of the day" (119). Horacio, disappointed, then offers to buy Berthe a hotel room when she realizes she has forgotten her keys; she misunderstands, thinking he is propositioning her, and slaps him: "the hand of the other—

to which Horacio has necessarily submitted himself […]—ultimately shatters [his] utopian journey" with Berthe (Colás 54). This leads him to completely remove himself from the game by rationalizing "away the possibility of a risky emotional investment" (ibid., 55).

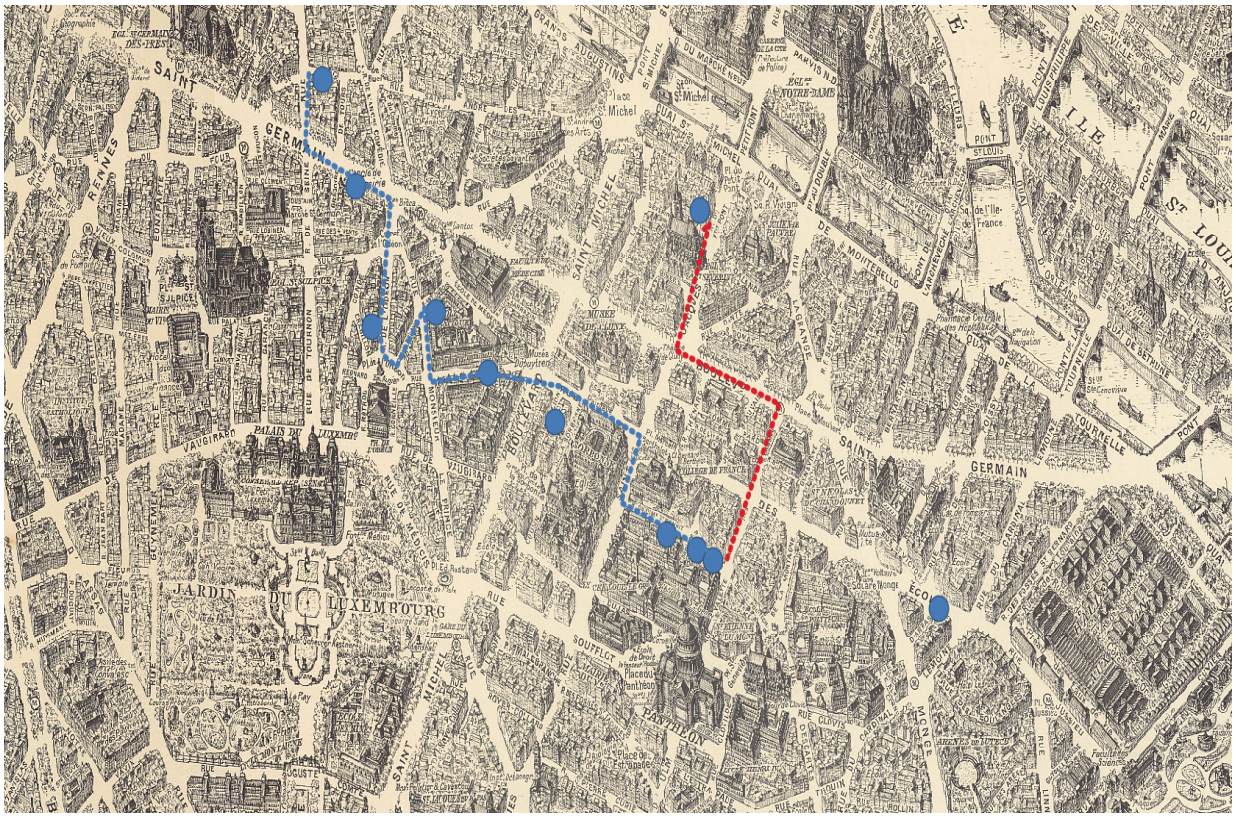


Figure 3.12—Horacio and Berthe's Walk (blue); Horacio leaves alone to return to Maga's apartment alone (red).

In the following sequence, Horacio joins the Serpent Club at Maga's apartment. While Maga runs around attempting to take care of her infant son Rocamadour, who is ill, the rest of the Club smokes, listens to jazz, and debates various metaphysical issues. Horacio, still soaked and stinging from his failed attempt at bridging between himself and Berthe Trépat, observes that Rocamadour is cold; the child has died. While he knows that he should behave in the predictable manner, that he should "'Fall into the pattern'" and begin to "'Shout, turn on the light, start the obligatory hustle and bustle'" (147), Horacio remains inactive, intentionally hiding the information from Maga and instead slowly notifying

the rest of the group before her. The discussion continues while Horacio observes the chain of events unfold: "Now we shall have fifteen minutes of chain reactions which no one will be able to avoid" (167). Clearly, the "memory of the episode with the pianist [Berthe] […] dictates Horacio's cruel experiment" with Rocamadour's death (Colás 55).

This chain of events causes La Maga's disappearance and pushes Horacio out of the Serpent Club. Alone and surrounded by his memories, this is the Horacio we meet in the beginning chapters of the novel, and this is the Horacio who is swiftly deported from Paris after spending a night drinking with Emmanuèle. This night becomes a "turning the world upside-down" for Horacio which "suggests the recreation of the original chaos in primitive societies at the end of a cycle before a new one can be born" (Boldy 68). This sequence ends the Paris section of the novel, starting a new cycle for Horacio: by purifying himself through transgressive sexual acts, Horacio aligns himself with Heraclitus who paradoxically sat "In shit up to his neck […] just like the two of them except without wine, and besides, he wanted to cure himself of dropsy" (210). Despite his reflections on this transgressive limit experience, which Horacio claims becomes a form of looking "at the world through the eyes of your asshole" (216), this sequence ultimately continues the chain of Horacio's use of women figures as mediums for his own enlightenment rather than a resolution of it:

> the pebble had to pass through the eye of your asshole, kicked along by the tip of your toe, and from Earth to Heaven the squares would be open, the labyrinth would unfold like the spring of a broken clock as it made workmen's time fly off in a thousand pieces, and through the snot and semen and stink of Emmanuèle and the shit of the Obscure one you would come onto the road leading to the kibbutz of desire, no longer rising up to Heaven (rise up, a hypocrite word, Heaven, *flatus vocis*), but walk along with the pace of a man through a land of men towards the

> kibbutz far off there but on the same level, just as Heaven was on the same level as Earth on the dirty sidewalk where you played the game (216).

Despite Horacio's claims of the immanence of Heaven on the dirty Earth, the sublimation of Berthe Trépat's and Emmanuèle's images into Maga's is not resolved in this transgressive act; rather, Horacio is forcefully evacuated back to Buenos Aires alongside his memories of Maga. Rather than Paris being a generative, womblike space that envelops Horacio, he is promptly and transgressively evacuated from its bowels.

In the second section of the novel, set in Buenos Aires, Horacio simultaneously adopts and criticizes his passive mode of searching. Now in a relationship with a woman he does not care about, Gekrepten, Horacio accepts his lot in life while commenting that the game is rigged. Likewise, his friends Traveler and Talita find him work—first at a circus, then at a mental asylum—again revealing his inaction and unwillingness to enter the game without using other people. Crucially, Horacio's inability to resolve his feelings over the loss of Maga structures his relationship with Traveler—who Horacio claims is his double—and Talita—who Horacio regularly mistakes for La Maga. This clearly reflects the failed attempt at sublimation through mediation shown at the end of the first section. For example, in a key chapter in this section, Horacio forces Talita to cross a bridge between her apartment and Horacio's to deliver him some nails and yerba mate. Horacio once again uses an idealized female figure as a medium for his development. While Horacio stands on one side, pushing Talita forward, Traveler observes from the other side, encouraging her to throw the nails and tea and turn around. Horacio remarks throughout that the sequence is predetermined by the same rules he has been fighting the entire time: "'It's funny,' he thought, as he watched the lasso go over her head. 'Everything really falls into place piece by piece if you really want it to. The only thing untrue about all this is the analysis of it'" (246). Shortly after, Talita decides to turn back, leaving Horacio's bridge yet again incomplete:

> ’If it’s all right with you, I’ll toss the package and go back inside,’ Talita said. Oliveira looked at the bridge, measured the window with a vague motion of his arms, and shook his head. ‘You might miss,’ he said. ‘Besides, I get a funny feeling having you out there in this freezing cold. Can’t you feel icicles forming in your hair and in your nasal passages?’ ‘No,’ Talita said. ‘Are the icicles going to be like fastigiums?’ ‘In a certain way, yes,’ Oliveira said. ‘They’re two things that do seem alike from the point of view of their differences, a little like Manú and me, if you think about it a little. You’re probably aware that all this trouble with Manú is that we look too much alike’ (252-253).

Further problematizing Horacio’s effort to construct a bridge between himself and Traveler by way of Talita, his girlfriend Gekrepten intervenes in the bridging game with a mundane story of her trip to the dentist. This prompts Horacio to remark to Traveler about his efforts to achieve a perspective beyond the rule-bound, mundane existence he is currently playing bridging games with: “’God put me here to watch over your city,’” (256). Traveler immediately replies, noting Horacio’s dismissal of Gekrepten, arguing that

> ‘When you’re not judging me you do it to your old lady.’ ‘In order to prod you and keep you both awake,’ Oliveira said. ‘Like a Mosaic mania. It came to you on the way down from Mount Sinai.’ ‘I like things to be as clear as possible,’ Oliveira said. ‘It doesn’t seem to matter to you that right in the middle of a conversation Gekrepten sticks in a completely fantastic story about a dentist and some damned skirt or other. You don’t seem to realize that these outbursts, pardonable when they’re beautiful or at least

> inspired, become repulsive as soon as they start to cut into an order of things, torpedo a structure (256).

For Santiago Colás this sequence shows that Talita "has become the medium through which Horacio and Traveler work out their own differences […]. [Horacio] defines her in terms of what she 'adds' to the reaction between him and Traveler. Her identity depends exclusively on her function in a system of mediations constructed rationally by Horacio" (57). Talita bridges the gap between them, while Gekrepten disrupts it, intervening with unrelated stories which for Horacio pervert the bridge he has constructed between himself and Traveler. Clearly, this bridge is yet another means by which Horacio unsuccessfully renders the other into "an object facilitating the constitution of a structure" (ibid.).

At the end of the first book, working in the mental asylum, Horacio and Talita have a romantic moment wherein Horacio mistakes her for Maga (321). This reconnection again reveals Horacio's inner-state, as does his reaction. Rather than approaching Traveler, Horacio panics and hides himself in a room on the uppermost floor of the institution. He builds a maze of "pieces of string and thread" (327) to hide behind, an effort to prevent Traveler from reaching him. After Traveler navigates the maze, he and Horacio discuss the situation until "Oliveira closed his eyes and thought that everything was so good like that, that Traveler really was his brother" (346). Through his navigation of Horacio's world of figures, Traveler reveals to Horacio that games—the frames within which Horacio lives his life—are potential means by which we might genuinely understand one-another. Games *might* serve as bridges between people, connecting them through mutual framing and willful participation: if we adopt another's game, we might learn who they are without necessarily benefiting ourselves. In this sense, the chain Horacio fears is somewhat broken. Watching Traveler and Talita standing on a hopscotch court below him, Horacio ends Book One sitting on an open window ledge contemplating a genuine jump into the game:

> the harmony lasted incredibly long, there were no words that could answer the goodness of those two down there below, looking at him and talking to him from the hopscotch, because Talita had stopped in square three without realizing it, and Traveler had one foot in six, so that the only thing left to do was to move his right hand a little in a timid salute and stay there looking at La Maga, at Manú, telling himself that there was some meeting after all, even though it might only last just for that terribly sweet instant in which the best thing without any doubt at all would be to lean over just a little bit farther out and let himself go, paff the end (348-349).

Throughout the first book, this genuine leap of faith—exposing oneself to the risk of otherness, the risk of genuine communication with another person—is depicted as an emergence into a transcendent elsewhere which Horacio must actively take. This ultimately resembles the Fichtean dialectical triad of thesis-antithesis-synthesis, showing that Horacio fails to expand beyond the dialectical, rational worldview he so clearly wishes to escape. Figures, therefore, are opposed to the more plastic form Horacio desires wherein history, language, and otherness are resolved through adopting countless, variable perspectives. This resolution is only possible, he originally believes, if he can "find ubiquity" (241): if he can see the systems determining the causal chain of his life and understand them, he can begin to manipulate them as a means of resolving his identity crisis and alienation.

Authorship as Figura in Book Two

To this end, Book Two breaks Book One's causal chains into independent elements of the novel through the principle of juxtaposition. Readers are pushed to leap back and forth across the three sections of the text in a seemingly-random order. In this sense, in Book Two "it is the inner dynamics of the novel that confer meaning upon [the] episodes […] [because] the reader must be prepared to apply

the principle of the possible equivalence between very different objects to his own reading" (Boldy 47). The relationships between these possibly equivalent objects in Book Two resemble the notion of structural equivalence found in stochastic blockmodels: "the aim of blockmodeling is to find a parsimonious representation of the total configuration of relations […]. The criterion of structural equivalence, therefore, groups individuals with respect to their relations to and from all other individuals" (Panning 589). The re-ordering of the novel into a distinctive kind of space—one where time and space are flattened, as they are in blockmodels—draws the reader's attention to the physical space of the text while at the same time re-framing the hopscotch gameboard with a different set of rules.

Therefore, a key distinction separating Book One from Book Two lies in the distinction between games and play. Book One is better understood as a game, as games are bounded by their rules. Rules provide context for how to interact within a game's environment, a notion tied to the notion of games as being played within the bounds of the "magic circle" (Huizinga 10). This conception of games is exemplified in the discussions of the Serpent Club, for example, when Maga "was terribly in awe of Oliveira and Etienne, who could keep an argument going for three hours without a stop. There was something like a circle of chalk around [them] and she wanted to get inside" (25). Horacio and his friends delineate this circle, defending their conversations from the outside world, which Maga so actively participates in, as a means of playing their own games without interruption.

By contrast, Book Two is better understood through the concept of free play, associated with the freedom and flexibility of jazz:

> jazz is like a bird who migrates or emigrates or immigrates or
> transmigrates, roadblock jumper, smuggler, something that runs and mixes
> in […] a cloud without frontiers, a spy of air and water, an archetypal

> form, something from before, from below, that brings Mexicans together with Norwegians and Russians and Spaniards, brings them back into that obscure and forgotten central flame, clumsily and badly and precariously he delivers them back to a betrayed origin, he shows them that perhaps there have been other paths and that the one they took was maybe not the only one or the best one, or that perhaps there have been other paths and that the one they took was the best, but perhaps there were other paths that made for softer walking and that they had not taken those (70-71).

The improvisational, open quality of jazz implies a random playfulness, an emphasizing of "pneuma and not logos" (427), which Horacio continuously searches for. As such, this notion of music as a space—as a series of paths—offers an easy analogy for the type of dynamic movement adopted by the reader in Book Two.

In comparing the beginnings of Book One to Book Two, this different emphasis becomes evident. Book One begins with Chapter 1, which shows Horacio searching for La Maga. Book Two begins, conversely, with a discussion of the "dull fire" which can never be cured. Though fire in the first novel may simply refer to "that desire (the fire) [which] cannot be satiated" (Ubilluz 96), in Book Two it is best thought of as a reference to the novel's desire for discerning fundamental structures and undoing them. References to Heraclitus also serve—beyond the paradoxical burying of oneself in dung to cure oneself of disease—as allusions to the deep desire for change and dynamism. Known for his desire to locate the primary element of existence, Heraclitus argued that fire is the *arché*, the primary structuring force of the cosmos. This fire shapes the universe as a constantly flickering flame, leading to the inconstancy and dynamism of life which are represented in Heraclitus's paradoxical philosophical models. As Santiago Colás points out, "this combination of beginnings puts in play the themes that

organize *[Hopscotch]*: alienation and immediacy, love and culture, the body and the mind" (31). Therefore, the structuring of both books is dependent upon their genesis points and the search for La Maga or this underlying 'dull fire'.

This immediately implies that Book Two is concerned with a different structural idea than the first. Concerned primarily with the structure of the novel itself, the biggest distinction between Book Two and Book One lies not only in the re-ordering of chapters but in the interpolation of the "expendable chapters" throughout the narrative as a framing device. These chapters primarily consist of the archive of Morelli, who is injured in a car accident in both books. In Book One, Morelli's identity remains obscured. Interestingly, only his address is provided: 32 Rue Madame. This address becomes the nexus point of Book Two, the point which connects all other points in the network of spaces represented in the book. Unlike in Book One where movement and memories throughout Buenos Aires consists of only two or three locations, Horacio's time spent in 32 Rue Madame allows for him to incorporate Buenos Aires and render it as structurally tied—and thus structurally equivalent—to spaces in Paris.

After visiting Morelli in the hospital, the author gives Horacio and his friends the keys to his home so they can move through his archive and better understand his authorial system:

> 'It's the key to my apartment,' Morelli said. 'I would really be very happy.'
> 'It really will be quite a job,' Oliveira said. 'No, it's not as difficult as it seems. The notebooks will help you, there's a system of colors, numbers, and letters. You'll figure it out at once. For example, this goes in the blue notebook, a place I call the sea, but that's marginal, a game so I can understand myself better. Number 52: all you have to do is put it in its

place between 51 and 53. Arabic numerals, the easiest thing in the world' (556).

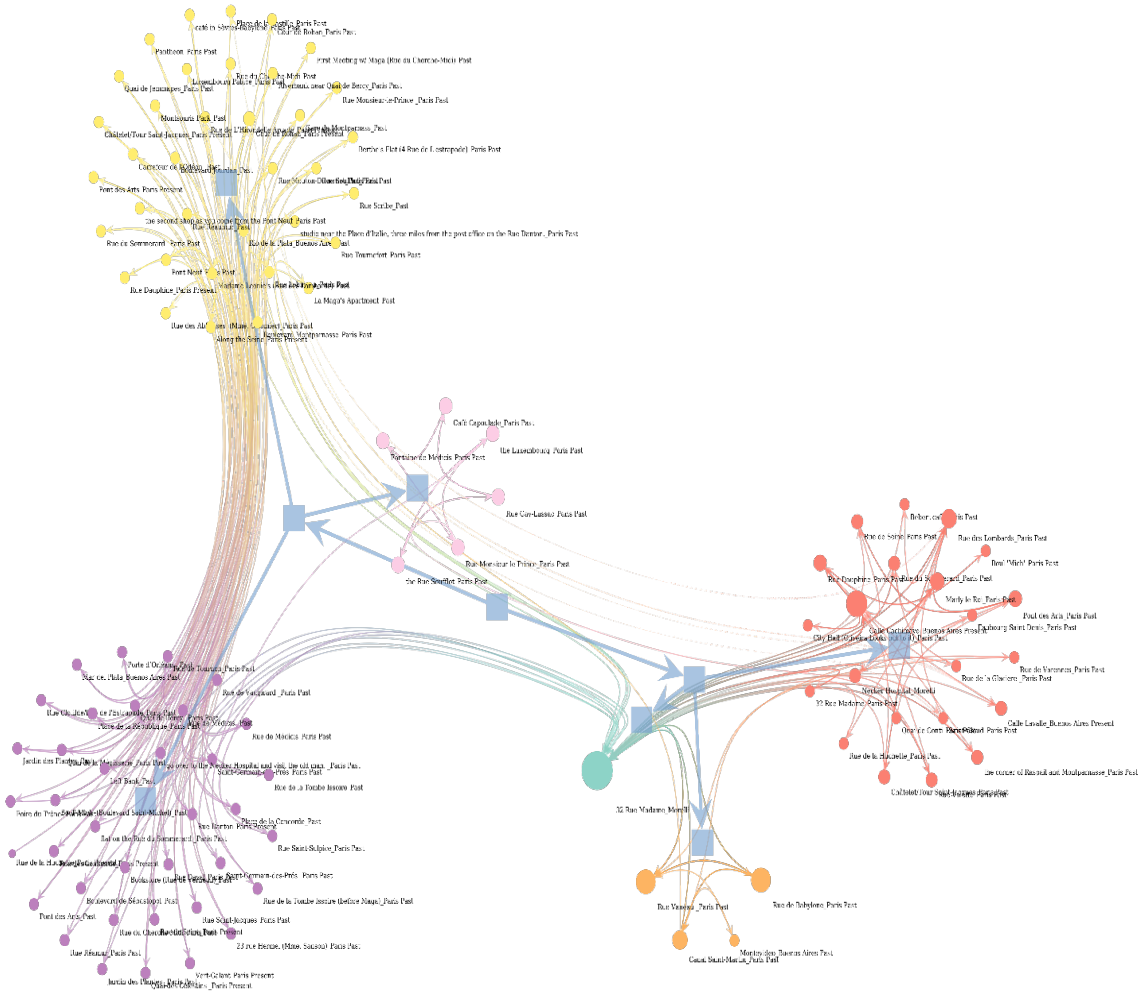


Figure 3.13—Block model showing Morelli's house (Mint Green/Teal Node) as the nexus point of the novel's spatial network. All other locations, including those in Buenos Aires, are structurally tied together through relationships to 32 Rue Madame (the Yellow and Purple are predominantly locations from "Paris Past"; the Red and Yellow are places directly travelled between in Paris Past, Paris Present, and Buenos Aires

> Present; the Light Pink Section concerns a tie between Pola, Berthe, and La Maga which I will discuss later).

Morelli's "expendable" archive is full of various documents, including citations and authorial reflections. The emphasis of Book Two changes in terms of structure and significance, namely in the interpolation of these "extraneous" materials within the plot of the novel itself. Rather than being trapped in his own memories in Book One—where Horacio feels trapped within the arbitrary structures of the hopscotch board he visualizes as his life—the second book attempts to render the hopscotch game into a tangible experience for the reader, who flits back and forth from chapter to chapter in a kind of "Brownian movement" (197) (see Fig. 13). This type of movement comfortably aligns with the notion of figura as constellations, the forming of "an absurd pattern" (ibid.), especially in how figura reflect Horacio's constant desire to step outside of his own life, to view it from an outside perspective. This flight—earlier compared to the patterns of an insect's flight—is Horacio's only means of escaping the grounded reality of Maga's inevitable disappearance, which he attempts to syncretize with his experiences with Berthe, Pola, Talita, and Gekrepten.

In Book One, Horacio's constant fear of patterns and his desire to escape them is ultimately oriented around an impossible center, a singularity which Horacio persistently seeks but cannot find. This is shown only by way of his remembering these previous times spent in Paris, to reconcile The Other Side of the bridge with This Side. Later in Book One, in Buenos Aires, Horacio resolves to ask

> himself the great question: 'Must one stay in the center of the crossroads, then, like the hub of a wheel? What good is it to know or to think we know that every road is false if we don't walk with an idea that is not the road itself? We're not Buddha, and there are no trees here to sit under in the lotus position. A cop appears and asks for your identity card' (291).

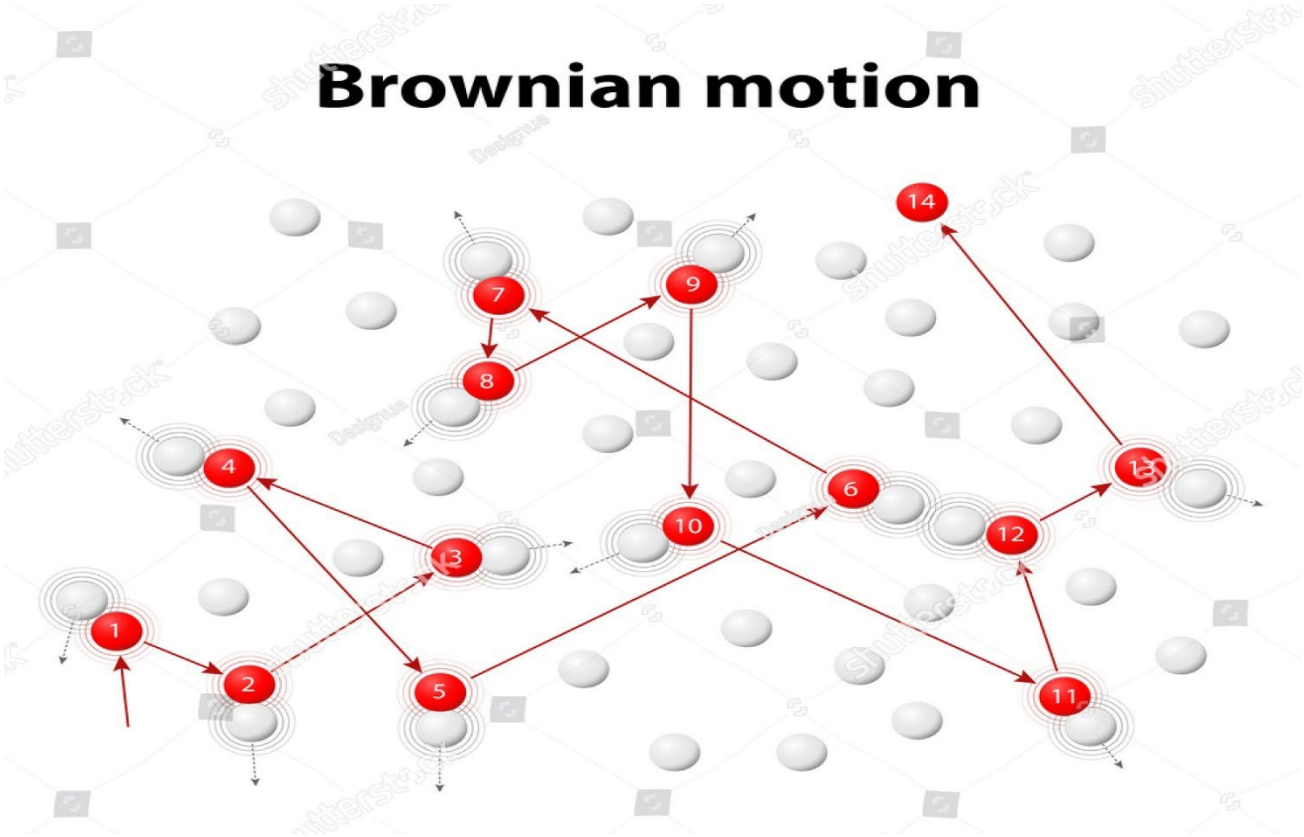


Figure 3.14—A Diagram of Brownian Motion, "a random movement of microscopic particles suspended in liquids or gases resulting from the impact of molecules of the surrounding medium" (Merriam-Webster).

Conversely, Book Two uses the materials of Morelli's archive as a means of opening the larger field of the novel as a physical object: it forces readers to chase significances across the novel's three sections, out of chronological order and across the novel's two major spaces, Paris and Buenos Aires. Figura suggest that past, present, and future events can be resolved as parts of a larger pattern or constellation. In Book Two, this constellation revolves around Morelli's house, the generative singularity from which Horacio's transcendent perspective can emerge, which connects to every other section of the novel and reframes them through juxtaposition. Thus, the previously-mentioned Brownian movement is reflected

on the geometrical and structural level as not only “representation” but also “realization” (Agostini 140).

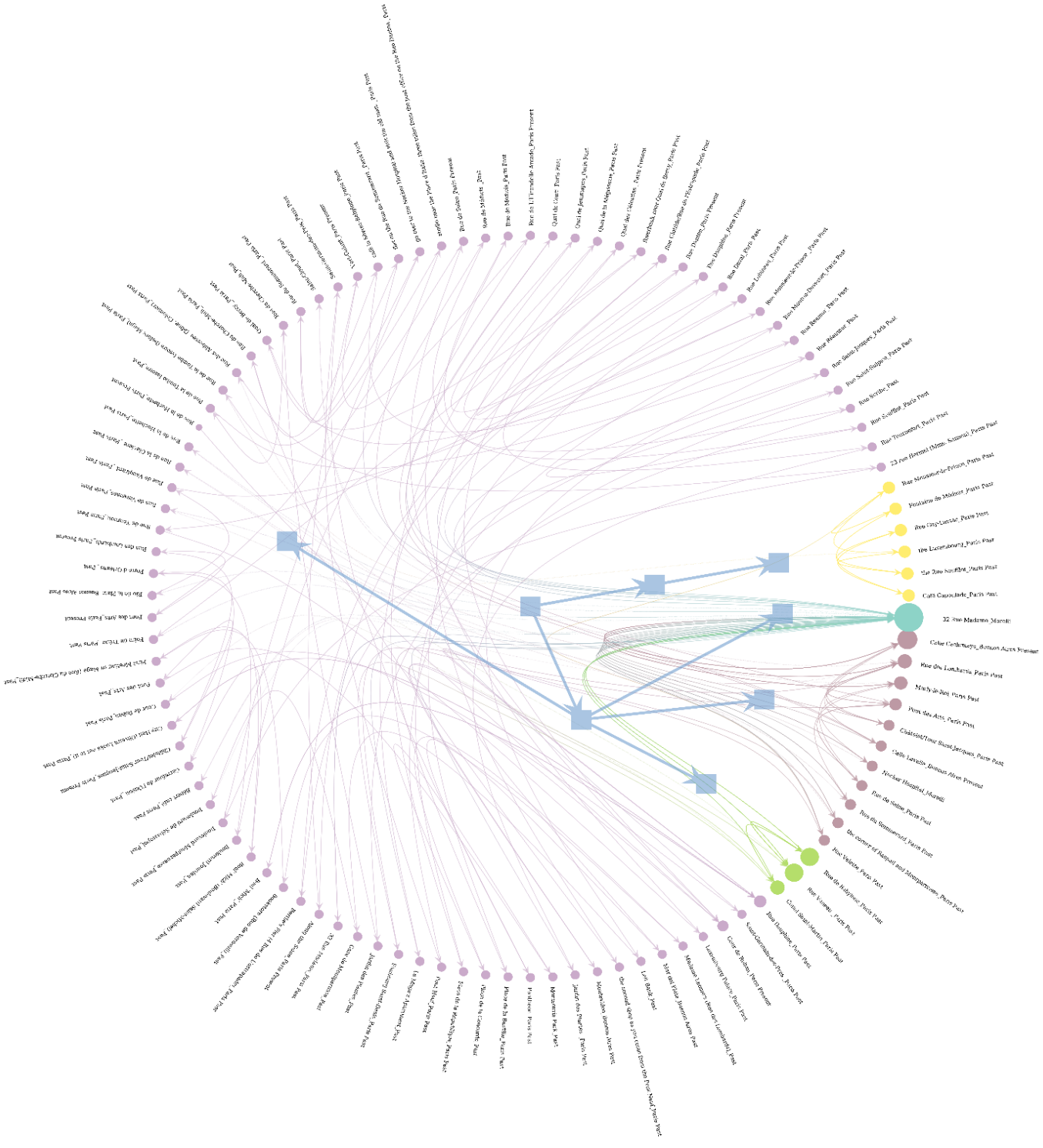


Figure 3.15—A Radial Bayesian analysis of Book Two. Morelli’s house is again represented by the teal (it is the largest node, indicating it is the most

> visited space in the book). Ties between spaces are colour coded by amount of ties to other spaces—teal being the most ties, brown/maroon being second most, green being third most, and yellow being a block of spaces tied together in every block model, suggesting a structural relationship between several female characters (Berthe Trépat, Pola, La Maga, Talita) from Book One and Book Two (which I unpack below).

As Horacio's thinking shows, figura are conceptualized in such a way as to allow for expanded movement on the interpretive level: readers are invited to consider Book Two as a reimagining of Book One wherein time and space are condensed and open-ended, left to the reader's activated intuition and reflection.

For example, the use of quotations in Book Two is temporally aligned with the structure of the book because quotations occur when you read them, while indirect allusions imply a pastness, a thing which has already occurred being like another present moment. As Santiago Colás argues, "Citing does not spring only from impoverishment" but "by its very nature, citing is a violence done to an original, an excision" (46). The removal of the citation from its original context is furthered by its removal from the context of Morelli's system. This double excision, rather than transgressing upon the original, "opens up a space in which something new can be said or made" (ibid., 48) through juxtaposition. This is stated by Morelli to Horacio in the hospital in a sequence that directly presents the aspirations of the second book:

> 'But what if we should make a mistake,' Oliveira said, 'and get things all mixed up. There was a terrible complication in the first volume, this guy here and I argued hours on end as to whether there hadn't been some mistake in the printing of the texts.' 'Who cares,' Morelli said. 'You can read my book any way you want to. *Liber Fulguralis*, mantic pages, and

> that's how it goes. The most I do is set it up the way I would like to reread it. And in the worst of cases, if they do make a mistake, it might just turn out perfect' (556).

Thus, the novel is intended to be experienced both inside and outside of the author's authority, understood as a practically-infinite labyrinth or an attempt at creating "the infinite game" (555). This labyrinth, like the generative structure of *mise en abyme*, mirrors Horacio's existential suffering, reflecting it back onto considerations of the novel and pushing the reader into the position of being a "cosufferer" by entering this labyrinth. Cortázar invites the reader, mirroring Morelli's invitation to Horacio, to combine and recombine these different structures just as Horacio does. This ongoing dialogue between author, audience, and emergence reveals how the generative structures which comprise the novel, the hopscotch court and the mandala, reveal both the structural elements of the game but also invite, in this revealing, the audience to manipulate these structures. This offers the reader what Horacio refers to as "ubiquity" or the author's-eye view of the novel.

This combinatoric approach to reading is associated directly with the medieval figura. As Steven Boldy outlines, a figura has two "separate but interrelated sides": "what might be termed its meaning, usually a movement of liberation, increasingly impersonal and independent of the individual, and the more formal aspect of the repetition which confirms the figura" (23). The formal aspect is all that Horacio sees in Book One, while in Book Two the 'movement of liberation' is achieved through the to-and-fro movement connecting Morelli's archive to every other space in the novel. Through the movement offered to readers in Book Two, the structures of "prefiguration and […] repetition or fulfilment" (ibid., 83) implied in the figura's form are realized. Rather than simple chains of causality, figura allow Horacio to re-organize his various experiences, to examine these events as part of a larger narrative fabric beyond himself.

In Book Two, the major focalization still surrounds Horacio but suggests the kind of simultaneity of narrative possibility and enaction that the figura signifies. For example, the sequence wherein Horacio meets Morelli and then Berthe Trépat is recontextualized in Book Two because of the connections found in Morelli's archive. In Book One, after meeting the "old man" in Chapter 22 ("Opinion had it that the old man slipped […]" (97)), Horacio goes to see Berthe Trépat's performance. In Book Two, this string of events becomes an expression of Morelli's theory of "an *impersonal* drama" found in Chapter 62. The note states that:

> "At one time Morelli had been planning a book that never got beyond a few scattered notes. It can be summed up best in this way: 'Psychology, a word with the air of an old woman about it. A Swede is working on a chemical theory of thought. Chemistry, electromagnetism, the secret flow of living matter, everything returns strangely to evoke the idea of mana; in a like manner, on the edge of social behavior, one might suspect an interaction of a different nature, a billiard game that certain individuals play or are played at, a drama with no Oedipuses, no Rastignacs, no Phaedras, an *impersonal* drama to the extent that the consciences and the passions of the characters cannot be seen as having been compromised except a posteriori" (362).

Chemistry and electromagnetism then proceed to generate explicit theoretical links between Morelli, Horacio, Berthe Trépat, Rocamadour, La Maga, and Talita in Book Two. When Horacio meets Berthe Trépat later, their connection is reframed as a genuine attempt to cross the "threshold" between self and Other:

> This must have seemed important to Morelli because he had piled up notes on a supposed exigency, a final and desperate recourse to drag himself out of the rut of

> the immanent and transcendental ethic in search of a nakedness that he called axial and sometimes called the threshold. Threshold of what, to what? (493).

Rather than an effort to prove that "'Only by living absurdly is it possible to break out of this infinite absurdity'" (101), Horacio's attempt at moving towards this threshold shows that this absurdity is a response to his failed attempts at moving towards the Other. After Berthe rejects him, Horacio refers to the process of reaching out to the Other, of approaching the threshold between himself and others, as "something like turning one's self inside out like a glove, as a way of receiving a brazen contact with some reality without the interposition of myths, religions, systems, and reticula" (493).

This thread is further elaborated when the reader jumps from Chapter 62 to 23, from 23 to 124, from 124 to 128, from Morelli's electromagnetic vision to Horacio's walk with Berthe and beyond. Chapter 128 features a quote from Antonin Artaud: "*Nous sommes quelques-uns a cette époque a avvoir voulu attenter aux choses, creer en nous des espacces a la vie, des espacces qui n'etaient pas et ne semblaient pas devoir trouver place dans l'espace—"Le Pese-nerfs*" (501)[85]. This desire "to create within us spaces for life" which do not have a "place in space" reveals that Horacio's ironic resolution to live absurdly is a coping mechanism regarding the figures which dictate how his life will unfold. Put differently, the spaces for life which lack this place in space produce an abyss which Horacio (and, by proxy, the reader) must fill.

This conflation becomes the generating concept idea for Cortázar's subsequent novel: *62: A Model Kit*. In this novel, this kind of realism takes precedence. Characters' interiority is hidden and actions occur beyond their control. Though much criticism of *62: A Model Kit* focuses on its apolitical, primarily aesthetic concerns, the key here is that elements of *Hopscotch* are used to generate new texts and new readings. In this novel, much like in *Hopscotch* itself

[85] "Some of us at that time wanted to make an attempt on things, to create within us spaces for life, spaces which were not and did not seem to have a place in space".

> Everything would be a kind of disquiet, a continuous uprooting, a territory where psychological causality would yield disconcertedly, and those puppets would destroy each other or love each other or recognize each other without suspecting too much that life is trying to change its key in and through and by them. […] That with each successive defeat an approach towards the final mutation, and that man only is in that he searches to be, plans to be, thumbing through words and modes of behavior and joy sprinkled with blood and other rhetorical pieces like this one (363).

This ideal "final mutation" is complemented by Morelli's attitude towards Horacio's concerns regarding making mistakes made in the archive. Only through mistakes, random occurrences, and chance alignments are exceptions—constellations of significance—possible.

Thus, through the analysis of structural ties using blockmodels, it becomes clear that Morelli's archive operates as a structural "center" which Horacio can find in the world around him. Upon finding this place, connections between characters previously unrelated (especially in Book One) become clear. This is most explicit in the increased role of Pola in Book Two, a woman with whom Horacio has an affair. Serving as a contrast to La Maga, Horacio's relationship with Pola is explicitly tactile, being described as "hands, as usual" (389):

> When she smiled she showed a set of small and regular teeth against which she drew her lips a little, lips painted a vivid orange, but Oliveira was still on her hands, he was always affected by women's hands, he felt the need to touch them, pass his fingers over each joint, explore with a movement like that of a Japanese kinesiologist the imperceptible route of the veins, discover the condition of the nails, have a Chiromantic suspicion of ominous lines and propitious mounds, hear the din

> of the moon resting against his ear the palm of a small hand a little damp from love
> or from a cup of tea (390).

Contrasted with La Maga, Pola appears to be "far more 'concrete'" (del Castillo 93). Pola "is [like Maga] also identified with one of the symbolic attributes of the Magna Mater: the City. As Pola-Paris she appears as the Earth, or the provider of sensuous pleasure, while la Maga-Isis appears primarily as the subject of inspiration" (ibid.). Paradoxically, Pola largely remains outside of the narrative of Book One—not the 'subject of inspiration' per se, but an absent subject—while she physically and concretely appears in Book Two. Thus, Pola's expanded role in Book Two merits closer observation.

Observing the relationship between chapters featuring Pola and those of other characters through stochastic blockmodels, an interesting tie between Berthe Trépat and Pola is formed (see Figures 3.16 & 3.17) which further informs Horacio's efforts to resolve his "exceedingly trismegistic" triangle with Traveler and Talita. This suggests a structural tie between not only Maga and Pola, but also Horacio's affair with Pola and his other efforts to cross the bridge towards the Other. Observing the block model in Figure 3.18a and 3.18b reveals a set of spaces which are tied together, but which only have two structural ties to the rest of the novel's network of spaces. While structural equivalences are generally expressed in ties based on position in a network, it is important to note that blockmodels "can easily be applied to data concerning *asymmetric* relations" (Panning 590). This means that even "blocks that contain no observed ties indicate important structural patterns" (ibid., 399). The spaces tied together are Rue Soufflot (Paris Past); The Luxembourg; Rue Gay-Lussac' Rue Monsieur-le-Prince; Café Capoulade; and Fontaine de Medicis to Rue Clotilde/Rue de l'Estrapade (Past) AND Calle Cachimayo (present). These spatial ties connect chapters 6, 23, 37, 46, 73, 76, and 132, which include Horacio's walk with Berthe Trépat and his affair with Pola (especially Rue Soufflot, which connects Chapter 23 (Berthe) and Chapter 76 (Pola) directly). Somehow, Horacio's experiences with Pola and Berthe are structurally

aligned. Horacio's affair with Pola, through the network of spaces presented, is thus integrated into the larger constellation of his experiences in Paris, becoming an attempt at a kind of synthesis much like Berthe's efforts at "prophetic syncretism". Pola offers the concrete form that Maga lacks in Book One and Two which Horacio attempts to attain, revealing that while "La Maga and Pola complement each other in their relationship to Oliveira […] Readers soon realize that not only these but all of the characters function together; they form a picture of a complete human being" (Yovanovich106).

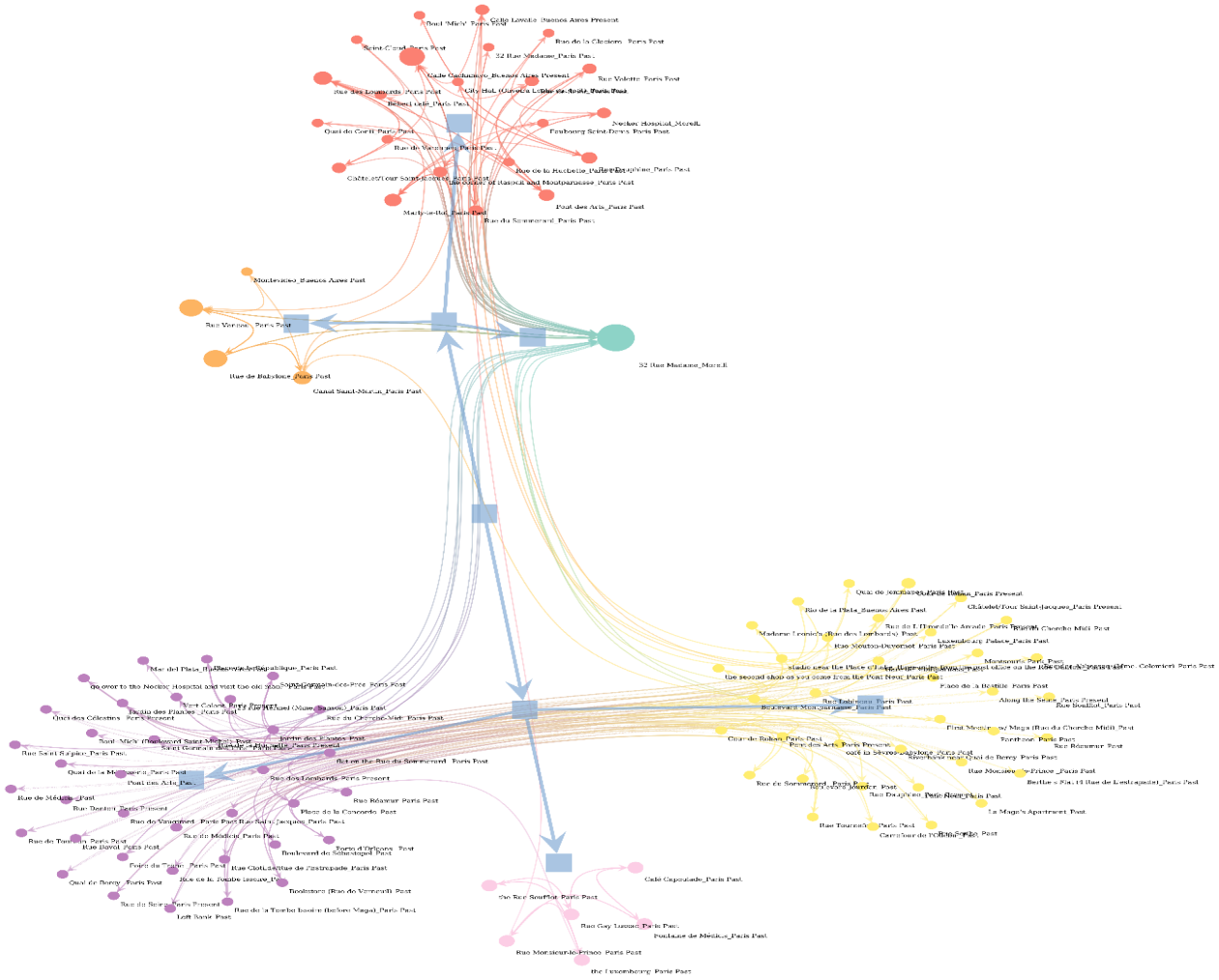


Figure 3.16—A Force-directed graph drawing of Book Two, which depicts a previously-hidden relationship between Pola and Berthe Trépat, and,

thus, La Maga and Talita. The Pink Block is where the relationship between Pola, Berthe, La Maga, and Talita is shown to be structurally equivalent.

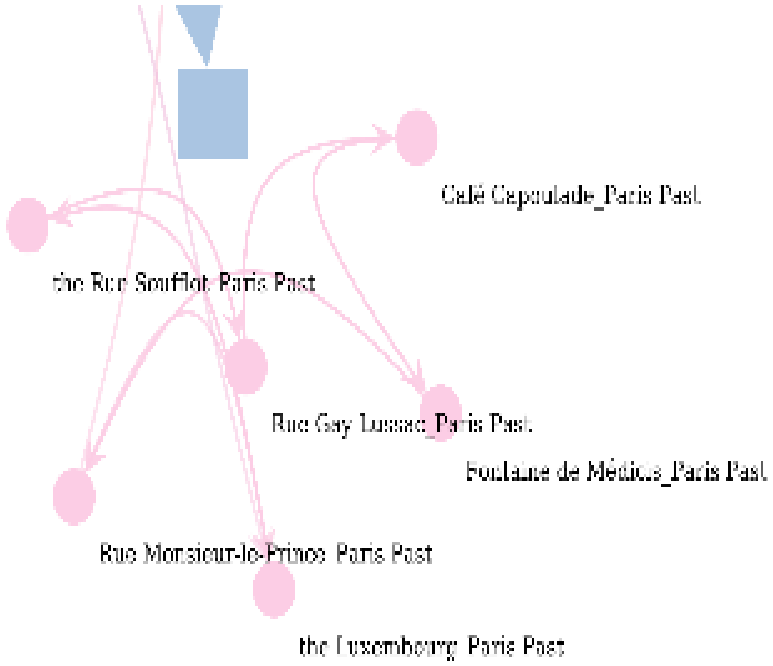


Figure 3.17—A closer look at the nodes which tie Berthe, Pola, La Maga, and Talita.

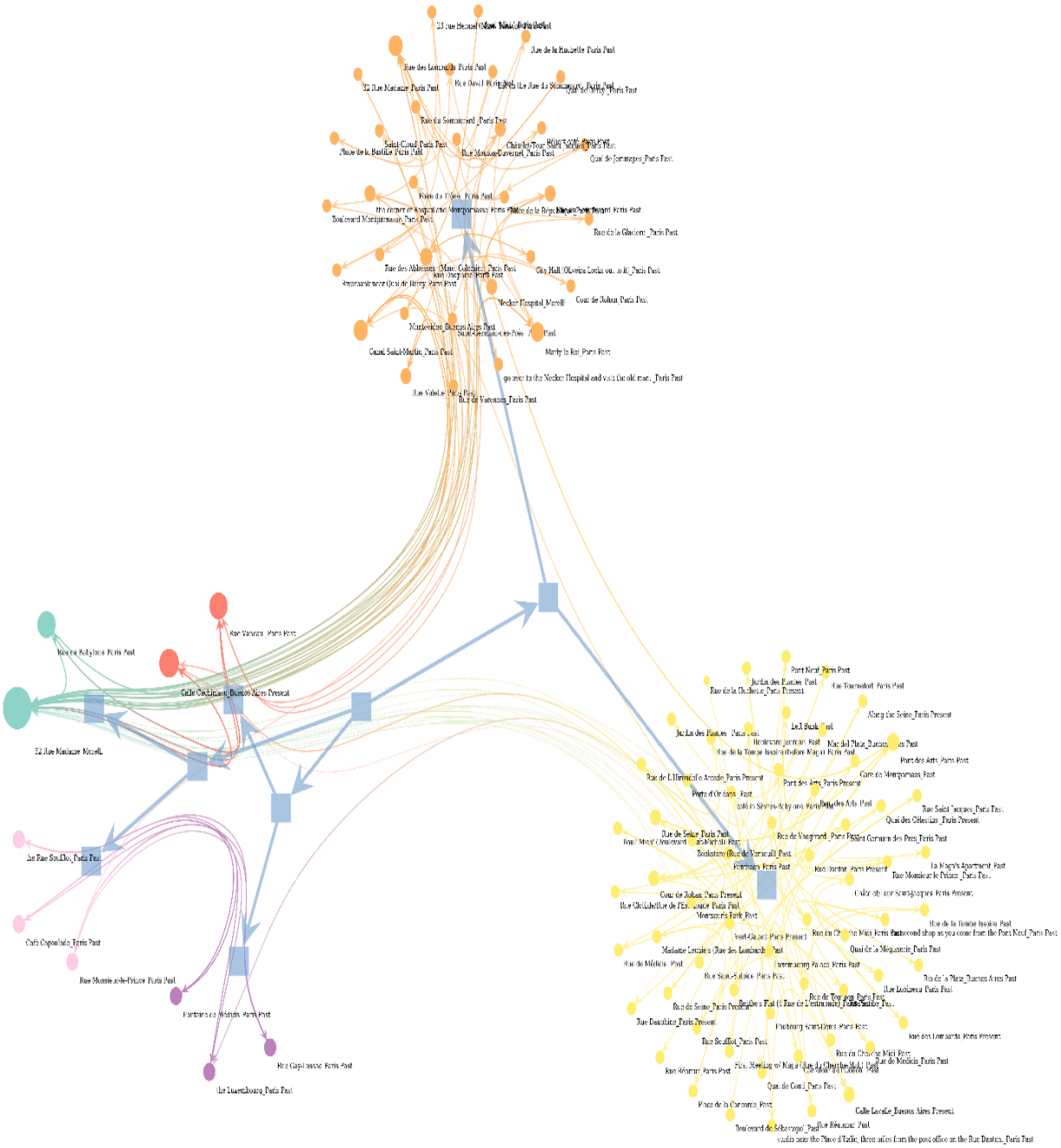


Figure 3.18a—The Pink/Purple Block below Rue 32 Madame only features two direct ties to the rest of the novel. This block aligns the chapters discussing Pola and Berthe Trépat.

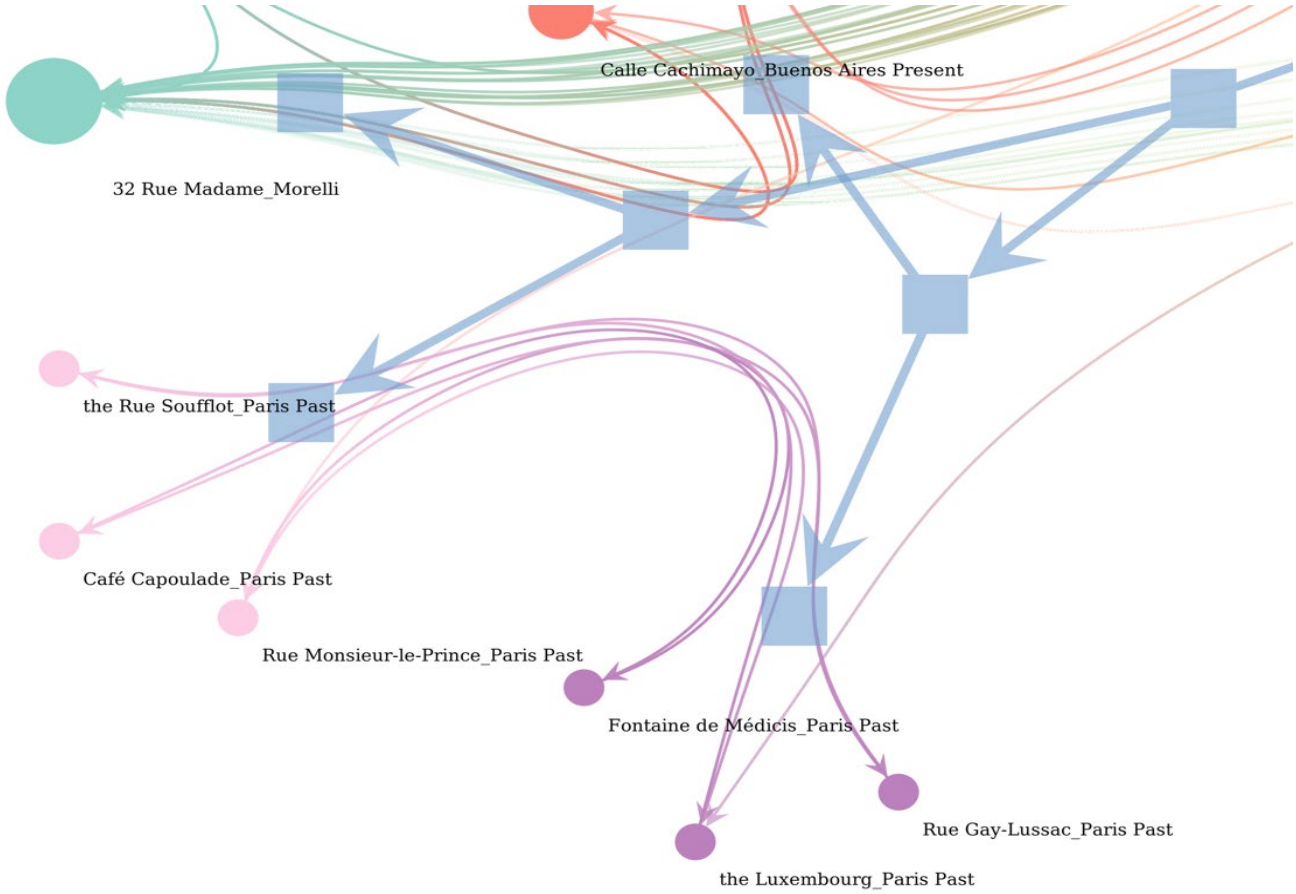


Figure 3.18b—A closer look at the Pola→Berthe block. Two ties emerge: one yellow tie (from Café Capoulade in "Paris Past") and one pink tie (from the Luxembourg in "Paris Past") bring Pola's story into relationship with the larger structure of the novel.

This revealing is a call towards a more impersonal kind of pattern recognition through figural interpretation. Although Horacio expresses concern that Morelli's figura-based impersonal drama—despite protecting him from failure because it devises "a movement on the margin of all *grace*" (493)—will lead to a permanent self-negation, he is likewise concerned with his inability to integrate his various experiences in a profound way. Much like Horacio disappears into his memories, Morelli's impersonal

novel likewise disappears, becoming a blank page "without words, without people, without things, and potentially, without readers" (494).

In Book Two, the reader is asked to reach the book's center and, in doing so, complete their search (see Figure 3.19). But this resolution never clearly arrives, at least in the two readings offered by the Table of Instructions. In Book One, an ambiguous ending delays any conclusions; in Book Two, this delay is literalized in an endless loop between Chapters 131 and 58. Thus, no easy endings are possible in either book. Instead, throughout both books there are possible constraints and affordances for the active reader: readers are given two distinct authorial systems, both of which provide, through their form, instructions for how they are to be read. Thus, they are both deeply authored. Despite the emphasis on two distinctive spatio-temporal structures, it is undeniable that to a certain degree "the effect of the expendable chapters is to control the reading" as a means of never allowing the reader to fully escape the labyrinth which comprises the novel as a holistic object (Hardin 80).

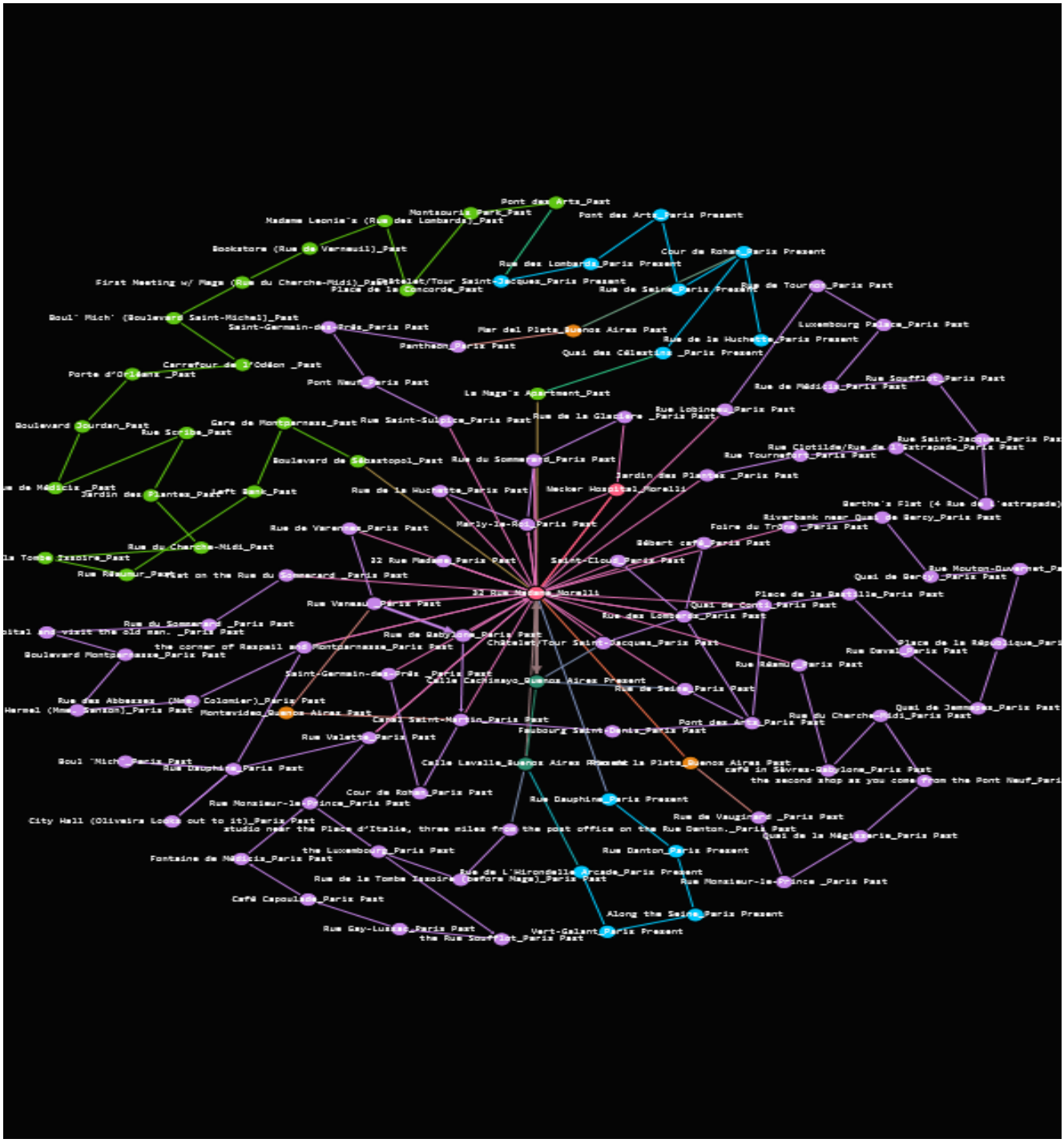


Figure 3.19—A diagram of direct connections, again with Morelli's home as the nexus.

The Search: Agency in Hopscotch

This inability to resolve the labyrinth suggests that alternative readings are required to resolve Horacio's game (or at least different conceptions of what each reading offers the reader). As Michael Hardin argues, it is possible that Book Two is inherently unwinnable because of how it is designed: the image of the labyrinth implies one need escape it to succeed. If the reader "takes the novel seriously as a game, then the [first] reading is the only one which provides a possible winning move: it allows the reader to exit, which in this novel constitutes victory" (74). For Hardin, Book One and Book Two are in essence aligned with types of readers, one who succeeds and one who fails at the game: "Oliveira is the key to understanding why we as critical readers cannot win the game of the novel. [While he] (the male-reader) is one of the two paradigmatic readers within the text, the other is La Maga (the female-reader)" (ibid., 78). Against the flow of much criticism about the novel, Hardin argues that to win the game we must adopt La Maga as "our guide through the labyrinth; she, like Ariadne, provides us with a string to help us find our way out" (ibid., 81). Hardin observes, further, that La Maga's treatment in the novel already suggests that her approach is more valid than Horacio's: "Even her name, Maga, is the feminine of *magus*, or wise one/seer. Therefore, if a hero(ine) exists in the novel, it is she; she knows the way out of the labyrinth, she is attuned to her surroundings, and she sees" (ibid.).

Of course, Hardin's approach to the novel is a direct response to the novel's own attitude toward the reader. In Book Two, Morelli outlines a theory of the "hector-lembra" or the Reader-Accomplice, a reader who works with the author directly in creating the work:

> To attempt […] a text that would not clutch the reader but which would oblige him to become an accomplice as it whispers to him underneath the conventional exposition other more esoteric directions. Demotic writing for the female-reader (who otherwise will not get beyond the first few pages, rudely lost and scandalized,

cursing at what he paid for the book), with a vague reverse side of hieratic writing' (396).

As Hardin notes, this reader-accomplice is projected as inherently masculine and more adventurous as a means of goading the reader to adopt this approach to the text. This goading can, therefore, be understood a means by which to entrap the reader into performing a losing move: the further this masculine reader "goes into the text, the greater his/her entanglement, the more he has lost" (Hardin 77). Conversely, this reading might be taken seriously as a more challenging and ultimately winning move despite the inability for escape: "this 'recommended' but ultimately optional reading of the text [impacts us in] the way that it interferes with and interjects any possible conventional narrative, reminding us always that this is literature, writing, to be thought about and mulled over, but not to be considered escapism" (Rix 196). Despite Hardin's reading, critical work around *Hopscotch* tends towards the latter pole: for many, although "either approach […] requires effort on the part of the reader, […] the second radically changes the reader's experience" because Cortázar "challenges and guides" the reader, though they do ultimately choose their own path (Standish 95).

Ultimately, either of these critical readings fail to integrate the figural thinking Book Two offers, as it is clearly placed in direct juxtaposition with Book One. This juxtaposition is shown in Chapter 34, where La Maga reads "a clumsy novel, in a cheap edition" beside Horacio who observes her reading and mocks it. The juxtaposition here is, at the same time, a structural equivalence: La Maga's novel comprises the odd lines, while Horacio's commentary comprises the even ones:

> IN September of 188o, a few months after the demise of my
> AND the things she reads, a clumsy novel, in a cheap edition
> father, I decided to give up my business activities, transferring
> besides, but you wonder how she can get interested in things […] (191).

As this chapter represents, the two approaches to reading render the novel itself into a situation of mirroring and interpenetration—a bridging across the gap between Self and Other—despite Horacio's ironic criticisms of Maga's tastes.

Thus, critical readings of the novel which valorize Book One or Book Two unfairly segregate the two books: the novel's image of the male-reader skews too far into a utopian, masculinist conception of reading, while the "female-reader" is hardly passive—or, at least, hardly as passive as Horacio —in Book One. Because of the structural complexities found in Book Two, the notion that Book Two is the superior path is defended by Morelli and Horacio within the text itself. To take their valorization of this path for granted is, ultimately, an uncritical acceptance of the 'given' patterns imposed on readers by the author, making it hard to discern between the novel's negative conception of the female-reader as passive and the hector-lembra as active. Rather, the books are complementary through their being juxtaposed: Book One introduces readers to the game of hopscotch by bounding them to a linear path; it produces an environment out of figures which is framed and limited. This is directly mirrored by the second book, which proclaims to free Horacio from figures. Nonetheless, the experience of the second book only makes sense once the reader, like Horacio, has experienced the bounds of the first. The masculine reader-accomplice operates within and outside the confines of the game, much like in every gameplay experience. The ability to transcend the passive receptivity of the female reader—to take some degree of control, to deform, improvise, and reform the text—is directly tied to Horacio's relationship with La Maga, his search for the "center", and his aimlessness at the end of the novel represented in the constant loop between two chapters without resolution.

Emergence

Throughout the novel, authored events are attempts to signal to the reader an entirely new attitude towards the reading of a novel, though one of a particular moment in time. As in any historical

literary movement, the New Novel (*nouveau roman*) claimed its unique formal potential. The reader's role, for example, was explicitly expanded upon. This suggests that Hopscotch offers an interesting analogy, though not a perfect one, of the tension between designers, players, and texts in digital contexts. In digital games more specifically, a game only happens when it is agreed to be played, and in more traditional senses the game is played one way. Over time attitudes, strategies, and rules might change slightly, leading to greater changes in response to these shifting rules. These changes can ultimately lead to two variants of the same game: they appear similar but differ dramatically as an experience for players. These variants also require different strategies, some of which may work better in one version than in another.

In *Hopscotch*, player-readers are asked to create their own variations on *Hopscotch's* core structure, because reading and writing are conflated through the figure of the reader-accomplice. Thus, when Morelli argues that to write is "sketching my mandala and at the same time going through it" (402), we can understand that the reader's experience is supposedly the same. The center, the utopian "heaven" square that is Morelli's archive, represents a zen paradox throughout the novel: thus, readers are being directed to map the novel from the vantage of Morelli's archive as though it were a mandala. The hope in making this process explicit for the reader to follow is the desire that the novel will become potentially infinite. Further, by making the infinite possibilities of the novel explicit for the reader, Cortázar hopes to fashion a particular type of reader who observes from all sides, present but not immersed, who can trace figuras across the novel that even the author has failed to notice. This emphasis on types of readers in *Hopscotch* suggests the possibility of playing the game more correctly than the two versions given to the reader.

Thus, by way of these types of readers, the hope of completing the search and transcending the game altogether becomes a core aspect of the novel's narrative, finding spaces which are often referred

to with metaphysical language regarding the “center”, “the kibbutz of desire”, and “heaven”. This metaphysical sense of emergence is offered to the reader through the constant references to structures not clearly presented in the two versions of the novel. As pointed out previously, the use of game-like structures in *Hopscotch* serves as a generative system which fosters a cooperative dialogue between author and reader, who serves as the author’s accomplice. If the reader does not choose to participate in this manner as an accomplice, they may instead choose to read in a more passive way. They will win the game, perhaps, but it will be an uninteresting win. These types of readers are indicated by various characters in the novel, each of whom serve as stand-ins for certain approaches to life, serving as strategies for the reader-accomplice to adopt and experiment with. Horacio’s own strategy, that of playing hopscotch, is by no means the only approach to the game. Rather, the novel’s emphasis on types of reader suggests that each unique reading is one among endless possibilities. As Morelli argues, reading is an opportunity to generate something new every time: “By read let us understand generated. Who cares about the dictionary as a dictionary? If from delicate alchemies, osmoses, and mixtures of simples there finally does arrive a Beatrice on the riverbank, why not have a marvelous hint of what could be born of her in turn?” (370).

Emergence as a novel form of reading, however, does not always lead to an ideal outcome. As Gordon Monro argues, there is some degree of indeterminacy involved in a generative system's outcomes—as in games, where results are often unpredictable—, and this motivation for surprising new combinations is crucial to the novel. Yet, the ambivalence of the two novels suggested in the Table of Instructions reflect both Cortázar’s own inability to resolve the problems of authorship he emphasizes through the character of Morelli *and* the inability of Horacio to escape the unending loop his rational, logocentric strategy predetermines. Horacio's approach is ultimately a failure in the sense that he never finds La Maga, never jumps from the window (or walks away), and never emerges into the heaven

square (Hardin 79). Though he constantly hunts for this emergence, even managing to locate the center that is Morelli's archive, Horacio's core problem remains despite the change in structure between Book One and Book Two: his radical inability to transcend the gap between his own sense of self and the otherness he encounters in every interaction with the world and others living in it.

The inability of Horacio to complete the leap required, the leap La Maga supposedly makes into various metaphysical rivers like Shakespeare's Ophelia (465), is answered only by the reader's willingness to either take the leap themselves or to flow down the river. This paradox, that the second version of the book never ends, means that "for us to be optimal readers, we must either pre-empt Cortázar's assumptions of us as readers, change the rules (be non-cooperative), or cheat" (Hardin 80). In this sense La Maga, constantly living in an 'erotics of the present', suggests a kind of emergence which goes against the rules of the game. This emergence is not La Maga's death or her madness, but the generation of an entirely distinct approach to the world than that of Horacio which allows her to achieve "satori", which "is instantaneous and resolves everything" (360).

In her work discussing the divide between form and content, Susan Sontag famously argues that "we need an erotics of art". It is worth asking what an erotics of art might entail in the case of La Maga. Firstly, an object of erotic desire is autotelic—it is desired in and of itself—and secondly, the erotic relationship is a type of presence or immersion where the form of an artwork or the form of a desirable body draws one into itself. This erotic sensibility, therefore, is an emergence into a present relationship with an artwork that is notably active, if not in a wandering or searching sense. The subject, in this relationship, has already been located. In *Hopscotch*, this presence is portrayed as short-lived and transient, though no less transcendent as a result.

Consistent allusions to a "dialectical pattern" (12) suggests that Cortázar's intention is to draw the reader into an erotic relationship—a resolving of the tension between the detached sensibility of

Horacio and the attached one of La Maga—to the novel on the level of structure. This triad resembles the relationship between self and other required to play a game, but it likewise resembles the procession through a mandala:

> three stages are critical for the true spiritual experience of pilgrimage. First, pilgrims must leave the specific social settings with which they are familiar. They then must undergo 'liminal experiences' by means of various sorts of displacements that enable them to gain an understanding of greater or magnified truths. Finally, they must become reintegrated into their original social structures (ten Grotenhuis 5).

This displacement culminates in the synthesis of self and cosmos, renegotiating the relationships forged between the study of the womb realm (this side) and the diamond realm (that side) with new connections and reflection. The plot of the novel, in this sense, resembles the experience of studying the mandala, as Horacio leaves Buenos Aires, endures various "liminal experiences", and returns home to "reintegrate" with his "original social structures".

This reintegration is further embodied in the notion of the "kibbutz of desire". In both books, the kibbutz is depicted as a collaborative, spatialized matrix which houses the desires (and readings) of all potential readers:

> 'Kibbutz; colony, settlement, taking root, the chosen place in which to raise the final tent, where you can walk out into the night and have your face washed by time, and join up with the world, with the Great Madness, with the Grand Stupidity, lay yourself bare to the crystallization of desire, of the meeting (203).

This suggests a more collaborative attitude towards the novel's gameplay than might be apparent based on the Morelli's theoretical writings (though, of course, even Morelli requires Horacio to finish organizing the raw materials of his archive). As Ubilluz argues, *Hopscotch* is "a novel of cohabitation, a

text in which a conventional novelistic development cohabits with an atheist mystic one" (137). *Hopscotch*, then, is not so much a novel antagonistic to the female reader; rather, it allows for readings of all sorts to co-exist and integrate into the kibbutz of desire. Though this might not be necessarily the case—it is clear that Cortázar is in control of the reading of the novel, that the expendable chapters provide a specific way to read—it does suggest that the novel is open for multiple readings. The novel, seen in this light, becomes a "kingdom […] made out of plastic material" (380), an "infinite game of chess" (476).

Returning to Chapter 34, Horacio's thoughts are eventually replaced by his reading beside La Maga: we are, therefore, shown two novels in direct juxtaposition—the cheap romance read by la Maga and the first chapter of Galdos's *Lo Prohibido* read by Horacio —suggesting that the novel invites various forms of reading based on new structural interpretations. Though Horacio and Morelli might mock La Maga's choice of book, *Hopscotch* still places it in juxtaposition to other types of writing and thus it is "structurally" equivalent within the confines of *Hopscotch's* bindings. As an analogy for reading in the novel, this chapter models the different approaches taken in Book One and Book Two. These readings are juxtaposed as a means of offering the reader the knowledge required to take a deformative critical leap of faith of their own.

One of the more obvious examples of this kind of leap is discussed by Santiago Colás, who argues that a third reading of the novel would involve reading the novel from front to back all the way through, including the expendable chapters. If we perform this reading, we see the relationship between figures and figuras as a more integral one: Horacio begins the novel lost, searching for La Maga, and eventually emerges into the third section of the novel freed of his spatial-temporal restrictions. The third section of the novel becomes a synthesis of the two approaches offered to the reader as Horacio finally reintegrates himself into his original social structure: "the fragments […] do not only refigure Horacio's

alienation […]. They also suggest the utopian dimension into which Horacio's leap has propelled him" (Colás 64). As such, Horacio's efforts at escaping his feelings of alienation are shown to "exist only as a constitutive process" (ibid.), much like in the reading of a mandala where "liminal markers also allow devotees to enter into the sacred realms where transformative experiences can occur" (ten Grotenhuis 5). This reading eschews the surface-level hopscotching of Book One and Two, while still depicting an "asymmetrical" sense of space and time with the inclusion of the novel's third section. Although it rebels against the original rules in the Table of Instructions, this reading renders Oliveria's journey into one of progressive development and potential liberation. This liberation is an emergent by-product of a change in the novel's structure: rather than ending with Horacio trapped in the asylum, contemplating his next move in an infinite loop, Horacio develops into an individual who is finally able to take the leap into the third section.

Literary critics Lisa Samuels and Jerome McGann argue that this kind of critical reading—one which alters the reading of the text based on structural decisions—can be as simple as reading a text backward ("Deformance and Interpretation"[86]). This reveals certain unexpected energies, emphasizing things the original text carries but mystifies or hides. Consider *Hopscotch* read backwards: in some sense, it would chart Horacio's emergence from the pre-cosmogonic void into an existential dilemma that ends with the search that haunts him forever. This is a rather cynical reading of the text. Nonetheless, as Samuels and McGann argue, this reading might reveal certain unexpected aspects of *Hopscotch* that are missing from other readings. In such a reading, the notion that Horacio's searching is doomed to fail before it even begins becomes literally true, a regression from freedom and maturity to constraint and immaturity—from the mandala to the hopscotch board and, eventually, back to the womb.

[86] Also, see Stephen Ramsay's *Reading Machines* for an examination of deformance and backwards reading.

Conclusion

The emphasis on movement and structure in *Hopscotch* brings up questions of the relationship between literary generativity and spatiality. The structural differences between Book One and Book Two form, in theory, two distinct textual ecosystems. For example, the hopscotch court serves as an analogy for Horacio's life itself in Book One, while in Book Two the gameboard becomes a spiritual map—a mandala—which replaces the rule-bound children's game. Yet, in both books, the hopscotch court is suggestive of a spiritual exercise because it is immanent in the world. This suggests that emergence, new and unexpected outcomes, comes through experiencing the text's world and learning to dwell there.

Further, the confounding of games and maps reminds one of the emergent qualities of the novel—namely its emphasis on a heaven, center, or kibbutz of desire. The center is a strong example of the mapping urge in the novel and its relationship with the hopscotch game. Thus, while *Hopscotch* was originally titled "Mandala", it remains crucial that Cortázar changed it to *Hopscotch* before publication. Mandala—translated from Sanskrit as "center"—is a kind of spatio-temporal diagram or map that one can use to develop their meditation abilities. By re-naming the work but maintaining the textual and structural significance of the mandala, Cortázar prioritizes the finding of mandala in the immanent experience of the hopscotch board. Thus, if we consider the hopscotch game as an experience of this mandala, we again see that the mapping element of the novel frames Horacio's perspective on the need for playing hopscotch. This equally applies to both books.

Hopscotch, then, might be better understood as a novel about mapping: as many critics have noted, the game might not be possible to win at all in the normative sense (Hardin; Sharkey). In part this is a result of the constructed nature of the game, which attempts to deny its author's role but, nonetheless, is authored: as Sharkey argues, "reader and writer do not compete for 'shares' of understanding. Instead, understanding is an experience in which the self is surrendered to a larger event,

a loss of self that effects an enrichment" (104). Mapping in this sense becomes a more central concept even than that of the hopscotch game the novel is named after.

As the novel progresses through the first section in Paris, spaces are landmarked and Horacio learns to dwell within these spaces. Further, by understanding characters' relationships to spaces the reader comes to better understand their relationships to one-another, another theme the novel emphasizes using the spatial metaphor of 'the bridge' which connects various spaces in the novel. This also connects characters to one-another and, ultimately, to the reader and the author. The reader, unlike Horacio, does not hopscotch in a vacuum: the novel is a spatial object that the reader is asked to chart based on different kinds of mapping.

These alternative mappings of the novel confirm Cortázar's claim that *Hopscotch* is many books, more than just two. Thus, a better understanding of the various timelines and Horacio's path through Paris and Buenos Aires in each book reveals the novel's structural argument or "center". If taken seriously on this level—literally mapping the books out to better visualize the relationship between time, space, place, and the reader—we are able to see the concrete structural distinctions between Book One and Book Two. We are also able to see, based on these distinctions, the potential to produce other maps beyond those prescribed by the authorial rules. These maps would likely generate different situations, geometries, and constellations. Thus, Horacio's musings in Book One and Book Two offer the reader two forms of dwelling in the novel's world. In Book One, this means doing so absurdly as a means of breaking figures apart; conversely, in Book Two this means locating the actual bridges—the figura—by which one might understand otherness in the form of both author, text, and other readers. Once this knowledge has been integrated, readers might contribute their own readings and engage in producing "the infinite game" the novel consistently references.

Chapter 4—Metalepsis, *Mise en abyme*, and *Methexis*: Indigenous Storytelling and Generativity in Thomas King's *Green Grass, Running Water*

"*No action upon an object without retroaction of that object upon the subject*" (André Gide, *Journals: 1889-1913*, 29).

This chapter examines Thomas King's *Green Grass, Running Water* (1993), outlining how the novel develops its textual system by mixing literary materials and transgressing narrative levels, encouraging textual misreadings—the making of mistakes—to trap readers in a game of chasing intertextual allusions. By chasing these allusions and attempting to "master" the novel's various discursive fields (McGill 249), the reader is persuaded to commit to a game based on the logic of a "merry chase" (Fee and Flick 132). This chase generates a textual spatiality wherein "the entire book [becomes] a site of contestation between conflicting Indian and White versions of a shared history [...] [that] is guaranteed to increase one's knowledge by connecting what you do know to something you ought to know" (Ridington 351). Building off Robin Ridington's claim that the book becomes "a site of contestation", I argue that King builds *Green Grass, Running Water* into a generative system based around vertical and horizontal metaleptic shifts and the generative structure of *mise en abyme*. The desired outcome of this system is *methexis*—a kind of "Imitation" which "may lead to participation (*methexis*), both physically and spiritually" (Mitscherling 86)—by revealing points of contact between cultures which independently precede the colonial situation and thus are simultaneous and, despite this simultaneity, distinct.

Throughout this chapter, I show that the space in which this *methexis* is generated—the space generated by metaleptic shifts and *mise en abyme*—consciously mirrors the pan-indigenous Medicine Wheel structure. The Medicine Wheel reflects the "indigenous philosophical concept of holism [which] refers to the interrelatedness between the intellectual, spiritual (metaphysical values and beliefs and the

Creator), emotional, and physical (body and behaviour/action) realms to form a whole healthy person" (Archibald 11). This relational sense of holism likewise expands beyond the individual, as the "never-ending circle also forms concentric circles to show both the synergistic influence of and our responsibility toward the generations of ancestors, the generations of today, and the generations yet to come" (Archibald 11)[87]. The novel is ultimately structured by this concentric, recursive circularity which is generated to renegotiate the contested gap between indigenous and non-indigenous stories formulated on the novel's surface.

To better examine the relationships generated by vertical and horizontal metaleptic moves and *mise en abyme*, and then further to describe how emergence becomes possible in this ecosystem, I examine how King generates the Medicine Wheel structurally. The first step is to describe the rules of the "merry chase" game, which helps to generate the Medicine Wheel structure as another step in the generative process. This description of the merry chase game will involve a description of the mistaken "Image of the Indian" that is built up throughout the novel, as well as intra-diegetic countermeasures adopted by characters in the novel which contradict this image. Of relevance is the novel's hybridization of binaries, which facilitates the novel's metaleptic moves and its production of the *mise en abyme* structure through juxtaposition and renegotiation of the contested gap between indigenous and non-indigenous cultures. This will be shown by examining the unfolding of each of the novel's several narrative levels, in particular discussing three examples of situational generativity which are condensed into three repeated images throughout the novel which function as reflections from outside of the novel's

[87] Reinforcing the complex terminological situation when it comes to studying generative structures, this inter-generational understanding of generativity aligns with use of the term in Social Psychology. Coined by psychoanalyst Erik H. Erikson, "generativity" is significant for Erikson's seventh stage of psychosocial development, "the care stage", which occurs during middle aged adulthood. In this stage, Generativity concerns "*procreativity*, *productivity*, and *creativity*, and thus the generation of new beings as well as of new products and new ideas, including a kind of self-generation concerned with further identity development" (*The Life Cycle: Completed* 111-112). In tension with generativity, the care stage also concerns a "sense of stagnation" (ibid.) in which an individual does not participate in these generative concerns. This remains a note because, while this aligns quite well with the novel's structure, generativity in Erikson's sense is nonetheless distinct from indigenous models of the generative which I will explore below.

diegesis, while also being segments of this diegesis: firstly, the persistent presence of Water; secondly, the repeated contact between Christopher Columbus and the Indians, which contributed to the mistaken Image of the Indian; and, thirdly, the Plains Indian Ledger Art which generates the stories of the Old Indians while reflecting the situations the novel's narrative describes. These situational generators operate across all narrative levels of the novel, meaning it is crucial to observe their constructive role in the generation of the Medicine Wheel structure. Finally, a description of the audience's possibilities for agency and emergence will be offered by way of an analysis of the *methexical* relationship forged between the insider and the novel's system as an experiential, participatory movement from inside to outside of the text which is prefigured in these three generators.

The Merry Chase Game: The Dissimulation the "Indian Image"

The primary grounds upon which these inside/outside readerships are produced is through the binary thinking commonly adopted in colonial (and, sometimes, postcolonial) conceptions of indigenous and European stories. In the novel's fourth section, for example, Old Woman meets a "skinny man. I'm Nathaniel Bumppo, Post-Colonial Wilderness Guide and Outfitter. You must be Chingachgook" (392). Shortly afterwards, "Nasty" Bumppo tells Old Woman that "Indians have Indian gifts […]. And Whites have white gifts" (ibid.). Indian gifts include "a keen sense of smell […]. Indians can run fast. Indians can endure pain. Indians have quick reflexes. Indians don't talk much. Indians have good eyesight. Indians have agile bodies" (392-393). Whites, meanwhile, "are patient. Whites are spiritual. Whites are cognitive. Whites are philosophical. Whites are sophisticated. Whites are sensitive" (393). Knowingly, Old Woman summarizes Bumppo's argument: "So, says Old Woman. Whites are superior, and Indians are inferior" (393). Notably, while Bumppo declares himself as a "Post-Colonial Wilderness Guide", it becomes clear that the categorical distinctions between "Indians" and "Whites" expresses the primacy of

colonial misinterpretations, oftentimes retained in the supposedly "post" colonial mindset[88]. Throughout the novel, these myths, through their mistaken origins in the contact between Columbus and the "Indians", contribute to the symbolic "Image of the Indian".

To counter the negative implications of such reductive binaries, King assembles the narrative debris of this historical context and combines indigenous and non-indigenous narratives, especially indigenous creation stories, biblical stories, and European/American literature. Though most critics of the novel are preoccupied by these binaries, reinforcing them, and even celebrating them in reverse, Greg Bechtel argues that forcing readers to "[adopt] such Native versus non-Native [...] binary frameworks, […] elide[s] one of the central dilemmas implicit in King's novel, which is that the artificial binary of 'Whites' versus 'Indians' is itself one of the main problems facing the [novel's] Blackfoot characters" (206).The role of humour in the novel is thus both a means of inclusion *and* of exclusion, dependent upon who the reader is and what they know or think they know.

In particular, narratives that are complicit in the creation of this Indian construct are shown to be a series of comical mistakes. While the Indian image is often associated with a failure to adapt, an inability to be authentic, or a forthcoming doom (Durham 10), the concept of mistakes becomes associated with both indigenous and non-indigenous narratives throughout the novel. Regardless, the innately human quality of mistakes—that everyone makes them—does not disregard the greater power some mistakes, made by certain people, might have over the world. Critic Patricia Linton discusses the importance of mistakes in the novel, claiming that King "suggests that some mistakes are more important than others" (226). Linton focuses primarily on Coyote's "Dog dream", which calls itself

[88] As I will discuss later in this chapter, King has famously critiqued the notion of postcolonial theory in his essay "Godzilla vs. Post-Colonial", arguing that postcolonial theory "is, first of all, part of a triumvirate. In order to get to 'post,' we have to wend our way through no small amount of literary history, acknowledging the existence of its antecedents, pre-colonial and colonial" (11). For King, this temporal structure is suggestive of linear progress and "improvement" in indigenous culture, and thus a "guardian" and "ward" relationship between indigenous and settler cultures (12). Thus, for King, postcolonial theory as a lens "remains, in the end, a hostage to nationalism" (ibid.).

GOD because it "has everything backward" (*GG,RW* 2). As Linton notes here, even the Christian God is generated by Coyote's mistake-filled nature. In this sense the fallibility of the “Indian” is made level with that of Christianity and of rigid, rule-guided European culture, returning them again to the original point of contact: Coyote’s dreaming above the water.

King’s subversion of the Christian God and his creation of the Earth indicates that indigenous spirituality and stories precede Christianity, shown when The Lone Ranger begins the story with "'In the beginning, God created the heaven and the earth'" and is instantly corrected by Ishmael, who says "'That's the wrong story [...]. That story comes later'" (11). In *Green Grass, Running Water* the supposedly ‘New’ world predates the ‘Old’ one: by erasing narratives of imperialism and making them later than indigenous creation stories, the novel forces a humorous collision of indigenous and European myths where indigenous stories are told and then invaded by non-indigenous stories, characters, and rules. By reversing the dichotomy of Old and New Worlds—a linear resequencing that reproduces the original colonial situation from an indigenous perspective—King humorously resituates *GOD’s* story as a mistake made by the trickster Coyote:

> “Now you’ve done it,” I says.
>
> “Everything’s under control,” says Coyote. “Don’t panic” (2).

Coyote's dog dream—which angrily demands to be recognized as GOD—proves to be selfish, arrogant, and domineering in its insistence on "Christian Rules" (69). Through this insistence on rules, GOD—and the clash between GOD and the mistake-prone Coyote—produces the situations where European myths invade and irreparably alter the stories being told by the Old Indians (who are also, at the same time, the “earth diver” women described in the stories they are telling). As Greg Bechtel argues, the destructive power of mistakes is constantly demonstrated throughout the novel and structures the narrative itself:

> [in] every instance, the flow of the mythic story is brought to a halt by an externally imposed binary framework, that of 'Indians' versus 'Whites,' and in each case it is a self-defined 'White' character who first articulates the Indian-versus-White binary [...]. In this sense, these mythic narratives do not represent successful acts of subversion at all, but rather depict the literal disruption, arrest, and incarceration of one culture's stories by those of another (213).

While these narratives of invasion begin with a humorous tone—for example, the Noah's Ark sequence in which Changing Woman falls from the Sky World, landing on Old Coyote to avoid the Ark because "There is poop everywhere" (144)—, these situations always end in the same fashion, as each of the four Old Indians is sent to Fort Marion, a prison where the Old Indians are sent for, essentially, "being Indian" (77).

By aligning the literal disruption and incarceration of the Old Indians with a real-life prison (and, later, the mental asylum run by Dr. Joe Hovaugh), *Green Grass, Running Water* analyzes how the Indian image prefigures or anticipates indigenous failure and social delinquency. The image recursively generates mistakes, itself being an image built on the generative power of Christopher Columbus's original case of mistaken identity. Thus, this image functions as a container in which the actual lives of indigenous characters are held: in the case of the Old Indians, the Indian image is a literal prison and mental asylum.

After the initial moments of the text, which feature mistakes made by Coyote, *GOD*, and the storytellers in the form of misdirection, delusion, and false starts, the reader is introduced to Lionel Red Dog, a Blackfoot man whose life is controlled by three major mistakes: "the kinds of mistakes that seem small enough at the time, but somehow get out of hand. The kinds that stay with you for a long time" (28). This runs parallel to the beginning of Lionel's story where he has a discussion of carpets with his

aunt Norma who claims she does not “want to make a mistake with carpet” because “you got to live with it for a long time” (8). Ultimately, Lionel's mistakes resemble the Indian image: a serious case of mistaken identity. For example, when a young Lionel wants to have his tonsils removed, he is taken to "the Frog doctor" (29), Dr. Loomis, so that he can miss school. Rather than seeing "Martha Old Crow or Jesse Many Guns, who were the doctors of choice" (29), Lionel goes to a non-indigenous doctor so he can get out of school. When Lionel is finally in the hospital, the nurse mistakes Lionel for another child who requires heart surgery, sending him to Toronto. Though a child when this mistake was made, it continues to impact his life well beyond childhood: “A year later, Lionel applied for a car loan, and when he went back to check with the loan manager, the man sat Lionel down, smiled, and asked him if he had had any more trouble with his heart”; “Six months after that, he was turned down for a part-time job driving a school bus because of his health, and for years the Heart Foundation sent him letters about tax-deductible donations”; “Three years ago, a woman from Calgary called to say that a group was forming to help heart patients in outlying towns such as Blossom and asked if Lionel would like to come to their first meeting in March and share his experience” (36-37). A similar case of mistaken identity, Lionel’s second mistake “was going to Salt Lake City” to speak on behalf of his supervisor, “Duncan Scott”, at “a conference on Indian education” (55). Lionel’s speech is abruptly interrupted by protestors associated with the American Indian Movement (AIM) and he is invited “to a rally that was going to take place at the state capital later in the day” (58). While traveling to this rally, Lionel is arrested, held for 30 days, and mistakenly accused of being a leader of the AIM. Ultimately, “One day less than a month after he left for Salt Lake, Lionel was back in Blossom, an unemployed ex-con” (63).

Lionel’s third mistake, “taking the job at Bill Bursum’s Home Entertainment Barn” (80), solidifies the image of the Indian’s influence over Lionel’s own confused sense of identity. Standing outside of Bursum’s Entertainment Barn late at night after being visited by his cousin Charlie Looking

Bear, Lionel observes both Bursum “inside” the Barn and the landscape “Outside”: inexplicably, Lionel is “exhilarated, intoxicated. For a long time he stood there in the dark, smiling and swaying until the edges of his ears began to burn and he started to shiver. And as he came back through the darkness and into the light, he caught a glimpse of his own reflection in the glass” (84). Lionel’s mistakes—which respectively effect perceptions of his body, his worldview, and, finally, his own sense of identity—are treated as symptomatic of the Indian image itself, as it progresses from Columbus's first mistaken use of the term to the Indian image as it is applied in modern, everyday life. How Lionel is controlled by these mistakes, both in his social life and in his liminal self-conception (shown in his reflection in the glass), reveals how the image of the Indian gatekeeps Indigenous characters in the novel, forcing them to perceive the world around them as necessarily negotiated and liminal, leaving them trapped between the inside and outside aspects of hegemonic culture and society.

The novel provides—through the characters of Lionel, Eli Stands Alone, and Portland Looking Bear in particular—various examples of the power of this Indian image in everyday life. Ultimately, each of these figures struggles to succeed in their day-to-day lives, personally and professionally. Because to be ‘Indian’ is, in and of itself, to become the butt end of a bitter joke, an unattainable perfection, and a (neo)colonial subject simultaneously, Lionel, Eli, and Portland attempt to negotiate their identities in favour of assimilation or stasis. Lionel persistently desires to be like John Wayne, "the hero" (265), while Portland and Eli attempt to move beyond ‘designated’ indigenous spaces by pursuing careers in cities away from Blossom. Even Coyote wonders aloud at some point "[who] would want to be an Indian?" (437).

This crisis of identity permeates the novel as each of these men attempts to negotiate their identity as Indian. As stated previously, a central aspect of the Indian image is that it shapes indigenous characters’ lives before the fact. Because Lionel, Portland, and Eli all attempt to abandon their

prescribed role for non-indigenous society, their Indian identity is tied to a profound sense of shame due to their liminality. They never fit in on either side of the binary. For Lionel, whose life has been run by 'his' mistakes and his inability to leave his demeaning job at Bursum's, he remains trapped in his own reflection. He is situated both inside and outside of his own culture throughout the novel. Similarly, Portland is controlled by his failure to look Indian enough, causing him to become motionless and depressed. An aspiring Hollywood actor, "Portland's nose wasn't the right shape" and thus he did not look Indian enough to star in major roles in Hollywood Westerns (168). The groundless aspect of the Indian image emerges again, as actors who are not actually indigenous—whether they are Italian, Greek, or just generally 'Indian-looking'—are coded as more authentic than Portland (204). This bitter irony places Portland in limbo, trapped on the couch watching television (239), doing demeaning work at a strip club called The Four Corners where he performs the role of the Indian during a striptease by "wearing a black mask" and having "done something to his nose […] [painting] it red" while "waving his tomahawk and grimacing and sneering at Pocahontas and the audience" (235-239)[89]. The Indian image controls who is seen to be Indian more than ancestry or blood quantum; Indianness in this sense is prefigured by history, art, religion, and, ultimately, non-indigenous perspectives. King's joke here is once again that the Indian who dances, wears headdresses, and succumbs to pressure from non-indigenous culture is a costume that must be worn to assimilate. And yet, at the same time, this costume proves impossible for actual indigenous people to live up to. Because Portland must dress Indian and cosmetically alter his face with a prosthetic, Indian-looking nose, the image proves tacked on, stinking "like rotting potatoes" (170).

Along with this loss of self-respect and value is a sense of motion as exclusive to those who assimilate or move beyond indigenous spaces. Eli, for instance, is a professor who renounces his

[89] Notably, the allusion to a square geometry implied by the four corners also signifies the carceral quality of the Indian image, a strong contrast to the four sections of the novel which form the corner-less Medicine Wheel.

indigenous identity through his education[90], leaving Blossom for Toronto. Eli persistently neglects his identity as an indigenous man and it is not until he revokes his professional position that he finds his own sense of identity and power. Interestingly, this identity manifests in a hybrid manner, as Eli takes pride in suspending the processes of non-indigenous institutions rather than healing his damaged sense of self. Through Eli, a meta-critical notion of the novel itself as a work is revealed: Eli's hybrid approach resembles the process by which the novel merges indigenous and European ideas and stories. Eli becomes the "Inconvenient Indian"[91], living in a wood cabin and disrupting supposedly "bigger" and "better" uses for the land beneath the dam. Eli, throughout this process and "in a rather perverse way [...], [comes] to enjoy the small pleasures of resistance" (287). Eli's hybridity suggests a potentially productive tension between cross-cultural models of resistance: not only does Eli embody several ideas of the Indian image, but he also isolates himself, becoming "[an] Indian Thoreau" (315). This hybridic model exemplifies a balance between the two cultures, one side reverential of works such as *Walden* (or texts which praise individualized narratives of resistance) and the other a more communal sense of disruption, signified in the elevated importance of living alone in the cabin at the end of the novel which Lionel attempts to claim (though this is immediately rejected by his aunt Norma, who argues that it is her time to live in the cabin (423)). Through Eli, King reveals the short-term benefits such a method can have on the level of the novel as a whole: humour, blending, and strategic essentialism are not permanent strategies of healing or resistance, but instead rely on the momentary slippage that occurs when the reader's habits are challenged. Eli's interpretation of resistance is similarly short-term, rather a

[90] This is a historical allusion to the controversial history of indigenous "enfranchisement", a sub-section of Canada's 1876 *Indian Act*. Enfranchisement concerned loss of an indigenous person's status as Indian, proportional "to the degree of civilization to which he or she has attained". This revocation of indigenous status occurred either through marriage or university education (Indian Act, S.C. 86, 1876). Thus, receiving a university education often caused an indigenous person's status as "Indian" to be revoked for them and their descendants.

[91] See Thomas King's later monograph *The Inconvenient Indian*.

deferral of the problem and not a solution to it: Eli has, throughout his time in the cabin, "won very little" (286).

The stories of Lionel, Portland, and Eli offer portraits of the influence of the Indian image and the narrative it has helped structure, revealing the disconnect each of these characters feel with their own indigenous identities. The Indian image ruins their sense of self, their pride, and their ability to succeed long-term. Not until Portland, Lionel, and Eli renounce their culture, either in the form of a John Wayne outfit, an Indian costume, or willing enfranchisement, are they able to assimilate. Yet they are still not accepted and are still singled out as Indian in the novel. This shows yet another layer of the Indian image, one directly related to *Green Grass, Running Water*'s generative strategy: because the novel is humorous and entraps by making the expected feel unexpected, and vice-versa, it is easy to ignore that these men are labelled regardless of their attempts to escape the imprisoning Indian image.

This pattern of mistaken or confused identity is also reflected in the narrative of the Old Indians, who are first mistaken for an Indian sidekick from famous narratives, such as Queequeq in *Moby Dick*, Tonto in *The Lone Ranger*, Friday in *Robinson Crusoe*, and Chingachgook in the *Leatherstocking Tales*. By emphasizing the role of mistakes in the formation of the Indian image, King promotes a humorous model of disruption, drawing "our attention to the narrative construction of belief systems" (Cox 231). Further, this structural emphasis on mistakes analyzes how art and representation, rather than historical dominance, have become the chief generators of the Indian image in contemporary life. Once the mythical indigenous women don these costumes, they argue over how to begin their story correctly to avoid making mistakes and, when The Lone Ranger claims that "'Everybody makes mistakes', it is immediately clarified that it is "[best] not to make them with stories' (11)[92].

[92] This directly parallels Lionel's earlier discussion with Norma mentioned above.

The Old Indians cause mistakes to be made just as often as they correct them. Their identity, their age, and their gender are all persistently questioned, especially by Dr. Joseph Hovaugh (56), who runs the mental institution in Florida which the Old Indians repeatedly escape from. Even their escape is a source of confusion in the novel, baffling another doctor named Dr. Eliot, who questions Dr. Hovaugh: "how [do] they escape. And where do they go? [...] And why, in God's name, would they want to leave?" (50). These figures, because they constantly change from their indigenous names to costumed identities, gender-swap from women to men, and border-cross from the United States to Canada, consistently deny the Indian image prescribed by Christian Rules (for example when they talk to animals and are chastised by Noah for "Bestiality", which is "against the […] Christian rules" (146)). This is a subversive reaction to the imprisoning effect of the Indian image and to the underlying irony of the construct's conceptual, historical, and legislative plasticity.

Put differently, this irony is effective only because the Indian image is historically paradoxical: it constantly and consistently changes, while denying that a person who is Indian **can** change. As Vine Deloria Jr. observes in *Custer Died for Your Sins*, "[to] be an Indian in modern American society is in a very real sense to be unreal and ahistorical" (2). This is because "[the] American public feels most comfortable with the mythical Indians […] who were always THERE. These Indians are fierce, they wear feathers and grunt. Most of us don't fit this idealized figure" (2). The Old Indians reveal, through their gender, spatial, and structural fluidity, that this image is built on unstable ground; it is yet another mistake. It is unsurprising then, that their escape is treated in an equally light manner. Dr. Joseph Hovaugh responds to their escape in a range of ways: at first, he expresses disbelief. Then he becomes certain that the Old Indians are dead, begging Dr. Eliot to sign their death certificates with "'Heart attack, cancer, old age. I don't care. Be creative'" (49). Finally, Dr. Hovaugh goes searching for them himself.

Once again, this is a mocking exploration of the Indian image as it has constantly changed to suit the whims of the colonizer, who is first intrigued and perplexed by the Indian (in early colonization), then wishes for the death of the Indian (during Western expansion), and then romanticizes and mourns the death of the Indian (after this expansion). Ironically, Dr. Hovaugh is incapable of expressing why the Indians are even in the asylum, instead stating that:

> "It would be difficult to discuss the specific prognosis in lay terms. I suppose I should say at the start [...] that many of the problems we face are those created by the divisions in the medical sciences and the social sciences, particularly in the [...] areas of gerontology and cultural anthropology and the lack of [...] any substantive crossover research" […] (80-81).

As shown in his winding explanation, Dr. Hovaugh struggles to understand the implications of his own role in the perpetuation of the Indian image. Through both the treatment of the Old Indians by non-indigenous characters and their own role in the four mythical narratives, the novel charts the historical progression of the Indian construct. Yet, though each narrative ends with the Indians being sent to Fort Marion, there is a paradoxical agreement between the repetitious orality of their stories and of their role as indicators of adaptability and change; the indigenous storytellers become symbolic of fluidity despite their being placed in the role of the Indian throughout the novel.

Therefore, The Old Indians successfully depict a model for counter-acting the image of the Indian through their adoption of different identities, their crossing of boundaries (of narrative and identity), and their donning of popular and stereotypical costumes from the European/American imaginary. In this sense, the novel represents and reflects on non-indigenous discourses that promote negative, unreal stereotypes of the Indian while also depicting these stereotypes as potential sites for ironic subversion. Another useful example of this is in the story of Lionel Red Dog's sister, Latisha

Morningstar, who runs a restaurant called the Dead Dog Café. This restaurant—which is also referenced in the title of King's popular 1997 radio comedy *The Dead Dog Café Comedy Hour*—claims to sell various dishes made with dog meat, ironically performing Indian stereotypes to entrap tourists. Capitalizing on these stereotypes, Latisha jokingly embraces them to the point of ridiculousness, representing Indians and Europeans in eerily "expected"—stereotypical—ways which playfully subvert expectations by mocking them. As Norma tells Lionel, it is

> "Nice to have a real Indian restaurant in town."
>
> "She sells hamburger."
>
> "People come from all over the world to eat at the Dead Dog Café."
>
> "She sells hamburger and tells everyone that it's dog meat."
>
> "Germany, Japan, Russia, Italy, Brazil, England, France, Toronto.
>
> Everybody comes to the Dead Dog."
>
> "The Blackfoot didn't eat dog."
>
> "It's for the tourists."
>
> "In the old days, dogs guarded the camp. They made sure we were safe"
>
> (57).

Latisha's performative gesture points to and undermines the presence of exaggerated and problematic stereotypes, functioning as a carefully laid "snare" that presents what is expected in obvious ways so readers might become skeptical of it (Fleischmann 160). For Aloys Fleischmann, "Old Agency Puppy Stew can be seen as a trick [...] [but] tourists are not fooled by the food; they are *expecting* the stereotype to be without substance. The trap is truly sprung when Latisha gives her customers exactly what they were/n't looking for" (ibid.). Because the Indian image is obviously impossible, expectations are set on indigenous characters to become Indian lookalikes, imposters who are unreal and unrelated to

authentic Indians. When this expectation is defied, a slippage occurs during which King's humour can place readers on the wrong side (or outside) of the joke.

This occurs continuously throughout the novel, and while tourists are shown searching for "real" or "authentic" Indians, these expectations are often the subject of a joke. This creates a suspicion of clichés and of met expectations in the reader, unravelling the traps of the Indian image. The fine line between a joke's levity and its bitter pedagogy is expressed throughout the novel, perhaps most appropriately in its title: "Green Grass, Running Water" is a reference to "'As long as the grass is green and the water runs' […] an expression frequently employed in treaties between Euro-Americans and Natives to signal the Euro-American settlers' willingness to honor the agreement infinitely" (Gruber 84). Throughout the novel this title "resonates [...] as a code for betrayal, but betrayal compounded so many times that it has become predictable. In the mouths of Native characters, the phrase expresses bitter humor" (Linton 218). These empty words become representative of the persistence of the Indian image, even when spoken to resist encroachment on indigenous lands by Duplessis, a company who builds the Grand Baleen Dam near Blossom. Lionel's boss Bill Bursum, "one of the first people to buy a lot at Parliament Lake", an artificially constructed lakefront town near the dam, recalls a discussion he had with Eli, whose cabin "tucked in under the face of the dam, [and] was in the wrong place. It was too small. There were no utilities. But because of the cabin, because of the injunction, because of Eli, no one could build on the lake itself until the matter was settled" (267). Continuing, Bursum remarks that it "'[wouldn't] be hard to move the cabin,' […]. 'Probably get the government to move it to higher ground for free'" and that Eli "'[can't] stay there forever'". Eli replies that he can stay "'As long as the grass is green and the waters run.'". Frustrated, Bursum considers Eli's response: "It was a nice phrase, all right. But it didn't mean anything. It was a metaphor. Eli knew that. Every Indian on the reserve knew that.

Treaties were hardly sacred documents. They were contracts, and no one signed a contract for eternity. No one" (ibid.).

As such, *Green Grass Running Water* suggests several means by which North American indigenous peoples can disrupt or even potentially escape the Indian image. The first aspect is a structural: because this image is historically associated with Columbus's original mistake (and mistakes in general), the mistake-filled arrangement of the novel and its layered stories is a playful critique of the image and the types of stories it prefigures. In this sense, the novel blends narratives and blurs borders—between reality and mythology, indigenous and non-indigenous, authentic and inauthentic—so that much of the text becomes a collision of these binaries.

Further, the novel blends narrative styles, especially oral and written styles, in an effort to produce a site for the interaction between written and oral cultures and the mindsets produced by this historical-conceptual collision. The effort to synthesize written and oral modes is prevalent in several ways throughout the novel, especially in the dual-function of language which can both be read silently and read aloud. While an emulation of the oral storytelling situation begins the novel, much of the narrative depicts dialogues which are difficult to follow because characters prove to be poor listeners, constantly speaking past one another. At the same time the text pushes readers to read aloud, even hiding jokes from those who read silently. Puns scattered throughout the novel are easily missed if not spoken out loud, such as the name of Dr. Joe Hovaugh, a play on Jehovah. Elsewhere, the three cars which are eventually used by Coyote to destroy the Grand Baleen Dam—the Nissan; the Pinto; and the Karmann Ghia—are all phonetic echoes of the three ships Columbus brought to America: the Niña, the Pinta, and the Santa Maria. In the first of these examples, the pun is difficult to catch if not spoken quickly, blurring "Joe" and "Hovaugh" into "Jehovah". The second allusion is similarly reliant upon orality because the car names align in terms of cadence and syllable count. Another example of this is the

narrative through-line which begins with “just the water”, moving towards the dog dream’s Garden where “Ahdamn” is introduced. The realist plot, likewise, features a waterway that has become contained by “A dam”: the Grand Baleen Dam.

Orality is utilized in other ways as well, as the novel’s four narrative levels intersect actively throughout the novel. As Robin Ridington observes, indigenous storytelling is directly linked to a theorizing of the world, filtering indigenous perspectives into metonymic narratives, "parts that stand for wholes" (346). Indigenous stories are expressions of indigenous culture, art, and livelihood, and "[each] story is connected to every other" (346). Even Thomas King claims, in his collection of lectures *The Truth About Stories*, that "[the] truth about stories is that that's all we are" (2). Thus, the risk of mistakes makes the storytelling process even more important. Misunderstanding is depicted as the most common risk—especially shown in the slippages and puns between written and oral discourses—, one which extends to the repetitious, adaptable, and cyclical structure of the novel. At the beginning of the first section of the novel, the Old Indians deliberate over whose turn it is to tell the story:

> “Whose turn is it?” said Ishmael.
>
> “Mine,” said the Lone Ranger.
>
> “Are you sure?” Said Robinson Crusoe.
>
> “Maybe it’s Hawkeye’s turn.”
>
> “No,” said the Lone Ranger. “Hawkeye has already had a turn.”
>
> “Maybe it’s Ishmael’s turn.”
>
> “Ready,” said the Lone Ranger. “Here we go.” (10).

Though this is the beginning section of the novel, it is immediately made clear that the story is circular and continuous, built upon earlier iterations. A significant element of oral storytelling, as I have argued

above, is the circular, repetitious structure of stories. Implied by this structure is the reality and acceptance that mistakes can always occur:

> “Don’t forget the jacket,” said Ishmael.
>
> “I won’t.”
>
> “You forgot it last time.”
>
> “Did I?” (9).

By emulating the structure of an oral storytelling situation, *Green Grass, Running Water* emphasizes learning from such mistakes rather than being defined by them. Each of the four stories told by the Old Indians follows the same basic formula: an indigenous Earth Diver figure falls from the Sky World and is then introduced to non-indigenous figures (first a biblical figure, then a literary one). After these meetings, the Earth Diver is imprisoned in Fort Marion. These stories are fluid and cyclical across each section: as Robinson Crusoe tells The Lone Ranger when she starts the story wrong, "'you can't tell it all by yourself'" (11). This is strongly emphasized by The Old Indians’s repeated phrase "'[remember] what happened last time?'" (ibid.), which implies that the Old Indians have previously told the story incorrectly. This is also humorously referenced by Dr. Hovaugh when he shows Dr. Eliot a book which charts several natural disasters which correlate to several escapes performed by The Old Indians:

> “Yellowstone,” said Dr. Hovaugh.
>
> “Joe…Joe, we’ve talked about this.”
>
> “It’s in the book,” said Dr. Hovaugh. “I didn’t make it up. The Indians disappeared on July eighteenth, 1988.”
>
> “Yes,” said Eliot, “but that doesn’t prove anything.”
>
> “By the end of the month, Yellowstone was in flames.”
>
> “Coincidence.”

> "Mount Saint Helens. They disappeared on May fifteenth, 1980, and on the eighteenth, Saint Helens explodes." (46).

Through its emulation of The Old Indians' circular oral storytelling in the novel form, *Green Grass, Running Water* promotes a communal, growth-oriented perspective which relies on multiple perspectives, retellings, and constant renegotiations. This is shown once again in the four stories the Old Indians tell, as the Earth Diver figure First Woman relies on a communal creation of the world, requesting help from animals—who, one by one, dive deep into the water to gather mud before placing it upon Grandmother Turtle's back—rather than creating the world alone (39).

Similarly, the narrative set in Blossom, Alberta leads figures like Eli and Lionel to return to their community, finding their identity through their relations. This concept, one of relations and respect for communities, is further extended to King's portrayal of the Sun Dance, a key set piece in the novel indicative of "a cyclical movement towards regeneration" (Cox 239). As Eli and Lionel return to their homes, they abandon their desires for heroic, atomistic identities in favour of the communal gathering of the Sun Dance. This is best signified by Lionel's discomfort while wearing the John Wayne-esque leather jacket the Old Indians give to him for his birthday, which had started "suffocating him" and "had begun to smell [...] like old aftershave or rotting fruit" (422). The reference to rotting fruit is particularly indicative of Lionel's state, as rot is a critical aspect of the cyclical process of entropy and negentropy[93]—the processual tension between a system's falling into chaotic and more stable states. Much like Lionel's identity crisis has left him in a negentropic state—in a long-term limbo without change—his experience of the Sun Dance promotes the beginnings of a new generation through an increase in entropy generated by the presence of Coyote and the Old Indians. As stated previously, Coyote's capacity for destabilizing semiotic systems which have become negentropic—not to mention

[93] The jacket, also tied to Hollywood representations of indigenous peoples, clearly parallels Portland's prosthetic nose.

the similarly playful and mistake prone Old Indians—provokes chaotic change in previously static, imprisoning notions of the Indian which led to Lionel wishing he was John Wayne in the first place.

While King explores unexpected avenues for indigenous communal growth and resistance through the juxtaposition of myths and the emulation of oral stories in written form, this approach extends beyond myth and genre to focus on the role popular media have played in perpetuating the Indian image. For example, writing, film, and television are consistently shown to perpetuate this stereotypical image of indigenous peoples. For example, because the novel emulates oral storytelling structures in the written form, writing becomes another site of contestation. In contrast with the rhetorical situation of an oral storytelling, novels are read individually (atomistic), they are more 'permanent' (static), and they can be read in different environments (reproducible).

As stated above, King defies these typical readings by framing an oral narrative inside of a written one. This approach is in response to the hegemonic influence literature has had in maintaining the image of the Indian over time. When Changing Woman encounters Captain Ahab, she realizes that Moby Dick, the great white whale, is actually "'Moby-Jane, the Great Black Whale'" (196). Coyote immediately questions the "I"-narrator's story, saying that Changing Woman "'means Moby-Dick,'[…]. 'I read the book. It's Moby-Dick, the great white whale who destroys the Pequod'" (ibid.). The "I"-narrator immediately retorts that Coyote has not "'been reading [their] history,' […]. 'It's English colonists who destroy the Pequots'" (ibid.). The substitution of a white, male whale for a black, female whale ironically subverts Melville's fixation on whiteness in *Moby Dick.* But the second interruption of Coyote by the "I"-Narrator refers to the nature of symbolism in literature more broadly, especially because this symbolic function of writing is portrayed as distanced, monological, and outside of lived experience. Immediately, the immediacy of oral storytelling is emphasized over the symbolic, imagined history influenced by colonial literature:

> "But there isn't any Moby-Jane."
>
> "Sure there is," I says. "Just look out over there. What do you see?"
>
> "Well…I'll be," says Coyote (ibid.).

These linguistic swerves away from literary symbolism (Moby-Dick, the great white whale and the ship's nominalization as the Pequod) towards direct experience (Moby-Jane, the great black whale and the historical destruction of the Pequots by colonists) offers another perspective in reference to what Terry Goldie describes as "the profound gulf which is usually seen between the two forms of communication, the oral and the written" (108).

Just as the written word is a tool for developing dominance and the symbolic imaginary which helped generate the Indian image, the film genre of the Western is another means by which the image is perpetuated and, eventually, fetishized as an easy, predictable commodity. This relationship between film and literature is further established in the structurally dense ending of Section Two told by Ishmael. In this later section, several of the novel's characters watch a film called *The Mysterious Warrior* on cable. The strong connection between literature and film is solidified when the cable film is structurally juxtaposed with Eli's reading of the novel the film is adapted from, skimming

> ahead almost to the end of the book. Chapter twenty. Iron Eyes was dressed in feathers and war paint and Annabelle was dressed in a beautiful white buckskin dress […]. "No," said Annabelle, flinging herself into his arms. "I want to stay with you forever." Iron Eyes held her for a moment, and then pushed her away. "No," he said, his proud face turned toward the rising sun. "I am a warrior and a leader of my people. I cannot turn my back on them. I must fight and you must go." (202).

Of note is the clear connection to the mythical sense of indigenous people mentioned by Vine Deloria Jr. in *Custer Died For your Sins:* "fierce, they wear feathers and grunt" (2).

When Eli arrives at "Chapter twenty-six" the scene quickly transitions to the film version, being shown on "Channel twenty-six", further exemplifying the interwoven nature of the Indian image across different media. Charlie Looking Bear, Portland's son, is alone in a hotel room watching the film while "[on] the screen, the chief and the captive white woman were in each other's arms. It was standard stuff, but Charlie found himself watching the romantic tension that was building and wishing that Alberta were here" (207). This tension leads to Charlie's reflecting on his father, Portland, whose desire to be part of the film industry has been consistently impeded by his inability to meet the Indian image demanded by Hollywood Westerns. Much like the novel version, the film is deeply stereotypical because it comfortably reinforces several key aspects of the Indian Image. As the neo-colonist Bill Bursum lovingly notes, the movie is

> The best Western of them all. John Wayne, Richard Widmark, Maureen O'Hara. All the biggies. [Bursum] had seen the movie twenty times, knew the plot by heart. Even knew some of the lines (188).

The comfortable predictability of the film, which attracts Bursum to it, is likewise noted by Latisha's son Christian, who asks "'Mom, is this the one where the cavalry comes over the hill and kills the Indians?' (192). When Latisha responds by saying "'Probably'", her son asks "'How come the Indians always get killed?' […]. 'But what if they won?'" (193). In this manner, the novel also suggests that film and television might also be utilized to subvert the predictable, stereotypical narratives of the image of the Indian.

The potential mutability of film as a tool for opening *and* closing possible stories is shown by the entrance of the Old Indians into the film version of *The Mysterious Warrior* later in the novel. In a

similar manner to how King interweaves different cultural narratives for subversive effect, the Old Indians occupy and alter the typical narrative of the Western by physically altering the film when Bursum plays it at his Entertainment Barn. When the predictable battle scene—when John Wayne and his men storm toward the Indians across the river—arrives, the Old Indians subvert it by introducing Portland into the scene as the Chief, a role he constantly desired but was never given: "As the camera pulled in tight to the chief, Charlie stood up and took a step forward. It was his father" (319). In the original sequence of the film the battle is evenly matched until a heretofore unseen "troop of cavalry" charge "down the hill into the river bottom" and turn the tide against the Indians (ibid.). When the Old Indians see this version of the film play out, they realize the film has the incorrect ending:

> "Oops," said the Lone Ranger. "I thought we fixed this one."
>
> "Yes," said Ishmael, "I thought we did, too."
>
> "A lot of them look the same," said Hawkeye.
>
> "Boy," said Robinson Crusoe, "this is sure a lot of work" (320).

Shortly afterwards, the Old Indians enter the film, removing the troop:

> There at full charge, hundreds of soldiers in bright blue uniforms with
> gold buttons and sashes and stripes, blue-eyed and rosy-cheeked, came
> over the last rise.
>
> And disappeared.
>
> Just like that (321).

With the intervention of the Old Indians—substituting Portland for the troop of cavalry—*Green Grass, Running Water* suggests that the border between stories and reality is permeable, including the borders between television and its capacity to influence real life stories. This is done by performing a vertical metaleptic shift wherein the film—a story within the story—is invaded and altered by the Old Indians.

At the same time, the occupation of the film scene by the Old Indians renders the original black and white film into “color” (ibid.), most notably “red, white, black, blue” (ibid.). These colours have several generative implications: firstly, they are the colours according to which each quadrant of the Medicine Wheel structure is ascribed. These are also the colours associated with the Old Indians and their confused identities, as the detective investigating their disappearance, Sergeant Cereno, refers to the Old Indians as “’Mr. Red, Mr. White, Mr. Black, and Mr. Blue’” (53). Colour’s symbolic significance for the novel’s structure is echoed by the addition of colour to the film, emphasizing that film might also become an avenue for potential communal growth. In this way, while "[television] is […] implicated both in the division of Native communal life and in the neutralization of political resistance" (Johnson 3) throughout the novel, cinema is also shown to be a space in which the Indian image might eventually be undermined.

Much like religious, literary, and filmic narratives provide support for the binary logic mediating indigenous and non-indigenous peoples, media technologies—particularly with their ability to capture and re-present—serve the interests of colonial and postcolonial attitudes more comfortably than those of indigenous characters in the novel. Another predominant technology which provided colonial and imperial projects in North America with “substantial epistemological and narrative support” (Freedgood 394) was the map, which, as the primary tool of Cartography, “has often served as a tool of the colonizer to intrude into the Other’s territory and make a lopsided claim of such territory as their own” (Panda 241). Bill Bursum, for example, reinforces the notion that maps offer substantial epistemological and narrative support to empires in his purchasing of the lakefront lot near the Grand Baleen Dam: “Bursum put his feet up on his desk, leaned back in the chair, and looked at the large picture on his wall of Parliament Lake with the red circle around the piece of lakefront property that Bursum had bought just after the dam was announced” (266). Despite the dam’s delay due to Eli’s resistance, Bursum is a firm

believer that the property demarcated on maps of Parliament Lake will exist and become his someday. In fact, he "had been one of the first people to buy a lot […]. Even before the dam had been started, before the contours of the lake were actually realized, Bursum had looked at the topographical map […] and picked out the best piece of property on the lake" (ibid.). As shown by Bursum's firm belief that the property would be made because it had been mapped "before the contours were actually realized", his belief that maps are a concrete contract contrasts his previously mentioned attitude towards treaties, which Bursum conveniently argues are "a metaphor", "contracts" which "no one signed for eternity."

The second example of Bursum's ideological dependency on maps comes with his construction of The Map, a cartographic representation of Canada and the United States made out of televisions. While Bursum finds this project to be "magnificent, spectacular, genius" (126), he struggles to explain "the unifying metaphor or the cultural impact The Map would have on customers" (128). Standing "in front of the 'fantasy' section", Bursum unveils the "far wall […] filled with television sets. They ran from corner to corner and were stacked right to the ceiling, all shapes and sizes" (126). Trying to explain the relevance of The Map to his employee Minnie, Bursum "loved the sound of it. There was a majesty to the name [The Map]. He stepped back from the screens and looked at his creation. It was stupendous. It was more powerful than he had thought. It was like having the universe there on the wall, being able to see everything, being in control" (128). Humorously, Minnie notes that The Map is both "crooked" (126) and that "its advertising value [possibly] compensates for its lack of subtlety" (129). Agreeing with her (while also ignoring her), Bursum observes that "'It's like being in church. Or at the movies'" (ibid.). Through this ironic representation of Bursum's attitude towards maps and mapping, which he refers to as "beyond value" shortly before asking if Minnie has read Machiavelli's *The Prince* (128), the novel directly associates mapping with spiritual and cultural control. Through the televisual arrangement

of the Map, King unifies the spiritual, cultural, and spatial developments of the Indian image and its perpetuation in colonial and postcolonial imaginaries.

Generating the Medicine Wheel: *Metalepsis* and *Mise en Abyme*

Through these narrative strategies and structures, King's text disrupts any sense of universalism, prioritizing the reality and necessity of hybrid approaches which emerge in response to the imposition of static, hegemonic structures such as the Indian image. King argues for "other ways of imagining the world, ways that do not depend so much on oppositions as they do on co-operations" (*The Truth About Stories* 110). To this end, *Green Grass, Running Water* intentionally problematizes European culture's homogenizing, universalizing, and technologized conclusions about indigeneity. Just as the Indian image dictates an unrealistic notion of indigenous life, structures which champion abstraction, generality, and hegemony prove incapable of adequately understanding and valuing the genuine difference between indigenous and non-indigenous cultures.

A key element of the novel's environment, then, is its postmodern mixture of various stories, languages, modes, and media, each of which contribute to a spatial textuality resembling the Medicine Wheel. As Robin Ridington argues in "Coyote's Canon," Indigenous oral storytelling is fundamentally built on the idea that stories are a generative dialogue between the storyteller and the listener (Ridington 246). Reflecting on how the listener helps the speaker "actually [talk the world] into being" (ibid.), *Green Grass, Running Water* requires an understanding of oral stories and written stories, of Indigenous creation myths and Christian creation myths, of Indigenous art and the European canon. Arnold E. Davidson et. al, argue that King's fiction requires "the recognition of dominant discourse conventions, and their systematic overturning and refashioning" (49). This overturning and refashioning are a result of King's application of generative procedures, which leads readers on "a merry chase" (Fee and Flick 132) into and then outside of the text. Further, while "[some] passages [...] play tricks on readers […]

some create an ‘inside’ and an ‘outside’ readership” (Davidson 51). In doing so, King uses generative procedures to facilitate a dialogue between author and reader that pushes the audience both inside and outside of the textual environment.

The primary means by which G*reen Grass, Running Water* develops the medicine wheel is through the building of a ludic textual system based on chasing references from European and Indigenous art, myth, and history. Through this meta-textual style King proceeds to "[build] up structured sets, not directly with other structured sets but by using the remains and debris of events" (Levi-Strauss 21-22). This is conceptually tied to the constant presence of water, which is ubiquitous throughout the novel, and which literally produces ‘remains and debris of events’ as it flows across and throughout the novel’s various levels. Water intrudes on every narrated situation and crosses the boundaries of every narrative level in the text. The water, alongside other primary situational generators (i.e., Christian Myths and the Plains Indian Ledger Art), structures the narrative’s boundaries and, simultaneously, transgresses them as a means of rendering these boundaries changeable.

Crucially, this water holds both generative and re-generative potential; it serves both as the waters of both creation and destruction. Fundamental to the generative system in the novel, the water is generative specifically *because* it is fluid and situational. The continuous presence of water in the novel, through its situational fluidity, produces a space for the reproduction of stories and their mutually reflexive quality across all narrative levels. For example, the water at the time of creation precedes and facilitates the creation of the world in both indigenous and Christian myths, while water likewise generates the meeting between indigenous creation myths and European myths (such as Changing Woman meeting Noah in the Water World (144-148)). The water both generates and destroys, often simultaneously: for example, Coyote’s rain dance (247) later impregnates Alberta Frank (354) and sweeps away the flooded cars—the Nissan, Pinto, and Kharmann Ghia—which cause the death of Eli

Stands Alone when the Grand Baleen Dam is destroyed (407-411). By developing a generative system which produces a neutral space in the reflective surface of water, "the ludic [quality of the novel] not only holds the mirror up to reality, but also infuses diversification by generating communities of readers caught by these counterfactual worlds, and engaged—as gap fillers—in their creation" (Dickmann 179). Thus, the diversification of an inside and outside readership produced by the sliding, dual-signification of water as potentially creative and destructive serves a central function in generating the environment of the novel.

This use of the water as a *mise en abyme*, alongside the vertical and horizontal metaleptic moves performed by Coyote and The Old Indians, generates the spatiality of the narrative in *Green Grass, Running Water*, especially as it pertains to the reader and the merry chase game. As outlined in the introduction of this dissertation, *mise en abyme* produces a directionality (that of centrifugal or centripetal motion) in the relationship between reader and text (Morrissette "Postmodern Generative Fiction" 259-260). The system in *Green Grass, Running Water* first draw readers in centripetally, though this is done in service of the underlying pedagogical goal of readers moving centrifugally, from the work into life.

The primary means by which this generative system operates involves the admixture of unrelated materials which cross the borders between the colonial (and postcolonial) European/Indian binary. The connections between European and Indigenous cultures built by King are predominantly humorous, constructed around an inside/outside dichotomy which spatializes the novel through centrifugal and centripetal motion. Those who get the joke are insiders, while those who are uninformed are "[enticed], even [tricked] […] into finding out for themselves" (Fee and Flick 132). King facilitates the collision of disparate stories that are treated as closed and objective accounts of History, presenting them instead as merely differing perspectives on the world. For example, the mistaken story that Christopher Columbus

discovered “Indians” when he sailed to the Americas is inverted, opening the original point of contact for re-interpretation. To disrupt this mistaken history, King develops a retroactive relationship between European stories and indigenous stories (at least, retroactive to those expecting a story to begin with the Genesis myth), arguing for an indigenous vision of history that long precedes colonial contact and even Judeo-Christian creation myths.

King’s postmodern challenging of colonial metanarratives about indigenous history subscribes to Gerald Vizenor’s argument that “[the] closure of meaning by cultural representation, however thick, provides the situational potentiality of native tease, parody, mockery, and irony” (*Native Liberty* 4). This opening of once-closed cultural representations through “tease, parody, mockery, and irony” is forced by King’s connecting “what you do know to something you ought to know” (Ridington 351), pushing readers to recognize “the synthesis of diverse elements involved in the actual construction of any person’s or group’s identity” (Leuthold 26). King’s ironic cultural combinatorics transcends the level of story, adopting and ironically utilizing the postmodern attitude towards surfaces (Harvey 7) across language, genre, myth, and media. Because “every reader [of the novel] is […] inside at least one network and can therefore work by analogy to cross borders into the others” (Fee and Flick 131), this emphasis on surfaces structures the reflexive ground on which the novel’s cultural collisions occur. This reflexive ground obscures the latent, concentric, circular structure of the novel while simultaneously demanding repeated readings and renegotiations, drawing readers into the circular narrative through humorous entrapment, often in the form of linguistic slippages and intertextual allusions, to produce readerly mistakes which situate readers outside of the boundaries of the novel. This joke-like structure thus produces a circularity of readership which enforces the distinctions between those ‘inside’ and those ‘outside’ of the joke.

Considering the ironic and ludic quality of the novel, Margery Fee and Jane Flick argue that the novel begins by forcing uninitiated readers into a series of "border crossings" including different sections of the novel, different alphabets, and different cultural myths. Readers are immediately moved "across a border, but which one? And then we hit the Cherokee syllabics: this is Cherokee territory, but even when we translate the words, when we know the colours and the directions, we still don't know what they mean to the culture that uses them" (131). These border crossings are shaped, in terms of their technical figurative application, by utilizing metaleptic shifts and *mise en abyme*. Metalepsis involves the crossing of traditional borders between levels of a narrative; *mise en abyme* concerns the mirroring of subject and object, which forms the ground and gap between them. Through the procedural chain formed between the novel's metaleptic shifts and its generation of the *mise en abyme*, King facilitates an uneasy affect in readers whose knowledge leans too heavily to one or the other side of the binary—connecting what readers know to what they do not. This connective mediation of binaries pushes the reader to think combinatorically, producing relationships across cultures and stories.

Rhetorically influencing readers to become familiar with multiple worldviews simultaneously, King attempts to subvert the "Indian" image perpetuated through biblical, literary, and filmic representations of indigenous peoples by non-indigenous institutions, combining these stories with indigenous creation myths to produce ironic encounters. This combinatorial approach applies across every narrative level, as characters transgress narrative levels with both vertical and horizontal metalepses. Vertical metalepses include ascending and descending intrusions across narrative boundaries within the text—for example, when the trickster Coyote and The Old Indians cross narrative levels in the novel—, while horizontal metalepses involve characters crossing the borders between different texts—such as when religious, mythical, and artistic figures intrude on the indigenous creation myths

throughout the novel or when literary and historical figures appear in the 'realistic' plotline focalized on Lionel Red Dog and Alberta Frank.

In combination with this transgressive approach to narrative boundaries, King utilizes the generative structure of *mise en abyme*—especially for its "use of inner-outer image correspondences" (Morrissette, *Intertextual Assemblage*, 63)—to draw readers deeper into the novel's rhetorical situation. To produce this inner-outer effect of *mise en abyme*, King's readers are teased and ultimately entrapped in the desire to master the text's various discursive fields. Once readers are provoked into this process, they are further pushed into a cyclical set of narratives told by The Old Indians that emulate the figure of the Medicine Wheel, a pan-indigenous figure for expressing holistic, cyclical understandings of the cosmos:

> The Medicine Wheel (whether of stone or of logs or whatever) is a sacred and purified space at which rituals, magical work, and ceremonies may be conducted. It usually marks a 'power place', a place where beneficial energies are present in unusually high quantities, and it serves as a doorway through which communication with the Honored Spirits can be amplified. But it can also serve as a helpful tool for looking deeply into ourselves and our reality. The Wheel can help us to understand our world and in doing so can help us to evolve (Atli).

By developing a narrative system built around the Medicine Wheel, King's intersecting stories become a means by which relationships across cultures can be potentially renegotiated by unfamiliar readers, emerging as new stories in the world. In this sense, because "[the Medicine] Wheel can even be manifested mentally, like a mandala" (Atli), *Green Grass, Running Water* is decidedly focused on pushing the reader until they have learned to reproduce stories that can "fix the world" (416). That is,

until readers become familiar with the novel's various storytelling codes, they cannot express their agency through *methexis*.

Much like the character of Coyote, who fails to listen to the stories being narrated to him throughout the novel, an uninformed reader cannot understand and thus remains outside of the joke and the pedagogy embedded in it. Coyote is chaotic and mischievous, but he is also one whose mistakes, misapprehensions, and misdirections can bring balance to the world. In indigenous storytelling contexts, Coyote brings balance specifically because he "steals, lies, and lusts and in the process shapes and endows the world as we know it" (Babcock and Cox 96) through the novel combinations he generates. Functioning as both a "cultural hero" and a kind of "*bricoleur*", "[the] trickster is agonistic imagination and aggressive liberation, a 'doing' *in* narrative points of view, and *outside* the imposed structures" (Vizenor, "Trickster Discourse", 285, my emphasis). Embodying the role of the trickster, Coyote is driven by his own flaws to deconstruct, accidentally or otherwise, hegemonic power structures or monocultural interpretations of the world. The generative power of Coyote within the system of *Green Grass, Running Water*, then, is emergent because he produces novel combinations across and between these juxtaposed cultural and power dynamics.

That the reader is aligned with Coyote—whose role is likewise to listen to stories attentively, to learn the proper way to interpret a story so that it can be repeated and performed in the world—suggests that readers are pushed to recognize themselves in Coyote as a means of regenerating the world through the telling of a new story: "The fact that Coyote in *Green Grass* is also a listener, that is, the audience of the I-narrator, suggests that everybody can be a trickster" (Matchie and Larson 166). This is, as Jo-Ann Archibald argues, a result of the tendency for Coyote to be understood "as a 'doing'" rather than "'a being'" (6); because readers are aligned with Coyote, whose mistakes "Challenge us to conceive of new […] possibilities" (Smith 516), they "must constantly be aware that they are involved in construction of

meaning rather than simply reading" (ibid., 523). Readers of *Green Grass, Running Water* are encouraged, therefore, to become a "doing" alongside Coyote.

The emergent power of Coyote is expressed in the procedural interplay of metalepsis and *mise en abyme*, which situate the Medicine Wheel as what Iddo Dickmann refers to as a "paradoxical" *mise en abyme*: contrary to the "static mirror paradigm […] [which imposes] binary values upon free-floating variants" (14), King invokes the poststructuralist "double mirror—entailing the irreducible gap of retroaction—to pursue the 'difference in itself,' unmediated by the binary logic of representation" (ibid.). This retroactive gap is produced by three situational generators in the novel: firstly, the presence of water across all levels of the text; secondly, the historical point of contact between Columbus and Indigenous Americans, which generated the mistaken "Image of the Indian"; and thirdly, the real historical displacement and incarceration of Indigenous peoples in Fort Marion, Florida, which subsequently compelled these peoples to produce artworks collectively referred to as the Plains Indian Ledger Art.

By proliferating these smaller segments of the novel which tie to the whole of the work throughout, King generates "the breaking of linearity between cause and effect" (ibid., 14) to generate the Medicine Wheel structure using *mise en abyme*. The situations produced by the water, the Image of the Indian, and the Ledger Art generate a reflexive, "retro-prospective" (Dällenbach 60) relationship between insider and outsider readers and the text. Because retroaction in *mise en abyme* occurs when "the small-scale segment that reflects the whole functions at the same time as a segment of the whole it reflects" (ibid., 212), this retro-prospective structure serves as a means for "[providing] a fulcrum between the 'already' and the 'not yet'" (ibid., 67) of the narrative situation: in this case, it provides the fulcrum between what "one knows" and what "one ought to" about each of these objects. This can be

exemplified in the usage of the Plains Indian Ledger Art as a reflective mirror of the narrative as a whole, namely in the most famous Ledger, *Bear's Heart and Ohet-Toint Sketchbook* (Figures 1 and 2).



Figure 4.1—"Changing the guard at Ft Marion", *Bear's Heart and Ohet-Toint Sketchbook*, July 1876.

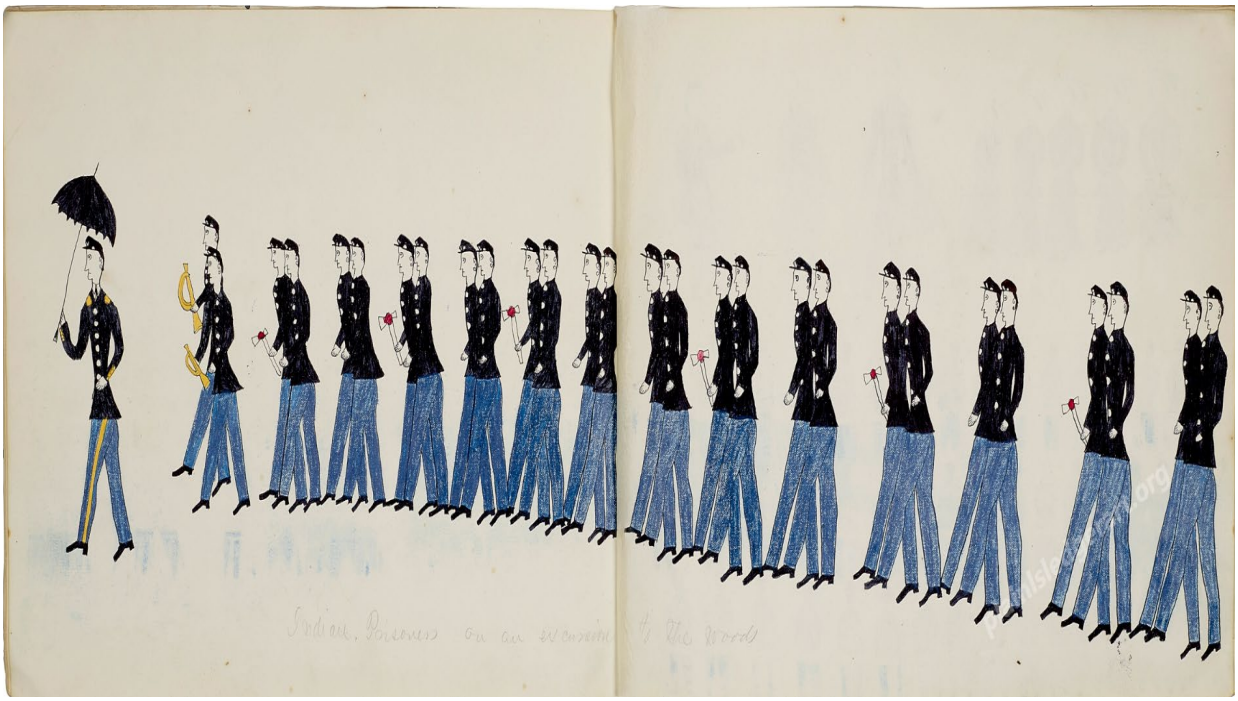


Figure 4.2— "Indian Prisoners on an excursion to the woods", *Bear's Heart and Ohet-Toint Sketchbook.*

As figures 1 and 2 illustrate, the Ledger Art operates as a retro-prospective *mise en abyme* because it reflects the constant interruption experienced by the Old Indians while they tell their stories. While the ledger artworks are depicted as a forgettable 'segment' of the narrative of the novel when they are discussed by Alberta Frank, they also serve as one of the narrative's situational generators, informing how the story unfolds in advance while also being part of its diegesis. Put differently, *mise en abyme* is always situational because it produces a new ground in which object and subject meet, are enmeshed, and yet remain irreconcilable. This occurs because in cases of *mise en abyme* "the reflective utterance operates in two incompatible series at one and the same time: the main narrative and the embedded, reflective one" (ibid.). While the Ledger Art operates from outside and inside the diegesis at the same time, this merely serves to create the sense of retro-prospection as described above: the artworks generate the story in which they are embedded, crossing several narrative levels while prefiguring all of them.

This push and pull force of meaning construction in *Green Grass, Running Water* is generated by King's engagement with multiple semiotic systems at once to facilitate a certain type of reading that "is 'performative'" (Smith 520). This emphasis on readerly performance suggests that readers are likewise pushed by the textual system "'to participate'" (Mitscherling 86) in the text directly, suggesting a *methexical* relationship to the text through their identification with Coyote as listeners who will learn the story well enough to perform it correctly in the future. *Methexis* is translated most often as participation, which "means to share the same habit, the same way of being, with another" (ibid.). This same way of being is a result of one's "'inhabiting' or repetition of language that allows [previously composed] forms to be apprehended anew or as if experiencing them in 'the real' and/or for the first time" (Barrett 113-114). In indigenous contexts, the *methexical* relationship between storyteller and listener

> entails a collapse between the ontological and the representational, emphasises the physical/material ground of Indigenous practices and permits an understanding of how the 'real' and the 'immaterial', the 'imaginary', the 'spiritual' and the 'representational' operate concurrently as 'real immateriality'. It is this interrelatedness and its effects that assign value and meaning in Indigenous cultural production and worldview (ibid. 112).

Through these collisions, the novel emphasizes that *how* stories are told influences extra-diegetic reality. This vision aligns with indigenous cultural attitudes about the power of storytelling, as "stories can 'take on their own life' and 'become the teacher' if [the] principles [of storywork] are used" (Archibald ix). Ironically, this power of stories to "take on their own life" is also inverted by King to emphasize how stories told without considering principles such as "respect, responsibility, reciprocity, reverence, holism, interrelatedness, and synergy" (ibid.) can improperly influence or damage the world.

This subversion contributes to the novel's ludic "merry chase", which aims to procedurally persuade readers to take on these "storywork principles" through imitation and performance.

The novel's challenging of grand, colonial narratives about indigeneity pushes readers deeper into the novel's structure, driving them to chase connections between knowledge networks to synthesize them. Upon successfully chasing down these allusions and engaging in the principles of storywork, the reader enters a cyclical, circular fictional space which resembles the Medicine Wheel, a pan-indigenous symbol for the attainment of

> a mutual balance and harmony among animals, people, elements of nature, and the Spirit World. To attain this goal, ways of acquiring knowledge and codes of behaviour are essential and are embedded in cultural practices; one practice that plays a key role in the oral tradition is storytelling (Archibald 11).

In alignment with this culturally spiritual vision of stories regenerating harmony in the world, King's admixture of narrative materials and situations generates several narrative levels which manifest as a series of concentric circles.

The narrative level that begins the novel (**Level 1**) is an extradiegetic circle which frames nearly every other level of the narrative. This level is focalized by the novel's invisible narrator (the "I"-narrator) and Coyote, who listens to and often interrupts the "I"-narrator's story (see: Fig. 1). Coyote's constant intrusions into the "I"-narrator's story generate various mythical collisions, especially in the form of Coyote's dog dream. As the story progresses, GOD's narrative unfolds implicitly in the background and therefore could be considered an alternative, implicit narrative level (**Level 2B**). While the "I"-narrator and Coyote's discussions are presented in quotation marks—suggesting their being on a shared narrative level—GOD speaks to them without quotations, suggesting a monological perspective

("I am god, says that Dog Dream" (2); "Where did all that water come from? shouts that God" (3); "I *am* in charge of the world, says that silly dream" (2)). The "I"-narrator, likewise, speaks without quotations to begin the novel: "So. In the beginning, there was nothing. Just the water" (1), suggesting that GOD likewise generates his own narrative level which unfolds concurrently, beyond the narration framed by the "I"-narrator's story.

Coyote's interruptions of the "I"-narrator mirror the subsequent narrative level (**Level 2A**), which is presented as a series of four creation myths told by The Old Indians: The Lone Ranger, Ishmael, Robinson Crusoe, and Hawkeye. These four stories comprise the four sections of the narrative, each of which begins with Cherokee language denoting a cardinal direction. This level is likewise novel: Coyote's dog dream, being a "contrary" who "gets everything backward" (2), enters and imposes his own interpretation on the stories being told on **Level 2**. The traces of these intrusions further invade the creation stories being told by The Old Indians in the form of encounters between indigenous and European religious and literary figures who are subjected to GOD's Christian Rules: for example, when Changing Woman meets Ahab and Coyote observes that "'Just around the eyes […] he looks like that GOD guy'" (196). Coyote's dreaming of the

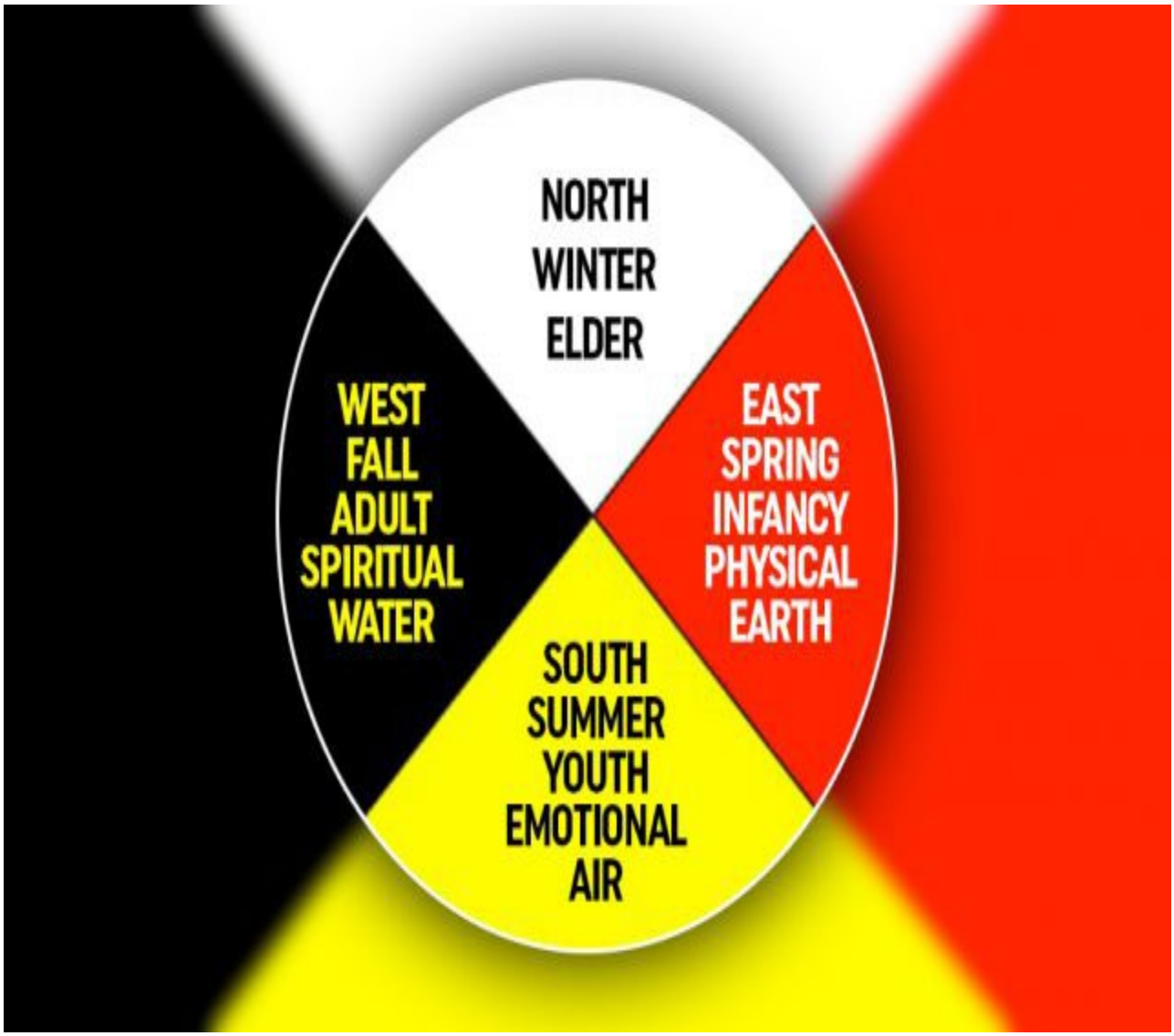


Figure 4.3—The Medicine Wheel

dog dream, therefore, generates conflicting situations described after the creation of the world in The Old Indians' four stories.

Critically, The Old Indians and Coyote willfully cross all narrative levels of the text, mediating between the outermost and innermost levels of narration. Much like stories told incorrectly can cause the world to become "bent again" (409), the narrative situation between the "I"-narrator and Coyote

generates situations that transgress the boundary between the creation myths and the inner-most narrative level (**Level 3**), referred to as "The Here and Now" circle of a Medicine Wheel. On this narrative level, diegesis is primarily focalized by the novel's various indigenous characters—Lionel, Alberta, Latisha, Eli, and so on—who struggle to integrate their indigeneity with contemporary, North American society. Nonetheless, there are chapters which are focalized by non-indigenous perspectives, including Dr. Joe Hovaugh; Bill Bursum; Duplessis's legal representative Clifford Sifton; and the janitor at Dr. Hovaugh's asylum, Babo Jones. As stated before, the generative situation of **Level 1** produces cultural clashes and reflections on **Level 2** *and* **Level 3**. This is reflected in the challenging, hybrid nature of contemporary indigenous identity I have previously analyzed.

Interestingly, these three narrative levels are likewise tied to another narrative (**Level 0**) which concerns the imprisonment of historical Indigenous leaders at Fort Marion, Florida (alongside, as I have stated earlier, the generating waters and Columbus's mistaken "Image of the Indian"). This historical narrative resides firmly beyond all the other narrative levels, **as all other narrative levels are ultimately framed and generated by it**. This narrative level is paradoxically extradiegetic, diegetic *and* hypo-diegetic: on **Level 1**, each of the creation myths ends with the protagonist women being arrested and taken to Florida; on **Level 2**, The Old Indians escape from a mental institution run by Dr. Joe Hovaugh, which is either literally Fort Marion or a mirror image of it; and, on **Level 3**, Alberta Frank discusses the drawings done by the Plains Indians who were forcefully removed from their homes and taken to Fort Marion to a group of bored university students:

> Henry Dawes was sound asleep at the back of the room, his head wrapped up in his arms. Mary Rowlandson and Elaine Goodale were bent over, their heads locked together. Hannah Duston and John Collier had moved their desks together again, and were virtually in each other's laps. Helen

> Mooney was sitting in the front row, writing down every word Alberta uttered (19).

Of note in this section is the presence of several influential colonial figures, some of whom worked against indigenous interests and some who were sympathetic listeners: Henry Dawes, "author of the Dawes Act of 1887, which privatized communally held Indian land"; John Collier, who "reversed the assimilationist policies of Dawes"; Mary Rowlandson and Hannah Duston, both "Indian captive[s]" who wrote about and perpetuated violence against their captors"; Elaine Goodale, "A young reformer" who married "Charles Eastman (Ohiyesa), a Sioux doctor who was the first doctor to reach the killing field of Wounded Knee"; and, finally, Helen Mooney, possibly named after "James Mooney, a pioneering ethnographer who wrote about Cherokee sacred formulas and the Ghost Dance" (Flick, "Reading Notes" 17-18).

In relationship to the real-life history which frames the ledger art, each of these characters reflects a smaller-segment of the novel's plot: Dawes, for example, reflects Bill Bursum's mapping project; Goodale reflects Eli's girlfriend Karen, who unwittingly fetishizes his indigeneity; and Mooney reflects the novel's repeated reference to the forbidden recording of indigenous ceremonies and religious beliefs. This recording of ceremonies is shown in Eli's flashback when "a station wagon with Michigan plates pulled off the road and came into the [Sun Dance] camp just as the men were finishing their second day of dancing. Before anyone realized what was happening, the man climbed on top of the car and began taking pictures" (139). This situation is later repeated when George Morningstar—Latisha's ex-husband and a clear allusion to General Custer with his "fringed jacket" which the Old Indians steal and give to Lionel—returns to the Sun Dance in the novel's fourth section with a camera hidden in a suitcase. Much like Eli remembers attempting to stop the man from capturing the sacred ceremony on camera, Lionel prevents George from capturing the event. Furious, George argues that the Sun Dance

"'is ice age crap!'" (386). Regardless, Lionel's prevention of George's theft resolves the earlier situation where Eli and his uncle Orwell were unable to stop the man from stealing his film from the camera (142). As shown here, the Plains Indian Ledger Art generates and reflects various situations across the spatial and temporal dimensions of the novel.

Throughout each of the novel's narrative levels, it becomes clear that the primary strategy is one of emphasizing the borders between indigenous and non-indigenous readers. This is accomplished using humorous traps which catch readers in their misconceptions about indigenous culture. These traps allow the novel to foster a feeling of anxiety for outsiders—who see reflections of themselves in the European/Christian narratives—which take on a life of their own in the novel. This produces the anxiety of *mise en abyme*, a generative structure which draws readers deeper into the textual world as they strive to become more capable and active listeners. This desire to shift narrative levels as the reader is, therefore, only the first step in a chain of metaleptic moves undertaken during the reading of the novel. Although technically a novel—written literature and not an oral storytelling—King's use of metalepses questions the boundaries between fiction and life in a way that prioritizes the oral storytelling mode. Regardless of the novel's play with media, the process of moving from being a solitary reader to a dialogic listener becomes one of jumping across all the narrative levels of the text or, to put it bluntly, "mastering" the text's various discourses: "*Green Grass, Running Water* might seem to cultivate an impulse toward mastery. That is especially the case with respect to the novel's range of historical and cultural references" (McGill 249). This mastery is further tied to America's "narrative about itself", which "is only superficially concerned with 'taming the wilderness' and 'crossing new frontiers'", and which "*must* be hidden, and sublimated, and acted out" (Durham 8). This narrative

> proclaims that there were no 'Indians' in the country, simply wilderness. Then, that the 'Indians' were savages *in need* […]. Then, that the 'Indians'

> all died, unfortunately. Then, that 'Indians' today are (a) basically happy with the situation, and (b) not the real 'Indians'. Then, most importantly, that that is the complete story (ibid., 10).

Once readers have been ensnared in this desire to become masters of the text, they are pushed to undergo an "ontological metalepsis" which challenges the boundaries between fiction and real life. This emphasis on shifting narrative levels is a response to the recognition that, like "all sophisticated and organic structures […] imperialism has known how to bend and incorporate that which opposes it—to mask, absorb, transform or elide contradictory accounts—so that not all counter-discursive gestures against it are successful (Turcotte 1). Caught between the normative situation of a solitary reading of the novel and the peer pressure to become part of the 'inside' audience, the reader is compelled to become a member of a community of readers outside of their individual reading. Thus, the desire to "master" the text is forcefully directed, especially through the humorous depiction of European Christian figures whose prejudices of mastery over the world and its creatures are not only distasteful but ultimately parodied as mistaken.

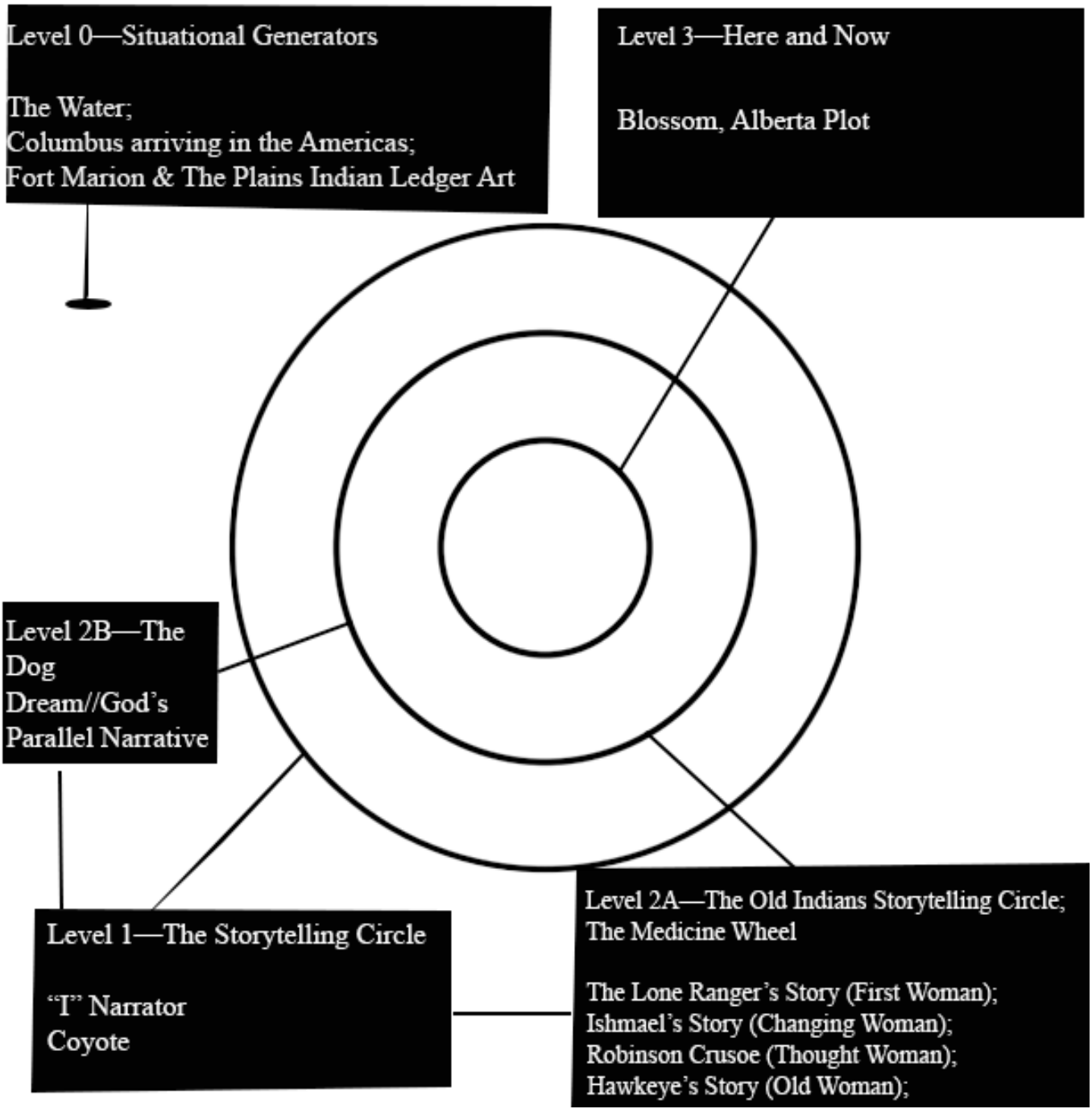


Figure 4.4—The Map of Narrative Levels in *GG,RW*

Though much of the novel operates around this problematic relationship between the master narratives of colonizers and the subsequent subjugation of colonized peoples by these narratives, the novel is equally critical of theories which purport to understand the specific viewpoint of indigenous peoples. Rather than write in a postcolonial mode, then, King formulates *Green Grass, Running Water* as a critical interrogation of such models which favour nationalistic, self-reflexive approaches rather than syncretic ones. As noted above, in his essay "Godzilla vs. Postcolonial", King argues that post-colonial is an ineffectual term largely because it is built on nationalistic, hegemonic presumptions that "the starting point for that discussion [regarding Native literature] is the advent of Europeans in North America (11). King instead offers models more closely aligned with indigenous worldviews, which tend towards four key "genres" or "modes": tribal, polemical, associational, and interfusional. Tribal literature is literature "shared almost exclusively by members of [a specific] community [and that] is presented and retained in a Native language (12-13), while polemical literature is focused explicitly on the conflict between white and indigenous peoples and cultures (13). Associational literature is communally focused, meaning it moves away from the typical narrative structure found in Western literature in favour of leaning "towards the group rather than the single, isolated character, creating a fiction that de-values heroes and villains in favour of the members of a community, a fiction that eschews judgements and conclusions" (14). Finally, King describes interfusional literature as literature which attempts to combine oral and written modes of storytelling. Interfusional writers such as the Okanagan storyteller Harry Robinson might have told stories to be translated in written English, "but the patterns, metaphors, structures as well as the themes and characters come primarily from oral literature" (13).

Green Grass, Running Water conforms to each of these genres and can thus be thought of as King's self-reflexive attempt at expressing a pan-Indigenous literary theory. The **Level 1** narrative is

inherently interfusional, literally mixing oral stories with written ones as a means of systematically trapping readers in their preconceptions—especially those whose culture is primarily a written one. The Old Indians' narrative on **Level 2** is interfusional, polemical, and tribal: it is a written oral storytelling, features untranslated sections of Cherokee writing, and expressly juxtaposes European and Indigenous myths to place them in direct tension. Finally, the **Level 3** narrative is decidedly associational: it concerns the everyday lives of contemporary indigenous people and has a communal approach to narrative perspective. Despite the distinctions between these levels at the start of the story, as readers progress through the novel the levels are increasingly blurred, weaving seemingly-mundane plots together with the metaphysical narrative levels above it. This accretion of narrative levels and resonances is an attempt at revealing the dynamism of oral stories, which "change and adapt depending on the teller and the audience" as a means of creating "a further space in which the reader synthesizes new meanings and interpretations" (Green 23).

For example, **Level 1** of *Green Grass, Running Water*, at its most basic, emulates the rhetorical situation of an oral storytelling. The story begins in the opening sequence of the novel when the "I"-narrator states: "So. In the beginning, there was nothing. Just the water […]. Coyote was there, but Coyote was asleep. That Coyote was asleep, and that Coyote was dreaming. When that Coyote dreams, anything can happen" (1). Shortly after the "I"-narrator establishes the narrative situation of its story, it is revealed that the Christian God is Coyote's "dog dream", a contrary that mistakenly inverts its name to *GOD* because "'It thinks it is in charge of the world'" (ibid.).

On **Level 2**, where the Old Indians tell their stories, this storytelling situation is further supported when The Lone Ranger works to begin the story with opening sequences common to European stories ("Once upon a time…" (11); "A long time ago in a faraway land…" (12); "Many moons comechucka…hahahahahahahahahahaha" (13); and, finally, "In the beginning, God created the heaven

and the earth" (14)). Each of these beginnings are rejected by The Lone Ranger's fellow storytellers, especially the Christian creation myth found in Genesis which is "'the wrong story' […]. 'That story comes later'" (14). Finally, The Lone Ranger begins the story correctly:

> "*Gha*!" said the Lone Ranger. "*Higayv:ligé:i*."
>
> "That's better," said Hawkeye. "*Tsane:hlanv:hi*."
>
> "Listen," said Robinson Crusoe. "*Hade:lohó:sgi*."
>
> "It is beginning," said Ishmael. "*Dagvyá:dhv:dv:hní*."
>
> "It is begun well," said the Lone Ranger. "*Tsada:hnó:nedí: niga:v duyughodv: o:sdv*."
>
> "Okay?"
>
> "Okay." (15).

These false-starts are corrected by Ishmael, Robinson Crusoe, and Hawkeye, who argue that it is "[b]est not to make [mistakes] with stories" (14), suggesting the generative potential stories can have.

By pushing readers to engage with Indigenous stories which precede the European/Judeo-Christian "Truths" which have become accepted myths—for example, the *Genesis* account of creation itself—King traps uninitiated readers in their assumptions. For example, the Lone Ranger's story begins by describing "two worlds […]. One world is a Sky World. One world is a Water World", despite GOD claiming that "[this] is all wrong […]. Everybody knows there is only one world" (38). Shortly afterwards, First Woman falls from the Sky World into the Water World and builds land on the back of grandmother turtle (39). Likewise, after building First Woman's Garden (40), First Woman "lives there with Ahdamn" (40). The narrator humorously notes that "I don't know where he [Ahdamn] comes from. Things like that happen, you know" (40). Ahdamn's creation from nothing humorously subverts several Judeo-Christian stories: firstly, that the garden is GOD's creation; secondly, that Adam is created before

Eve, the first woman; thirdly, that Eve is created from Adam's rib by God; and, finally, that Jesus was the product of immaculate conception (which is likewise shown to be an action performed by Coyote when Alberta becomes pregnant). By connecting what Judeo-Christian readers know with what they may not know—that they should "mind [their] relations" (39), for example—King builds what Aloys Fleischmann refers to as snares which trap the reader in their misconceptions. By implementing *mise en abyme*, also known as internal doubling, the novel's system presents stories which foster an anxiety regarding the "desire for laughter and the group identification of laughter [which] combine to facilitate either solidarity or a significant shift of recognition" (ibid.).

Once readers have been ensnared in this inside/outside mindset, this dichotomy is further subverted to encourage a more syncretic mindset. This mindset relies on the deliberate inversion of what Homi Bhabha refers to as colonial power's "regime of truth", which attempts to maintain binary distinctions between self and Other in colonial situations: "The objective of colonial discourse is to construe the colonized as a population of degenerate types on the basis of racial origin, in order to justify conquest and to establish systems of administration and instruction" (101). As Bhabha explains,

> In order to understand the productivity of colonial power it is crucial to construct its regime of truth, not to subject its representations to a normalizing judgement. Only then does it become possible to understand the productive ambivalence of the object of colonial discourse – that 'otherness' which is at once an object of desire and derision, an articulation of difference contained within the fantasy of origin and identity. What such a reading reveals are the boundaries of colonial discourse and it enables a transgression of these limits from the space of that otherness (95-96).

Despite this attempt at developing a structure of distinction along the lines of racial difference, such structures of distinction become less about *actual* distinctions and more about maintaining a balance of desire and derision which fabricates (or fantasizes) difference: that is, despite attempts at assimilating or becoming members of the colonial society around them, colonized people are perpetually kept at arm's length. They are—as Bhabha observes when he adopts Freud's notion of mimicry as "*almost the same but not quite*"—"*almost the same but not white*" (127-128). As such, in *Green Grass, Running Water*, the primary mirror between European and indigenous cultures is the hegemonic logic of binaries which reflect one-another. Thus, King's comic mirroring shows how these colonial fantasies of distinction produce greater—yet also increasingly virtual—distances between Self and Other.

In this sense, the novel's system is framed by a hybridized or syncretic framework which resists such powers of distinction by exposing the underlying logic (or, as King shows, the underlying illogic) of these distinctions in contemporary life. Surely, much of the novel's allusive material refers to historical figures whose legislative, moral, and cultural attitudes have continued to develop the Indian image. This image is then exposed as a colonial fantasy rather than an actual cultural experience: indigenous characters in the novel are consistently forced to segregate themselves from non-indigenous attitudes and peoples due to the damaging narratives perpetuated about the Indian, even though they are equally part of and in tune with the culture surrounding them. Thus, by chasing intertextual allusions across narrative levels, genres, and semiotic domains, readers are pushed to reflect on their own conscious or unconscious adoption of reductive binaries. This facilitates the experience of mirroring wherein the main diegetic situation is reproduced in the experience of the reader simultaneously. Put differently, this facilitates the generation of the reflexive *mise en abyme*.

The ubiquity of these binaries is revealed in much criticism of the novel, as most critics of King's fiction are preoccupied by binaries like indigenous/non-indigenous; colonizer/colonized; and

storyteller/listener. Pushing against this tendency to take binaries for granted or to merely invert the binaries to subsequently invert power relations, these artificial binaries are challenged throughout the novel in ways which emphasize genuine difference: "readers are bribed with the pleasure of comedy to pay attention to counterpropositions they would otherwise gloss—mis/understand. Then the distraction of laughter combines with the imagined-community equivalent of peer pressure" (Fleischmann 172). Readers, feeling the anxiety of being either outside of the joke or, worse, the butt-end of it, are pushed deeper into the novel's spatial scheme: they find themselves in the Medicine Wheel, the second circular narrative which is placed concentrically within the storytelling circle of the "I"-narrator.

Agency and Emergence—The Medicine Wheel and Coyote

The Medicine Wheel is an inherently dynamic, processual concept: the wheel turns along with the seasons, allowing life to emerge in Spring/Summer and recede in Autumn/Winter. As the wheel turns, it accumulates a variety of symbolic meanings for each of its quadrants—colours, emotions, animals, and personal developments—each of which is tied together by the progression through the wheel's spokes. Likewise, by accretion the novel's spatio-temporal structure becomes increasingly 'ripe' with significance, introducing new characters, new objects, new stories, and new transgressions of the novel's concentric narrative levels: "King's versions of European religious, cultural, literary and historical narratives are contained and subverted within an oral and circular framework, rather than a linear and teleological framework" (Wyile 117). This is implied early in the novel when The Old Indians debate whose turn it is to tell the story on **Level 2**.

As readers are guided along this circular storytelling process, they are likewise guided to become agents in hopes of healing the relationship between Indigenous and European/Christian cultures through the fostering of "balance and harmony", which "depend on understanding the concept of First Nations holism, sometimes symbolized by the medicine wheel" (Archibald 10-11). This supports the claim that

oral stories help to "confer truth by the understanding of the world that the story enables and protects" because "knowledge is not the final identification of an unmediated truth, but an ongoing process in which storytellers and listeners may offer multiple perspectives" (Teuton 23). This desire for "growth […] as a process wherein performers consciously incorporate new conventions—even contradictory versions of a particular piece—within a flexible body of thought" (ibid., 22), structures the speaker/listener storytelling situation of the novel. In *Green Grass, Running Water*, this situation requires audience effort to comprehend the various intertextual references, intercalated myths, and geometrically-intersecting narrative levels. Each of these elements are relationally encapsulated in the name of the novel's primary setting: Blossom, Alberta, which characterizes both the trajectory of the novel's plot and the procession of the Medicine Wheel structure.

Of particular interest here is the spatial-temporal structuring of the novel, including its application of geometrical and conceptual figures to express a pan-indigenous worldview which is structurally juxtaposed with a pan-European view. Also referred to as the "sacred hoop" or "Sundance Circle", the Medicine Wheel has become a "pan-indigenous" symbol for the expression of wholeness, mediation, and healing. Comprised of "four quadrants", the medicine wheel represents "interconnectedness between a variety of terms associated with the person and nature" (Papp 161-162) (see Figure 4.5). The Medicine Wheel "symbolizes [that] all things are interrelated, and the personal determination is to achieve […] balance and harmony" (ibid.).

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
North	Physical	Winter	Night	Elder	Earth
East	Intellectual	Spring	Dawn	Child	Air
South	Spiritual	Summer	Noon	Youth	Fire
West	Emotional	Fall	Dusk	Adult	Water

Figure 4.5— Table of medicine wheel concepts (Papp 162)

The Medicine Wheel, though it is begun after the opening sequence when Coyote's dog dream becomes GOD, ultimately aids in the modeling of all narrative levels in *Green Grass, Running Water*, including the oral story shared between the "I"-narrator and Coyote on Level 1 and the Plains Indian Ledger Art narrative on Level 0 which are situated on narrative levels above the wheel. In part, this is because the medicine wheel also—beyond the cardinal directions—depicts aspects which are "Above", "Below", and "Here in the Center" (Atli) of the wheel. If we consider the frame narratives—Level 0 and Level 1—as "Above" and "Below" respectively, then the central plot of the novel, which focuses on contemporary indigenous characters such as Lionel Red Dog and Alberta Frank, among others, functions as the "Here in the Center" section of the model.

The framing narrative on Level 1 (or, the "Above"/"Below" narrative) is iterated upon from inside of this frame by four Old Indians on Level 2, who are generated by the story the "I"-narrator tells, making the narrative's structure a series of concentric circles. Inside of this framing story circle, the four Old Indians proceed to tell their own stories in a likewise circular fashion. Named after famous mythical figures of European/Christian colonial imagination—The Lone Ranger, Ishmael, Robinson Crusoe, and Hawkeye—these four elders are in actuality the four first women in indigenous creation myths—First Woman, Changing Woman, Thought Woman, and Old Woman—who are generated by the clashing creation stories told by the "I"-narrator and GOD. This second circle divides the novel into four sections, each marked in Cherokee language associated with colours and cardinal directions: East/Red, South/White, West/Black, North/Blue[94]. These four sections intercalate different mythical situations from Indigenous and European culture into the story circle, attempting to use the figure of the medicine wheel as a means of restoring balance between these discrete mythologies. This explicitly reorients the colonizer/colonized binary imposed on indigenous and settler cultures, suggesting that an effort to heal

[94] Jane Flick's "Reading Notes", published with the novel in later editions, tie this to Cherokee depictions of the medicine wheel but do not fully correlate the novel's structure to the medicine wheel.

these bonds in a syncretic fashion is the ulterior motive for trapping readers in their presumptions. These narratives further envelop the "Here in the Center" of the novel's plot, which follows a community of Blackfoot characters as they live normal, modern lives while still being affected by the Indian image. The crossing of these levels re-arranges the spatial and temporal aspects of the novel through this proliferation and intercalation of stories.

Essentially, we see the frame narrative on Level 1 forcefully blurring the narratives on the innermost levels in a fashion which emulates the rhetorical situation between a storyteller (who scripts the possible combinations within the narrative levels) and the listener (who brings their own attention and cultural background into a dialogic relationship with the storyteller and, thus, the stories being told). This blurring operates across four narrative levels: firstly, the novel uses a frame narrative—an oral storytelling situation or story circle—which features an unnamed "I"-narrator and Coyote; secondly, within this frame narrative are four Old Indians who likewise form a storytelling circle which the "I"-narrator and (especially) Coyote directly enter; finally, this blended second circle frames and blends with the "Here in the Center" narrative of life in Blossom, Alberta. This ties the "Here in the Center" level to Level 2—as a recursive expression of the meta-textual relationship between author and reader or storyteller and listener—meaning that this innermost level is likewise framed by the oral storytelling situation on Level 1. Navigation of this second narrative level takes on the figure of the "Medicine Wheel" which corresponds to each of the four Old Indians' stories: The Lone Ranger's story beginning in the East of the wheel with First Woman; Ishmael's story continuing in the South with Changing Woman; Robinson Crusoe's story in the West with Thought Woman, and Hawkeye's story in the North with Old Woman. These quadrants of the medicine wheel are associated with colours which carry symbolic and spiritual significance: Red to signify Spring and "New Generation"; White, Summer and "Further Growth"; Black, Autumn and "Ripeness"; Blue, Winter and "Old Age".

Thus, the generative model of *Green Grass, Running Water* emphasizes both the storyteller's agency as a means of undercutting European, "Christian Rules" and the reader's capacity to likewise subvert expected or normative rules of reading. While in the novel these "Christian Rules" emphasize various narratives of Western European culture—generated by the fundamental creation myths of Christian cultures based on domination, progress, and individualism—, indigenous oral storytelling is depicted as dynamic, fluid, and relational because it provides active roles for storytellers and attentive listeners. Through the principle of juxtaposition, the re-combination and re-situating of myths from an indigenous perspective invites readers to personally reflect on the humorous diversions and subversions throughout the novel. By ironically playing with several fundamental myths of colonial culture, King invites an alternative, syncretic perspective to readers who are "trapped" by various misreadings. In this fashion, the inside and outside dichotomy of the first narrative level—permeable only through careful listening and the potential repetition of stories—emulates the fluid boundaries of indigenous oral narratives.

This is best emphasized by the figure of Coyote, who sits opposite from the "I" narrator on Level 1. As readers become more active and proceed through the medicine wheel, they are further exposed to Coyote, who listens to the "I"-narrator and interrupts the narrative at the center of the novel's medicine wheel. Coyote is a figure who, "[with] folly and blunder, profanity and immorality, […] expresses that other human urge toward chaos that is also potentially wildly productive" (Teuton 31). Coyote, often considered a "cultural hero" in indigenous cultures, is heroic specifically because he embodies the balance between life and death, beginning and ending, chance and design. Because "[the] events of history are important only because they function to reveal the system as a whole" (Schorcht *Storied Voices* 63), Coyote works to "[de-privilege] unity in favour of the local and regionally specific, working out of chaos rather than ordered system" (ibid., 64); further, Coyote works to draw the reader "into

apparent chaos and confusion to become part of the performance" (ibid., 55). As such, Coyote reveals the power of stories, which "are powerful entities" (ibid., 47), while also being "like dreams […,] multiple and multiply contexted; they defy attempts to categorize them into closed systems of thought. They have the power to change the world" (ibid., 61).

As the novel proceeds—first trapping readers and then pushing them through the medicine wheel—Coyote increasingly intervenes across all the narrative levels: he dialogues with the "I"-narrator, participates in the creation myths told by The Old Indians, and appears as "[a] yellow dog", "sniffing at the rear tire" of Babo Jones's car (23) or "dancing in the rain" (279). Through this "ontological metalepsis", Coyote "makes possible an ontological flexibility in cultural memory, an open circuit between fact and fiction" that disrupts "the undertaking of the work of empire" (Freedgood 408). For example, through the rain dance witnessed by Lionel, Coyote generates the possibility for the Old Indians' intervention into Bill Bursum's screening of *The Mysterious Warrior* on The Map. The rain also provides the flood water which carries the Nissan, Pinto, and Kharmann Ghia into the river, eventually re-appearing when Clifford Sifton "thought he saw something" "at the far end, just beyond the range of sight": the cars emerge as "[dots] on the horizon", much like the ships which their names are meant to imitate (401). As the cars re-appear, Coyote begins to dance again: "'Earthquake, earthquake!' yells Coyote. 'Hee-hee-hee-hee-hee-hee-hee-hee'" (411). In both cases—the causing of the flood and the destruction of the dam when the cars crash into it—Coyote's intervention reshapes the world much like the Old Indians "fix" Western films perpetuating the Indian image. This reshaping involves both destruction and regeneration: the rain dance impregnates Alberta Frank, causing Alberta to "blossom" again; the resulting flood destroys the dam, but also overruns Eli's cabin; Eli is killed, but his death generates a new story where Norma, Eli's sister, moves into the cabin to start the story anew (423).

In this sense Coyote's metaleptic moves align comfortably with the Old Indians because they all emerge from the creation stories told by the "I"-narrator, a figure who often points to "the illusory nature of any ontological boundary between the story and narration" (Macrae 102). The Old Indians and the "I"-narrator, through their recursive relationship as storytellers on different narrative levels, generate a concentric-circular environment in which Coyote emerges from myth and becomes a part of the inner-most narrative in Blossom. This is further evidence that this inner-most plot correlates to the central circle of a medicine wheel, the "here and now" situation around which all other circles are formed. In this fashion, Coyote's movements have a butterfly-effect impact on the narrative, ranging back to the creation of the Christian God who is really Coyote's primordial dream when there was "nothing, just the water" (1). Coyote's responsibility, therefore, is one of combination and re-generating through performance and play: he constantly breaks the rules which constrain European/American storytelling conventions as he performs numerous ontological shifts across the different narrative levels of the text. As these shifts occur and must be followed, readers "are thus reminded of trickster's sacred function within traditional oral cultures as a healer, but also as a disruptive semiotic element that resists colonial representations and stories of containment" (Smith 531). In this sense, Coyote serves as a figure of emergence in *Green Grass, Running Water*, provoking further self-awareness and self-reflection by breaking with conventions and expectations because "meaning shifts, contexts float" (ibid., 529).

Conclusion—Listening and *Methexis*

Thus, given the clear structural relationship between readers and Coyote, the novel both attempts to pull readers deeper into the text *and then* to push them out from it and into the world more informed and capable of producing change. Moving through the medicine wheel-like structure of the novel involves a close attention to the near-infinite potential significances of any text. This is encouraged by King, who then systematically unravels the mythological structure of the Indian image which has long

been imposed by legal, cultural, social, and psychological means. Much like Coyote, who embodies chaos in his constant inversions, the reader is invited to actively participate in the novel. This invitation is emphasized on every level of the text, as the story circle, medicine wheel, and realist plots are all examples of King's vision of indigenous literary genres. These genres intersect and interpenetrate the reading situation through linguistic and situational generators. As Coyote moves across various levels of the narrative, it becomes clear that the boundaries between these levels are incapable of containing the chaotic, fluid, dynamic qualities of Coyote. Readers, then, are invited to likewise perform like Coyote does through a more active reading of the text. This participation is a "*methexical*" relationship, which simultaneously suggests both group participation and a metonymic understanding of strands of a story as "parts which contribute to the whole". As such, readers take on the *methexical* role of expressing, in part, the experience of oral stories which are performed over and over while slightly expanding, becoming ripe, decaying, and beginning again.

In sum, King incorporates the sacred and profane, the theoretical and speculative, and the historical and fantastical as a means of humorously trapping readers in their misconceptions generated by the false “Indian image”. In service of this, the novel operates within multiple modes simultaneously, crossing the thresholds between different cultures and forms of knowledge. Critically, this is not merely a binary relationship because, “[by] mixing the familiar Biblical elements with new elements, King creates a parodic bitextual synthesis […] that stresses similarity and gap” (Dvorak “King’s Abo-Modernist Novels” 25). Christian biblical narratives, literary stories, and historical accounts are blended with indigenous creation myths, and both are further intercalated throughout the novel’s realist plot, suggesting that stories inform and inflect the development of cultural perspectives in any environment, but especially a cross-cultural, transnational, or “post”-colonial environment. As a result of this blending, which is “homologous to tropes such as the metaphor and irony, in which levels of meaning

coexist within a paradigmatic relation of substitution and equivalence" (ibid.), King's "synthetically manipulative recontextualizing of preexisting [stories]" invites the reader into the labyrinth of allusions embedded in the text's language and narrative because it is "dependent for its decipherment on the reader's knowledge and ability to deconstruct and collocate" (ibid.). By examining the relationship between author, text, and reader that this procedural chain encourages—by tracing the situations generated by metalepsis and *mise en abyme*—readers of *Green Grass, Running Water* can examine how the novel utilizes these generators to emphasize the fluid, polysemous, and socially determined nature of language, myth, and meaning. This is predominantly generated by the shared image of the waters of creation. By unpacking the continued presence of water in the different levels of the story—both in the Indigenous and European-American-Christian stories—the destructive and healing potential of the water is expressed. By stressing both the similarity and gap between this potential of the water, King also reflects on an inherent gap between Indigenous and European-descended cultures: the reflective surface of the water, therefore, produces the "contestatory site" on which the novels' synthesis can occur. Following the chain of signification the water carries, readers are invited to dwell in the "Keatsian negative capability" of the trickster, whose "dwelling in mysteries, fears, and doubts […] demonstrates the slipperiness of language itself" (Wiget 98).

Although this chapter is primarily an examination of the novel's structure, it is not possible to untangle the formal aspects of the text from the political, social, and historical conditions such a cross-cultural exchange requires. It is necessary to unravel the politicized nature of the book through understanding its form as it relates to and produces an environment for its content to unfold and generate political dialogue beyond the boundaries of the text. This is accomplished by persuading readers to reflect on their own presumptions about indigenous culture in relationship to their own internalized myths. By unraveling the image of the Indian, King encourages readers to participate more actively by

working to perform their own metaleptic shift from "outside" of the text's world to "inside" of it, and then back again. This is a kind of *methexis*, which "refers initially to external practices—the participation in performative ritual or memorialisation" (Barrett 113)—, but can also be conceived of "as an external action or performative participation that gives rise to internal processes, which, in turn, lead to creative production" (ibid.). In this case, the distinction between "creative production" and "ritual or memorialization" is blurred, provoking readers to participate in the generation of understanding and healing that indigenous storywork implies.

Chapter 5—The Aesthetics of Procedural Content Generation and the Concept of 'Lifecycle' in Hello Games's *No Man's Sky*

"*PCG [Procedural Content Generation] comes with a warning label. It*

can be a black hole, a slippery slope, a project risk, and a dark abyss

[…]"

—Tanya Short, *Procedural Generation in Game Design*, 5.

Introduction

This chapter is an examination of computational generativity—especially the narrative potential of the design method called Procedural Content Generation (PCG)—in Hello Games's popular video game *No Man's Sky*. *No Man's Sky* is a simulated universe that consists of more than a quintillion planets, each of which can be visited and traversed by players. The scale of the game's universe is extreme and proliferative: every individual star system features several planets governed by their relationship to each other and the type of sun they orbit; star systems have their own market economies based on certain resources, which is also determined algorithmically; each planet is an ecosystem in its own right—featuring its own weather patterns, topology, flora, and fauna—which can take weeks to fully explore 'on foot'. The generative system thus structures every element of *No Man's Sky*. Even the game's narrative, which concerns the player exploring their galaxy, accruing resources by manipulating the game's combinatoric sub-systems, and eventually reaching the center of their galaxy, involves engaging directly with fractal parts of the underlying systems and manipulating these sub-systems. Upon reaching the center of the galaxy—which houses the AI singularity, the Atlas, which has generated the universe in the game's narrative—players are given the option of shutting the simulation down or, conversely, generating another galaxy with certain attributes, including 'balanced', 'lush', 'vicious', or 'abandoned' types, which emphasize different aspects of the game's procedural system.

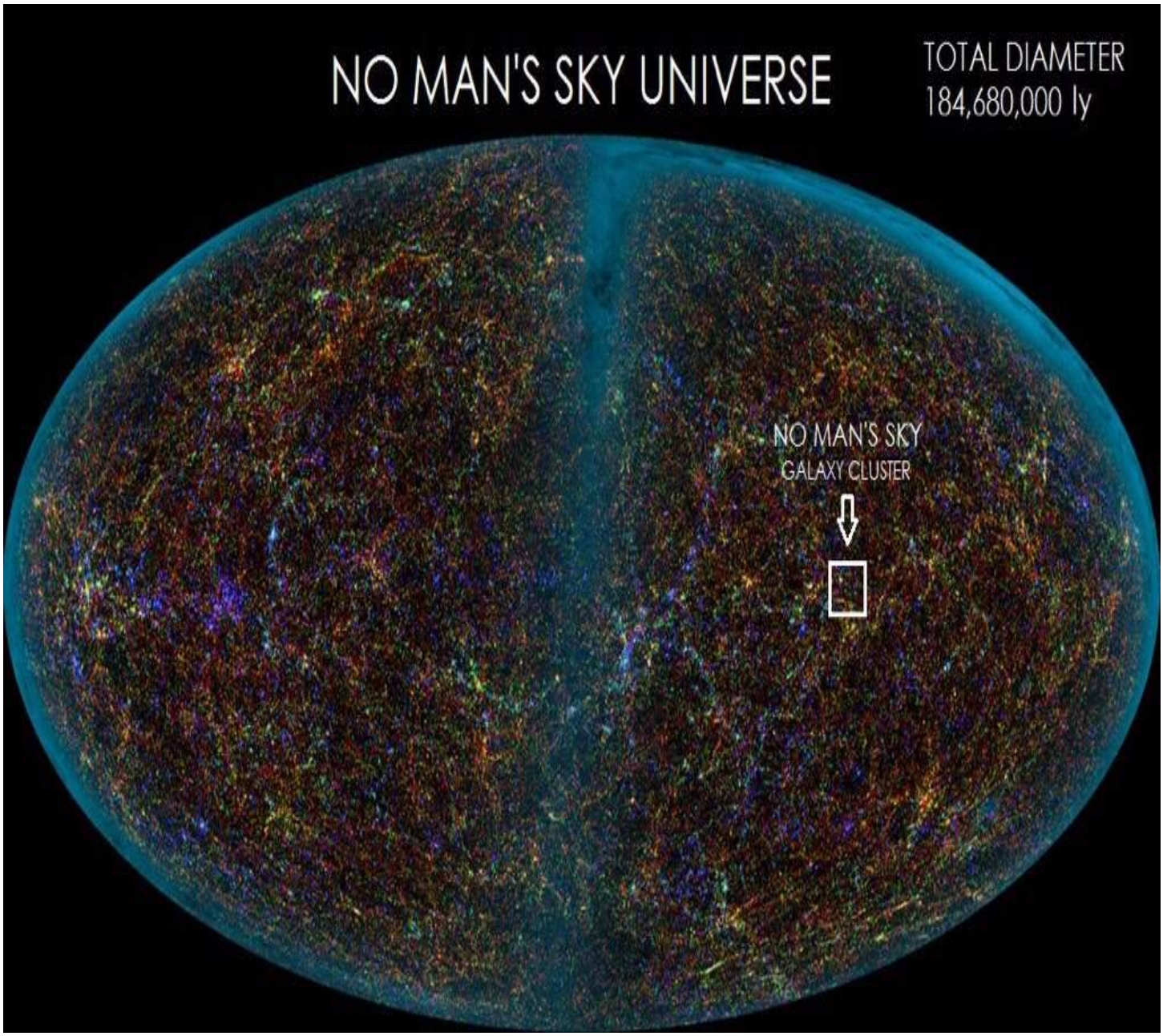


Figure 5.1—Map representing the scale of the universe in *No Man's Sky*, based on the mathematical seed and its potential outputs[95].

[95] See: https://aminoapps.com/c/no-mans-sky/page/blog/new-galactic-map/XjME_ebhgu5DbNe8N7dWjLMQaRqYElxonp.

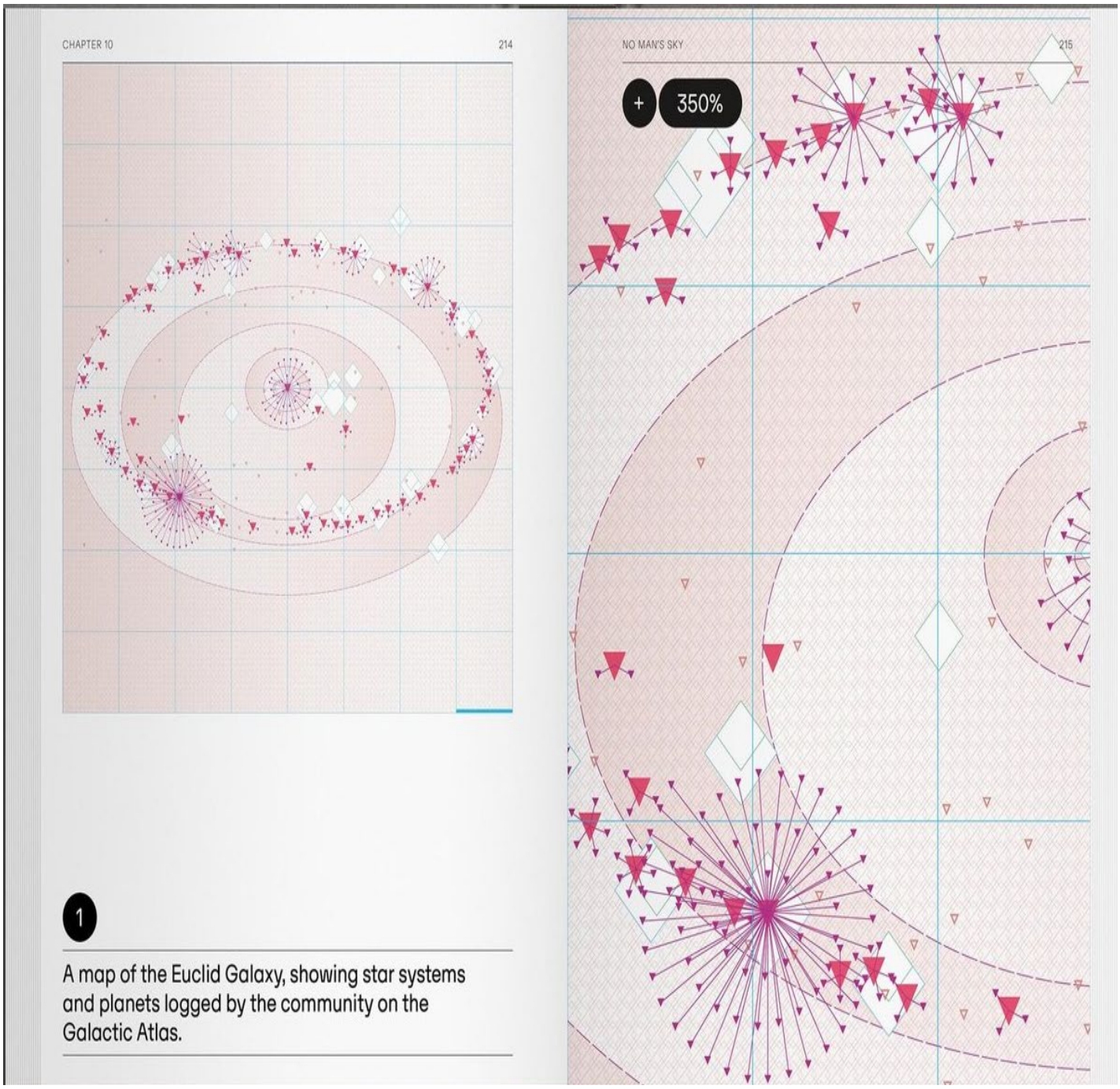


Figure 5.2—A map of the Euclid Galaxy, the starting galaxy in *No Man's Sky*[96].

[96] Map found in Pearson, Luke Caspar and Sandra Youkhana. *Video Game Atlas: Mapping Interactive Worlds*. Thames and Hudson, 2022.

At the beginning of *No Man's Sky*, players wake up on one planet of countless many. Your ship is damaged and must be repaired. You are prompted to find resources and fix your ship, using a mining tool to harvest a variety of things that can then be crafted into useful items. As you wander, scavenging resources and exploring nearby caves, you might stop and scan the horizon. Your ship is five or so minutes away, lost among markers of plutonium and zinc. The sky is streaked in blue, or purple, or fluorescent pink, and some plants break out from the peaks of mountains. A landmark appears two minutes away, then another, each arising when one has fallen behind you. There are how many planets here? By the time you return to your ship, an hour has passed. The scale of *No Man's Sky* begins to sink in. You fix your ship, fuel it up, and take off.

Surveying the planet for more curious sites or somewhere neat to land, you find an alien relic, or a hub, or an abandoned shelter. Each of them provides upgrades in some form, be it in alien languages or lore, multi-tool upgrades, or more locations to scavenge that might not show up on your map naturally. Five planets later, ten systems later, little changes. Much is seen but little is offered beyond a constant, grinding process of resource acquisition and organization. One planet might have some animals to document or feed, while some might have caves to get lost in. The player might die a few times, regenerating and being forced to re-acquire their lost resources. Eventually, the novelty of each planet wears thin. Each species is only marginally distinct from the last batch and discovering them only gives you currency, which you will then spend back into the galactic economy using a terminal in a space station that looks exactly like the last space station terminal you found. Everything is tied, rather tightly, to everything else. Everything is self-similar.

Ironically, the game's key selling point is the player’s ability to experience entirely novel spaces unseen by other human beings: to quite literally become an explorer. This contradicts the diegetic level of the game’s narrative, as the galaxy has already been colonized by three different races, the Gek, the

Vy'Keen, and the Korvax, each at work before your character even wakes up. At the same time, no human has seen and will ever see a vast majority of the game. This creates very discrete senses of time because nothing is undiscovered while everything is also entirely unique. The landmarks you visit are already known, but not by anyone conscious. You are reminded, every time you land, that this is first contact despite the narrative saying otherwise.

Narratively speaking, *No Man's Sky* invites players to adopt the role of a "Traveler", a race devoted to exploring the game's vast cosmos in hopes of reaching its center. Regardless of this motivation, players are left to their own devices to locate what they find meaningful. Because the game is procedurally driven, it is effectively random and unexplored, even by the game's designers. As many critics have noted, the game's extensive scope would take multiple lifetimes for any individual player to fully explore[97]. Therefore, players are offered infinite potential paths instead of linear paths through the game. As proof of this emphasis on potentiality and process, it is important to note that *No Man's Sky* has changed drastically over its lifespan. Players have adopted multiple playstyles in response to these changes. In this sense, *No Man's Sky* simulates and places in tension two fundamental elements of our own universe observed by Alfred North Whitehead: "unity, involving in its essence the connexity of things," and "multiplicity [which emphasizes] many actualities, each with its own experience" (*Modes of Thought* 70). The universe in the game is unified in that the whole is potentially changed by any adjustment to the game's system; it consists of multiplicities because of the actualized experiences resulting from each individual player's choices from within this unity.

This chapter is an attempt to analyze the dynamic, procedural structure of the game's generative system—describing how this system generates the game's ecosystem, processes, and entities—before examining the narrativity of the game's "lifecycle" throughout which these mundane, emergent systems

[97] See Khatchadourian, Parkin, and Tach for examples.

have evolved into a holistic 'living' universe. The game's original release, while considered a failure by many fans and critics alike, has since become part of a **long-form narrative** in which the game's ecosystem has consistently changed over the course of over 27 content updates, a paratextual augmented reality game (ARG)/advertising campaign called *Waking Titan*, and consistent player interaction.

Discussing the game's 'lifecycle' involves examining whether a game's lifecycle constitutes a narrative in the first place. Indeed, questions of the narrativity of video games have often been raised both from within the field of critical game studies and outside of it, both in the broader fields of new media studies and narratology. Attempting to resolve some of these critical disputes, I examine the concepts of database and simulation, each of which has been strongly contrasted with narrative in new media studies (especially in the work of Lev Manovic and Richard Walsh, respectively) but have been unified in film scholar Marsha Kinder's concept of "database narrative" and, further, in the wider discussion of "emergent narrative" that has become increasingly prevalent both in critical game studies and narratology more broadly. In both database narratives and emergent narratives, database, simulation, and narrative are united, rendering the text into a variably-interactive combinatorial matrix of narrative situations. With this notion of a matrix of narrative situations, many of the challenges to video game narrativity based on database and simulation prove *complementary* to narrative, helping theorize the concrete move of narrative into an increasingly spatialized paradigm rather than the classically temporal emphasis attributed to it. With this spatialized conception of narrative, the structure of a video game's spaces—what Henry Jenkins has referred to as a game's "narrative architecture"—becomes a crucial aspect of the narrative situation because players operate within a game's spaces over time, dwelling in a game's world and coming to terms with its rulesets through a procession of first-hand experiences mediated by the system, the author, and other players. Thus, I briefly outline the

arguments made from within digital game studies that question the intrinsic narrativity of video games, arguing that while mechanics and player choice are complications for narrative as it has been construed in game studies thus far, this is more an indictment of the field's limited notion of narrative rather than an overcoming of narrative as a paradigm in itself.

Once the question of narrativity in video games has been established, the notion of lifecycle must be examined procedurally: does the 'evental' structure of game's metatextual lifecycle fulfill—at least, to a certain degree—the minimal conditions of narrativity? The attempt at answering this question begins by examining the generative situations produced by the game's procedural generation, which shapes the game's lifecycle into a paradoxical "*generative space*"[98], both "[a] single instantiation of the system—with a fixed set of parameters and fixed codebase" (Smith "Understanding the Generated" 232) and an expression of the system's effectively infinite potential simultaneously. In this dynamic, the concrete space in which the game unfolds produces the affect of movement—or, more appropriately, of organic evolution—but is actually instantiating an entirely new 'generative space' with each authorial filtering and player interaction. Thus, the game is composed of an iterative series of 'generative spaces', each of which becomes increasingly concretized as the game's ecosystem produces collisions between various entities, processes, and sub-systems, including even the author as filterer and the player as emergent agent.

It is in this fashion that *No Man's Sky* reflects the procedural dynamics of computational generativity, both on the intrinsic level of its systems and on the extrinsic level of the dynamic feedback loop between author, system, and player. As digital technologies are produced, adopted, and re-produced, they undergo a continuous process of "concretization", which expresses the "inherent

[98] Crucially for Gillian Smith, "generative space" is meant to describe this single instantiation only. The system's potential is referred to as the "expressive range" of the generative system, as I discuss below, hence the 'paradoxical' quality here. The game is an iterative series of new 'generative spaces', each of which resembles earlier iterations but are technically distinct.

tendency of many technological objects, specifically, their dynamic functionality as originating from new forms of synergy, plurifunctionality and internal coherence" (Egliston and Carter, "Mobile Virtual Reality", 596). Such concretization also informs how technologies become enmeshed in cultural, social, economic, and political spheres. For example, online platforms—especially Amazon, YouTube, Netflix, Meta, and Twitter—undergo a continuous process of "platformization", "the penetration of infrastructures, economic processes and governmental frameworks of digital platforms […] as well as the reorganization of cultural practices and imaginations around these platforms" (Poell et. al, "Platformisation"). *No Man's Sky* simulates these processes of concretization and platformization in the narrative loop of the game's conception, production, expression, and reception. This process is discernable if the game is considered from the perspective of its 'lifecycle': as it has developed, the game has internalized both author-designed and player-generated approaches and situations into its diegetic ecosystem, which affords the adoption of various playstyles—not to mention an effectively-infinite potential playing time—in response.

Because *No Man's Sky*'s iterative series of 'generative spaces' is evolving over time, the game is particularly conducive to emergent narratives, "[the] phenomenon of unexpected contextual stories arising through play" (Murnane iii). Paradoxically, this emergence is possible *because* of the underlying tension between the game's ecosystem as a "generative space" and "[this] system's *expressive range* [, which] is made up of many potential generative spaces" (Smith 232). This expressive range is placed in tension with the procedural relationship between author/filterer, textual ecosystem, and emergent players as an ongoing "lifecycle", suggesting an alignment with developments in narratology regarding "possible worlds" theory. As Ruth Ronen observes, "[the] idea that a narrative text composes a constellation of possible worlds, that each narrative situation is modally indexed, and that a selective actualization of narrative possibilities produces an action-

structure has opened a new direction in narrative theory" (170). The connection between this conception of the narrative text as a "constellation of possible worlds" and theories of emergent narrative suggests a useful alignment for the understanding of the narrativity of generative systems as has been outlined in this dissertation, especially because, "given the complexity of [emergent narrative], any meaningful form of authorship must also embed an understanding of the narrative potential of each piece of content within the greater system" (Kybartas, Verbrugge, and Lessard 1). In this sense, games are reconceived as spatialized matrixes of narrative situations which are selected and re-arranged over time by authors, players, and (potentially) the generative ecosystem itself.

Thus, the notion of lifecycle outlined here suggests that *No Man's Sky*'s ecosystem is subject to potential, evolutionary change, which then facilitates further emergent responses from the game's audience. As Richard Walsh has theorized, this "emergent behaviour" can be thought of as "that which becomes narratable at a higher level of organization" ("Emergent Narrative" 75). These behaviours are emergent, therefore, because they likewise become concretized within the text, transcending the realm of mere playstyle and instead recursively infolding these playstyles into the game's proliferating systems. Put differently, in response to players' emergent behaviours, the game's systems are filtered by the authors of the text in the form of content updates—expanding narrative situations, introducing different sub-systems, and incorporating new gameplay elements—which results in another 'generative space' being rendered from the tension between the system's potential range of expression and its most recent concretization. Because of this ongoing feedback loop-like process, any analysis of the game's potential for emergent narrative must itself emerge beyond the intra-diegetic layers of the game to examine its lifecycle as a holistic text, especially concerning the looping, evolutionary process of its conception, production, expression, and reception, which lie in parallel tension with the game's system's expressive range and generative spaces.

In this sense, the situational generator *mise en abyme* takes on the experiential character of the feedback loop, rather than the *escutcheon* or reflective mirroring previously discussed. In cybernetic theory, feedback is present in a system when a "circularity of action exists between the parts of a dynamic system", when any given part "affects the other" (Ashby 53). Given that this leads to a concretizing force where these parts congeal and synergize to produce a coherent whole, the feedback loop as *mise en abyme* relies on the emergent behaviour of players and authors in response to the system's semi-autonomous unfolding. This relationship is mutually reflexive: through interactions, connections between disparate parts contribute to holistic alterations to the system itself. Thus, while understanding the decision-making of any dynamic or complex system is itself a complex process because "complex systems cannot be treated as an interlaced set of more or less independent feedback circuits, but only as a whole" (ibid., 54), this interrelation of wholes and their fractal parts suggests that "complex systems, richly cross-connected internally, have complex behaviours, and that these behaviours can be goal-seeking in complex patterns" (ibid.).

One element of this relationality is that the circular process of mutual reflection causes the game's ecosystem to take on traits from both authors and players, much like algorithms function in other social media contexts. This is shown in several cases, including the obvious examples of authorial filtering by way of content updates or in the 'transcendental' *mise en abyme* that is *Waking Titan*, a supplementary Alternate Reality Game (ARG) about *No Man's Sky* which relies on centrifugal force, pushing players beyond the text before, centripetally, drawing its audience back deeper into the text. Further, player-generated approaches, including the Archaeogaming "code of ethics", galactic civilizations, and other emergent behaviours which originally went against the text by moving outside of it, eventually became part of the game itself. Thus, interacting with *No Man's Sky* as a platform produces an entanglement of author, audience, and text by way of this *mise en abyme* structure.

Building on the notion of the dynamic feedback loop as *mise en abyme*—a processual, circular mirroring of wholes and parts (but also of parts in other parts) concretizing and thus becoming further enmeshed in the textual ecosystem—*No Man's Sky* is a narrativized, goal-seeking ecosystem of relations between players, authors, entities, and systems which dynamically reflect and mediate one-another. The goal, in this case, is the recursive expansion of the game's relations—to explore itself and to be explored—, which further expands the game's universe both in terms of its actual substance—the expansion of the in-game universe itself or the expansion of the game's player base—and in its potential for increasing significance and narrative situations. As this suggests, the feedback loop as a procedural structure of relations is, in itself, a precondition for the game's narrativity.

In sum, I argue that in *No Man's Sky* the interaction between designer, system, and audience unfolds in three key ways. Firstly, by applying generative methods, designers are explicitly de-centered, instead authoring an ecosystem in which systems somewhat-autonomously produce interactions to generate environments, sub-systems, and entities. This ecosystem is largely mechanical and superficially repetitive, a by-product of its having been procedurally generated. As such, it amounts to little more than an image of the static, eternal forms of a purely mechanical or mathematical nature, what Alfred North Whitehead calls "Nature Lifeless" (*Modes of Thought* 173).

Secondly, *No Man's Sky* frames players as both entities with the game-world and as agents from outside of it, meaning that without players the game-world remains, quite literally, "lifeless". Essentially, the simulated nature of the game affords players the agency to overcome this static, purely mechanical notion of nature, drawing them deeper into the game's ecosystem. Literally speaking, players are discovering the different planets/systems/environments at the same time as these objects are manifesting, though these manifestations are 'pre-figured' in the game's mathematical code. This is, as Roc Morin argues, an extra-diegetic tension that frames the experience of the text: "In one sense,

because of the game's procedural design, the entire universe exists at the moment of its creation. In another sense, because the game only renders a player's immediate surroundings, nothing exists unless there is a human there to witness it" (n.pag). Diegetically speaking, however, the game's infinite range of planets are all populated, feature ancient ruins and deeply buried artifacts; they have all been long-populated, narratively speaking. Through this interesting case of retro-prospective paradox, the universe narrativizes its own sense of being both entirely novel and entirely repetitious. This creates a disjuncture between narrative levels, producing the sense of being thrown into a feedback loop. From within this *mise en abyme*, players are forced to find meaning within the worlds of the game, an existential drama that resembles the plight of Sisyphus described by Richard Taylor in his essay titled "Time and Life's Meaning".

Thirdly, by resolving the game's existential drama how they see fit, players generate emergent narratives which are then concretized as part of the text in future authorial filterings. In part, these emergent 'narratives' arise because players interact with this mechanical simulation of a lifeless nature, produce their own narrative situations, and infuse the game with their own significances. Nonetheless, players are likewise subject to the authorial filterings of the text, which radically reshape the game's narrative and ecosystem. Interestingly, this also involved players leaving the in-game universe and collaborating via discussion boards and other paratexts.

As this process shows, the sum-total of these emergent playstyles and authorial filterings collide, vivifying the game's ecosystem from a static image of lifeless nature into a simulation of "Nature Alive", which for Alfred North Whitehead, itself "arises from the vivid grasp of the interdependence of the one and the many" (ibid., 84). Thus, the lifecycle of *No Man's Sky* is intrinsically relational, requiring this interdependence across all narrative levels and across the game's intricate systems.

Procedural Content Generation in *No Man's Sky*

In the case of computer video games more generally, the logic of computer languages—which are, like other languages, intrinsically generative—has deeply informed how game worlds are designed. Of particular interest here is the broad adoption of a specific method called Procedural Content Generation, which has become a common design approach for games of any genre or scale. Historically, many accounts agree that PCG was first utilized as a method in the popular dungeon-crawling game *Rogue* (1980), which was

> one of the most popular mainframe games of the early 1980s. Inspired by William Crowther's text-based *Colossal Cave Adventure* (Crowther/Woods 1977) and the table-top role-playing game *Dungeons & Dragons* (Gygax/Arneson 1974), *Rogue* was a series of dungeon rooms that the player wandered through, defeating monsters, collecting treasure, and looking for food. In order to provide variety, the rooms and the pathways connecting them were procedurally-generated (Mark J.P. Wolf, "Combinatorial Explorations" 296).[99]

The desire to provide variety is one of many motivations for utilizing PCG, which can range from the 'utilitarian' to the 'unique' (Darren Grey, 8). Most notably, PCG methods are cost-effective and space-saving, two benefits which greatly assisted early game developers when lacking budgets and miniscule system memory heavily informed the game design process. Nonetheless, as these issues have slowly disappeared—game design is more accessible than ever, memory is more affordable and expansive—an aesthetics of procedural generation has continued to influence the motivations for utilizing these methods. In part, this is because of the overall flexibility of PCG as an approach: as Tom Betts outlines,

[99] *Rogue* is also considered the starting point of PCG methods by Darren Grey in Tanya Short's anthology *Procedural Generation in Game Design* and in Alba Amato's article "Procedural Content Generation in the Game Industry", among others.

> Procedural content generation (PCG) is the general term for the process whereby algorithmic methods are used to produce game content. This content may relate to any aspect of game design. Common areas of PCG implementation are fractal terrain, RPG (role-playing game) loot generation, enemy placement, or resource distribution. However, PCG can be used for a wider variety of purposes, including the creation of mission objectives, dialogue trees, character profiles, and behavior patterns. There is also a growing area of game design where PCG systems contribute significantly to the emergent aspects of AI (artificial intelligence) behavior and dynamic autonomous environments (62).

PCG is therefore extremely useful for designers because it mixes pre-rendered assets or archetypes to create novel content. This is done procedurally, meaning these assets are exposed to a rule-set which algorithmically determines how assets or entities interact (and how these assets and entities are combined). The result is a pseudo-random, seemingly-authorless, somewhat-autonomous virtual world.

Typically, a game's design team manually authors a game's "content", which "is most of what is contained in a game: levels, maps, game rules, textures, stories, items, quests, music, weapons, vehicles, characters, etc." (Togelius, Shaker, and Nelson 1). In games which use PCG, however, "we are dealing with computer procedures, or algorithms, that create something" (ibid. 2). In video games, computational procedural systems are used to build portions of the game world which would be significantly more difficult to make manually. Video games, like most new media, require a breadth of expertise and are difficult to design. However, there are more aesthetic purposes behind using PCG as well. As Darren Grey argues, using PCG can be motivated by a range of functional or aesthetic desires: to create "Individual Experiences" or "New Gameplay/Interaction Modes"; to encourage "Player Input",

systematic “Unpredictability”, or foster “Living systems”; and, finally, to explore the generative problems surrounding matters of “Inhuman Creativity”, to generate “Reflections and Refractions of Humanity”, to observe the “Inspiration of Infinity”, and to create games that are “Fun” to play (10-12).

Although PCG emphasizes systems which ‘produce’ their own content, it is important that the content generation system takes the design, affordances and constraints of the game that it is being generated for into account. This sets PCG in games apart from many works of generative computer art, for example, which are not subjected to the constraints and affordances of game design. As Togelius, Shaker, and Nelson point out, a key requirement of generated content is that it must be playable: it should be possible to finish a generated level, ascend a generated staircase, use a generated weapon, or win a generated game (2). Procedural content generation, then, complicates purely theoretical notions of generativity because it requires a greater degree of control from the author, facilitates the possibility for a participatory audience, and seeks emergence in the relationship between these two poles to produce the variety of inputs and outputs that make the system and its rules iteratively, infinitely replayable. Thus, PCG demands a notion of generative art that prioritizes the structure of the work, wherein structure “is […] seen as a constraint that gives the artist the opportunity to reduce the virtually infinite range of options in the decision-making process” (Franco 227).

Upon further inspection, this conflict has deep critical ties to the late 1950s, when cybernetic and systems-based theories emerged into the realm of artistic praxis. Undoubtedly, the emergence of the computer corresponds with these artistic developments, as the first electronic computer, the Electronic Numerical Integrator and Computer (ENIAC), was constructed at the Moore School of Electronical Engineering at the University of Pennsylvania in 1946 (Brockmeier). From this point forward, generative art became increasingly prevalent in a plethora of “artistic milieus including poetry, mathematics and conceptual art”, which “were involved in similar experimental approaches and

techniques" (Franco 227). For example, "advances in seriality and structure in art brought forward by conceptual artists such as American Sol LeWitt represent an interesting connection with the work of a number of generative artists" (ibid.). The cybernetic and systems-oriented quality of the artworks which emerged from these artistic milieus were theorized to be a "new art" which "originated in cybernetics and general systems theory" (Boden and Edmonds 21). This development is a common origin of the 'objective', 'scientific', 'experimental', and 'art-as-research' approaches in computational generative art. *No Man's Sky*, through the adoption of PCG methods, belongs to this objective, scientific, experimental, art-as-research lineage.

The Narrativity of the System in *No Man's Sky*

On the surface, *No Man's Sky* is an essentially-infinite universe generated by algorithms which, from a limited pool of objects, produce novel combinations—entities and sub-systems—from this pool. The game's simulated universe is, on every scale and on every narrative level, the recursive product of this system of mathematical re-combinations. This PCG system generates entities, sub-systems, and environments—planetary topologies, planetary weather, planetary ecologies, star system economies, and other entities like animals, minerals, and plants—which rely on the underlying pool of data being continuously recombined according to the logic of authored mathematical models.

In an article for *The Atlantic*, Roc Morin explains that *No Man's Sky*'s universe: "begins with a single input, an arbitrary **seed**—the phone number of one of the programmers. That number is mathematically mutated into more seeds by a cascading series of algorithms—a computerized pseudo-randomness generator" ("Inside the Artificial Universe That Creates Itself", my emphasis). Continuing, Morin explains that while computers are technically incapable of random operations, the scale of the operations a computer can process creates the sensation of randomness in human observers (ibid.). Thus, the game's utilization of arbitrary, pseudo-random strings of numbers

> determine the characteristics of each game element. […]. Once the first seed is entered into the void within the program, the universe is unalterably established—every star, planet, and organism. The past, present, and future are fixed indelibly, with change to the system only possible from a force outside the system itself—in this case, the player (ibid.).

While this emphasis on external forces is accurate, it is crucial to note that the system has likewise been greatly changed by authorial filtering, including decisions made in terms of how the game's 'arbitrary seed' manifests in terms of objects and the ecosystem of the game itself.

In this fashion, each of the game's scales—cosmic, intergalactic, interstellar, planetary, and so on—is recursively expressive of the underlying algorithmic system. This produces a sense of the data's statistical average, leading to the central problem with extensive procedural content generated spaces, the "10,000 Bowls of Oatmeal Problem":

> So your algorithm may generate 18,446,744,073,709,551,616 planets. They may each be subtly different, but as the player is exploring them rapidly, will they be perceived as different? I like to call this problem the 10,000 Bowls of Oatmeal problem. I can easily generate 10,000 bowls of plain oatmeal, with each oat being in a different position and different orientation, and mathematically speaking they will all be completely unique. But the user will likely just see a lot of oatmeal (Kate Compton "So you want to build a generator…" 1).

According to the "10,000 Bowls of Oatmeal Problem", *No Man's Sky*'s entities, economies, ecologies, and topologies are the results of the underlying system's combinatorial potential being expressed

through multiple generations in what is, effectively, a mathematically and conceptually endless abyss of mundane difference on the level of parts. This difference, however, is not immediately perceivable on the level of the whole. The system produces swathes of similar-looking, lifeless, and superficially uninteresting planets which, at the same time, are technically unique and unrepeatable events of the systems' expressive capacity. Thus, objects within the game are simultaneously mundane and emergent, if only in a quantitative sense rather than a qualitative one.

As such, certain mathematical decisions have greatly influenced the complexity of the game's generative outputs in its attempts to produce greater variety and avoiding the perceptual problem the 10,000 Bowls of Oatmeal dilemma suggests. As Mark Wilson notes in his pre-release discussion of the game for *Fast Company*, "*No Man's Sky* uses procedural generation, or mathematical formulas that draw mountains and quadrupeds. Each formula can use a few limited variables to produce limitless varieties" (n.pag). More precisely, Wilson notes that

> The game depends on L-systems, which were identified in 1968 by the Hungarian biologist Aristid Lindenmayer. He demonstrated that very complex algae or plant life could actually be broken down into relatively simple, fractal-like, branching structures. The easiest way to picture how an L-system works is simply to picture a tree (ibid.).

After utilizing L-systems, the game's generative system is given greater complexity through the incorporation of the "Superformula" equation ("The Algorithms of *No Man's Sky*", *Rambus Press*, N.Author, N.pag). While the game was nearing release, lead designer Sean Murray "noticed geological formations that an artist had hand-designed for another video game, and realized that the algorithms of *No Man's Sky* were not equipped to make them. The problem nagged at him, until he found an equation, published in 2003 by a Belgian plant geneticist named Johan Gielis" (Khatchadourian "World Without

End" *The New Yorker* n.pag). After applying the Superformula, Murray noted that the formula produced terrain that was "asymmetrical, marred by depressions and rivulets" while only requiring "a hundred and twenty lines of code" (ibid.). Immediately, Murray

> envisioned using the Superformula throughout the game, especially at the center of the galaxy, where landscapes would become more surreal. With only small shifts in its parameters, the equation was producing impressive variability. In one rendering, it produced rolling hills. Murray refreshed the screen: a star-shaped rock formation appeared (ibid.).

Through this complex cascade of algorithms and the authorial addition of mathematical distortion/turbulence which informs these systems (ibid.), *No Man's Sky*'s assets are selected and recombined by the system, producing the game's unique topologies, weather systems, resources, and locations. This extends even to the particular flora and fauna found on each planet: for example, "creatures are generated through the procedural distortion of archetypes, and each given their own unique behavioral profiles" (Morin, n.pag), while L-Systems and the Superformula are notably useful for generating plant-like and contoured shapes with a high degree of variability.

As Jason Grinblat argues, the adoption of mathematical and computational models for producing content which would normally be authored manually fundamentally alters the role of the author of a game. Although

> there is room for authorial voice in procedural systems that enable emergent narratives, […] the designer's role diverges from that of the traditional author. In procedural design, it's possible to insert elements like themes and mood into both the rules of generative systems and the handcrafted atoms that get procedurally combined. The result is less

> precise than the traditional story but richer in other ways. Whereas the author crafts a storyline that traverses narrative space, the procedural designer crafts a *story volume* that contains numerous adjacent stories exploring similar themes or invoking a similar mood. It's important to note that a story volume doesn't enclose an arbitrary lump of narrative space. Instead, it encloses a family of emergent stories, all of which are begotten by a set of carefully curated system parameters (202).

In this fashion, generative game designers use PCG methods to generate ecosystems with intrinsic narrative and situational potential, which unfold as a result of "the collision of systems rather than the script of an author" (ibid., 201). In these generative ecosystems, "the roles of designer, gamer, and author can become blurred. Ownership and authorship of game content, narrative, and game play mechanics can become a collaboration between the player, the designer, and the code itself" (Betts 67). Put differently, from within the "*expressive range*" of *No Man's Sky*'s generative system this range's "*potential*" becomes a concretized "*generative space*" (Gillian Smith "Understanding the Generated" 232) through the interaction of author, text, and player. This relationship has been expressed iteratively and procedurally—though never exhaustively—over the course of the game's lifecycle. By means of this relationship, the game's "story volume" continuously expands, takes on different shapes, produces novel objects and environments, and provides these objects with 'story volume' in the form of a 'family of emergent stories' which players are afforded.

As I outline in Chapter 2, because generative art has the capacity to generate "new and surprising artifacts" (Galanter "Generative Art Theory" 174) through the negotiation between the artist's goals and their specific filtering of the generative system, these changes can greatly affect the range of assets produced to the degree that what was once familiar can become unfamiliar with a few alterations to the

system. The selective nature of generative authorship, then, relies on the decisions made by the generative system. As generative artist Matt Pearson argues, the author's role here "may be closer to that of a curator than a creator. You create a system, model it, nurture it, and refine it, but ultimately your ownership […] may be no more than a parent's pride in the work of their offspring" (4). The designer becomes only one of the bottom-up processes of a text's environment, while systems are responsible for bringing the filtered results into being. In this fashion, generative authors invite "chaos" into their work (ibid., xli). This bottom-up process gives "the audience a sense of dynamism and [offers] the generative system itself as the expression of aesthetics" (Galanter "Generative Art Theory" 174). Generative art, then, "[celebrates] the aesthetic of creation as an activity" (ibid.).

Nonetheless, Galanter concedes that "most artists producing generative work begin with an idea of what the final result might be, or at least what final result might be desired […] creating systems that will conform to and yield their preconceived notion" (ibid., 173). The generative system operates within the parameters set by its author, which shapes the environment of the generative system. Inside this environment, anything can provide the material which interacts with authored processes. These interactions are executed by the system, which functions as an algorithm, a "procedure for addressing a problem in a finite number of steps using logical if-then-else operations" (Terzidis *Algorithmic Architecture* xii). The use of algorithms by generative artists provides opportunities to simulate "the way natural processes work and as such they must not be regarded as human inventions but rather as human discoveries" (ibid., 19). In *No Man's Sky*, this is shown rather effectively, as the authors of the game are physically incapable of witnessing the extension of the game's algorithmic system due to the sheer scale of the game's universe.

Regardless of this emphasis on the autonomy of processes, even a work the size of *No Man's Sky* fundamentally depends upon the relationship between authors of the generative system and the system

itself. Although generative systems "do not require moment-to-moment decision making or control by the artist", making them "functionally autonomous relative to the artist" (Galanter "Generative Art Theory" 152), these machines are most fairly characterized in the same manner as robots which "are referred to as being 'autonomous' without any implications or claims regarding free will or consciousness" (ibid.). This lack of consciousness suggests "such a system is wholly dependent on humans for its continuing operation" (ibid., 151). This dependence, as I have shown, informs much of the discourse surrounding generative theory.

Narrativity and the Lifecycle of *No Man's Sky*

Regardless of the intrinsic beauty of process, the decisions made by a generative system through these processes remains largely fostered by the author's fundamental decisions. Therefore, this aesthetic of creation as an activity glosses over an underlying conflation of two distinct processes, those of computation and computerization. This misconception is described by Architect Kostas Terzidis in *Algorithmic Architecture*: while computerization "involves the digitization of entities or processes that are preconceived, predetermined, and well defined" (xi), "computation is about rationalization, reasoning, logic, algorithm, deduction, induction, extrapolation, exploration, and estimation" (ibid., 16-17). This tension between computation and computerization helpfully characterizes the core tension in *No Man's Sky*, especially because the game's systems are generally computerized but are not necessarily computational. The system expresses random combinations of pre-rendered assets, which are filtered over time to produce the author's ideal results. Though this produces novel combinations, it does not necessarily produce these combinations through reasoning, much less exploration and estimation. Rather, these aspects of computation are solely the domain of the designers. If computational creativity is a result of sheer computerization or the alien logic of algorithms, the aesthetic of generative texts relies on the sensation of a world created through systemic interactions: "through such inventions […] as

the computer a world is encountered, that of applied computation, which, while intellectual in nature, abides to principles, mechanisms, and performances that lie beyond the realm of the human mind" (ibid.). Using algorithms, the impression "of an alternative, perhaps parallel, logic to that employed by the human mind" (ibid.) becomes a major factor in the narrative experience of *No Man's Sky*.

Therefore, a generative artist's approach aims to become partially autonomous (non-human and technological), while also manifesting the artwork as an expression of authorial intention (intentionally designed and filtered). The artwork's outcomes are subject to change based on decisions enacted by the designer and the generative system's processes. In the case of narrative, decisions made by the audience likewise enact changes. This, as Frank Popper argues, is a movement away from the traditional art object to a new kind of practice in which "spectator participation and the environment" can ultimately converge (*Action and Participation* 11).

Interestingly, the relationship between participation and environment characterizes all games, even those which intentionally remove player agency. Understanding the role of generative approaches to video game design, then, requires to a certain degree an acknowledgement that all games are inherently procedural and relational. Many games emphasize the tension between authored rules and each player's subjective expression, between afforded mechanics and emergent narratives. In his influential work on games and play, Roger Caillois argues that "games are not ruled and make-believe. Rather, they are ruled or make-believe" (*Man, Play and Games* 9). This either/or logic, rather than contributing to more complex discussions of games and their relationship to narrative, has influenced the long-held disagreement between narratologists and ludologists in video game studies[100]. Ludologists typically avoid comparisons with non-ludic forms, while narratologists typically emphasize the unique qualities of games in comparison to prior media. Both cases have merit but are treated as a zero-sum

[100] See: Jan Simons' "Narrative, Games, and Theory".

game. The relationship between games and narrative has deeper roots than either side appears ready to acknowledge.

As a result of this split between ludology and narratology, the relationship between generative systems and narrative in video games is underrepresented. Ian Bogost, for example, argues that "the best interactive stories are still worse than even middling books and films […]. Games' obsession with story obscures more ambitious goals anyway" ("Better Without Stories"). This logic pervades studies in ludology: namely that games are a new artform, while narrative is older and therefore irrelevant. Bogost concludes that telling stories in video games is "just to dream a complicated dream of the novel", disregarding what games "are already so good at: taking the tidy, ordinary world apart and putting it back together again in surprising, ghastly new ways" (ibid.).

It is unclear why storytelling and the process Bogost describes are mutually exclusive. Games and narratives have always intersected namely because generative systems and narrative are "both a system of constraints, reducible to rules, and […] an exercise in freedom, in distraction" (Greimas "About Games" 31). In this sense, the player experiences even the most randomly-generated game as a narrative. This is because games and stories are reliant upon the audience whose experience is an act of dwelling in a world into which they have been thrown[101]. In the universe of *No Man's Sky*, this thrownness results in the spatio-temporal relationship between text, author, and audience, which produces a complex rhetorical situation which encapsulates the game's lifecycle as a narrative.

[101] This notion is, of course, deeply reliant upon the existential phenomenology of Martin Heidegger, who is a primary influence on the spatial theory of 'topophrenia' in Robert Tally Jr.'s monograph *Topophrenia* and in the hermeneutic philosophy of Gianni Vattimo shown in *Art's Claim to Truth*. While these two figures directly rely on Heidegger's philosophy to help them establish the ontological status of artworks by proving the 'worldly' quality of contemporary artworks, I am more concerned with describing the alluring sensation of topophrenia as a kind of 'coming-to-terms' with the materially-established and thus concretized text as a world. The affect of topophrenia as a pleasurable kind of 'dwelling' in the world of a text is deeply suspicious, especially given the productive situation surrounding video games as entertainment products and Capitalist artifacts. The continued 'growth' of these works and its increasing encroachment into the domain of real life has deep ramifications, I argue, for notions of textuality as fictitious or segmented off from the world outside of them.

This greatly affects the way *No Man's Sky* is structured as a playable experience. The game is both entirely open-ended and, simultaneously, defined by its rules. This creates a tension, as the game fosters emergent behaviors from both the game's systems and from players. These behaviors involve the creation of new narrative paths and approaches unique to each individual player, though guided by the structures imposed by the developers and the system. This makes storytelling in *No Man's Sky* inherently co-creative and dynamic, implicating its evolution over time as part of the game's story. It is an open question whether this can be considered an organic form of emergence or, more cynically, a concretization of the game's systems in response to the capitalist feedback loop formed between authors, systems, and players found in all entertainment products. Regardless, such changes make the game difficult to examine, as it has changed significantly since it was first released. The approach taken here is to treat the game's various updates as an ongoing aspect of the game's narrative, meaning the beginning of the game and its current state are intrinsically related in a process of the game's universe moving from repetitious, static lifelessness to a more unique, kinetic, living world.

A deeper examination of generative theory proves this unity on the level of structure. The game's lifecycle consists of the holistic notion of the text, as the triadic relationship between author, text, and player generates narrative situations diegetically, meta-diegetically, extra-diegetically, and para-diegetically. This has been especially notable in the case of *No Man's Sky*, as the game has greatly changed since its release through consistent updates and filterings of the generative system. As Lu, Li, et.al, argue,

> The changes to *No Man's Sky* exemplify several typical types of change in digital games. Digital games, as other software products, evolve during their *lifecycle*. The evolution of games can be in the form of emerging change (designing a space for the players to mold their own game

> experiences), reactive change (changing the game by reacting to direct or indirect feedback from the players) or pre-planned change (content that is already designed, or in some cases already produced, before the launch of the game), and their evolution has similarities to how more utility focused software products evolve ("Patches and Player Community Perceptions" 2, my emphasis).

As these authors argue, *No Man's Sky* "is a mixture of all three types of evolution" (ibid.), namely because it has been subject to an abnormally-fluid cycle of reception across its pre-release, release, and post-release phases. While producing a feverish excitement when it was first announced, the game was famously released with many missing features and was broadly painted as a failure. After 27+ content updates, including the release of *Waking Titan*, the game is seen in a much better light by players and critics. Clearly, in this sense the notion of 'lifecycle' proves crucial for computational generative aesthetics, namely because it forces scholars to take seriously the dynamic, procedural, and relational situation informing all levels of the text.

While it is broadly acknowledged that machine decision-making partially shapes the experience of the player in generative video games, the implications of this decision-making for narrative has largely been overlooked. Rather, generative video games are described as open-ended, non-narrative, or even un-narratable: the text, so explicitly systematic, appears merely mechanical. In part, this is because the structural description of *No Man's Sky* given above—of the mathematical recombination of pools of data—is more like a database than a conventional narrative. This database logic—rather than a causally-linked, imitative system of "events" found in narrative—is often described as a matrix of non-hierarchical relations of objects which can be arranged around a variety of emphases. As New Media scholar Lev Manovic has famously argued, "[many] new media objects do not tell stories; they don't

have a beginning or end; in fact, they don't have any development, thematically, formally or otherwise which would organise their elements into a sequence. Instead, they are collections of individual items, where every item has the same significance as any other" (80). Nonetheless, it is crucial to note that Manovic—who argues that database can replace narrative, functioning as "a new way to structure our experience of ourselves and of the world" (ibid., 81)—does not include video games in this larger database-oriented trend. This is because video games "are experienced by their players as narratives. In a game, the player is given a well-defined task—winning the match, being first in a race, reaching the last level, or reaching the highest score. It is this task which makes the player experience the game as a narrative" (83). In *No Man's Sky* and many other games released after Manovic's *The Language of New Media*, this binary distinction between database and narrative has proven increasingly untenable even without this first-hand experience. In *No Man's Sky*, the underlying system which produces the game's ecosystem functions both as a pool of possible interactions—a database with no definite hierarchy between entities—and, at the same time, as a narratable universe in which players are provided with the task of reaching the universe's center by manipulating the interlocking sub-systems which express the game's underlying combinatorial structure. This involves manipulating economic systems, building bases, repairing damaged ships, breeding animals, and exploring the game's endless array of undiscovered galaxies, star systems, and worlds.

Critically refashioning Manovic's insights regarding database structure as a potential symbolic form, film scholar Marsha Kinder argues, "database and narrative [are] two compatible structures whose combination is crucial to the creative explosion of new media, since all narratives are constructed by selecting items from databases (that usually remain hidden), and then combining these

items to create a particular story" (3-4)[102]. More precisely, Kinder claims that database narratives are

> those narratives, whether in novels, films, or games, whose structure exposes the dual processes of selection and combination that lie at the heart of all stories and that are crucial to language: the selection of particular characters, images, sounds, events from a series of paradigms, which are then combined to generate specific tales. Raising meta-narrative issues, such structures reveal the arbitrariness of the particular choices made and the possibility of making other combinations, which would create alternative stories ("Narrative Equivocations between Movies and Games" 127).

Database narrative, therefore, is an attempt to resolve the question of the narrativity of generative systems: the logics of databases (with their lack of intrinsic hierarchy) and narrative (with its selective, narrow, authorial (and thus always somewhat arbitrary) vision) are dialectically synthesized in the unveiling of the systems of selection and combination. While "narrative is traditionally perceived as a mode of discourse […] containing actions and characters that interact and change according to laws of causality within a spatial and temporal setting", Kinder argues that New Media's "privileging [of] nonlinear storytelling and communication […] help us see that in a much broader cognitive and ideological sense narrative is also a means of patterning and interpreting the meaning of all sensory input and objects of knowledge" (ibid., 8).

Building on this notion of database narrative, the ecosystemic notion of generative systems I have outlined in earlier chapters effectively describes how users interact with database texts and

[102] Among the many examples of database narrative which Kinder observes in cinema, a notable one is *Last Year at Marienbad* (1961), directed by Alain Resnais and featuring a screenplay from Alain Robbe-Grillet. Robbe-Grillet's novels, as I have shown in Chapter 2 and 3, are a concrete literary example of Kinder's database narrative logic.

produce narratives which help to "map the [textual] world and its inhabitants, [locating] us within a textual landscape requiring a constant refiguring of our mental cartography with its supporting databases, search engines and representational conventions" (ibid.). In this sense, the deictic quality described by David Herman as the fundamental precondition for narrative is revealed and navigated in the simultaneous situation of ludic performance and text's systematical unfolding. While in narrative the "storytelling involves a shift of deictic centers, whereby narrators prompt their interlocutors to relocate from the HERE and NOW of the act of narration to other space-time coordinates – namely, those defining the perspective from which the events of the story are recounted" (Herman 271-272), this relocation occurs simultaneously to the narrative's unfolding in the here and now of each iterative generative space. In *No Man's Sky*, the procedurally-generated ecosystem—the entire universe and the sum of all authorial and audience interactions with it—functions as a collaborative narrative database in which the mechanisms of selection and combination are emphasized across every narrative level. The relationship between designer, system, and audience dynamically shapes the conception, production, and reception of the game into a narrative of the game's overarching 'lifecycle'.

Arguably, this suggests the primary ground upon which any interpretation of a generative video game must begin: *No Man's Sky* exemplifies the narrativity of generative systems inasmuch as it relies on this triadic relationship in perpetuity. Engaging with the game as a database of entities, events, and playstyles, players directly engage with and, to a certain degree, inhabit the procedurally-generated ecosystem of the game; they dwell within the near-infinite potential of the game's generative system, which increasingly evolves as a byproduct of the mutually constitutive relationship between iterative authorial filtering and continued player engagement. The game's ecosystem reacts to and, in a sense, records the player's real-time experiences as data for forthcoming authorial filterings of the text.

This is a natural extension of notions of emergent narrative in which the player's firsthand

experience of playing the game itself constitutes a narrative within the overarching diegetic framework of a game. *No Man's Sky's* system produces deterministic outputs in a seemingly-random fashion: it generates entities and prefigures interactions from within designed parameters, making certain decisions which might contribute unexpected, non-human alterations to textual environments. This produces the experience of—to variable degrees of persuasiveness—an autonomous, dynamic, and independent textual ecosystem. This dynamic, autonomous, and recursive quality of the ecosystem in *No Man's Sky* aligns quite comfortably with the notion of constraint adopted by the Oulipo. Constraint, as Warren Motte argues, produces a sense of dynamism inasmuch as it constrains the author, text, and reader simultaneously; this produces texts which, although they take on "dizzyingly different shapes", share the kinetic notion of "constraint […] [which] provides them with a mobility—a formal, thematic, or indeed syntactic dynamism—that they might otherwise lack" ("Constraint on the Move" 721). Thus, the overarching 'lifecycle' of *No Man's Sky* as it has evolved from a lifeless universe into a procedural, relational, and emergent living universe is itself a crucial element of the game's intrinsic narrativity. In this evolution, the emergent behaviours observed in the agency of players is a recursive reflection of the ongoing evolution of the ecosystem they are playing in.

This becomes especially apparent when observing the ongoing relationship between conception, production, expression, and reception as a recursive feedback loop or *mise en abyme*. As Smith argues, "[when] you change an input parameter or a line of code, you are creating a new generative space filled with a lot of different pieces of content" (232). This iterative, superficially-similar and yet mathematically different "generative space" facilitates further iterations of the triadic, reflexive relationship between author, system, and player which, in a likewise ongoing fashion, are deeply mediated by their relations to each other. In the case of *No Man's Sky*, authorial filtering was performed in the original version of the game and has since been performed in subsequent update of

the game. The system has gradually become more complex, producing more unique combinations of the game's assets. The game's ecosystem, therefore, is variably dynamic depending upon the manner in which the author approaches matters of input and output: "the system's output informs the creator's iterative redesign of the system and underlying processes, resulting in changes to its entities, interactions, and outcomes" (Dorin, et. al, "Understanding Generative Art" 246). In *No Man's Sky*, with new updates come significant changes to weather patterns across all planetary systems. What was once a paradise planet full of life might become a desolate wasteland after an update, depending on the authorial filtering of the system and the system's subsequent decisions. These changes are unpredictable specifically because the system's 'choices' are involved.

Further, this textual emergence characterizes each individual instance of the system's decision-making, including each planet and each individual element of these planets as they are individually arranged. This ecosystem is generated by a relationality formed between the human and the machinic aspects of the text, be it between authors and systems or systems and players. The author designs the mathematical systems and determines what objects or entities these systems act upon. Players are then given direct and explicit means of interacting with the game's environments as entities or agents whose decisions likewise alter the text, generating their own meta-diegetic situations within the larger framework of the game's overarching diegetic framework. As these situations accumulate, the author responds by updating the game to accommodate increasingly more of these player-generated situations. These 'emergent narratives' unfold in and around *No Man's Sky*, which has itself become—again, over time—a narrative about the collaboration between human and machine 'intelligences' on the diegetic level.

Of critical importance when discussing *No Man's Sky* is the fact that the game's diegesis is tied to the game's extra-diegetic demands as a playable simulated universe *and* as an ongoing live-service

platform. The game must be interactable and it must change over time to maintain itself as a persuasive simulation of a dynamic universe, but it must also do so to maintain a player base. As has been shown in the game's dynamic, fluctuating reception—first as a massively hyped entertainment product, then as a commercial and critical failure, and finally as a regularly-populated 'living universe' after several years of updates—this persuasiveness is required to maintain the game's player base, without which the game's universe will effectively cease to exist. As of this writing, the game still averages around 10-20,000 concurrent users according to Steam metrics—which is only one of the many platforms the game has been released on—with player counts spiking roughly 30-40% when new content updates are released (see Fig.1).

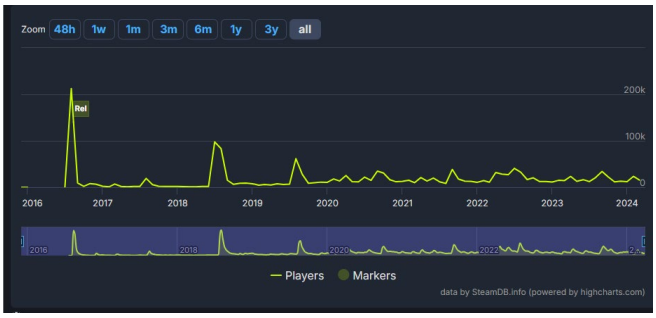


Figure 5.3—Steam's visualization of concurrent player counts over the lifecycle of *No Man's Sky*

As Figure 5.3 shows, Player counts over the lifecycle of *No Man's Sky* began well over 200,000 concurrent players. The later spikes correspond, primarily, with new content updates.

Interestingly and perhaps most strikingly for narratology, this interactable, simulated, and dynamic universe has proved exceedingly dependent upon para-textual excursions by both authors and players. In particular, the game's popularity greatly increased when players left the diegetic level of the text and played the ARG *Waking Titan* (2017-2018), which told the story of how the Atlas generated the universe in *No Man's Sky*. Alternate Reality Games, as Felicitas Meifert-Menhard observes,

> form a relatively new genre of gaming that is based on interactive collaboration and problem solving—they constitute a modern-day, digital version of the scavenger hunt. As collective gaming experiences that deliberately blur the line between virtuality and reality, ARGs are performed both online and within the everyday life of the players" (161).

Because they blur the line between virtual space and real life, ARGs likewise blur the line between fiction and reality, demanding a "narratological conceptualization […] that allows for processes of selection and (unexpected) feedback, spontaneity, and structural openness—aspects that, in traditional theories of narrative, have been diametrically opposed to what the notion of storytelling embodies" (ibid.). As a result, ARGs are, like video games, "based on patterns of continuation by choice" (ibid.) where "[the] interaction of player and text thus determines and forms the narrative […] in a concrete sense, rendering alternate reality games highly sensitive systems whose designers must constantly respond to the reactions of the players" (ibid., 167). Doubling as a narrative framing and a marketing campaign, *Waking Titan* was itself an inverted mirroring of the game's diegetic situation, reproducing the narrative thrust of the intra-diegetic narrative but on a higher narrative level. This is what Iddo Dickmann refers to as a *transcendental mise en abyme* in which "[the] work is in quest of an origin which is nothing but the *transcendental mise en abyme* it contains, hence, despite reflecting a fictional origin, the *transcendental mise en abyme* functions as the origin itself" (29).

Narratively revealing how the Atlas came to create the universe in *No Man's Sky* by pushing players into the real world to collaborate, this *mise en abyme* inverts the narrative thrust of Thomas King's *Green Grass, Running Water*: players were actively expelled from the game's diegesis into extra-diegetic spaces, which then compelled players to return to the game's universe by way of a paradoxical ontological *mise en abyme*. Upon the game's original release and subsequent commercial

failure, Hello Games collaborated with Alice & Smith, a studio that designs Alternate Reality Games (ARGs), to produce a hybrid, paratextual game which would tie to an upcoming update for *No Man's Sky*, "Update 1.3, *Atlas Rises*", which greatly changed the game's narrative and diversified many of its procedural systems in late-2017. This update produced the largest spike in player count after the game's original release and, further, indicated a significant improvement in player reviews surrounding the game[103].

Players—before, during, and after *Waking Titan*'s two seasons (in 2017 and 2018 respectively)—were likewise forced to venture beyond the diegetic situation of the text to keep the game alive. This was first done to discuss the game and document interesting experiences which could not be shared otherwise, as the game lacked a multiplayer mode until the game incorporated multiplayer in "Update 1.5, *NEXT*" in 2018, over two years into the game's lifecycle. Eventually, players ventured beyond the game's ecosystem to collaborate and build galactic civilizations, implement value-laden playstyles and codes of ethics, and document the evolution of the game over its many content updates, each of which greatly affects the game's code and thus directly impacts these 'civilizations'. This paratextual maneuvering of the audience is especially relevant for discussing the narrativity of the game's lifecycle: without paratextual collaboration between authors and players, both in the form of releasing *Waking Titan* and in creating extra-diegetic spaces for discussion of the game, the game would effectively end. Thus, the player's emergent behaviour outside the textual ecosystem—on another level of organization, as Walsh observes—has become deeply intertwined with the consistent process of authorial filtering which has ramifications for the game's diegesis AND the inner-outer dynamic which this diegesis relies upon.

[103] See Lu, Li, et.al, for a topic modeling of user-based review scores on Steam and their correlations to updates in *No Man's Sky*. This research shows a strong positive correlation between each update and, beyond the bounds of their study, the impact of *Waking Titan* on the game's popularity and positive reception.

Beyond the narrative of the game's successful lifecycle—which was at the beginning of the game's lifecycle by no means guaranteed—the threatening and impending sense of the game's future 'death' is ultimately inseparable from *No Man's Sky*'s formal nature as a commercial video game. Put simply, games require willing players; these willing players demand games consist of rules that can be fairly observed in the course of play; these rules can be later altered to improve a game, emphasize certain approaches to play, or prevent games from becoming stagnant as playstyles concretize; these rule changes can again demand new players who are willing to adapt to those rules and continue playing; and so on. Thus, the real-time demands of video games, which are now regularly updated and tinkered with after release, are deeply subject to the positivity of a game's reception and its continually being played. This emphasis on a game's potential reception—its capacity for facilitating player-oriented 'narrative emergence' and its potential market value—, and a game's procedurality on the level of its code—of its gameplay loop, and its iterative authorial filterings—shapes the generative dynamics of the game and involves players in a **long-term narrative**[104] encompassing all levels of the text's conception, production, expression, and reception.

Narrative Emergence in No Man's Sky

It is not new to game studies theorists to assess players' experiences of a game. Often, this is considered an element of the new media design of video games, which emphasizes interaction and immersion. Conversely, generative art theory is often opposed to interactive art because generative art emphasizes the designed qualities of an artwork while interactive art emphasizes participatory potential. This opposition between generative and interactive art is regularly challenged by video games because almost every game presumes players, even games which challenge player autonomy. Rather than oppose generative and interactive art on this experiential basis, it is logical to consider them as differences of

[104] To clarify, the game's latest update, "Update 4.3, *Orbital*", was released on March 27th, 2024. This is the 27th official update of the game since its release in 2016.

degree rather than differences in kind: they both foster relationships resulting from different ideas: the systemic and the para-textual, of interaction between author, text, and audience.

Such paradoxes of systems design do not only manifest in the process of a generative artwork's production, but also influence how the artwork is experienced by its audience. In computer games, the relationship between designer, system, and audience dynamically informs the conception, production, and reception of the game. This dynamic tension renders the system as an environment which unfolds **as** it mediates the competitive and cooperative relationship of game's designers and its players. This mediation attempts to open itself for players to "take an active part in writing the story that is being woven before them" (Short and Adams 185). Interpretation is also challenging because generative methods, including the use of Artificial Intelligence (AI) to guide PCG, must "cope intelligently (or at least with the resemblance of intelligence) with near-infinite varieties of spaces, other actors, and gameplay scenarios" (Mark R. Johnson "Artificial Intelligence" 133). Further, the decisions made by a generative system often operate beneath a layer of visual representation, making these systems difficult to discern. Effectively, a generative system generates its own structure, which reacts and adapts to player choices on a continuum of persuasiveness in terms of worldliness[105]. This worldliness, often considered more as a sensation of telepresence (International Society of Presence Research) than of a continuum of presence, becomes immersive because the system is kinetic, it mystifies its systems through visualization, and it demands interaction. This means that the author, text, and player each have some autonomy and independence from each other while, at the same time, they reflect and are mutually constitutive of each other.

Literary theorist Hans Ulrich Gumbrecht argues that "something that is "present" is supposed to be tangible for human hands, which implies that, conversely, it can have an immediate impact on human

[105] See above note regarding thrownness, worldliness, and the affect of topophrenia.

bodies" (*Presence* Location 40). Gumbrecht claims that literature produces "the presence of the past in substance" (*Stimmung* 14), both on the levels of mediation and of readerly desire. For Gumbrecht, literature evokes the past through moods which are brought about by the immediate reading experience. The reader is immersed through language and the book's materiality into feeling the past, but this experience is always aesthetic and, thus, transient (*Presence* Location 98). The reader's desire to be present, then, resembles the desire to be tele-present in virtual worlds which is likewise an aesthetic experience.

Participation in art contexts is typically thought of as direct involvement, decision making, or agency. Often conceived of as the major difference between previous artistic media and video games, this direct involvement is believed to require a different level of engagement or immersion than more passive, 'outdated' forms. As John Dewey argues, "[t]he first great consideration is that life goes on in an environment; not merely in it but because of it, through interaction with it" (13). The relationship between environment and agent in a generative artworks shapes, much like the rules in any game shape, the experience of the artwork. In cases of narrativized generative artworks, then, "experience is the result, the sign, and the reward of that interaction of organism and environment which, when it is carried to the full, is a transformation of interaction into participation and communication" (ibid., 22). Thus, participation is a ubiquitous element of art, not only on the level of interpretation but on the level of presence.

In generative computer art circles, emergence suggests that an authored system can become more than the sum of its parts on its own; however, the narrativity of generative systems explicitly implicates the audience in the fostering of emergence because they influence the system's outcomes and function as part of that system. Emergence is a by-product of the meeting of authored processes, textual worlds, and audience agency.

In narrative videogames, interaction is also related to a player's identification with their avatar and a sense of agency which requires a performative attitude. This attitude is not just a suspension of disbelief but a willingness to be an agent in the world, adopting its rules and even the social or political attitudes a character might express. This is referred to by game scholars as a "lusory" attitude (Suits 54-55), where rules and constraints are willingly adopted even though they may be arbitrary or irrational. Players are often left to slowly realize a virtual interpretation of the thought process of their characters, which changes with each iterative playthrough of the game.

As David Myers argues, "this replay process, an inescapable consequence of the formal properties of game and gameplay, ultimately carries no meaningful reference to social institutions or cultural histories and may actively oppose any authorial intent to impose those (or similar) references during play" (18-19). Myers further claims that the "meaning-making processes evoked by game rules and procedures are incapable of functioning in parallel with those meaning-making processes most commonly associated with non-game forms" (ibid., 18). For games without narrative this may make sense; however, the presumption that narrative is some form of closure (Myers cites Bordwell's claim that "storytelling remains necessarily a form of "artistic tyranny (ibid., 19)) disregards much work done in literary and narrative theory wherein games and narrative appear rather complementary.

If gameplay is couched in narrative, there are dissonances between playstyle and narrative logic only when players choose to ignore or contradict their role in the narrative in favour of experimentation. Through these experiments, players learn more about the world through environmental storytelling, mood, dialogue, and other narrative elements (which replace description on the level of detail, if not on the level of figuration). Players also learn through mechanics, gameplay loops, and systems. None of these forces need be opposed to narrative, but rather narrativize the act of interpretation itself. Because narrative games are open to various approaches to the same set of rules, they are always in some manner

dependent upon player performance, decision-making, and meaning-making within a context not of the player's own creation (Voorhees “Play and Possibility”). This is what Vattimo refers to as being “thrown” into the artwork as a world. In *No Man’s Sky’s* original state, players were thrown into a world without purpose. The game’s endless loop was impressive in scale but lacked necessity: “a dead nature can give no reasons” (Whitehead *Modes of Thought* 184). Players were forced to search for reasons in a world which could not provide them, much like the mythical figure of Sisyphus who must roll a large stone up a hill each day, only for the stone to always roll back down the hill in the end: “*And I saw Sisyphus at his endless task raising his prodigious stone with both his hands […]” (*Homer *Odyssey* 11.13*).*

Sisyphus’s plight serves as the perfect analogy for the original experience of *No Man’s Sky*. Each planet in the game is a new day, and Sisyphus’ stone remains largely the same. In part, this similarity is found in the tension between the spatial infinitude of *No Man's Sky* and the constrained nature of the player's ability to clearly impact the universe. Players can go mining, flying, or spelunking *ad infinitum* but they can’t emerge beyond these processes. Similarly, Sisyphus can imagine great potential in the landscape around him, the top of the hill waiting for him, and the stone finally arriving there. But he is constrained by actuality: the landscape is beyond his reach, the stone always rolls back down, and he can’t escape until he’s reached the top. In *No Man's Sky*, players are given access to a variety of landscapes and are left to roll themselves upward. But this runs its course after an hour or two.

In future updates, this futility was directly attacked by the authorial filtering of the game’s systems. Just as you feel the need to turn the game off, an anomaly is detected by your ship. A figure named the Atlas arrives, a machine intellect that offers your character an objective: reach the center of the galaxy in service of the Atlas. Upon accepting this, your avatar embraces a prescribed path to the center of the universe in exchange for a sense of purpose. But this machine’s name is The Atlas for a

reason: the Atlas holds the weight of player expectation on its shoulders, at once an allusion to the mythical Titan and a self-aware commentary on the game's futility. Atlas is appropriately represented as a red, fluctuating geometric shape. Hope can take on many shapes, many forms. Accepting this path is akin to the acceptance of a faith-based structure, a religious guide along the way ("it demands worship. It demands obedience. It welcomes me, it knows what I am"). Accepting this is agreeing to follow a pathway, persuasively prescribed, which the game states is an offer of "the gift of true understanding." When you finally arrive, though, it is by doing more of the same. Upon reaching the end you birth a new star, or you help the Atlas birth a new galaxy which prolongs the game *ad infinitum*, all before being hurled back to another random planet to begin again and again.

Hello Games has worked hard over time to address this problem of futility, but in predictable ways. The game has been updated many times, adding more things to do in the form of stories, base building blueprints, and game modes. But these are just bloated elements of the process already in place, a broadening of an already-immense time sink: busy work. For example, the story update just described, "Atlas Rising", boasts "30 hours of story," where players are no longer random avatars but are rather part of a species called "the travelers," whose role is to explore the universe. The main storyline has you meeting a variety of new characters, such as Apollo, Artemis, and -null-. These figures represent motivations offered by the designers for multiple styles of play. Artemis, for example, is seeking other travelers to cure her loneliness; -null- wishes to see every planet possible; and Apollo likes money. These characters embody possible approaches to the game that players are invited to take on. Unlike the heat death of the universe, Hello Games attempts to expand their universe over time are efforts to bring more energy and life to it.

Game critic and designer Gareth Damian Martin, in their review of *No Man's Sky* for *Kill Screen*, argues that what "the team at Hello Games have created is not a universe without limits, but a series of

limits recombined to form an unforeseeable number of variations. You cannot find any planet in *No Man's Sky*, but you can find any variation of the game's limits of what a planet might be. To put it another way, *No Man's Sky* resembles the library of Jorge Luis Borges's short story Library of Babel" ("A Theater of Processes"). The comparison to Borges' Babel Library is apt, as the near-infinite permutation of his library/universe has a foundation (22 letters, a space, a full-stop, and a comma; books of 410 pages) that affords every possible combination within its constraints. Notably, each book in the Library of Babel is without question marks. It is up to the readers in the library to ask questions. *No Man's Sky* drops players, alone, into a generative world and expects them to create their own pathways or accept prescribed ones, just as in Borges' short story librarians create and apply structures and methods for approaching the hexagon they are working in. With too much room for interpretation and no resolution, the Librarians in the Babel Library lose their minds; in *No Man's Sky*, players tuned out and returned their copies.

Clearly, there are similar concerns addressed in Borges' Babel Library, *No Man's Sky*, and the myth of Sisyphus. Each is a story of constant process and little reward. Further, the futility of such a constant process is immediately apparent. But I argue that games gather their meaning from the interplay between designer prescriptions and player actions, and that games also appear Sisyphean since the attitude of Sisyphus shapes the myth's meaning. Does he smile in acceptance? Or is he aimless, empty, and undermined? Philosopher Richard Taylor's argument that "meaningful existence [...] is inseparable from the concept of creativity" ("Time and Life's Meaning" 681) suggests that if Sisyphus were to roll stones up a hill with the intention of creating a religious temple, it would have meaning for Sisyphus himself. Likewise, the librarians of the Babel Library ask questions and theorize while the player in *No Man's Sky* brings their subjectivity to bear on the world in how they "play off" the prescriptive code of the game.

This emphasizes that the environment in *No Man's Sky* is a series of systems interlocking to produce novel outcomes. Alfred North Whitehead argues that the universe is subject to an impulsion towards creativity, a "creative advance" (*Modes of Thought* 200) because every interaction is part of a long causal chain of prior interactions. In *No Man's Sky* we are shown a universe created from the admixture of random elements--or, as it is often stated, "assets"-- which are mixed so extensively that difference is formulated through sameness. Something new is born, making each space in the game both eerily similar and, paradoxically, unique. This is not simply representational, but rather mimetic of a materialistic and emergentist stance on cosmology. In this view, life is generative more so than creative. Iteration, recursion, and re-production shape the world and our experience of it.

This stance leads, naturally, to some questions about meaning. As Mark R. Johnson ponders in relationship to PCG methods, players are asked the same questions as authors in PCG worlds: "How might randomness be given meaning? Can the placement of elements of a procedurally generated game ever have the kind of meaning present in other games, especially those notorious for deep narrative significance in the nature and location of every component[?]" ("Meaning" 301). As Johnson concludes, the answer in the context of No Man's Sky is related to the interrelationship between authors, players, and systems who interact and recursively reflect each other: in this fashion, "Meaning is fundamentally created through the connection of otherwise disparate elements" (ibid., 302). Though over time *No Man's Sky* has evolved significantly, this original crisis of purpose shaped the game's future narrative situations. The game's iterative structure became its narrative structure and players were thrown into a constant loop without being given a meaningful reason to keep going.

If we imagine Sisyphus rolling stones up to build a religious temple, like Richard Taylor argues, does this truly give his task a sense of "meaning"? And, further, is this actually something that involves narrative? Discussions of agency in video games typically get lost in discussions of power and change,

but power is merely “the compulsion of composition” (Whitehead *Modes of Thought* 162-163). It might be helpful, instead, to think about this agency in relationship to the idea of presence, which is to some degree “the drive towards aesthetic worth for its own sake. All power is a derivative from this fact of composition attaining worth for itself” (ibid.). In games, agency often refers to the dialogue between players and the game's world; agency is the feeling that there is a causal chain between player action and the environment's reaction. This suggests that presence inside the system changes the system in unexpected ways. The world constrains what players can do while also encouraging them to test the limits of what is possible, again suggesting that by playing one becomes implicated in the creative advance of the generative system.

In *No Man's Sky*, this manifests in a variety of approaches which are user-generated or user-specific. Two primary examples of this are expressed in Andrew Reinhard’s monograph, *Archaeogaming*. Narrating the formulation of an in-game code of ethics for conducting an ‘archaeological survey’ of *No Man’s Sky*, Reinhard and his team produced a procedural approach to gameplay which other players could model. The code of ethics, released on the “archaeogaming blog” before the release of *No Man’s Sky*, is as follows:

> In brief, the Principles require archaeonauts to:
>
> 1. Act consistently with the in-universe public interest, protecting worlds, human and nonhuman people and animals, and their societies and cultures and, where possible, not interfering with the normal development of societies and cultures by introducing knowledge, strength, or technologies more advanced than their current levels.
> 2. Advance the integrity and reputation of the Survey consistent with the public interest.

3. Maintain integrity and independence in their professional judgment.

4. Release data publicly and publish in the public interest, in line with open-access principles, unless this conflicts with Principle 5.

5. Ensure the integrity of archaeological sites, humans and nonhuman people and animals, and archaeological artifacts where possible; work to ensure good stewardship of sites, peoples, and artifacts; and avoid and discourage activities that enhance the commercial value of archaeological artifacts. Interaction with artifacts in order to progress according to game mechanics is permissible; destruction or sale of artifacts for profit is not.

6. Only act against another human or nonhuman person or animal in self-defense where no other option is available (including avoidance of and/or escape from potentially hostile situations, and self-terminate with respawn) (Reinhard 204).

While many of these approaches could be applied to *No Man's Sky* in its original form, there were of course others which were not relevant until much later in the game's lifecycle.

A second key example of this is the creation of player-run Galactic Civilizations, groups which were formed before the game featured in-game multiplayer. Collaborating over the internet in discussion forums and message boards (and, after several years, in-game), these groups host their own competitive games, build home planets, and generally work together to create something meaningful or significant. In earlier versions of the game this was not possible or, at least, it was not possible within the confines of the game. In the beginning, multiplayer was not functional; later, players could see nearby users as little wisps of light (suggesting that, finally, they were not alone); now players can play with friends or join strangers on various missions. This further interaction between players as "entities" allows much

more expansive travel across the universe of *No Man's Sky*, allowing them to witness interesting new sites and reach planets they could never reach before. These communities provide services such as an "Uber" for players unable to reach the home base of a civilization and, most interestingly, these communities can even be victimized by dramatic environmental changes, being forced to migrate to new worlds after updates change weather systems. As Andrew Reinhard narrates, this is the first example of

> a [digital] climate-induced mass migration of thousands of people. I wonder who they are and what they left behind in their haste to evacuate the planet for another star system. Over the next few days I make my way to their abandoned, icebound homeworld and see the memorials they left as they said goodbye. *No Man's Sky* is the first video game to feature an accidental catastrophic event that forced human players to flee en masse (1).

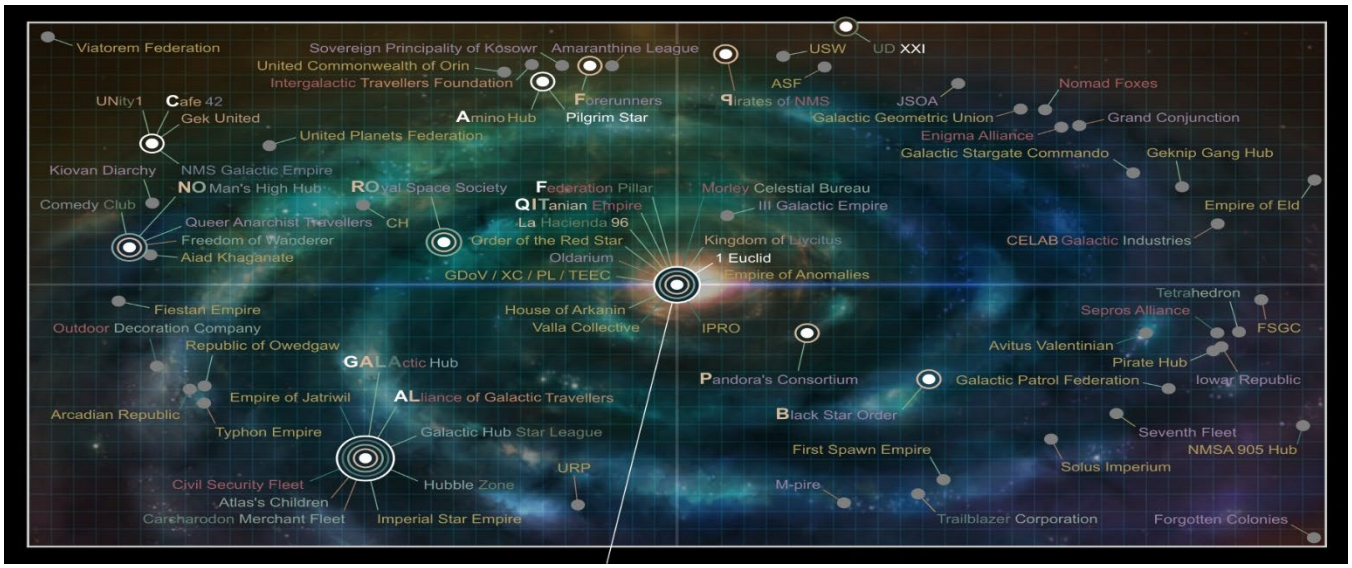


Figure 5.4—A Community-made map of Civilized Space in *No Man's Sky*[106]

[106] See: https://nomanssky.fandom.com/wiki/Map:Civilized_Space_Euclid_Map.

Conclusion

Procedural Content Generation has received a particular reputation in discussions of narrative video games, namely because of the intrinsic relationship between narrative and the notion of authorship as authorial, rule-bound, and authoritative. While these texts may feature some basic frame narrative which motivates player decision-making, they are not properly narrative because they produce unexpected outcomes due to the system's displacing of the author's decision-making. While this produces several core issues regarding the nature of authorship—namely the issues of interpretation and reception as a historical, situational matter—, the overarching paradox of narrative as being "too authoritative" while games are characterized as being "rule-bound" again suggests nothing but an affinity between games and narrative. This viewpoint on authorship and narration is challenged, particularly in the conception of authorship as a type of filtering. Through filtering, the relationship between the combinatoric systems enacted in PCG designs and the experience of the player likewise becomes one of hidden influences which are expressed in the veiled decisions of these limited systems and their superficially infinite possibilities.

Another reason for the problematic reception of PCG games lies in the fact that most game developers use PCG methods as a means of producing game assets quickly and cheaply. Unquestionably, producing video games is expensive, interdisciplinary, and demanding. Regardless, the superficial, capital-oriented aspect of PCG adoption veils a deeper "significance" regarding the nature of generative systems: their capacity to grow, adapt, and proliferate over time and in space.

Considering recent trends in the development of games, including the adoption of aggressive marketing strategies and micro-transactions, this superficial model of capitalist production appears even more cynical than previously considered. In the era of procedurally-generated content, unfinished games are released at full price before they have even been fully developed or conceptualized, meaning that they are updated slowly over time, becoming more persuasive simulations which incorporate more

inclusive, more captivating, and more targeted narratives, algorithmically adapting to each player's behaviours, wishes, and desires. While theoretically interesting, this model produces a disparate array of player experiences: many games are released in broken, relatively unplayable states and slowly "grow" into a completed work through many iterations and filterings of the procedural system over time. Thus, generative games produce a meta-narrativized "fear of missing out" around each iteration of the game's growth and inevitable entropy, which keeps players deeply involved in a game's lifecycle for well over a decade[107]. This paratextual development itself suggests a narrative arc in terms of a game's lifecycle; further, this extra-diegetic lifecycle recursively reflects back on the diegesis, as stories are added and filtered into desirable, seemingly-organic arcs in each new iteration or "season" of the game. As such, the cynical or purely practical decision to adopt these systems fails to veil the quantitative, emergent nature of systems which accounts for their capacity to accumulate interactions and "grow" over time. This growth informs a generative games' ability to impose meanings on the player, while simultaneously encouraging the audience's active participation in the text's perpetually ongoing unfolding. Ultimately, the potentiality and particularity of a system's subsequent emergence and decline over time become the primary story arc, even in this more cynical model.

No Man's Sky simulates an endless series of unique, lifeless worlds into which players are thrown, forcing them to learn to dwell within them. Players are given access to numerous sub-systems, such as breeding animals, refining materials, and building trade routes, which are fractals—self-similar reflections across different scales—of the textual ecosystem as a whole. In this sense, players are given the capacity to organize the database of materials to tell their own stories by way of this selective, recombinatory capacity. Much like *Hopscotch*'s Horacio Oliveira attempts—from within the

[107] Or the situation might be the exact opposite: a game like Valve's *Artifact* (2018) may be updated and lose its entire fanbase after a single iteration. Once this audience has been lost, many developers—after pouring millions of dollars and hours of labour into their game—abandon their works. There is much research left to be done on this 'graveyard of ungrown games'.

database/archive of Morelli—to select from his memories and recombine them with different interspersed 'raw materials', the audience of *No Man's Sky* is consistently reminded of the structure of the framing textual system and given the means by which they can manipulate this framework to continuously dwell within this ecosystem, manipulating it to generate their own narrative situations. Players thus experience the "novelty of feeling by the entertainment of unexpressed possibilities" (Whitehead *Modes of Thought* 36), suggesting that the act of **playing** is a hermeneutics aimed toward "diversified worthwhile experience" (ibid., 43).

By examining this underlying tension between authors, systems, and players in generative games, I have attempted to develop an interpretive framework which accounts for the interaction between human and non-human systems in *No Man's Sky* as an emergent, procedural relationship akin to a collaborative database narrative, one which comprises both the diegesis created by the authors and the emergent narratives of players. This has been done here by examining the environment of *No Man's Sky*, namely the game's spatio-temporal structure as an endless series of *mise en abymes*, which unfold as a dynamic feedback loop, a structure which suggests a structural evolution of the *mise en abyme* as a situational generator. The question of whether or not these emergent narratives constitute narrative can thus be repurposed by the definition of generative systems which accounts for their narrativity, which emerges from the procedural relationship between author, text, and player. I have examined the ways in which players have influenced, through their approaches to the game's environment, the development of the game into a 'living' universe. Finally, I observed how these different playstyles bring life—in the form of willing players who continue to play the game—to the universe of *No Man's Sky*, emphasizing the relational, procedural nature of generative textuality.

The implications of the narrativity of generative systems—which rather literally concerns the sum-total of the games' filterings, playthroughs, and combinations—are especially provocative in light

of rapid developments of data-processing technology and machinic intelligences. Although PCG systems do not function like conceptions of Artificial Intelligence (AI) in the contemporary popular imaginary, they nonetheless can be seen as a reflection of the structure of AI as it *actually* operates. Like all computational systems, PCG and AI systems are not independently autonomous; rather, they heavily rely on the procedural interaction between users, systems, and designers to generate the input which these systems draw from and interpret the output of datasets they produce. In this fashion, complex patterns heretofore hidden from the human eye (due to their extensive reach and expansive scale) are now made visible through the processing and interpreting of human-generated data, yet another example of how these systems are deeply dependent on continuous human interaction and mediation. The scale and scope of such pattern recognition—grand and far-reaching though it might be—is not autonomous, independent, or 'intelligent'; rather, these systems are heavily mediated, co-dependent, and statistically (and, thus, 'cognitively') average.

This discussion of *No Man's Sky* also argues that players are producing new and unforeseen ways of experiencing the game, telling new stories collaboratively with and without (and sometimes against) the developers' intentions. What emerges from these new stories is something generative systems specifically afford: once designed and filtered by the author, the game's system accounts for truly open-ended behaviour. In response to this, players, through their dwelling within the environment, expand it through experimentation and interaction. This tension is the specific aesthetic model for a generative game which is both infinitely extended in scale and, simultaneously, limited in terms of its expression of this scale. This is, as Whitehead notes, a fundamental tension between infinitude and finitude: ultimately, while "we can never understand a composition in its full concrete effectiveness for all possibilities of environment" (*Modes of Thought* 83), we must likewise acknowledge that "all the inter-relations of

matters of fact must involve transition in their essence" (ibid., 200). *No Man's Sky* represents this transition in the dynamic, feedback-like relationship between authors, system, and players.

Conclusion—Narrativity, Generativity, and Ecosystem: Generative Systems and Relational Narratives

"*In this drama of intimate geometry, where should one live? […]. Space is nothing but a horrible outside-inside*"—Gaston Bachelard, *The Poetics of Space*, 218.

As the case study examples from the three previous chapters clearly show, generative art theory involves any artistic practice where an artist uses external systems (rules, algorithms, organic processes) to help 'complete' an artwork. This definition has proven usefully open-ended in this dissertation, allowing for a more targeted reflection on **the narrativity of generative systems as the result of the tension between authorial inputs, designed system, and audience agency, which influences the process by which a generative artwork is constructed. In this sense, authorship, agency, and emergence tie directly to the narrativized movement from conception to production, production to expression, expression to reception.** This model offers a means by which to examine the generative elements of an artwork as the elements which render the artwork into a spatial-temporal ecosystem, rather than an examining whether or not a work qualifies as generative in a broader or more categorical sense. This of course introduces a second, equally complex theoretical problem: namely that, within these broad parameters, most—if not all—artworks are generative in some capacity. In this more open sense of generativity, any artwork can easily be reimagined as an ecosystem in which narrative 'forces' unfold and produce tensions between author, text, and audience. Even to the degree that an artwork's materiality itself inscribes a certain process of conception, production, expression, and reception, as in the case of sculpture, painting, photography, film, literature, and so on, the constraints implied in any material likewise suggest a certain intrinsic systematicity.

To resolve this open-endedness without ignoring generative insights from the past—a potential

limitation of notions of 'pure' generativity in computational models—I have suggested we rethink the generative artwork as a narrativized process which unfolds across the continuum of authorship, agency, and emergence. This model is useful not only because much of generative theory contests with these three concepts in particular, though it certainly does; rather, it allows for a more algorithmic approach to criticism and comprehension which aligns more closely with textuality in the computational society we find ourselves in today. In this sense, the computational demand for a 'pure' generativity becomes something more like a 'genre' of generative art praxis rather than the whole of generative praxis. This genre involves the auto-reflexive theorizing of generative approaches described by critics who are also generative artists, as well as the ongoing, mutually constitutive interactions provoked in the meeting between authors, audiences, and systems in those works. The tenability of this genre, as I have argued, is somewhat tenuous if taken as the total culmination of generative theory; it functions best as a smaller sub-section of the discussion of generative approaches to textuality, more radical in its claims and, perhaps, its structuration. At the same time, systems-oriented or generative interactions now unfold in real time, a given quality of our current technological moment in which virtual and real spaces are increasingly infolding; as the architecture of daily experience continues to incorporate the internet and cyberspatiality to unprecedented degrees, the demands for an increasingly procedural and real-time understanding of the relationship between authors, audiences, and texts is logical.

In the previous chapters, I have shown that literary generative systems feature complex processes—algorithms of conception, production, expression, and reception—in their own right. Nonetheless, there is one clear limitation in literary examples and, by extension, in questions of the 'literary machine' that so greatly concerned authors of the Oulipo such as Italo Calvino. The spatial and temporal dynamics of a real-time ecosystem is a representational problem that print literature can strongly emulate but never truly overcome: reading time cannot and will not correspond to narrative

time, nor author time to reader time. This drastically differentiates literary and computational forms of generativity along each of the dimensions of authorship, agency, and emergence. Surely, an author can perform a durationally prolonged kind of filtering by incorporating responses to a book's readership and reputation in later editions; ultimately, however, this renders a book into a distinct text, as many cases—such as Whitman's *Leaves of Grass*—have shown.

This is naturally different in the case of digital literary authors who can facilitate an ongoing, real-time dialogue with their readers and consistently revise or filter their writing. In a popular example of this contemporary, dialogic relationship—Mark Z. Danielewski's *House of Leaves*—the serial release of chapters of the book onto online discussion forums is meta-textually incorporated into later sections of the novel when the protagonist Johnny Truant meets a band from Philadelphia who has already read his as-of-yet-unfinished manuscript. The band shows Truant a copy of the manuscript full of their own marginalia; reading their notes ultimately allows Truant to resolve the manuscript's complications and complete it, a direct reflection on the novel's own writing process. Regardless, it is unlikely (though perhaps not impossible) that an author can revise the published version of each of their digital literary works with an over-the-air update. Nonetheless, while such an update may be possible technologically, it is not the norm for literature to receive regular content updates which change the nature of the text. This was in fact, as distinctions painted in Chapter 4 show, originally one of the major benefits of written literature. Thus, while it is undeniable that literature and video games are comparable in terms of generators and narrative approaches, it is clear that these media feature several major distinctions when it comes to the narrativity of generative systems, both for authors and audiences alike.

Video Games, unlike literature, are almost always a compounding of narrative and player time: the narrative unfolds and is quite literally changed by the player's approach to playing. In video games,

these changes are decidedly literal, while in literary senses this is often in the realm of interpretative license (though, as *Hopscotch* shows, not always). Games are now regularly filtered by designers over time—to the degree that this is expected by consumers—which produces a sense of dynamism in the text as it changes subtly over its lifecycle. This dynamic textuality, conversely, produces certain limitations which are less concerning for older artistic media: as my use of the term 'lifecycle' in the previous sentence implies, once a video game's online servers have been closed and the authorial filtering ends, a video game often fades into obscurity or becomes literally unplayable.

As Umberto Eco observes in *The Open Work*, "[in] every century, the way that artistic forms are structured reflects the way in which science or contemporary culture views reality" (13). Considering this statement, the ubiquity of generative methods in artistic works throughout history suggests an underlying philosophical ground regarding the nature of creativity proper: through novel combinations and alignments, previous arrangements are brought into new contexts and rendered novel through these changing arrangements. As such, the development of kinetic and generative art in contemporary artistic practice suggests a likewise fundamental trajectory regarding the physical problem of "'possibility'" as it is represented in current discussions of physics, particularly considering the complex, combinatoric interplay across and between macro and micro scales of perspective. The contemporary discussion is, naturally, significantly more open-ended in that it requires to a greater degree the involvement of audience agency: the physical universe's dimensions are spatio-temporal and time is entirely relative to one's spatial positioning. Therefore, the spatial rendering of generative systems—the contemporary prioritizing of spatial narratives rather than temporal ones—opens textuality to a discussion of "potential" narratives; this is, therefore, an opening of narrative discourse to the "relational" quality of narrative which has always been latent in the notion of authorship as a type of performative growing of textual elements into relationships (or ties). This aligns with what Jonathan Zittrain argues is the central

concern of generative systems as they operate in the world in general: they "are built on the notion that they are never fully complete, that they have many uses yet to be conceived of, and that the public can be trusted to invent and share good uses (*The Future of the Internet—And How To Stop It*, 43).

Noting a similar trend in the music of Karlheinz Stockhausen, Luciano Berio, and Henri Pousseur—as well as the writings of Franz Kafka and James Joyce—Eco observes that works are becoming less and less authoritative in their structure; rather, these "unfinished" open works have become increasingly significant throughout the 20th century, offering a novel approach to structuring an artwork based on plasticity and "mutability which is always deployed within the specific limits of a given taste, or of predetermined formal tendencies, and is authorized by the concrete pliability of the material offered for the performer's manipulation" (19-20). Effectively, in terms of the work of Stockhausen, Berio, and Pousseur, the composer offers the performer "considerable autonomy […] in the way he chooses to play the work" (1). In James Joyce's *Finnegan's Wake*, likewise, the polyvocality of the work, its rendering in and across multiple languages and linguistic codes, offers readers the opportunity to forge new linkages or forage for new relationships across the work. Eco refers to this type of artistic work as "the work in movement" because it "offers the interpreter, the performer, the addressee a work *to be completed*" (19). This trajectory is represented by the emphasis on potential or "possibilities which the work's openness [or its unfinished state] makes available" which is made "available" by the author who exposes the audience to "a given *field of relations*" (ibid.). Borrowing the language of contemporary science, Eco observes the complex relationship between spatial, temporal, and cultural perspectives on the world and how forms of textuality are capable of representing these relationships.

The ubiquity of computational and linguistic generative structures in contemporary artworks likewise speaks to current theories in science, trends in popular culture, and developing models of

human consciousness. Put differently, generative structures are not only relevant for generative practice. This can be understood by observing how a **narrativized** notion of generative artworks justifies many of the explicitly stated goals of generative artists. For members of the Oulipo, Nouveau Roman and the New Tendencies, this was a formative aspect of their generative approaches, producing the constraint-oriented, anti-commitment, and informational environments emerging from within these groups respectively. These approaches to the literary were political, inasmuch as any scientific, technological, or cognitive approach to contemporary life in post-war France (say, for the nouveaux romanciers) and late-capitalist society (for the New Tendencies) could be thought of politically.

Thus, the camera-eye reflected in Robbe-Grillet's *choisisme* shows this strong tendency to open texts up to a variety of interpretations, to allow the reader to choose for themselves rather than following this or that dogma. Consider the introductory passages of Robbe-Grillet's novel *In the Labyrinth*, in which the text's environment—a room with a table, covered in dust, where the outlines of objects tell a story by means of their absence (or their having been moved to another location in the room)—is described. This description is contradicted immediately afterward, though never definitively. Robbe-Grillet's narration opens the singular, outlined object into a range of several possible objects depending on one's vantage point:

> To the right, a simple shape that is vaguer, already covered by several days' dust, can nevertheless still be recognized; from a certain angle it is even distinct enough so that its outlines can be followed without too much uncertainty. It is a kind of cross: an elongated main section about the size of a table knife but wider, pointed at one end and broadening slightly at the other, cut perpendicularly by a much shorter crosspiece; this latter is composed of two flaring appendages symmetrically arranged on each side

> of the axis at the base of its broadening portion—that is, about a third of the way from the wider end. It resembles a flower […]. Or else it might be an approximately human statuette […]. It might also be a dagger (*Two Novels* 143).

Robbe-Grillet's description of "potential" objects—objects no longer present and yet the residue of their semiotic potential remains in the formal outlines of dust on the table—is highly relativistic in the Einsteinian sense of the term. Ironically, it is impossible to determine what these objects were, despite the narrator's claims that the objects' outlines "can be followed without too much uncertainty". This absence of the object, then, is a call for the audience to fill the gaps in the text in much the same way that the narrator's shifting declarations of the object's shape are attempts to declare the object's 'objectivity', its autotelic capacity to behave as 'a thing in itself'. It is a call for acknowledgement of the fundamentally relativistic universe in which human beings project meanings onto otherwise indifferent, indiscernible surfaces.

Similarly, the works found in the New Tendencies' exhibitions were formulated around theories of involving the audience in significantly greater ways, particularly aiming to prepare contemporary publics for the age of information and cybernetics. The concern that cybernetics—the science of 'control' over processes—would overwhelm and mislead the masses is palpable in the writings of Abraham A. Moles in particular. Along these lines, Moles argued for a reconceiving of the artwork as inherently **non-auratic** and **non-eidetic** in late capitalist frameworks: "[the] essence of the work of art is to be found now in the *copy*, not in the *original*. The segregation of creative artists, who speak, from consumers, who listen or who merely receive passively, has put the final touch to the dominant fact of our time: cultural alienation" ("Experimental Aesthetics in the New Consumer Society", 300, my emphasis). This renegotiated, 'inauthentic' art demanded, therefore, a reconsideration of the work of art

as a kind of communicative information: "[the] process of creation and reception of a work of art became a special case of communication. The artist created messages, which the viewer then received. 'Thus, the work of art was then construed as a message or, more precisely, as carrier of particular, namely, aesthetic information'" (Rosen 31).

In a similar manner to the *choisisme* of the nouveaux romanciers, the New Tendencies' approach to this communicative, informational aesthetics was rooted in the prioritization of the various 'receivers' of an artwork: because "[the] work of art is a system of 'sensory qualia' belonging to the spatiotemporal world […] [it] is therefore entirely natural that in our critical research we should turn to our senses" (Molnar and Morellet, "For a Progressive Abstract Art", in Rosen 140). This reliance on the communicative aspect of an artwork, which is the relationship between "system" and "receiver" (who in this case could be the author, "aesthetician", or audience), means that it is critical to outline the role of the receiver. This is because, "[theoretically], we could imagine all sorts of receivers" whose understanding of the work might vary infinitely according to "any arbitrary criterion" (ibid., 141). In this perspectival, subjective sense the receiver of an artwork reveals the fundamental role of reception in the artwork as a system, namely because "[the] perception of form […] depends both on the stimulus and the 'setting' of the receiver, in this case, the spectator's eye" (ibid.). Thus, because "our eye is not just some nondescript optical receiver with a constant sensitivity, set once and for all, but is strongly influenced by every facet of our individuality […] our perception of form also depends to a great extent on social factors" (ibid.). As such, for this informational aesthetics, "the basis of all aesthetic pleasure is to be found in the work, or more precisely, in the reciprocal relationship between the receiver/eye and the stimulus/work" (ibid.).

This emphasis on the generative artwork as a kind of "reciprocal" aesthetic process between author, system, and audience is fundamental in the majority of generative works, as I have shown

throughout this dissertation. In the case of a purely generative artwork which prioritizes the textual system exclusively, the mystified and autonomous system often proves incomprehensible, alien, and potentially meaningless for the audience and thus is an artistic refusal of this reciprocity. The audience, as the New Tendencies movement suggested, might be incapable of observing the artwork and receiving it properly: while this might produce a unique and worthwhile aesthetic experience, it might also be impossible for audiences to interpret this experience.

Conversely, the socially ubiquitous presence of generative structures in contemporary human experience becomes a component of the rhetorical situation of narratives beyond the technical, objective domains prized by generative artists. The narrativity of generative systems, therefore, is an expression of this paradigmatic shift toward a model of the universe as fundamentally processual and relational. As such, the affirmation of the generative structure of life itself becomes navigable, narrativized, and experientially meaningful in ways that the purest examples simply cannot. Thus, beyond individual case studies of texts which utilize generative systems or linguistic/situational generators, it is crucial to examine the many ways in which generative art praxis is becoming more central—potentially even paradigmatic—in modern life and, as a result of this shifting paradigm, how generative methods and meanings warrant deeper analysis than the niche goals of purely generative art can offer.

The emphasis on the combinatory aspect of artistic creation described through this dissertation, then, might continue to be considered only technically, though these technical applications nearly always serve grander, more philosophical aims beyond raw technique, as I have shown. It is hardly a coincidence, then, that each of the object texts analysed in this dissertation include metaphysical, spiritual, or religious figures as core underlying structures for their narratives. The open-endedness of these structures—and their fundamentally metaphysical quality, which constrains them within a given value system or context—is appropriately described in Aldous Huxley's examination of the tension

between infinitude and finite particularity in artistic representations, especially his considerations of Renée, the subject of Marguerite Sèchehaye's influential *Autobiography of a Schizophrenic Girl*:

> [and] then there is the horror of infinity. For the healthy visionary, the perception of the infinite in a finite particular is a revelation of divine immanence; for Renée it was a revelation of what she calls 'the System,' the vast cosmic mechanism which exists only to grind out guilt and punishment, solitude and unreality […].

Building on this notion of the system, the open-endedness of generative structures speaks to the increasingly reified quality of mundane human interactions described by Nicolas Bourriaud in his *Relational Aesthetics*:

> The ideal subject of the society of extras is thus reduced to the condition of a consumer of time and space. For anything that cannot be marketed will inevitably vanish. Before long, it will not be possible to maintain relationships between people outside these trading areas. So here we are summoned to talk about things around a duly priced drink, as a symbolic form of contemporary human relations. You are looking for shared warmth, and the comforting feeling of well-being for two? So try our coffee... The space of current relations is thus the space most severely affected by general reification. The relationship between people, as symbolised by goods or replaced by them, and signposted by logos, has to take on extreme and clandestine forms, if it is to dodge the empire of predictability. The social bond has turned into a standardised artefact" (2).

As such, a relational aesthetics, one which concerns "an art taking as its theoretical horizon the realm of human interactions and its social context, rather than the assertion of an independent and private symbolic space), points to a radical upheaval of the aesthetic, cultural and political goals introduced by modern art" (ibid., 5). This notion of the artwork as a kind of "social interstice" (ibid.) can help contextualize generative aesthetics and the ways in which such an aesthetics fosters procedural interactions between authors, audiences, and systems. An examination of the narrativity of generative systems, therefore, modifies the previously 'objective' or 'neutral' stance of generative artworks to the degree that critics can observe how generative approaches—especially that of *mise en abyme*—appear to shrink the distance between the inner and outer levels of the text. It is, perhaps, exactly this permeability between outside life and inner text that generative design affords an artwork, giving it the capacity to "[*tighten] the space of relations*" (ibid., 6) between authors, audiences, and the artworks they collaboratively and simultaneously dwell within.

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