Convergence Lines: A Musical Distillation of Thomas Pynchon’s V.

Christopher Trapani

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ABSTRACT

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Christopher Trapani

This dissertation consists of two parts: Convergence Lines, my twenty-four-minute composition for ten instruments and electronics, and this subsidiary essay. Convergence Lines was written in 2013 to commemorate the 50th anniversary of the publication of Thomas Pynchon’s V. At the center of this discussion is my creative process in imagining a musical corollary to Pynchon’s fictional world: his large cast of vivid characters, far-flung settings, and disjointed sense of time. I also detail my attempt to fashion a formal parallel to the novel’s unorthodox structure of two independent strands of narrative that converge towards the end. I discuss the role of allusion in Pynchon’s work and in my own, and the various points of reference the music is meant to invoke. A second important topic is the role of electronics in the composition, presenting both a technical analysis of the tools employed and an aesthetic perspective, considering how the intrusion of non-acoustic sounds mirrors a central theme of V: the gradual replacement of the animate by the inanimate. The thesis endeavors to explain from a composer’s perspective, and in an integrated, organic manner, the poetic, musical, and technical aspects behind my work.
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www.christophertrapani.com/wordpresssite/thesis-media-examples/
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Convergence Lines was commissioned by GRAME in conjunction with a specific European program: the New Forum Jeune Création, and premiered 23 January, 2014 by the Ensemble Orchestral Contemporain under Pierre-André Valade at the Ultraschall Festival in Berlin. Repeat performances were given on 4 February, 2014 at de Singel in Antwerp, and 7 March 2014, as part of the Biennale Musiques en Scène in Lyon.
INTRODUCTION

The use of multiple threads of narrative, of stories told from diverse and even conflicting perspectives, has been a familiar literary device since the onset of the twentieth century. Since at least as far back as *The Sound and the Fury*, readers have been asked to follow nonlinear narratives by interpreting in retrospect—to read on a sensory surface level first, trusting that order and sense will emerge later. Moviegoers have long become accustomed to films that subvert linear conceptions of time; scrambled timelines, now a stock cinema technique, can be found as far back as the silent film era.

In contrast to other art forms, music seems to rely far more heavily on a long-established model of exposition and development. A memorable idea is presented, then elaborated in a process that is almost always unidirectional. To some degree, this type of exposition, establishing a signpost and procedures of recall, might be necessary, germane to a time-based medium. But is the listener’s ear really inherently less capable than the reader’s mind of retrospectively deducing an order from events presented in a non-linear fashion?

Similarly, the ideal of the inherent cohesion of a musical composition has held a particularly tenacious grip. The notion that each new piece must define a “sound world” at its outset, drawing lines around permissible language and timbres, persists
across otherwise impermeable stylistic boundaries. Jonathan Kramer, in his essay “The
Nature and Origins of Musical Postmodernism,” bemoans

the notion of musical unity, cherished by traditionally minded composers as well as by critics, theorists, and analysts. For both antimodernists and modernists, unity is a prerequisite for musical sense; for some postmodernists, unity is an option. I believe that unity is not simply a characteristic of music itself but also a means of understanding music, a value projected onto music. As such, it is necessarily demoted from its previous position of universality. It is no longer a master narrative of musical structure. Many postmodern composers have accordingly embraced conflict and contradiction and have at times eschewed consistency and unity. Similarly, postmodern audiences do not necessarily search for or find unity in the listening experience. They are more willing to accept each passage of music for itself, rather than having—in accordance with the strictures of modernist analysis and criticism—to create a single whole of these possibly disparate parts (7).

“We are accordingly lost to any sense of continuous tradition,” as one of
Pynchon’s characters puts it (V., 156). On a cognitive level, I would agree that in
relinquishing a degree of attention devoted to structure and meaning, whether speaking of a novel or a piece of music, the focus of a work shifts more onto the momentary and by extension the sensory, lending a greater weight to superficial details in the listener’s or reader’s experience.

In V., a work deliberately designed to resist total apprehension, or any rewarding sense of loose ends being neatly tied up, this emphasis on the ephemeral is palpable, and the reader’s experience has been categorically altered. One is expected to take in the scenery, to linger on momentary passages, to cherish fleeting impressions without the

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burden of searching for underlying cohesion—a quest thwarted in advance by the author. “I advocate surrender to Pynchon; letting your mind toss on the wild currents of his language is a lot more enjoyable,” argues Alexander Nazaryan, “than treating his novels like puzzles, wondering where the pieces fit: Who is Rachel Owlglass? Why are we in Egypt? Just enjoy the bumps—or try to.”

Part of the agenda of *Convergence Lines* is to similarly resist restriction to a predetermined palette. Readers of *V.* should be surprised by its shifts in setting; even if they become acquainted with the device after a few chapters and come to anticipate changes of scenery, the pleasure of being transported through these unexpected turns should remain fresh. Similarly, listeners to *Convergence Lines* should feel they are being lured to unexpected places. One should feel vectors pointing in many directions, an abundance of allusion, and the manic excitement of drawing connections between seemingly unrelated details.

In other words, what I love about Pynchon is what drew me to compose in the first place: the potential for synthesizing disparate influences and distilling an idiosyncratic personal voice from these far-flung strands.

For as long as I have been composing, literature has exerted a significant influence. Perhaps my most longstanding preoccupation is the translation of certain literary parameters to sound, and foremost amongst these, the goal of tracing the formal
shape of literary works. To some degree, *Convergence Lines* follows a well-established musical practice, one most closely associated with the late Romantic genre of the tone poem: the attempt to portray an extramusical narrative through sound. Many of my works stop at this surface level of engagement, contenting themselves to evoke, for instance, the sensuous Alexandria of Cavafy (in *Past All Deceiving*) or the exotic landscapes of Paul Bowles (with *Difficult Places*). This Romantic veneer is certain present in *Convergence Lines* as well, an intended homage to the ambition and bombast often associated with the tone-painting tradition. Yet I would like to think, perhaps owing to my own academic background as a student of literature, that my work engages further literary concepts in a subtle and focused manner. I have also written pieces based on literary criticism (*Writing Against Time*, inspired by Michael Clune’s book of essays), collections of literary lectures (*Five out of Six*, whose movements follow the contour of Italo Calvino’s *Five Memos for the Next Millennium*), and prescribed poetic forms (*Half of Me is Ocean, Half of Me is Sky*, which follows the form of Wallace Stevens’ “Sea Surface Full of Clouds,” or *End Words*, a musical exploration of several sestinas).

*Convergence Lines* is not my largest-scale work, nor my most technically ambitious, and is far from my best-received composition—yet it seems like the best choice for the close examination of a dissertation because of the wide-ranging ground it covers. Emulating Pynchon’s over-the-top prose style and his large canvas, *Convergence Lines* is composed as an unabashedly ardent work that pushes beyond the confines one
might expect of its instrumentation, striving for an encyclopedic breadth. More importantly, I believe the piece showcases several dimensions of my recent work—a harmonic language, technological tools, and the incorporation of a wide range of source materials—all pursuits central to my doctoral study that have attained a level of development characteristic enough to warrant being documented.

Still, writing about *Convergence Lines* is a challenge. My goal is to set down a prose discussion that might do justice to its many diverse components by oscillating freely between literary, musical, and technical analyses. It is assumed that any individual reader may be primarily interested in only one of these angles of the work, and may find the digressions into literary atmosphere flighty, or the technical details boring. These two threads however, inextricably intertwined in the act of creation, are equally hard to separate on the page. Furthermore, it is important to me to include technical details in order to provide a snapshot of the state of computer music at this particular juncture. The paradoxically poetic dimensions of working with machines, an intrinsic part of Pynchon’s language (born out of his previous job as a Boeing engineer) are an equally essential element of my own artistic process.
CHAPTER 1: 50 years of V.

_Convergence Lines_ was conceived as a celebration of the 50th anniversary of the publication of _V_. Pynchon’s work has always appealed to me for its ambitious dimensions, for the encyclopedic nature of his writing—his propensity for working on a grand scale, drawing together a large catalogue of vivid characters, far-flung settings, and a disjointed, malleable sense of time. But the real reason _V._ holds a special fascination for me is that it gives a glimpse of a young writer whose shell has not fully hardened, content to occasionally let his guard down and allow a spark of idealism to slip onto the page. Even though the outside world is crumbling, still, as Pynchon’s synopsis of Chapter 10 puts it, “various sets of young people get together.”

Though certainly less digressive on the whole than _Gravity’s Rainbow_ or _Mason and Dixon_—novels which more openly revel in luring the reader into quite possibly inconsequential diversions—_V._ does sometimes deviate from its main narrative, venturing into tangential storylines whose intersection with the main threads is tenuous. It is very much the point that these episodes may or may not advance the main plot, that the reader can never quite definitively unravel the mystery of _V._’s identity; we can almost feel Pynchon testing the limits of how far he can divert the reader in _V._, employing digression less as a prose technique and more towards structural means. In the words of the critic Tony Tanner, “the point is that by taking bits of history from different countries at different times during this century and putting them in the novel
with no linear or causal relationship, Pynchon is able to explore the possibility that the plots men see may be their own inventions (20).”

While Pynchon experiments with the nonlinear organization of time, the plot of V. cannot be encapsulated as a scrambled narrative. It is an oscillation between two sub-narratives, an idea descended from Ulysses and shared by contemporary novels like Julio Cortazar’s Rayuela (also 1963) and Raymond Queneau’s Les Fleurs Bleues (1965). More precisely, V. braids linear and nonlinear elements; the overall effect is of a disjointed novel with an embedded linear component. Forward-driving narrative has been framed as a nostalgic and anachronistic form, hearkening backward, reminiscent of various lost worlds depicted throughout the book.

CHAPTER 2: Structure, Setting, Plot

The basic structure of V. is remarkably simple to describe: two independent strands of narrative progress independently, converging towards the end of the novel. The first of these strands is rooted in 1950’s Manhattan, where we follow the misadventures of the “schlemihl and human yo-yo” Benny Profane and his cohorts—a band of post-war slackers known as The Whole Sick Crew. Events in this narrative strand (referred to throughout this paper as the Profane strand, strand A, or the odd-numbered movements) are presented in straightforward, more-or-less chronological episodes. There is not much of a propulsive plot in any classic sense, only a sequential
chronicle of the Crew’s misadventures, a deliberate choice made to reflect the aimlessness of Pynchon’s setting and characters.

The second thread features a second protagonist: Herbert Stencil, a fifty-something British adventurer, son of a distinguished diplomat. Stencil has embarked on a quest to uncover the identity of a woman mentioned in his father’s journals only by the initial V, a search through five decades of historical calamity that shapes the novels’ second strand (the Stencil strand, or strand B, or the even-numbered movements). The chapters that recount Stencil’s search jump freely through several eras of the past and multiple exotic locales—Egypt, Florence, Namibia, Paris, Malta—each a vignette with a new atmosphere and a sub-narrative of its own, loosely linked to the others only by a woman whose name starts with V, who may or may not be the same in each instance.

*Convergence Lines* borrows this basic narrative shape, slightly condensing the seventeen chapters into a structure of twelve parts, each of which lasts about two minutes. Odd-numbered episodes follow the New York storyline; generally up-tempo and rhythmically intricate, often foregrounding the brass, these movements are connected by shared material and sonorities, projecting a possible sense of development and forward motion. They often allude to music associated with the action of strand A, the popular styles of Manhattan in the 1950’s such as swing, jazz, bop, and salsa.
The strategy behind the even-numbered movements, on the other hand, is to deliberately avoid any attempt to preserve continuity. Rather, as with each change of scenery in Stencil’s search, the setting is recast with every new movement in strand B. Drawing on the novel’s fixation with travel-guide, Romantic exoticism, each presents a self-contained, crystallized world with a sonic palette of its own. Often this impression is reinforced by the electronics, whose focus shifts from piloting rhythmically precise interjections to creating collages of enveloping color in these expansive sections.

As the piece progresses, the boundaries between these two threads begin to blur; material begins to bleed over into adjacent sections as we approach movement XI., the point of convergence. This arrival marks the high point of saturation and recall, where timbres and gestures heard earlier in the piece resurface, contrasted against one another in close counterpoint for the first time.

**CHAPTER 3: Music and Postmodernism**

The question of how postmodernist strains of thought might be realized in music is not a straightforward one. It is hard to reach a consensus on what a definitive genre of postmodern contemporary music might even sound like. One on hand, many features we have come to associate with postmodern literary works have long been more at ease in musical contexts, such as a readiness to rework material from the past, or the blurring of distinctions between “high” and “low” art. But in other ways music seems reluctant
to adopt certain features of postmodernism that, by contrast, flourish on the page. The revered concept of structural unity has been particularly resistant. Even simple allusions to the canon are harder to accomplish in sound than in text. Reading a few lines of Shakespeare that have been transplanted to a contemporary novel is not the same as quoting a Beatles melody, since our aural impressions are tied to precise sonorities, often a particular record with the unique gestures of its interpreters. The act of listening to such a recording, even for just a few seconds, can of course trigger powerful associations—but whether this same cognitive effect can be reliably prompted by an identical sequence in a re-interpreted context is highly subjective.

Jonathan Kramer, in *Postmodern Music, Postmodern Listening* (9), sets out a list of sixteen criteria, a checklist of possible approaches—not all of which, he is quick to point out, need be embraced by every composer. Musical postmodernism, in his view:

1. is not simply a repudiation of modernism or its continuation, but has aspects of both a break and an extension
2. is, on some level and in some way, ironic
3. does not respect boundaries between sonorities and procedures of the past and of the present
4. challenges barriers between ‘high’ and ‘low’ styles
5. shows disdain for the often unquestioned value of structural unity
6. questions the mutual exclusivity of elitist and populist values
7. avoids totalizing forms (e.g., does not want entire pieces to be tonal or serial or cast in a prescribed formal mold)
8. considers music not as autonomous but as relevant to cultural, social, and political contexts
9. includes quotations of or references to music of many traditions and cultures
10. considers technology not only as a way to preserve and transmit music but also as deeply implicated in the production and essence of music

11. embraces contradictions

12. distrusts binary oppositions

13. includes fragmentations and discontinuities

14. encompasses pluralism and eclecticism

15. presents multiple meanings and multiple temporalities

16. locates meaning and even structure in listeners, more than in scores, performances, or composers

Within the admittedly constrained scope of this essay, far too short for undertaking such a large subject, I would like to hone in on four of Kramer’s criteria that strike me as particularly relevant, place them in a larger context, and discuss how they apply both to my work and to Pynchon’s.

**Allusion / Intertextuality**

Perhaps the work most consistently cited as the paragon of postmodernism in music is the third movement of Luciano Berio’s *Sinfonia*, a full-blown sonic venture into intertextuality. Starting with an almost complete quotation of the third movement of Mahler’s second symphony, Berio grafts layers of quotation—both music and text, sung or spoken by the five voices in front of the orchestra—onto Mahler’s *scherzo*. Citing texts by Beckett and Lévi-Strauss, borrowing passages of orchestral music from Ravel, Brahms, and many others, and asking the singers to insert the names of the conductor and other pieces on the evening’s program, Berio infuses the movement with several spiraling layers of meta-commentary. Without wishing to detract from the genius of
Sinfonia, Berio’s most extensive foray into postmodern themes, the idea of reworking established material often resurfaced in his creative process; many other admirable examples can be found in his catalogue, such as his brilliant approach to reconstructing Schubert in Rendering, to transcribing folk song in Voci, and to creating a bifurcating structure by interweaving imagined folk songs and a Neruda setting in Coro.

Another novel and more recent approach towards incorporating the past can be seen in the work of the French composer Gérard Pesson, who has developed an idiosyncratic technique of recomposing favorite pieces from memory, filling in the blank space of forgotten passages with sculpted silence or noise sounds. Applying this treatment to Brahms (in Nebenstück), Berlioz (in Panorama, particolari e licenza, which nobly attempts reworking all of Harold in Italy), and Bruckner (in Wunderblock [Nebenstück II], subtitled “an attempt to erase the Majestoso from Bruckner’s Sixth Symphony”), Pesson interlaces glimpses of tonality with extended techniques, interspersing white noise between remembered melodies and accompaniment figures, achieving a distinctive outcome that is both forward- and backward-looking, and definitively postmodern in its sensibility.

In Convergence Lines, rather than including outright quotations, I focus on incorporating sonorities that carry connotations, or mimicking stylistic gestures, attempting to invoke associations with a particular time period or genre, but without borrowing literally from my sources. Sonic references abound, mostly suggested by
settings that figure in the novel, both distant—the North African modal music in movement II., the shortwave radio signals and kalimba sounds in movement VI.—and closer to home. Pynchon fills his novel with winks at several styles of music from New York City in the 1950’s, and the piece plays off of these; jagged fragments alluding to bop and jazz, along with phrases reminiscent of the Ellington-era big band (their decadent predecessor, now in its twilight years), are heard alongside the brass and conga hits of an emerging genre, salsa, in the fifth movement.

**Fragmentation / Discontinuity**

Interrupted discourse, incongruous intrusions by foreign elements, is a natural fit for a time-based medium, and musical experiments with disrupting continuity can be found at least as far back as Beethoven’s sonatas and quartets. Pynchon himself was clearly inspired by the burgeoning movement of free jazz, fashioning a saxophonist who "played disregarding chord changes completely“(*V.*, 56)—a central character capable of subverting linearity. And from Ornette Coleman to Karlheinz Stockhausen to John Zorn, there are abundant examples in later music of diverse approaches to non-linear musical organization.

*V.*, as mentioned earlier, is not an exclusively non-linear book, however. While composing *Convergence Lines*, I often asked myself how best to express a mixture of linear and non-linear vectors. It was easier to tackle the problem of *non*-linearity
amongst the even-numbered episodes, which each had to feature memorable but unrelated sonorities. Episodes in the Profane strand, on the other hand, had to express a degree of continuity in addition to being credible as isolated scenes.

In *The Time of Music*, Jonathan Kramer posits the concept of multiply-directed time, as exhibited by pieces “in which the direction of motion is so frequently interrupted by discontinuities, in which the music goes so often to unexpected places, that the linearity, though still a potent structural force, seems reordered” (46). In *Postmodern Music, Postmodern Listening*, he pushes further, asking

> How does time function in postmodern music? Postmodernism is profoundly temporal, but it uses, rather than submits to, time. Its music shapes time, manipulates time. Time, like tonal sounds and diatonic tunes and rhythmic regularity and textual unity, becomes no longer context but malleable material (152).

These ideas resonate not only with the work at hand, but in much of the musical exploration I’ve undertaken before and since. Time in *Convergence Lines* is considered as a malleable component throughout the piece. Directivity can be switched on and off:

When the evaporating chords of movement IV give way to a *moto perpetuo* fifth movement, an absence of directed motion is being abruptly ratcheted up to a driven pulse. These shifting sensations of time are examined most extensively in movement III: just as Pynchon indulges an obvious metaphor for distorted time—the clock refracted by a mirror in the opening of Chapter 4—*Convergence Lines* announces in an analogous location that linearity can be expected to slip out of phase, as a mundane pulsation on the wood block is gradually distorted into a diffuse cloud of ticks.
Eclecticism

The word “eclectic,” when applied to music, too often appears to carry pejorative connotations. Diversion, as a general rule, seems to be more tolerated in literature than in music, where the ideal of structural unity still holds powerful sway. There have been powerful precedents: Stravinsky and Ligeti were adept at adapting deliberately archaic vocabularies and reworking outmoded conventions, but these incursions were considered permissible so long as they maintained a dialogue with the the style being imitated, and so long as any given piece retained its stylistic and structural integrity. By contrast, Ulysses firmly established polystylism as modernist territory in literature, and Pynchon is one of many postmodern writers who have followed suit.

The ambitious diversity of styles and settings in V. is remarkable, and the incremental way that Pynchon reveals this dimension of the novel is admirable. The storyline that is established at the outset—naval officer returns to New York City, seeks old flame, falls in with Puerto Ricans—is deliberately abandoned by the third chapter with a sudden shift of setting and characters. The reader steps out of the frame, and the outer limits of the narrative consequently have to be readjusted.

Convergence Lines aims for a similar effect, a sensation of expanding to encompass territory beyond its initial boundaries. The “sound world” (to cite the term most often used for the restrictions of palette imposed on a given piece) as defined by the opening
and the first movement is limited to a plausible reality: an ensemble, enhanced by samples in the electronics that respond to the sonorities on stage in real time. Just as a reader has lost all ability to guess where the Stencil strand of narrative will end up next, a listener should be incapable of predicting (and with luck, presently surprised by) the unexpected turns of sonority in the piece.

Irony

I have chosen to single out irony as one component of postmodernism that I explicitly avoid in *Convergence Lines*, and indeed in much of my work, particularly when confronting non-classical genres. I have an earnest and, I would like to think, reverent way of working with material that alludes to popular music. Interpreters of my music often have to be dissuaded from adding a sardonic veneer—an understandable impulse given the number of “blues-tinged” twentieth-century works than never venture beyond this superficial treatment. Furthermore, my sincere approach seemed like a good match for *V.*, where irony plays far less of a role in than in most of Pynchon’s later work—a distinction noted by Alexander Nazaryan in his fiftieth anniversary appraisal, “*V.* at L”:

*Blast through the multilayered densities of *Gravity’s Rainbow*, *Mason & Dixon*, and *Against the Day*, and you have a young Cornell graduate, an engineer from Long Island, writing with an earnestness you might not have expected, about a world he could never recover. Though we think of Pynchon as the progenitor of postmodern irony, the novel’s central theme, as uttered by the jazz saxophonist McClintic Sphere, is one of sly but unmistakable sincerity: “Keep cool but care.”*
CHAPTER 4: Major Themes of V. and their musical corollaries

I. Travel and The Exotic: Baedeker’s World

In the Stencil thread of the narrative, one of the few names to resurface in multiple chapters is not a Pynchon character’s, but that of a historical figure: Karl Baedeker (1827–1859), the founder of the Leipzig-based publishing house that pioneered the concept of the travel guide. By his own admission, Pynchon used the 1899 Baedeker guide to Egypt to mine details for his story “Under the Rose,” later rewritten as the third chapter of V. “Loot the Baedeker I did,” he writes in the introduction to his short story collection Slow Learner, “all the details of a time and place I had never been to, right down to the names of the diplomatic corps” (17).

Compared to his later years, the younger Pynchon seems more willing to luxuriate in the opulent trappings of his atmospheric settings, to linger on the evocative on rhapsodic. Convergence Lines proposes the same: an unabashedly cinematic, outright Romantic perspective—not born out of naiveté, nor irony, but a genuine celebration of color and refined detail. This sensation of voluptuousness is most evident in the lush collage sonorities of the even-numbered movements: the stylized evocations of sand in movement II., the kaleidoscopic soundscapes of movement IV., or the light, twinkling metallic percussion throughout movement X.
II. Colonialism and Decadence

Exoticism and colonialism, the enchantment of distant lands and the repercussions of that attraction, are intertwined in V. The historical parallels the personal: the decadence that afflicts turn-of-the-century Europe is mirrored by the incremental hardening of several of the novel’s characters, particularly the V-named woman (or women) who is the object of Stencil’s quest. Pynchon carefully arranges his exotic scenes so as to gradually reveal their darker side; the episodes in Egypt (Chapter 3) and Florence (Chapter 7) come first, both featuring wide-eyed young women full of promise and excitement, whereas Chapter 9 in Namibia shows a slide into detachment and brutal oppression, just as Chapter 14 in Paris shows a similar degradation on an emotional plane, from love into fetishism, from warmth to sadism.

This contour, the measured revelation of a darker hidden layer beneath a seemingly placid surface, is fleshed out a few times in Convergence Lines. In movement VI., for instance, a portrayal of the Namibia episode, radio signals are interrupted by the crack of a slavedriver’s whip; in movement X., it is the mechanical dance of an automaton that begins to creak, with expressionless chords on a prepared piano and bass pizzicati interjecting dulled sonorities and intermittent noise into an otherwise luscious texture.
III. Entropy and The Inanimate

Another significant theme of V. is the divide between humanity and the inanimate, between man and machine. In strand A of the novel we see a schlemiel protagonist whose adverse relationship with the material world is legendary. In Strand B, we encounter a woman who actively desires to becomes less human, replacing the parts of her body with prostheses, forcing herself into the realm of the inanimate. The same trajectory can be broadly traced in Convergence Lines, which works its way from a realm of vivid color to a wash of white noise at the end.

Both of the aforementioned characters embody another recurring concept in Pynchon’s work: the inevitability of entropy, of vibrant energy being used up, a vector towards disorder and decline. As the critic Tony Tanner notes,

while the endlessly ramifying and superimposed plots of the book defy summary, the general theme of the operation of entropy on every level serves to relate the disparate temporal and geographic material the book contains. Every situation reveals some new aspect of decay and decline, some move further into chaos or nearer death. The book is full of dead landscapes of every kind—from the garbage heaps of the modern world to the lunar barrenness of the actual desert. On every side there is evidence of the ‘assertion of the Inanimate’…The proliferation of inert things is another way of hastening the entropic process. On all sides the environment is full of hints of exhaustion, extinction, dehumanisation (23).

The primary musical translation of this idea is the use of mutes, preparations, and other unusual objects to physically alter the resonant properties of nearly all of the instruments. The brass play with multiple mutes, including a few functionally obsolete ones from the swing band era such as the cleartone and buzz-wow mutes. In the strings,
preparations are even more extensive: paper, felt, and clothespins on the harp, clamps that buzz in the piano’s lowest register, a piece of aluminum foil wrapped around the low C string of the bass. Even percussion instruments are subjected to alterations: washers and aluminum foil distorting the vibraphone’s resonance, needles and brushes rubbing almglocken and steel drums, thimbles places inside tuned cowbells for a prolonged rattle. The result is a wide palette of sounds with a heavy noise component but a distinct pitch identity; with both vivid and dull elements, these sounds can be considered on a continuum between noise and consonance that mirrors the sway between polarities established by Pynchon, the animate and the inanimate.

Last, the role of the electronics in *Convergence Lines* is itself envisioned as a theatrical embodiment of a bridge between the animate and the inanimate. Navigating both worlds, a computer interacts with human choices onstage in real time; the resulting symbiosis, with both technological and human components, could be considered as a metaphor, an idealized characterization of electro-acoustic music.

**CHAPTER 5: Overview of Electronic Tools**

From the outset, the electronics is *Convergence Lines* were designed to focus on aspects of pitch, color, and timing. It was also decided that there would be no live treatments, no digital manipulation of the signals sent by the onstage instruments. Rather, the ensemble would interact with pre-recorded sounds—either six-channel
sound files, or banks of pre-recorded samples—to assemble dense, microtonal collages of sound. All of the electronics sounds in *Convergence Lines* are prerecorded; though they often imitate what is happening on stage, and though their timing, shape, and color are sometimes piloted by the ensemble, at no point is the live signal, treated or raw, transmitted directly through the speakers.

Before going into detail in chapter eight, I will give a brief introduction and a generic explanation of both the technical underpinnings and the musical inspiration for the various tools used to create the electronics in *Convergence Lines*, focusing on three main strands of work with electronics: the creation of spatialized sound files with OpenMusic, the real-time selection and playback of samples performed by CataRT, and the score follower Antescofo which acts as both a reactive engine and as a cue list, oscillating between the two roles throughout.

**OpenMusic and Spatialized Sound Files**

OpenMusic, a LISP-based visual programming environment developed at IRCAM, has been central to my composing practice since 2006. I use the software at multiple stages during the composing process—not only for pre-compositional planning, but also to manipulate audio files directly, when editing via a musical notation interface can be advantageous. OpenMusic thus becomes a top-level command center for interacting with other types of software such as the phase vocoder SuperVP
and the versatile tool Csound, but always via an intuitive intermediate display of onset, pitch, duration, and velocity parameters on a traditional musical staff. It can also be a valuable time-saving device, especially useful for operating on long lists.

A further use of OpenMusic, one central to Convergence Lines, is for spatializing sound files. The OMPrisma library, written by Marlon Schumacher, contains a set of tools for spatialization that communicates with Csound, offering control over a dazzling number of parameters. For static spatializations, OMPrisma can take a list of sound files and give each a unique spatial position, or interpolate unique trajectories for a sensation of movement. An OMPrisma patch would often be the final stage of creating the six-channel sound files in Convergence Lines—the moment where sounds synthesized or otherwise edited elsewhere would be combined into one cohesive playback-ready file.

CataRT and Targeted Transposition

CataRT (a quasi-acronym that stands for “concatenative synthesis in real time”) is a tool developed at IRCAM by the researcher Diemo Schwarz. CataRT interacts with a database of prerecorded or live-recorded sound, a process known as corpus-based concatenative synthesis, offering a sort of intelligent granular synthesis by chopping up an incoming stream, analyzing these slices of audio for various characteristics, then querying the corpus to reassemble these grains into a new collage. Units are selected from the database that are closest to given target values for a certain number of sound
descriptors, such as brightness, loudness, or periodicity. These selected units are then concatenated in the playback engine, sometimes after additional transformations have been applied.

My personal contribution to the CataRT software package, and the central research component in Convergence Lines, consists of a feature called Targeted Transposition, programmed jointly by myself and composer Aaron Einbond in the fall of 2011. The idea was born out of my desire to work more precisely in the pitch domain with CataRT, to take a tool designed for scrambled noise and harness its powers to create enveloping fields of precise microtonal sound—a tool with the potential to interact with and extend the harmonic capacity of tempered instruments.

A simple transposition tool was already available of the software, but I yearned for a more precise control over the resultant pitch content of grains selected for playback, akin to the patches I had developed in OpenMusic. Samples would be selected according to target criteria, but before playback the transposition parameter would be adjusted—crucially, a fleeting and unique adjustment for each sample—between selection and playback.

The basic outline of the process is as follows: In a notation-based interface displaying empty staves, target pitches are defined at the user’s discretion; these can range from a single pitch to a dense microtonal field. As grains are selected from the
corpus (by their proximity to target descriptors, which may include pitch itself and/or other descriptors) their note number content is examined, and a transposition value equivalent to the difference between the estimated note number and the target pitch is sent to the CataRT playback engine. If more than one target pitch is defined, such as, for example a harmonic field of possible pitches, the pitch of each sample can be either drawn at random (with or without replacement) or chosen based on the shortest distance to the grain’s original pitch.

The patch offers two methods of selecting samples in CataRT. The first, “internal selection,” is to describe a curve of target descriptor values and a rate of selection, a movement analogous to navigating in two-dimensional descriptor space towards, for example, progressively brighter or softer samples. A second “external” mode of interaction involves analyzing the descriptor values of a signal from one of the onstage instruments, then mapping those parameters onto target descriptors; the result is a real-time selection that somehow follows the contours of an incoming audio stream—a process, detailed later, known as audio mosaicing.

Antescofo: Machine Listening and Score Following

A third key software component of Convergence Lines is the score follower Antescofo, a powerful and innovative score follower developed by Arshia Cont. Designed as a robust tool for live performance, Antescofo, performs the task of artificial
machine listening by analyzing an incoming audio stream and comparing the data to a
pre-loaded “augmented score” which contains both the instrumental part to be tracked
and the electronic events to be triggered. Lower-level processes are triggered in real
time, taking account of tempo fluctuations or flubbed notes to synchronize the live
performance with electronic events. Crucially for composers, Antescofo makes it
possible to express events in relative timing, the familiar syntax of musical scores—as
fractions of a constantly shifting beat rather than in absolute time values.

At the same time that I was composing *Convergence Lines* in 2012, I had just
returned to Paris to work as an embedded researcher in the Antescofo team, in the
framework of a six-month musical research residency at IRCAM. My goal was to tackle
the problem of predictive timing, to create tempo canons that (in the spirit of Conlon
Nancarrow) converge at a predetermined point. The exact technology developed during
this stay was not used in *Convergence Lines*, but the poetic idea of convergence and
canonic writing is very much a part of both projects.

**CHAPTER 6: Work Plan**

The electronic tools of *Convergence Lines* grew out of the unique circumstances
behind its composition. The piece began with a commission, a prize offered in
conjunction with a two-year European project known as the *New Forum Jeune Création*.
Through this EU-funded initiative, ensembles based in three countries offered two
commissions each to a total of six composers. Additionally each composer was awarded a month-long residency at a computer music center, where each had the chance to work with a computer music designer—a collaborative working method, familiar in France but little-used in the United States, that provides a chance to conceive and develop electronics in tandem, aiming to work on a more ambitious scope than that of a self-produced project.

My production residency was hosted by GRAME, a center for musical research and creation in Lyon, France, where I worked with the veteran computer music designer Christophe Lebreton. We agreed to divide the allotted month of studio time into three periods: one week in October 2012, two weeks in April 2013, and a week in January 2014. Our first meeting focused on conceptualizing our tools and embarking on preliminary programming to create a “working patch” that allowed me to experiment and save material as I composed. The second session in April was devoted to recording sessions with five musicians, editing the resulting samples, and further technical work on the concert patch. Our last session was used to test and finalize the patch and to correct errors before the work’s first rehearsal at the end of the January 2014.

During our sampling sessions in mid-April 2013, five musicians from the Ensemble Orchestral Contemporain—on trumpet, trombone, horn, percussion, and harp—were asked to record a mixture of single-note samples and longer phrases. These, along with other instrumental samples and one instance of a found recording (the short-
wave radio transmissions known as sferics, mentioned by Pynchon’s Kurt Mondaugen and used in movement VI.) make up the corpora from which samples are selected and stitched together in real time, into either nebulous collages or “bursts” of attacks.

I wanted to expand the palette of the electronics, to complement with my own collection, a set of new sonorities associated either with one of Pynchon’s settings (the dance band-era brass mutes of New York City, the Namibian mbira) or themes (the exotic shimmers of metal percussion, the grainy washes of ocean waves). I was interested in achieving finer gradations of color on the spectrum from pitch to noise, and particularly in sounds that combined a clearly discernible pitch component with some kind of non-harmonic shading. The idea of preparing instruments, deadening their natural resonance with mechanical interference, seemed to resonate of Pynchon’s transition from the vital to the inanimate. Figure 1 shows a full list of the preparations used in the piece, as well as the retunings (scordatura) it requires.

The longer brass phrases recorded in these sessions served a different purpose: With the intention of retaining the expressive shapes of these lines but altering their pitch and timing, these phrases were sculpted using the phase vocoder SuperVP, with OpenMusic offering a notation interface as an intermediary step. Once markers were placed in the sound files at each attack and pitch values were associated with each, these could be compared to the corresponding data in the target phrases to build breakpoint functions that pilot the timestretch and transposition in SuperVP.
Figure 1: scordatura and preparations used in Convergence Lines

Piccolo / Flute
Alto Flute in G

* The C Flute must be tuned down by a quarter-tone throughout the piece. Fingerings are 'normal' tempered pitches.

Trumpet in C

* The Trumpet player must have a slide whistle, used in movement VI.

Percussion

* The percussionist must have multiple thimbles to place inside the almglocken to create a buzzing effect
* In movement X., the crotales are played by dropping a washer onto the discs and letting it rebound and settle. The percussionist can tie fishing line around the washer to keep it from falling onto the floor.

Harp

* Notes in this register should be prepared before the piece begins with small pieces of aluminum foil wrapped around each string to create a noticeable buzzing effect
Other harp preparations are required throughout the piece:
- prepared with cloth: felt woven once between the strings for a damping effect with some pitch
- double-threaded cloth: felt woven twice between the strings, a damping effect with no discernable pitch
- prepared with clothespins: clothespins placed on strings to create a "multiphonic" sound
- prepared with clothespins and aluminum foil: a combined "multiphonic" and buzzing effect

A piece of paper should be woven between the four lowest strings throughout the piece to create a sustained buzzing effect

Piano

One free, loose clamp on each string; pitch + buzz
With four free clamps. Almost no pitch; resonance deadens automatically after 2 seconds
mark the positions of the 11th and 13th partials
(make sure that the D natural rings free, not damped by prepared notes)

* The pianist must also have a guitar pick or plastic card and a hard percussion mallet

Violin

* The violinist must have a practice mute (sourdine en plomb) as well as a paper clip, used in movement VIII.

Contrabass

* The contrabassist must have a five-string contrabass with the lowest string tuned to C. Additionally, this fifth string is prepared by wrapping a small piece of aluminum foil loosely around the string to create a noticeable buzzing effect in both pizzicato and arco passages.
CHAPTER 7: Ensemble and Setup

Convergence Lines is scored for an ensemble of ten musicians: flute, clarinet, horn, trumpet, trombone, piano, harp, percussion, violin, and double bass. The entire ensemble is amplified, but only eight of the onstage microphones interact with the patch. Six loudspeakers surround the audience, projecting a 360-degree soundscape whose spatial dimensions are very much a core feature of the work. Figure 2 provides a basic guide to the layout and technical specifications of the piece.

Two strategies are used to coordinate the live instruments and the electronics. The global timing strategy involves the use of a MIDI Foot switch operated by the conductor which advances the events. The second level of control is commanded by the score follower Antescofo, which is turned on and off by the conductor at strategic points in the piece. As a compositional strategy, the passages requiring tight rhythmic alignment are commanded by Antescofo, whereas slower movements that allow for a more fluid coordination rely on the conductor’s pedal. The chart in Figure 3 visualizes the instances where Antescofo is used throughout the piece.
"Convergence Lines"

of Christopher Trapani

Instrumental setting

revision of 21th June 2013

Details of percussions:
- Steel Drum (one pan: F3 -> F5 whole-tone)
- Vibraphone (selected notes: F3, G3, B3)
- Crotales
- Snare Drum
- Timbales
- Bass Drum
- Bongos
- Suspended Cymbal
- Splash Cymbal
- Cymbal with Rivets (Sizzle Cymbal)
- China Cymbal
- Maracas
- Shaker

Electrical setup:
- MacBook Pro
  - core i7
  - 16Go RAM
  - MaxMSP 5
  - licence Antescofo
- RME-F800
  - Adat(8) in
  - 16 aux out
  - 6 in stage
  - 8 aux out
- Loudspeakers:
  - Loudspeaker 1 (MPB600)
  - Loudspeaker 2 (MPB600)
  - Loudspeaker 3 (MPB600)
  - Loudspeaker 4 (MPB600)
  - Loudspeaker 5 (MPB600)
  - Loudspeaker 6 (MPB600)
  - Loudspeaker 7 (2*MPB600E linked)
  - Loudspeaker 8 (2*MPB200R linked)
  - Loudspeakers (2*SUB)

Instrumentation:
- Microphones:
  - Microphone 1: Violin / DPA 4021 + VH4000 clamp
  - Microphone 2: Double Bass / DPA 4021 + VH4000 clamp
  - Microphone 3: Clarinet / KM184 set on mic stand
  - Microphone 4: Clarinet / KM484 set on mic stand
  - Microphone 5: Flute / KM184 set on mic stand
  - Microphone 6: French Horn / KM400+ with 2*KM400A clamps
  - Microphone 7: Trumpet / DPA 4099 with CC4099 fixed by a stick clamp
  - Microphone 8: Trombone / KM400+ with CC400A fixed by a stick clamp
  - Microphone 9: Piano / 2x C414 cardioide set on mic stand
  - Microphone 10: Horn / DPA 4099 with CC4099 fixed by a stick clamp
  - Microphone 11: Trumpet / DPA 4099 with CC4099 fixed by a stick clamp
  - Microphone 12: Trombone / DPA 4099 with CC400A fixed by a stick clamp

Figure 2: Convergence Lines stage diagram and technical details
CHAPTER 8: Breakdown and Analysis

I will take the reader through each of the twelve movements of *Convergence Lines* one movement at a time, a guided tour of both the literary and technical dimensions. Each section will be analyzed *in situ*, so that examples of particular processes can be examined at the point in which they occur in the piece.

Tracing this twelve-movement journey, it was crucial for me to provide signposts for the listener, so that the piece can be followed not only by intrepid concertgoers, but equally by those who might be familiar only with Pynchon’s novel, who might be encountering the piece from a literary standpoint. To that end, I created the listening guide in Figure 4, which should be provided to audience members at each performance; it contains cues about both literary setting and sonic timbre for each movement, in a visually striking layout meant to immediately convey the form of the work.
I. APOCHEIR
The low point: Christmas Eve 1955 in a Norfolk sailor's bar.
A slow climb back upwards, en route to New York City.
Big band brass hits with swing-era mutes pile up in
dense rhythmic antiphony, toward a frenetic climax, an
accumulation of energy as the yo-yo snaps back to the palm.

III. MIRROR-TIME
An Upper West Side waiting room. The hourglass
becomes a ticking clock, slipping out of phase.
Cup mute chorales meet their reflections.
Time reversed and forward time dovetail and overlap.

V. ROLLICKING
Sticks slapping skins. Subway trains shuttling
back and forth. A continuous zig-zag of sound bouncing
through harp glissandi, drum riffs, and Puerto Rican salsa.

VII. SPHERE
Piano center stage, an angular Monk-inspired solo.
Replies from a virtual counterpart, progressively
dampened and deformed by objects placed on the
strings. Interjections by a jazz natural horn trio.

IX. INANIMATE
Lush chords dry out into thin clicks and thuds.
A vector from emotion to numbness, man to machine,
pitch to noise—a step into the lifeless world of objects.

X. DECADENCE
Paris. Lush textures, shimmering showers of consonant
ringing percussion, coins falling onto metal. Delicate melodies
in flute and violin, an indulgent romantic atmosphere undermined
by a prosaic loop of muted piano and pizzicati, disillusioned and cold.

XI. VALLETTA
Convergence point. The grid of sandstone streets, sea vistas
from the ramparts, meandering towards the tip of the peninsula.
V-shaped patterns of confluence are everywhere: lines, material,
spatialization—all move towards or fan out from a central target.

XII. EPILOGUE (VANISHING POINT)
A sudden blackout on the island. A slip back in time.
A water spout in the Mediterranean sinks a small wooden boat,
its dissolving vortex the last trace, a pinpoint the center of the map.

II. SAND
Alexandria and Cairo at the end of the 19th century.
The desert pours in from all sides.
Muted violin and breathy flute intertwine against
a backdrop of buzzes and sibilant grains.

IV. COLORS
Florence in 1899, or the unexplored ends of the earth.
An exotic wash of sonorities, mystical metallic shades—
almglocken, steel drum, harp multiphonics—spinning
kaleidoscopic patterns, all formless texture and insinuation.

VI. SFERICS
Southern Africa. Disturbances in the electromagnetic
field: whistlers, tweeks, the dawn chorus. The crack of
the sjambok. A prepared harp blends with distant mbiras.

VIII. ROCK
Malta, cryptic and remote, a fortified outcrop in the
middle of the sea, isolated in space and in time.
A grounded meditation, smudged brass and solo strings
over a peal of rattling cowbells and prepared percussion.
I. Apocheir

*Convergence Lines* begins with a low, noisy slam on three buzzing low C’s: the lowest string of the harp vibrating against a loose sheet of paper threaded between its strings, a wound piano prepared with four clamps, and an open low C on a five-string contrabass wrapped with aluminum foil. Against this one hears a brief upward flourish in the violin and winds and a long sound file—a sliding, metallic whirr that could be mistaken for helicopter blades but is in fact a bit of aluminum foil sliding down the lowest string of a harp, recorded with two microphones in extremely close proximity, mixed along with the aforementioned prepared piano, included as Media Example 1.

This start mirrors a low point for one of the protagonists, the “human yo-yo” Benny Profane’s *apocheir*—a word apparently coined by Pynchon for *V.*: “If you look from the side at a planet swinging around in its orbit, split the sun with a mirror and imagine a string, it all looks like a yo-yo. The point furthest from the sun is called aphelion. The point furthest from the yo-yo hand is called, by analogy, *apocheir.*” (29).

Musically, this is the point of departure for a global crescendo that spans the whole movement, a gradual journey from noise to color, from pitchlessness to consonance, from static to frenetic—culminating with a crack on the snare drum at m. 101 and the dense *tutti fortissimo* on an F spectrum that follows. As the kinetic motion spins out and the falling bits of aluminum settle, the percussionist starts a slow
crescendo on the maracas, shown in Figure 5, that gradually distinguishes itself from the rattling in six speakers and crests with a point that defines a new tempo.

Trumpet and trombone enter on an indistinct mid-register slide (m. 5); both instruments play with a rare antique mute, the Humes and Berg “buzz-wow” mute shown in Figure 6. Essentially a cup mute fitted with two or three kazoo membranes,
this novelty mute was popular in the dance band era but has been out of production for the past several decades. This dirty timbre is the noisiest on a spectrum of muted brass sounds employed throughout the movement, outlined in Figure 7.

As the onstage players change mutes, the samples played back in the electronics retain the muted timbres used previously, as well as others (cup mute, harmon mute), so that the range of available colors grows consistently. This timbral progression, from soft and noisy to loud and clean, is mirrored by the rhythmic interplay between the onstage brass section and its double in the electronics—“answers” that gradually sharpen from buzzing *glissandi* (m.13) to layers of tight rhythmic antiphony (m. 89) in Figure 8.

These antiphonal brass passages mark the first usage of the score follower Antescofo in *Convergence Lines*. The brass play in strict homophony as Antescofo follows the trumpet, recalculating the live tempo with each attack and using this new data to trigger one of two types of responses in the electronics: either a flourish of brass samples in CataRT—selected in real time and notated with the shorthand “burst”—or interjections of retuned passages, such as a *fortepiano* crescendo to an accented hit, or
Figure 8: Convergence Lines score excerpt, measure 89

Figure 9 shows a screenshot from Ascogaph, an interface for visualizing and working with Antescofo scores. The main panel features a MIDI piano roll editor which displays the instrumental part to be followed—here, the trumpet line starting at m. 88, where the flutter-tongued low E is notated in blue (as a one-note trill, which proves to be a more reliable description for flutter-tonguing in Antescofo than a single pitch). Beneath this visualization, the cue commands associated with each attack are listed on a timeline, preceded by relative delay times (here displayed as decimal approximations rather than fractions) for each group of events. In a second window on the righthand
side, an editor containing the score in text file format appears; each trumpet attack has been labeled as a NOTE in red. Deciphering the syntax detailed in Figure 10, one sees that in measure 90, the attack on the F# is followed by an event in the electronics marked “1/3 CUE 139”—an indication that cue 139 should be triggered one-third of a beat (or an eight-note triplet) after the F# and placed according to Antescofo’s real-time tempo.

The exchange between brass and electronics here makes use of an idiosyncratic rhythmic procedure which I invented a few years earlier, one step in an ongoing exploration of uneven rhythmic patterns. The idea was to create a jumpy but regular
exchange between two voices, subdividing not in the traditional manner, according to a constant beat, but by the distance between attacks. Starting with a given line, antiphonal hits are interspersed proportionally according to predefined ratios of duration. The result is a layered, jagged rhythm which nevertheless retains some sense of regularity. This process can then be extended to create further rhythmic layers, as shown in Figure 11 and as heard at measure 94, where a treble-register antiphonal counterpoint emerges in the electronics, constructed from piano and wind samples with sharp attacks.

Though the concept is simple, notating the results can be surprisingly difficult, slipping quickly into the realm of irrational rhythm. Until Convergence Lines, I had used this device exclusively in works for mechanical instruments. I was encouraged however to try a first real-time implementation because of one particular feature of Antescofo: namely, the possibility of timing events in relation to a real-time tempo, described not on an absolute timeline in milliseconds, but rather in the proportional language of musical notation: 1 for a quarter note, or 1/4 for one sixteenth note, et cetera.
These hit points were calculated using a patch in OpenMusic which takes any musical line (here, the trumpet at m. 88) and interpolates hit points according to a given list of ratios (1/3 and 2/3 in this example). For *Convergence Lines*, I enhanced the patch to generate text files formatted precisely for Antescofo, as seen in Figure 12.

**Figure 12: OpenMusic patch for calculating rhythmic interpolations**
II. Sand

The second movement marks the entrance of the second narrative strand, mirroring the first extreme change of setting in Pynchon’s novel. After two chapters set in New York City, the action abruptly shifts to Egypt at the end of the nineteenth century. The justification for this jump in setting is evident here, especially when compared to later skips: Inspired by a postcard from his dead father, Stencil cobbles together an improvised narrative around a few clear facts for the third chapter, “in which Stencil, a quick-change artist, does eight impersonations.”

Musically, the transition to this second scene is accomplished via a two-stage cut. First, at m. 114 the frenetic energy of the first movement’s climax is abruptly cut in half. With only a subtle change in harmony, the dense texture is replaced by a web of *bisbigliandi* and airy flutter-tongued samples in the electronics, while at the same time the onstage orchestration thins drastically to breath sounds and harmonics. Measure 121 marks a further cut in texture, to string and flute harmonics; with the next attack at measure 123, all sustained pitches in CataRT disappear and only a layer of noise (maracas, breath sounds) remains, augmented briefly by plucks on the prepared harp which are sometimes doubled in the electronics. This progression from lush, busy, colorful brass to hissing, noisy, breath sounds is intended as a musical analogue to Pynchon’s image of an hourglass slowly filling up with sand.
From this grainy texture, a single line slowly emerges, transforming first from bridge and bow noise on the violin, deadened by a practice mute. Figure 13 shows the start of a duet (m. 130) with the alto flute, drifting in and out of breath sounds and key noise. Both parts are filled with glissandi and other minute expressive details, an allusion to the sonorities of the ney and the kemençe, Middle-Eastern instruments of similar construction, and to the heterophonic lines typical of traditional Arabic music.

Instead of creating a texture of voice plus accompaniment, I defer to the primacy of these soloists, supporting their lines with interjections of flourishes on prepared harp and piano. These clouds of buzzing attacks were derived from sum and difference tones between the two heterophonic lines, providing not so much a harmony as an extension of color. A process of recursive symbolic ring modulation in OpenMusic is used to retune and spatialize samples, then to export the resulting six-channel sound files. The first such example of this process, which occurs at measure 137, is outlined in Figure 14.
Starting in the upper left-hand corner of the page, a mid-register F sharp is modulated against two neighboring tones, one whole step above and three quarter tones below. Three layers of progressively denser recursive chords are derived, which are translated into a sculpted passage by using a random permutation of the ordering within each chord, then sampling breakpoint functions to obtain onset and velocity.
(later used to calculate gain) values. The result is displayed in a chord-seq object, on a musical staff and in proportional notation. The musical parameters of this object will be used for the calculations that follow: onsets are sent as entry points to the spatialization engine, velocities will be scaled as gain coefficients, and pitch information is used to select the closest-pitched sample in the subpatches to the left, each of which contains sound files and pitch information in lists.

A list of transposed (using SuperVP) sound files is sent to the red subpatch at the bottom left-hand corner of the figure, a spatialization tool (handled by the OMPrisma library, communicating with CSound) which applies a trajectory to each sound. In this example, all sounds start at a minimal distance of one meter and at the same azimuth (around 60 degrees, crowding them on the front and left) and then fan out to fill a larger space as the samples both multiply and get fainter. This spatial movement underscores the semantic direction of the musical passage; it is the first of many gestures of distancing that occur throughout the movement, always softer and denser, ending with the receding chorales in ever-noisier timbres, as shown in Figure 15 (m. 158).
III. Mirror-Time

With the start of the third movement, *Mirror-Time*, we experience a shift from the amorphous world of sandpaper blocks, breath sounds, and transverse *tremolandi* to a steady and clear rhythmic ticking on the wood-block. This sound is meant to recall the opening of Pynchon’s fourth chapter, where Esther follows the mirrored image of a clock in a doctor’s waiting room, musing that “here were time and reverse-time, co-existing, cancelling one another exactly out” (46).

These wood block sonorities eventually slip out of phase and turn from distinct points into clouds of attacks, while the brass onstage play cup-mute chorales—a dance
band timbre, drawing us back to 1950’s New York—that have distorted doubles in the electronics. These are edited versions of full phrases played by individual brass players, which have been aligned, stretched, and retuned by SuperVP via the OpenMusic interface.

At the recordings sessions mentioned in chapter six, players were asked to play several phrases, such as those in Figure 16, in approximate tempi, observing all tongue, slur, and dynamic indications, each with a variety of mutes and in contrasting registers for timbral variety.

Recordings were then loaded into sound objects in OpenMusic, where markers can be added by hand for each onset; these are then correlated with a list of pitches in a subpatch, shown in Figure 17. This data can be recuperated in a master OpenMusic

Figure 17: OpenMusic subpatch with monophonic audio, sound file markers, and pitch data

Figure 16: prerecorded trumpet phrase, performed on multiple mutes
patch where pitch and onset data in multiple voices are used to pilot timing and pitch transformations in SuperVP.

For *Convergence Lines* these dynamic alterations were rarely a final step, however; these exported monophonic brass lines would generally be further reshaped in a digital audio workspace; in Figure 18 the portions of each line that will be discarded are marked with middle C so they can be quickly excised from exported files. This working method permits a precise microtonal retuning that nevertheless preserves the contours and spirit of an instrumentalist’s execution; one short stereo version of such a file can be heard here in Media Example 2.

![Figure 18: OpenMusic Patch, with chord-seq data piloting time stretch and pitch shift in SuperVP](image)

The third movement of the piece, after several languorous brass phrases over polyrhythmic pulses, builds to a loud antiphonal climax at measure 204. The brass play *fortissimo* (now with cleartone mutes, another big band holdover) against staccato
octaves in the winds, harp, and *pizzicato* violin, while two layers of antiphonal responses sound in the electronics propel towards the downbeat of measure 211.

**IV. Colors**

Movement IV. marks a return to the Stencil narrative strand, transporting us to another setting: Florence in 1899, as seen in the seventh chapter of *V.*, “She Hangs on the Western Wall.” The action in the Renaissance city is overlaid by memories of the explorer Godolphin, given to rhapsodizing about an exotic polar land called Vheissu:

“The colors. So many colors... No sequence of colors is the same from day to day. As if you lived inside a madman’s kaleidoscope. Even your dreams become flooded with colors, with shapes no Occidental ever saw. Not real shapes, not meaningful ones. Simply random, the way clouds change over a Yorkshire landscape.” (*V.*, 155)

This movement accordingly takes it musical cues from the idea of emphasizing timbre, instrumental color, over all other parameters. The sharp pulsations of New York City give way to dreamy soundscapes filled with formless washes of color—mostly the wispy shine of metallic percussion instruments like the steel drum and almglocken played with various unconventionally light touches, such as fingertips, wire brushes, and knitting needles. Linear movement is deliberately sidelined in favor of an enveloping voluptuousness, a step into what Jonathan Kramer called “vertical time”—“a single present stretched out into an enormous duration, a potentially infinite ‘now’ that nonetheless feels like an instant. In music without phrases, without temporal
articulation, with tonal consistency, whatever structure is in the music exists between simultaneous layers of sound, not between successive gestures“ (The Time of Music, 55).

The harmonic material of this movement is derived from recordings made in April 2013 of harp strings prepared with clothespins as in Figure 19—a preparation that gives a quasi-metallic multiphonic timbre, demonstrated in Media Example 3, to the strings’ harmonic resonance. I analyzed simultaneous versions of this effect on two different mid-register pitches, and compiled a list of dyad-derived harmonies to create a progression of microtonal chords, shown in Figure 20, that (to my subjective ears) sound consonant without being easily picked apart into component spectra.
The samples are intended to act as an extension of the ensemble, who sound the same timbres onstage, making the provenance of each new sonority, electronic or acoustic, difficult to discern. The effect of constantly shifting timbre is enhanced by a “spin” command added to CataRT, instructing the patch to rotate through up to four separate timbre spaces, each with its own collection of target pitches and selecting a particular subset of the corpus—as demonstrated in a short video, Media Example 4. This kaleidoscopic effect is further enhanced by spatialization, with each timbre placed in a separate physical listening space—so that what at first sounds like a melded sonority eventually separates itself into distinguishable layers.

The two minutes of movement IV. feature the most melodically sparse music of the piece, trading linearity for a completely enveloping wash of sound. Only in its final moments, starting at measure 241, does a brass chorale coalesce, recalling the main sonority of the previous movement and preparing the quick transition back to New York City in the mid-twentieth century.

V. Rollicking

Rollicking, in Benny Profane’s world, means bouncing up and down the city on drunk subway rides. Pynchon sets out the guidelines in Chapter 3:

Back in August 1956, rollicking was the Whole Sick Crew’s favorite pastime, in- or outdoor. One of the frequent forms it took was yo-yoing. Though probably not inspired by Profane’s peregrinations along the east coast, the Crew did undertake something similar on a city-scale. Rule: you had to be genuinely drunk… Rule: you had to wake up at least once on each transit. Otherwise there’d only be a time gap, and that you could
have spent on a bench in the subway station. Rule: it had to be a subway line running up and downtown, because this is the way a yo-yo goes (V., 63).

The fifth movement is a moto perpetuo bombardment with constant up-and-down movement in both the electronics and onstage. This is the point in the piece that undoubtedly makes the most intense demands on Antescofo, with the interplay between onstage lines and electronic passages at its most precarious.

*Rollicking* also features sounds meant to invoke, in alternation but in close succession, several styles of popular music. First, we hear the uneven rolls and cymbal hits of a wild jazz drummer (m. 278)—demonstrated in Media Example 5; soon after, starting in measure 304, brass, conga, and cowbell hits emerge, intimations of the nascent genre of salsa. The movement ends with an increasingly sparse and lazy upward drift of plucked harp samples, rising toward to a high A flat which becomes the focal pitch of the following movement.

**VI. Sferics**

Movement six, the third installment in the Stencil strand, parallels Chapter Nine of *V*. The action moves to Südwest-Afrika, the German protectorate in what is now Namibia, in the early twentieth century, and the tale of Kurt Mondaugen, a scientist who has been sent to the antipodes to study radio atmospherics. The movement opens with a collage composed of found recordings of these short wave sonorities. With poetic names like tweets and whistlers, such as those heard in Media Examples 6 and 7, these
“sferics” (for short) contrast sharply with previously heard material—a sonic jump that mirrors the drastic shift in setting to another hemisphere. These ethereal sweeps of signal are blended with violin harmonics, glissandi on the piccolo and strings, and a few artificial timbres created using additive synthesis (m. 331-344).

This tranquil atmosphere is brutally interrupted at measure 345 by the percussionist’s whip, a sharp attack echoed the electronics as well as onstage by percussive hits on the body of the harp and inside the piano. This is the crack of the sjambok, the harsh interjection of the pain of a lashing; it is also meant to mirror the novel’s first intimation of the darker, oppressive side of the colonial era—when the closed-door lavish parties start to lose their glamour in the face of a barbaric siege.

Another otherworldly sonority enters at measure 357: the mbira, or African thumb piano, playing microtonal polyrhythmic patterns. The instrument used to record these samples came directly from Namibia, purchased by a relative in a rural corner of the country. In addition to the metal blades attached to a plank of wood (which would typically be placed on a drum or gourd to resonate), this mbira features a row of loose washers on the bottom of the plank. Designed to add a non-harmonic buzzing timbre to the sound, these washers demonstrate a traditional version of the type of preparations I apply to Western instruments throughout the piece; they can even be pushed together or spread farther apart for timbral variety, to control the overall degree of noisiness.
The movement closes with a slip back into an exoticism-tinged lull—still languorous on the surface, but now recast with a definite uneasiness. Mbira samples in CataRT are layered with soft rhythmic patterns on tom-toms, string glissandi, and more distant sounds of sferics for a lush final passage (starting around measure 371), that sets up an unexpected intrusion, the attack of a solo piano that soon interrupts the reverie.

VII. Sphere

Throughout the New York City episodes in V, one recurring setting is the V-Spot, a venue favored by the Whole Sick Crew. Here, the novel’s allusions to the music scene of the 1950’s are at their most evident: The V-Spot clearly winks at The Five Spot, the legendary jazz club on St. Mark’s square that hosted many late-bop luminaries. Pynchon’s jazzman, McClintic Sphere, a saxophonist who often holds court at the V-Spot, seems to be an amalgam of Ornette Coleman (who infamously played a white plastic saxophone, similar to Sphere’s “hand-carved ivory saxophone”), and Thelonious Sphere Monk—whose middle name is lent to the character.

The music of movement seven attempts a fictional amalgamation of my own, synthesizing the vocabularies of Thelonious Monk and the maverick American composer Conlon Nancarrow (1912-1997). Composing for years in isolation near-obscurity in Mexico City, Nancarrow wrote an idiosyncratic collection of studies, considered too rhythmically intricate to be reliably performed by human interpreters,
for the player piano. In my mind, Nancarrow’s music begged to be fused with *V.* for a few reasons. First, like Pynchon’s novel, it interrogates the divide between man and machine, pointing towards a new era of mechanical reproduction. Second, through historical coincidence: Pynchon and Nancarrow could have been neighbors, as American expatriates working in Mexico City in the early 1960’s.

Accordingly the piano (despite being an instrument Pynchon explicitly precludes from McClintic Sphere’s band) is foregrounded in movement seven. The theme of a dialogue with the mechanical is here embodied by Antescofo, which follows the onstage piano throughout and interjects six-channel sound files in response.

The form of the movement was inspired by Nancarrow’s *Study No. 40a*, included as Media Example 8. Contrasting ideas cascade down the keyboard, each with a chiseled character: a long *glissando* from the extreme treble to a held bass, then repeated staccato chords in short bursts, and quick trills. A second voice enters with similar material, but moving at a faster rate. The result is a sort of timbral tempo canon: the aforementioned figures are first heard in succession, then in ever-narrowing counterpoint, and finally superimposed, as stacked masses of sound. This effect is further magnified in the companion piece *Study No. 40b*—which Kyle Gann calls “surely the only piece of music in existence whose second movement is its first movement squared” (Gann, 200)—where two pianos perform the same roll at different speeds.
In my piece, the analogous canon takes place between the live piano and the electronics. Antescofo follows its spiky rhythms, assuring the correct point of entry for each response. In a strategy similar to Nancarrow’s, I wanted to delineate material by using distinct gestures in the piano, while at the same time making reference to the idiosyncrasies of Monk’s piano style. These include pseudo-stride exchanges between bass notes and mid-range chords, and chromatically (and later, microtonally) descending muted lines within sustained chords. I also singled out an iconic gesture: the descending whole-tone scale (recalling Nancarrow’s opening tumble), familiar as the start of many Monk recordings, such as the rendition of “Body and Soul” heard as Media Example 9. I imported MIDI transcriptions of this gesture into OpenMusic in order to apply symbolic transformations and reconstitute the results with piano samples—a process outlined in Figure 21. True to the novel’s theme of gradual hardening from organic purity to mechanical enhancements, these replies gradually incorporate more samples of prepared piano, sweeps of attacks that spiral in six channels.

The piano solo is intercut with outbursts featuring the reduced ensemble of bass, percussion, and a horn which only rips and glissandos through the harmonic series—a reference to the combo mentioned by Pynchon, to one unlikely member in particular: “The group on the stand had no piano: it was bass, drums, McClintic and a boy he had found in the Ozarks who blew a natural horn in F” (59). During these short interludes, Antescofo is disabled as a safeguard, reactivated only when the piano returns.
The short video included here as Media Example 10 demonstrates the soloist’s interaction with Antescofo throughout movement VII.; the score is on the left, the pitch and attack recognition in Antescofo in the upper right, and the scrolling timeline of Ascograph on the lower right. Figure 22 displays a screenshot of this layout.
VIII. Rock

Back in the Stencil strand of the narrative, we find ourselves in Malta during the Second World War. As the time periods portrayed in the two narratives approach their closest point, a distance of roughly a decade, events in the two timelines start to bleed into one another. The “Confessions of Fausto Maijstral” in the novel’s eleventh chapter, consists of an imagined firsthand account of the Siege of Malta, in the form of a journal.
uncovered by Stencil and given to Fausto’s daughter Paola, who appears throughout
the Profane strand in New York City.

In several entries, Fausto details his encounters with a “bad priest” who—
crushed by a fallen beam and undressed by local children—turns out to be a disguised
woman, one whose body has been replaced by several mechanical parts:

Other children crowded round her head. One pried her jaws apart while another
removed a set of false teeth. She did not struggle: only closed her eyes and waited.

But she could not even keep them closed. For the children peeled back one eyelid to
reveal a glass eye with the iris in the shape of a clock. This, too, they removed.

I wondered if the disassembly of the Bad Priest might not go on, and on, into evening.
Surely her arms and breasts could be detached; the skin of her legs be peeled away to
reveal some intricate understructure of silver openwork (V, 343).

The musical material of the eighth movement, Rock, is meant to present an
analogous sonic shift: a willful alteration of pure sound by mechanical means, with a
focus on preparations that damp, mute, or otherwise alter the timbre of live
instruments. The movement opens, as seen in Figure 23, with a low tuned cowbell that
has a thimble placed inside, producing a constant rattle when struck. Aluminum foil has
been placed on certain strings of the harp for another buzzing timbre (recalling the
“sandy” attacks of the second movement). A paper clip is attached to the lowest violin
string, giving it a constant non-harmonic rattle, and the brass return to buzz-wow
mutes, which color the sound with wax paper vibrations. The lead instrument
throughout is the double bass, whose slow, muted slides in its highest register weave
amongst the foregrounded attacks.
IX. Inanimate

Movement IX. can be heard as an extension of the process of deadening that began in the previous movement. Preparations reach their extreme limit in blocking out pitch in favor of dull noise. The motivic thrust slows as well; there is no linear dimension, only a flat series of noise-laced microtonal chords that gradually lose their color, even as they appear progressively faster—a sort of negative imprint of the kaleidoscopic swirls of movement IV.
The electronics in here make use of two CataRT modules, both of which trace the contour of wind instruments from harmonic sounds to pure breath. Following two separate banks of samples, both travel in descriptor space, describing curves of decreasing periodicity (in other words, from color to noise) and a progressively spectral centroid values (from bright to dull). Both modules land squarely in a world of dull thuds: heavily muted harp and piano strings, pitchless key noises on woodwinds, and occasional hisses of maracas and a fishing reel.

X. Decadence

The tenth movement opens with a sudden shimmer: the delicate sound of coins falling on crotales—a burst from the electronics, shown in Figure 24, behind the onstage percussion.

The setting has shifted abruptly to Paris before the First World War—the apex of colonial decadence, lavishness teetering on the cusp of disintegration. Pynchon here defines his key term: “A decadence is a falling away from what is human, and the further we fall the less human we become. Because we are less human, we foist off the humanity we have lost on inanimate objects and abstract theories” (V., 405).
Against this backdrop of twinkling metallic sparks, tuned in a chain of common-note harmonic series, a soaring violin phrases intertwined with a swooning flute suggest an atmosphere of opulence as well as the love story at the heart of the fourteenth chapter, “V. in Love.” In the second half of the movement, starting with measure 537, a third layer of sound intrudes: a dry, mechanical dance runs in counterpoint to these lush lines, with high pizzicati on the double bass and muted mid-register piano chords poking out of the texture. These sharp attacks are traced by Antescofo, which overlays each with a short burst of percussive noise or a cloud of breathy woodwind samples triggered by CataRT—another image of decay and static invading and ultimately dominating a richly-hued world. The interplay of these three layers and the role of the electronics are detailed in Figure 25.

The movement ends with a muted brass chorale, recalling a similar transition device in movements IV. and VIII. At the end of movement X, however, rather than fading away after only insinuating a timbral link to the odd, brass-dominated movements, the chorale lurches forward into the next movement, with woodwinds and brass tumbling to a five-instrument unison attack on G3—a visceral signal of arrival at the point of convergence.
XI. Valletta

The two narrative strands converge in movement XI., at the point where Pynchon’s protagonists arrive together in Malta. Here, both Profane’s transatlantic linear trajectory and Stencil’s cyclical journeys, through memory and around the old world, find a common and a fitting endpoint in Valletta—a city which (at least in most
If one imagines all of Europe and Africa folded into a funnel, then Malta, an isolated outcrop in the center of the Mediterranean, could be considered the lowest point of the resulting inverted cone (a shape which could be seen as a three-dimensional letter V).

At this point where the two strands meet, the piece gives itself over to the exploration of multiple musical embodiments of the idea of convergence. Materials from all prior movements are repackaged and freely mixed. The tolling G from movement VIII. resurfaces at the start in measure 561, as shown in Figure 27; onstage attacks are orchestrated with a newfound rhythmic propulsion meant to invoke Valletta’s grid of streets; purpose-built in the sixteenth century, the city plan has a squareness that is rare in Europe, making it a sort of Mediterranean Manhattan where Profane once again finds himself rollicking, albeit on a reduced scale.
The first CataRT module doubles the onstage G with a layer of repeated attacks in the electronics. The corpus from which single-note samples are selected contains a collection of timbres used throughout the piece: metallic or buzzing percussion, string
pizzicati, prepared harp and piano, and brass fortepiano hits, among others. They reappear in an unpredictable order, as if resurfacing like triggered memories, at an irregular rate.

Figure 28 shows both the currently activated subset of the corpus, and details the commands being sent to CataRT. Using NoteNumber (or the estimation of MIDI pitch of each grain) as a prime parameter, a target value of 55 (the MIDI pitch for G3) is sent at a rate that slows from 450 to 700 milliseconds per grain, plus or minus a deviation of 250 milliseconds. The num-nearest parameter, here set at 56, which means that the selected sample is not necessarily the closest match in the database, but rather chosen randomly.

![Figure 28: screenshot of CataRT module 1, soundest control, measure 561](image)
from the 56 closest samples to that match—a built-in chance element to the search that ensures a degree of variety.

The brass return to the foregrounds, building from muted swells—the sort of texture that characterized their background role in the even-numbered movements—to fuller chorales, then finally to big band hits that recall prominent passages in the first and fifth movements. In its first entrances, these brass swells are linked to CataRT queries. Take, for instance, the excerpt in Figure 29, where the trombone at measure 565 plays a low A flat with a harmon mute and shifting timbre.

This line is routed to the second Catart module, where a real-time analysis of timbre and envelope is used to pilot the selection of grains for playback—an interaction detailed in Media Example 11. An analysis of two descriptors, Harmonic Energy and Harmonic Spectral Centroid, is applied on the incoming trombone signal. These values are in turn mapped onto two descriptors which have been analyzed in advance by CataRT: Energy and Spectral Centroid. A selection rate is applied—here a quick jump from 450 to 180 milliseconds in the space of 500 milliseconds, with a standard deviation of 80 milliseconds and a constant delay of 190 milliseconds, allowing just a short delay between analysis and triggered response (not strictly necessary for computing
purposes, but subjectively useful in disassociating the contours of CataRT from the input signal). The result is a collage of samples that follows the gain and brightness envelopes of the live trombone: brighter and louder when the harmon mute is uncovered, darker and softer when closed.

Beginning in measure 587, a third element appears: retuned samples of the brass playing *fortepiano* in V-shaped patterns that fan outwards in both pitch and in space. Figure 30 details the construction of one such sound file at measure 598. The process begins with a central pitch, here C#4, and a list of possible next intervals for each voice, here the pure Pythagorean fifth, third, and seconds—intervals whose just tuning adds a further sense of pushing outwards. The alternating step-like motion of the two voices is mirrored in space by giving a distinct spatial position to each sample, creating two arcs that move outwards from the azimuth of the initial attack, along with a *decrescendo*—which could be seen as a sideways letter V, moving to its own final point.

figure 30: OpenMusic patch used to construct sound file at measure 598
The end of the movement, shown in Figure 31, features the highest density of antiphonal interplay in the electronics, paradoxically piloted by a strictly *monophonic* staccato line onstage. For ten fast bars, all electronic tools are deployed at once: Antescofo follows the trumpet to place sound files squarely on these attacks, and to interpolate hits and runs of brass samples in the second CataRT module; meanwhile the first CataRT module continues the layer of repeated notes (whose texture has suddenly shifted to *staccato*), changing the target pitch with each detected attack.

![Figure 31: Convergence Lines score excerpt, measure 644](image)

XII. Epilogue (Vanishing Point)

My musical epilogue opens with the image that ends Pynchon’s penultimate chapter: Profane and his newfound girl breaching the physical limits of Valletta, running out past the endpoint of the V-shaped promontory, at the exact moment of a blackout:

Presently, sudden and in silence, all illumination in Valletta, houselights and streetlight, was extinguished. Profane and Brenda continued to run through the abruptly absolute night, momentum alone carrying them toward the edge of Malta, and the Mediterranean beyond (V., 455).
On the downbeat of measure 654, all color and activity abruptly disappear. What follows in the novel is a moment where time and place reverse the roles they have held throughout: the setting stays constant, reiterating the idea that Malta is the point of arrival, while only time slips, backwards by four decades, to recount the final episode in the life of Stencil’s father.

The twelfth movement is constructed as a simple V-shaped vector from this hiss of white noise towards a glimpse of color with three chimed chords, then to an endpoint dominated again by sibilant waves that envelop the audience. This ending is meant to invoke the whirling of the waterspout—an inverted cone that touches the surface of the water at just one point—that kills Stencil’s father Sidney off the coast of Malta.

During the final bars, displayed in Figure 32, a three-dimensional whirling effect is achieved by layering multiple samples. Several sizes of shakers, maracas, and an overturned *darbuka* (a tuned Arabic/Turkish drum) filled with small plastic pellets were recorded with close microphones as the percussionist coaxed sustained, grainy samples by moving the instruments in circles. Often this *decrescendo* effect was enhanced by moving the instrument progressively further away from the microphone. Each of these percussion sounds was given its own spatialized trajectory, spiraling out from a central point. The last sound heard in the piece is the final punctuation of these circular sweeps: a single *pianissimo* shake of one drum that provides a definitive endpoint.
CONCLUSION: Microtonal Meandering

Having gone into great detail about individual movements in the previous chapter, I would like to conclude by taking a step back and offering some more general comments about my musical goals, not only in *Convergence Lines*, but also in other recent pieces.

What has by now become apparent to the attentive listener is how indebted my work is to concepts of spectral music. The continuum of consonance to noise, devised by spectral composers as an alternative compass to that provided by tonality, is used throughout as a yardstick parallel to Pynchon’s polarities of the animate and inanimate. Many procedures for deriving harmonies are borrowed from the spectral composer’s toolkit, including ring modulation (used to generate webs of sum and difference tones...
In many other places, the pure harmonic series itself is the source, though the context of certain passages may shroud their origins. Because it is present in all harmonic acoustic sounds, I treat the harmonic series as a first-order extension of a single note. This notion has its roots in another spectral concept, the blurred distinction between harmony and timbre; chords are not considered as collections of distinct pitches, but rather as a composite of fused sonorities. The harmonic series thus often serves the role of the most neutral choice for harmony, a consonant backdrop chosen precisely because it throws the focus onto details of orchestration.

My usage of the harmonic series however is quite different and in some ways unfamiliar to the spectral approach, or certainly toward drone-oriented just intonation. Take movement I., for instance: all of the brass hits are slices of the harmonic series, and the culminating tutti at measure 102 is based on nothing more than a harmonic spectrum on a low F—though here the busy texture overloaded with glissandi and brass scoops, loud intrusions of both pitched and unhitched material that obscure the harmonic underpinnings. At the other end of the scale is movement X., constructed almost entirely from harmonic series linked by a common tone. Starting at measure 524, for instance, C#7 is used as a pivot pitch for a chain of harmonies, representing first the eleventh partial, then the thirteenth (measure 529), the fourteenth (measure 532)—
continuing to mount until reaching the thirty-eighth partial at measure 554. While the C# is nearly always present in the instrumental writing, its harmonic complements are given almost exclusively to the electronics. Does the listener perceive its precise functional role at each change of harmony? Almost certainly not—but the sense of a shifting scrim of microtonal, consonant accompaniment should come across.

Roughly eight years ago, I began dreaming of a music that would be constructed from chains of consonance (a term whose meaning I wished to work to expand), drifting harmonies that would be decidedly absent of any functional implications. The idea, explored most thoroughly in *Westering*, for hexaphonic guitar and orchestra (2010), was to create a sensation of aimless meandering through consonant spaces. I heard this type of motion in the chord sequences of Joni Mitchell’s open guitar tunings and in the twisting tonalities of the *Pet Sounds*-era Beach Boys (both reportedly favorites of Pynchon; an epigraph from Joni Mitchell’s “Cactus Tree” was excised from *Gravity’s Rainbow* shortly before publication)—unstructured wanderings that could be considered akin to certain (perhaps typically American) literary forms, such as the expansive musings of Whitman or Kerouac.

The goal is to capture a sense of wonder, a whiff of unconstrained possibility. Furthermore, it captures better, I believe, the exploratory spirit in which I prefer to compose, eschewing all but the broadest formal plans and allowing myself to be open to digression and invention while immersed in the process. Perhaps my primary literary
model in this pursuit is Italo Calvino, the author of works whose surfaces brim with enchantment—*Invisible Cities, Marcovaldo, Mr. Palomar*—but whose respective forms were in fact rigidly pre-determined. The prescribed shape offers the artist a chance to embellish a bare outline with a world of colorful detail.

The flip side of this peripatetic approach is perhaps an indifferent attitude towards the ideal of total cohesion. Similar criticism is often leveled against Pynchon and other postmodernists, perhaps most notably by the critic James Woods, with his pejorative description of the genre of “hysterical realism.” In a negative review of *Against the Day* titled “All Rainbow, No Gravity,” Woods repeatedly assails the work for a lack of cohesion. “Pynchon has a tendency to use rhapsodic ‘fine writing’ to smudge the coherence of his meaning,” he argues, and “there is a sense of meaning being a little too conveniently pushed beyond the verifiable, or even coherent.”

Yet to search for unity in these works might be missing the point, and to discredit the artist for a conscious decision to abandon that principle may be short-sighted. Circling back around to a passage quoted in the introduction to this essay, I find myself in strong agreement with Jonathan Kramer’s assertion that “unity is an option,” as much for a composer as for a listener; many audience members today, he reminds us, “do not necessarily search for or find unity in the listening experience. They are more willing to accept each passage of music for itself, rather than having—in accordance
with the strictures of modernist analysis and criticism—to create a single whole of these possibly disparate parts” (7).

In other words, a cohesive musical syntax is probably not the thing to hunt for in my work. On the other hand, I am confident that what I have composed reflects the way I experience not only music, but also a lot of the literature that I admire. Surface gestures matter; color and invention are essential. I value discernible formal trajectories on multiple scales—both long narrative arcs and subsidiary vectors, as well as allusions that point outside the frame. These features, those that make music and writing both memorable and meaningful for me, are the same ones I aim to emulate.

The plot of V. was clearly designed to be deliberately elusive, to preclude any conclusive, gratifying sensation of cohesion. There is a definite kinship between my harmonic schemes and the meandering storylines of Pynchon’s novel, as well as its listless contemporary characters who bounce aimlessly around New York City like yo-yos. But rather than a lack of structural direction, this open-ended roving is exactly the point. It is what allows the novelist to shuffle between settings and play the wide-eyed traveler, fascinated by the local detail at each stop. And it is one recurring motivation that sustains me as a composer: the pleasure of changing course, of allowing oneself room to reinvent, to indulge in chasing down unanticipated connections or illuminating previously obscure details—to compose not along prescribed pathways, but by taking the scenic route.
BIBLIOGRAPHY


Rosenbaum, Jonathan. “One Man’s Meat is Another Man’s Poisson.” 1973, with later preface [www.jonathanrosenbaum.net/1973/03/one-mans-meat-is-another-mans-poisson]

