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Three Solitudes and a DJ: A Mashed-up Study of Counterpoint in a Digital Realm

Anthony B. Cushing
The University of Western Ontario

Supervisor
Dr. Norma Coates
The University of Western Ontario

Graduate Program in Music
A thesis submitted in partial fulfillment of the requirements for the degree in Doctor of Philosophy
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THREE SOLITUDES AND A DJ: A MASHED-UP STUDY OF COUNTERPOINT IN
A DIGITAL REALM

(Thesis format: Monograph)

by

Anthony B. Cushing

Graduate Program in Music

A thesis submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

The School of Graduate and Postdoctoral Studies
The University of Western Ontario
London, Ontario, Canada

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Abstract

This dissertation is primarily concerned with developing an understanding of how the use of pre-recorded digital audio shapes and augments conventional notions of counterpoint. It outlines a theoretical framework for analyzing the contrapuntal elements in electronically and digitally composed musics, specifically music mashups, and Glenn Gould's *Solitude Trilogy* 'contrapuntal radio' works. Conventional studies of counterpoint encompass sixteenth- through early twentieth-century modernist and neo-classical materials but stop there. Composition by magnetic tape and computer software using pre-existing recorded audio offers the potential for a new study of music that displays clear contrapuntal elements but lacks the analytical models to outline the underlying musical systems. Central to these investigations is the assertion that counterpoint operates not only within the sphere of art music but also in the compositional logic of non-musical sound works (radio documentary) and in the harmonic and melodic underpinnings of popular music.

The first chapter examines technological and cultural developments that contribute to the formation of digital contrapuntal music. The second and third chapters outline the traditional musical elements—harmony, form, and texture—of contrapuntal radio and mashups, respectively. Chapter Four explores how counterpoint exists in the sonic *space* of the stereo or mono sound field. Chapter Five presents the notion of program as a useful concept for analyzing interaction between lyric samples to form original narratives. These two final chapters present the original contributions from contrapuntal radio and mashups to a study of counterpoint.

In each of these chapters, counterpoint forms the basis for how we perceive the underlying systems of musical works composed by traditional counterpoint or by assembling pre-existing recorded audio. The connection between the old and new is important, as one does not supplant but augment the other. As such, counterpoint is a fluid musical concept, rather than a fixed system of rules governing composition in a narrow musical palette.

Keywords

Counterpoint, Glenn Gould, mashups, music and technology, composition, recording practice, *Solitude Trilogy*, contrapuntal radio, music and space

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Introduction to a study of digital counterpoint

Overview

In this dissertation I present an inquiry into the concept of ‘digital counterpoint,’ composition with pre-existing audio recordings informed by general ‘rules’ of counterpoint. Counterpoint comes from the Latin *punctus contra punctum* or “point against point.” Immediately, the concept of opposing points suggests a conflict or dialogue. Specifically, in a musical context, “[m]usic with two or more independent melodic lines is *polyphonic* or *contrapuntal*. Such melodies are in *counterpoint*.”¹ I argue throughout that two styles of music composition, music ‘mashups’ and Glenn Gould’s ‘contrapuntal radio,’ constitute a form of contrapuntal composition.² Whereas traditional studies of counterpoint examine works of notated music, mashups and contrapuntal radio exist *only* in the non-notational electronic and digital realms. When mashup producers bring together pre-existing music samples to form a new work they unwittingly participate in a centuries-old practice of contrapuntal composition. As producers layer their music samples - independent melodic and harmonic materials - they bring them into counterpoint. Contrapuntal radio uses mostly speech content in the form of personal interviews woven into counterpoint. This study outlines a form of non-notational counterpoint that encompasses both the musical materials of the mashup and the spoken word materials of contrapuntal radio.

My study focuses on examples from both the mashup and contrapuntal radio repertoire, and draws heavily from the concepts and compositional guidelines of common-practice counterpoint. I present digital counterpoint as an inventory of compositional techniques demonstrated by analyses of current and past works. I do this with the eventual aim of providing a model for future composers who wish to use these techniques in their own

1. Henry Martin, *Counterpoint: A Species Approach Based on Schenker’s Counterpoint* (Lanham, MD: Scarecrow Press, 2005), vii. I discuss concepts of counterpoint later in this introduction.

2. Music mashups combine samples from two or more pre-existing music recordings. The producer assembles them to create an autonomous new song or musical work. The classic form of a mashup follows an ‘A vs. B’ format with vocal samples drawn from one source and instrumentals drawn from another. The producer usually fragments the original works to create several smaller samples for easier production. ‘Contrapuntal radio’ comes from Glenn Gould’s audio production techniques used in his *Solitude Trilogy* documentaries. He draws connections between specific production techniques and composition terminology.

work. Counterpoint studies appear almost entirely in the realm of Western art music. Many listeners and students associate counterpoint with music in the tonal tradition of J.S. Bach and his contemporaries, or the Medieval and Renaissance choral polyphony of Palestrina, Thomas Tallis, *et. al.* The musical compositions I examine, mashups, belong to the tonal idiom, and augment current counterpoint curricula and composition practice. I position this study in the lineage of studies of counterpoint.

Polyphony emerges from the twelfth-century Notre Dame choral tradition of music directors Leonin and later Perotin. The medieval counterpoint of two and three voices is simple by eighteenth-century practice but radical relative to the monophony of Gregorian chant. There is a steady progression in the complexity of contrapuntal composition over the following five centuries. Subsequent composers took advantage of paper and notation to write complete melodies and countermelodies with increasing complexity. Paper thus served as a permanent store of information and released musicians from the task of memorization; the focus, then, shifts to performance technique. The tradition of notated music on paper endures to indicate a ‘prescribed’ performance. A composer indicates pitch, register, meter, rhythm, and other performance instructions. Digital counterpoint technique is not concerned with composition of original musical material but only in assembling and layering pre-existing recorded audio.³ Digital counterpoint diverges from common-practice counterpoint here. The practice of composing original, notated material requires a different set of techniques than contrapuntal composition with pre-recorded audio. The task for composers using digital techniques is finding harmonic, metric, and rhythmic commonalities between samples and assembling them, not creating independent musical material.

Nomenclature

Throughout this study I refer to counterpoint, both common-practice and digital, as compositional techniques rather than as genres, as contrapuntal compositional practice manifests itself in several genres. I reference two types of counterpoint throughout this study: traditional or common-practice, tonal counterpoint, and digital counterpoint.

3. The ‘digital’ distinction does not refer to performance of written music with digital instruments (synthesizers or samplers).

Traditional studies of counterpoint involve contrapuntal composition of *original* musical material with pen and manuscript paper.⁴ Additionally, composers working with traditional counterpoint techniques require active participation from three parties: composer, performer, and listener. A work cannot exist as music without all three elements in place. By contrast, ‘digital’ counterpoint involves audio storage and manipulation of a continuous flow of computer data in the form of binary digits, ones and zeros or, in the case of contrapuntal radio, a continuous flow of variable voltage read from magnetic audio tape. Whereas traditional counterpoint uses visual representations of music that performers read, digital counterpoint requires machines to read and interpret data, then to output audio. In this respect, digital counterpoint and contrapuntal radio require active participation from three parties. The composer and performer roles merge to form a single entity. The new work still requires a listener. In the case of the mashup, the authors of the original source works form the third parties necessary for digital counterpoint composition.

This study of digital counterpoint draws liberally from Gould’s concepts and techniques. In the following chapters I include contrapuntal radio within the ‘digital counterpoint’ nomenclature to simplify my discussion, and to emphasize Gould’s significant contribution to what would later become a study of non-notational, digital composition. My purpose in this study is to examine a body of works and distill a series of techniques for compositional practice using digital audio tools. My examination incorporates selected elements of traditional, notated counterpoint for concepts and analogies. Although Glenn Gould worked with analog magnetic tape and not digital media, the scope and complexity of his projects anticipate digital audio production. Contrapuntal radio forms a significant contribution to the possibilities of large-scale digital counterpoint composition. Further, in Gould’s essays and interviews he refers to “theatre” and related terminology. Throughout this study I use ‘theatre’ from the Greek ‘theatron,’ or ‘the place to behold.’ Later in my examination of program, the sound space becomes a sonic theatre, a place to behold an unfolding program. I use the term ‘drama’ from the Greek term for ‘play, action, or deed.’

4. This also includes digital metaphors for the manuscript page including music notation and engraving software like Sibelius and Finale.

Throughout this project, I use ‘composer’ in reference to art music composition. Similarly, ‘composition’ refers to the practice of composition in the context of art music, and ‘production’ in the context of popular music. Increasingly in popular music, the producer takes an active role through a different form of composition. Producers may not contribute actual melodic or harmonic material but they shape the artist’s work with their own sound, a sonic thumbprint. Brian Eno, in his landmark, “The studio as compositional tool,” outlines how using the space of the recording studio is, in itself, akin to adding original music material.⁵ As an explicit example, Phil Spector’s ‘wall of sound’ production method and style are as recognisable as the artist’s music. Gould’s radio works bear a distinct ‘sound,’ and mashup producers’ work carries a distinct voice even while working with pre-existing musical samples. Brian Burton’s (aka DJ Danger Mouse) work is distinctive for its economy of musical material, Jordan Roseman’s (DJ Earworm) production methods are finessed and exhibit clean production methods, and Gregg Gillis (Girl Talk) creates album length works that bear a crude production method but raw musicality. Composer and producer Virgil Moorefield, in his book on the ‘producer as composer,’ engages in a protracted discussion of this phenomenon with extensive case studies of past and current producers and how they shaped their artists’ ‘sound.’⁶ For this study, however, I avoid using ‘composer’ to describe mashup producers because it implies intent and awareness of the producer’s participation in art music composition practice. Additionally, I use ‘producer’ for the purpose of maintaining consistency with the popular and scholarly literature on mashups; however, I use ‘composer’ when referring to artists using digital counterpoint technique.

The digital form of counterpoint merges the roles of composer, performer, and listener. This implies not only a different relationship between authorial and receptive roles, but in presentation: traditional counterpoint relies on live performance whereas performance of digital counterpoint relies on playback of audio data from an electronic or digital data storage medium. Mark Katz illustrates how notated works and live performance differ from recorded performances.

5. Brian Eno, “The Studio as Compositional Tool,” in *Audio culture: Readings in modern music*, ed., Christopher Cox and Daniel Warner (New York: Continuum, 2004), 127-130.

6. Virgil Moorefield, *The Producer As Composer: Shaping The Sound of Popular Music* (Cambridge, MA: MIT Press, 2005).

Sing a single note. Now try to recreate that sound *exactly*—not simply its pitch, but its precise volume, length, intensity, timbre, attack, and decay. Now imagine trying to repeat an entire song in this way, down to the smallest detail. It simply cannot be done.⁷

The issue of repeatability marks a significant difference between notational and non-notational counterpoint. The non-notated digital recording is infinitely repeatable without variation, whereas a live human performance is infinitely variable. One can perform a ‘work’ repeatedly, but one cannot repeat a unique ‘performance.’ Consequently, digital counterpoint exists only in recorded form. Throughout this study, I draw on terminology and concepts from traditional counterpoint to illustrate similar compositional practice in digital counterpoint: mashup production uses pre-existing musical material rooted in common-practice harmony of triadic, vertical harmonies, and contrapuntal radio employs adaptations of common musical forms and polyphonic textures. There are few direct analogies between common-practice counterpoint and digital counterpoint, although I use the former for the purpose of exposition when explaining the concepts and techniques idiomatic to digital counterpoint.

The connection between audio (re)production technology and counterpoint has a historical precedent. In the 1930s, French composer Raymond Lyon suggested ‘phonograph duets’ with the combination of Schubert’s eighth symphony and Al Jolson’s “There’s a Rainbow Round My Shoulder” (1928).⁸ Lyon’s suggestion of this combination for the harmonic and metric similarities immediately evokes the mashup and its combination of samples from different genres. I discuss the historical roots of digital counterpoint more extensively in Chapter One.

Literature

My literature survey is three-pronged. First, I examine some concepts of traditional contrapuntal composition to establish a basis for comparison with digital counterpoint. Later, the literature on Gould’s contrapuntal radio ‘documentaries’ illuminates the need for a discussion of their status as musical compositions (as opposed to documentary or

7. Mark Katz, *Capturing Sound: How Technology Has Changed Music* (Berkeley, CA: University of California Press, 2004), 29.

8. *Ibid.*, 118.

radio drama). The discussion of the radio works as music provides the starting point for my own analysis. Finally, scholarly literature on the mashup focuses on issues of aesthetics, ethnography, and copyright. The literature on the mashup as a musical phenomenon is conspicuous by absence.

I begin with an examination of common approaches to counterpoint instruction and several ‘conceptions’ of counterpoint and contrapuntal composition. I confine my survey to the eighteenth-century tonal tradition only because to date mashup producers have worked entirely with music written in a tonal idiom. The resulting works bear the characteristics of vertical triadic harmony idiomatic to common-practice counterpoint. Contrapuntal radio incorporates very little musical material so I confine this discussion of harmony to the mashup repertoire.

Digital counterpoint closely resembles the Baroque ‘quodlibet’ contrapuntal composition because it uses only pre-existing musical material in the form of recorded audio.⁹

Specifically, the quodlibet is,

A composition in which well-known melodies and texts appear in successive or simultaneous combinations. Generally the quodlibet serves no higher purpose than that of humour or technical virtuosity, and may thus be distinguished from more serious works in which pre-existing material has a constructive or symbolic function.¹⁰

Whereas quodlibet technique fuses two or more recognizable pure vocal melodies, the mashup brings together both pre-recorded vocal melodies and instrumentals. The mashup’s appeal rests in the humour resulting from thwarted expectations and the novelty of bringing together unlike artists or genres. Kent Kennan’s counterpoint text mentions quodlibet, but only as an example of ‘theme and variation’ rather than as a compositional technique.¹¹

9. I indulge in a protracted discussion of quodlibet in Chapter One.

10. Maria Rika Maniates, Peter Branscombe, and Richard Freedman "Quodlibet," *Grove Music Online. Oxford Music Online*. Oxford University Press, (accessed January 28, 2013) <http://www.oxfordmusiconline.com.proxy1.lib.uwo.ca/subscriber/article/grove/music/22748>.

11. Kent Kennan, *Counterpoint* (Englewood Cliffs, NJ: Prentice Hall, 1987), 277-78. Kennan uses the last variation of J.S. Bach’s ‘Goldberg Variations’ to illustrate the concept of quodlibet. His explanation is brief and unsatisfying for anyone wanting to practice this technique.

Some historical instructional texts approach counterpoint by a graded series of lessons, the ‘species’ method, to guide students through the task of composing independent melodies in counterpoint. Each step is its own species, the first of which starts with one note against one note, progressing to the second species of two notes against one note. Additional compositional ‘rules’ are added with each new step. Honed and consolidated in Johann Joseph Fux’s *Gradus ad Parnassum* (1725) or *Steps to Parnassus*, species counterpoint established a standard for composition curricula.¹²

Species counterpoint provides a step-by-step method for learning to combine independent melodies according to idealized norms of sixteenth-century Western European vocal composition. Because of the underlying significance of these norms for tonal music, sixteenth-century principles are applicable to many Western musical genres, including much of the music of our own time.... Species exercises... present common musical situations in simplified settings. Working within the guidelines laid out for each species teaches techniques that refine compositional skills...¹³

After the success of Fux’s book, several theorists adopted the species technique for their own texts.¹⁴ Consequently, there are as many ways to approach species exercises as there are texts. Common to all counterpoint curricula is a series of rules for the best practice of composing simultaneous independent melodies. The author begins with a quick introduction to consonant and dissonant intervals before beginning the species exercises, lessons in ‘voice leading,’ ways to approach and leave consonant and dissonant intervals. The options for motion are limited to *similar*, where voices move in the same direction, by the same melodic interval(s); *contrary*, in which voices move toward or away from each other; and *oblique*, where one voice moves up or down while the other remains static and does not move. Voice leading is a significant determinant of a voice’s ‘independence.’

This present study is not concerned with specific rules, only that they exist. The rules are a prescribed method for composition that apply when the composer is concerned with

12. Johann Joseph Fux, *The Study of Counterpoint*, trans. Alfred Mann. (New York: W.W. Norton & Co., [1725]1965).

13. Martin, *Counterpoint*, vii.

14. Luigi Cherubini, *Cours De Contre-Point Et De Fugue* (Paris: Maurice Schlesinger, 1835); Ebenezer Prout, *Counterpoint: Strict and Free* 4th. ed. (London: Augener & Co., 1890); Hugo Riemann, *Grosse Kompositionslehre* (Berlin: W. Spemann, 1903); Heinrich Schenker, *Counterpoint*, trans. John Rothgeb and Jurgen Thym (New York: Schirmer Books, [1910-1912] 1987).

creating *original* material. Composers working with digital counterpoint techniques have the luxury of indifference to the rules of voice leading; they are not responsible for creating original material, only for *repurposing* existing recorded audio. Recorded musical excerpts contain melodies and harmonies with their own voice leading. When combining simultaneous audio samples, the composer cannot control the internal voice leading in the audio samples. The priority shifts, then, to managing harmonic, metric, and rhythmic consonance and dissonance. This is another significant difference between common-practice and digital counterpoints.

Contemporary counterpoint texts do not extend their curricula to working with digital audio, thereby rendering a direct comparison between some elements of common-practice and digital counterpoint technique unviable. Despite the dearth of composition texts dedicated to working with recorded audio, there is a significant body of literature devoted to technical analysis of contrapuntal compositions with atonal materials and recorded audio. The literature addresses ‘perception’ of space and independent voices in counterpoint as well as the extra-musical elements of speech and miscellaneous sounds in recorded audio.

A brief survey of the literature reveals three connected approaches to musical and audio analysis. The first, *Phenomenology*, studies the subjectivity of experience. It concerns not *how* we perceive something in a particular way but *what* shapes our perception. The ‘what’ is unique to each person. John Mowitt approaches the topic with the case study of a Memorex tape advertisement, using Ella Fitzgerald and Chuck Mangione to demonstrate the superiority of Memorex’s audio fidelity.¹⁵ The ad posed the question as to whether the listener could detect the difference between a ‘real’ live performance and a recording captured to Memorex tape. By what mechanisms or experiences can we perceive the difference between live and recorded? Thomas Porcello suggests that the “ultimate significance of music resides not solely in musical texts per se but rather in social and individual processes of musical encounter.¹⁶ In other words, listeners all hear

15. John Mowitt, “The Sound Of Music In The Era Of Its Electronic Reproducibility,” in *Music and Society: The Politics of Composition, Performance, And Reception*, ed., Richard D. Leppert and Susan McClary (Cambridge: Cambridge University Press, 1987), 173-174.

16. Thomas G. Porcello, “Tails Out: Social Phenomenology and The Ethnographic Representation

the same thing in different ways, localised to personal experience. The second, *Gestalt psychology*, concerns one's ability to form stable perceptions of objects through 'noise,' or through objects that might distract one's focus. Gestalt psychology normally centres on the visual element although it is adapted to aural phenomenon. The literature may be further broken down into several categories, the first of which applies Gestalt principles to notated music.¹⁷ Charles Fox argues, "The art of counterpoint is... an art of segregation of melodic lines within the total context."¹⁸ He places his argument in the context of analyzing the twentieth-century contrapuntal styling of Bartok, Shostakovich, and Stravinsky. His study applies an interdisciplinary analytical model chosen from both music and psychology.

The second grouping of literature on Gestalt principles addresses extra-musical sounds.¹⁹ The "cocktail party effect" is applicable to the analysis of Gould's contrapuntal radio, as it deals with speech content. The "cocktail party effect [is] the human's ability to selectively attend to a single talker or stream of audio among a cacophony of others."²⁰ Early experiments with this effect grew out of the concerns of air traffic controllers in the mid-twentieth-century who relied on loudspeakers, not sound-isolating earphones, to direct multitudes of planes at takeoff or landing. Controllers shifted their attention frequently between active loudspeakers without adjusting volume levels. In the first experiments on this effect with speech, Colin Cherry deduced, "We can listen to one speaker when another is speaking simultaneously. There are acts of recognition and discrimination."²¹ When controllers focus on one voice they actively reject all the other

Of Technology In Music Making," in *Music and Technoculture*, ed., René T.A. Lysloff and Leslie C. Gay, Jr. (Middletown, CT: Wesleyan University Press, 2003), 265.

17. Charles Fox, "Modern Counterpoint: A Phenomenological Approach" *Notes* 6, no. 1 (1948): 46-57; James K. Wright and Albert S. Bregman, "Auditory Stream Segregation And The Control Of Dissonance In Polyphonic Music," *Contemporary Music Review* 2 (1987): 63-92.

18. Fox, "Modern Counterpoint," 47.

19. Colin Cherry, "Some experiments on the Recognition Of Speech, With One And With Two Ears," *The Journal Of The Acoustical Society Of America* 25, no. 5 (1953): 975-979; Colin Cherry and W.K. Taylor, "Some Further Experiments Upon The Recognition Of Speech, With One And With Two Ears," *The Journal Of The Acoustical Society Of America* 26, no. 4 (1954): 554-559; O.M. Mracek Mitchell, Carolyn Ross, and G.H. Yates, "Signal Processing For A Cocktail Party," *Journal of The Acoustical Society Of America* 50, no. 2 (1971): 656-660; Lisa J. Stifelman, *The Cocktail Party Effect In Auditory Interfaces* (Cambridge, MA: MIT Media Laboratory, 1994); Barry Arons, *A review of the cocktail party effect* (Cambridge, MA: MIT Media Lab, 2008).

20. Stifelman, "Cocktail Party," 1.

21. Cherry, "Some Experiments," 975.

voices as noise. This ‘effect’ will surface again later in my discussion of Gould’s ambitious polyphonic scenes in *The Idea of North* and *The Latecomers*.

The *Gestalt* literature also relates to the third category of literature discussed here, psychoacoustics. Psychoacoustics is the scientific and systematic study of sound perception, and it encompasses both physiological and psychological responses to sound. In the context of digital counterpoint, sound localization is the primary interest. It is the process of how one determines the location of a sound source in a given area.²²

These three categories of literature offer highly technical methodologies for examining atonal counterpoint and counterpoint in recorded audio, but what of traditional notions of common-practice counterpoint? Without the aid of species-style exercises or voice leading rules for composing with pre-recorded audio materials, I shift my focus to ‘concepts’ of counterpoint to illuminate a workable concept of digital counterpoint. Authors use metaphors to describe counterpoint to the novice composer. In their counterpoint text, Salzer and Schacter explain,

*The study of counterpoint is above all the study of voice leading. Wherever there is voice leading, wherever there exists motion and direction of voices, in any style or period whatever, there is counterpoint. The view that contrapuntal studies lead solely to the understanding and writing of sixteenth-century vocal polyphony, or of inventions, canon, and fugues, is narrow and misleading. It completely ignores the pervasive influence of the contrapuntal concept, so characteristic of Western tonal, as well as modal, music.*²³

Their conceptualisation of counterpoint offers a compelling metaphor to describe counterpoint, and, by extension, digital counterpoint. It eschews mention of specific rules of voice leading to include *any* motion. Further, counterpoint exists in the ‘real world’ of compositions, not as disconnected, abstract exercises. Salzer and Schacter also sidestep the thorny issue of counterpoint being the exclusive domain of art music. Kennan describes the function of counterpoint and the dynamic effect of contrapuntal works:

22. Jens Blauert, *Spatial Hearing: The Psychophysics of Human Sound Localization* (Cambridge, MA: MIT Press, 1983); Albert S. Bregman, *Auditory Scene Analysis* (Cambridge, MA: MIT Press, 1990); Stephen Handel, *Listening: An Introduction To The Perception Of Auditory Events* (Cambridge, MA: MIT Press, 1993). James K. Wright, “Auditory Object Perception: Counterpoint In A New Context.” Master’s thesis, McGill University, 1987.

23. Felix Salzer and Carl Schacter, *Counterpoint in Composition: The Study Of Voice Leading* (New York: Columbia University Press, 1969), xvii.

The chief objective of counterpoint study... is to awaken or sharpen in students a feeling for the contrapuntal element that is present to some degree in virtually all music; to make them sensitive to the forces of opposition and agreement, tension and relaxation, direction, climax... that operate whenever two or more voices are sounded simultaneously.²⁴

Kennan does not talk specifically about harmony, offering only qualitative descriptions of the effects of harmony. Terms such as tension and relaxation, opposition and agreement apply to a wide range of parameters that fall well outside melodic and harmonic considerations in traditional counterpoint, including timbre, instrumentation, and spoken words or song lyrics. Strictly speaking, these elements are not normally a part of traditional counterpoint instruction, which focuses primarily on pitch, melody, rhythm, and voice leading. These elements are more fundamental to digital counterpoint and contrapuntal radio than common-practice counterpoint. The theme of tension and conflict carries into Hugo Norden's text:

Contrapuntal lines are played or sung against, not with, each other so that the prevailing spirit is one of conflict or stress. This requires skillful construction of the separate melodic lines to insure smooth effective operations.... This is not conflict in the violent sense. It is... that of the two or more lines, each with a characteristic design of its own, functioning simultaneously with a common artistic purpose... this constantly surging activity of two or more contrapuntal lines moving at once is often compared to that of *quite unlike people working together* [emphasis added]. Discord and its ensuing concord are integral ingredients of the phenomena both of living and of music.²⁵

The notions of tension and conflict emerge often to describe counterpoint's aesthetic effect. This is a significant element of digital counterpoint and Gould's contrapuntal radio, especially when it concerns speech-based material, semantic harmony and 'program.'

Gould produced the contrapuntal radio documentaries for the Canadian Broadcasting Corporation (CBC) in the 1960s and 1970s. He and his audio engineer, Lorne Tulk, worked with magnetic audiotape, a pre-digital, analog recording medium. Contrapuntal radio fits in this study because the audio production techniques are conditioned by Gould's knowledge of counterpoint and the contrapuntal music literature. He treats

24. Kennan, *Counterpoint*, 1.

25. Hugo Norden, *Fundamental Counterpoint* (Boston: Crescendo, 1969), 1.

speech and sound effects as musical materials. Unfortunately, Gould left precious little discussion of *why* or *how* contrapuntal radio is music. Apart from one article in the form of an interview, he did not discuss theory or technique in any practical depth.²⁶

The bulk of the literature on contrapuntal radio debates the virtue of classifying these works as documentary, radio drama/theatre, music, or a combination of all three. I outline some of these discussions below. Gould's own descriptions of contrapuntal radio encompass the trinity of classifications and render a definitive classification difficult. The examination of contrapuntal radio in this study will explore what is musical about it, and will not debate the merits of one classification over another. By Gould's definition, in contrapuntal radio,

[E]very voice leads its own[...] life and adheres to certain parameters of harmonic discipline... how the voices came together and in what manner they splashed off each other, both in the actual sound and in the meaning of what was being said.²⁷

Similar to the above definitions of counterpoint, Gould implies an element of dialogue and conflict but also correspondence with musical elements, 'parameters of harmonic discipline.' Other authors elaborate upon Gould's own explanations of contrapuntal radio. The body of literature is growing not only in volume but also in specificity. The literature breaks down to five categories:

1. Gould biography, which often includes a brief mention and editorializing about the radio documentaries;²⁸
2. Analyses of Gould as performer, composer, and philosopher;²⁹

26. Glenn Gould, "Radio As Music: Glenn Gould In Conversation With John Jessop," in *The Glenn Gould Reader*, ed., Tim Page. (New York: Key Porter Press, 1990): 374-88. In the interview with John Jessop, Gould outlines talking points for the origins of contrapuntal radio, mention of formal design, and polyphonic textures but only superficially. Gould only reiterates his talking points in subsequent print and television interviews and specials.

27. Tim Page, ed., *Glenn Gould: A Life In Pictures* (Buffalo: Firefly Books, 2007), 31.

28. Geoffrey Payzant, *Glenn Gould: Music and Mind* (Toronto: Van Nostrand Reinhold, 1978); Otto Friederich, *Glenn Gould: A Life In Variations* (Toronto: Malcolm Lester & Orphen Dennys, 1989); Peter Ostwald, *Glenn Gould: The Ecstasy And Tragedy Of Genius* (New York: W.W. Norton & Co., 1997); Kevin Bazanna, *Wondrous Strange: The Life And Art Of Glenn Gould* (Toronto: McClellan and Stewart, 2005); and Helen Mesaros, *Glenn Gould: Bravo Fortissimo, The Mind Of A Canadian Virtuoso* (Baltimore, MD: American Literary Press, 2008).

29. Andrew Kazdin, *Glenn Gould At Work: Creative Lying* (New York: E.P. Dutton, 1983); Elizabeth Angilette, *Philosopher At The Keyboard* (Lanham: Scarecrow Press, 1992); Kevin Bazanna,

3. Those that co-opt Gould's work as a talking point in their own respective discipline, usually in philosophy,³⁰
4. Compilations of writings, and miscellaneous essays fêting Gould;³¹
5. Literature devoted specifically to contrapuntal radio.³²

The literature includes mainstream and academic works. Both offer incisive commentary and analysis. Payzant's biography, written with Gould's cooperation, offers compelling insight into Gould's then current ideas on performance, recording, and what Payzant terms the 'New Philosophy.' Helen Mesaros' self-published work grows out of her own professional concerns as a clinical psychologist and is, largely, a Freudian post-mortem for the Apollonian Gould. Her engagement with the radio work centers on the 'solitude' of the *Solitude Trilogy*, specifically Gould's own desire for solitude; Peter Ostwald, a psychiatrist, offers a similar analysis.³³

It is fair to suggest that the bulk of contrapuntal radio analyses lack depth because Gould's radio work is so unlike other contemporary composition. Compared to experimental radio projects in other international contexts—Radiophonics in the UK,

Glenn Gould: The Performer In The Work (Oxford: Oxford University Press, 1997); Peter Martens, "Glenn Gould's 'Constant Rhythmic Reference Point': Performing And Hearing Pulse In Bach's Goldberg Variations, 1955 and 1981," *voiceXchange* 1, no. 1 (1996): 30-44; Darrell Varga, "Locating The Artist In Thirty Two Short Films About Glenn Gould," *Canadian Journal of Film Studies* 12, no. 2 (2003): 99-120; Tim Hecker, "Glenn Gould, The Vanishing Performer And The Ambivalence Of The Studio," *Leonardo Music Journal* 18 (2008): 77-83; Paul Sanden, "Hearing Glenn Gould's Body: Corporeal Liveness In Recorded Music," *Current Musicology* 88 (2009): 7-34; Mark Kingwell, *Glenn Gould* (Toronto: Penguin Canada, 2011).

30. Jody Berland, *North Of Empire: Essays On The Cultural Technologies Of Space* (Durham, NC: Duke University Press, 2009); Anyssa Neumann, "Ideas of North: Glenn Gould And The Aesthetic Of The Sublime," *voiceXchange* 5, no. 1 (2011): 35-46.

31. John McGreevy, ed., *Glenn Gould variations: By Himself And His Friends* (Toronto: Macmillan of Canada, 1983); Tim Page, ed., *The Glenn Gould Reader*, (New York: Key Porter Books, 1984); John Roberts, ed., *The Art of Glenn Gould: Reflections Of A Musical Genius* (Toronto: Malcolm Lester Books, 1999).

32. Robert Hurwitz, "The Glenn Gould Contrapuntal Radio Show," *New York Times*, January 5 1975, D1; Robert Hurwitz, "Towards A Contrapuntal Radio," in *Glenn Gould Variations*. John McGreevy, ed., (Toronto: Macmillan of Canada, 1983): 253-264; Edward Said, "The Music Itself: Glenn Gould's Contrapuntal Vision," in *Glenn Gould By Himself And His Friends*. John McGreevy, ed., (Toronto: Doubleday Canada, 1983): 45-56; Richard Kostelanetz, "Glenn Gould As A Radio Composer," *The Massachusetts Review* 29, no. 3 (1988): 557-570; Kevin McNeilly, "Listening, Mordacity, Community: Glenn Gould's 'The Idea of North'," *Essays on Canadian Writing* 59 (1996): 87-104; Friedemann Sallis, "Glenn Gould's 'Idea of North' And The Production Of Place In Music," *Intersections* 25, no. 1-2 (2005): 113-137; Mark Laurie, "Pilgrimage to Solitude," Master's Thesis, Ryerson University, 2010.

33. Mesaros, *Bravo Fortissimo*, 372-37; Ostwald, *The Ecstasy And Tragedy*, 240-243.

musique concrète in France, and the German *Hörspiel*—*The Idea of North* and others do not belong to a particular genre. Most writers who venture into a discussion of *North* tackle the task of categorization. Payzant describes *North* as a hybrid, “music, drama, and several other strains, including essay, journalism, anthropology, ethics, social commentary, contemporary history.”³⁴ Kevin Bazanna spends several pages arguing for the documentary label.³⁵ Mark Kingwell perhaps perceives contrapuntal radio as something other than traditional counterpoint and brackets the contrapuntal aspects of it.

Contrapuntal is not the right word... despite Gould’s claims that the piece was constructed on the model of a fugue, it does not... offer the satisfaction of resolution to a tonic or even the meta-satisfaction of deliberately dashing the expectation of resolution to the tonic.³⁶

Gould’s own explanation of contrapuntal radio as music necessitates a different understanding of conventional terminology. The traditional concept of fugue, to which Kingwell alludes, varies from Gould’s own use of ‘fugue’ simply because Gould’s counterpoint employs speech and not musical material. A reimagining of fugue should not invalidate variations in concept or practice assuming the ‘spirit’ of fugue remains intact. Most writers cede that *North* is, to a varying extent, musical; however, their final assessment avoids a conclusive definition of the work as music beyond vague descriptions of multi-voiced polyphony. Bazanna devotes two and a half pages of his book to a discussion of the work as music;³⁷ Robert Hurwitz succinctly summarizes that “‘*The Idea of North*’ was a symphony.”³⁸ Friedemann Sallis treads closest to a musical discussion. He roots his analysis primarily in semantics and thematic content although he makes an argument for *North*’s classification as music with its own internal musical system that is a,

... Composition of sound (duration, dynamics, tempo, phrasing, and pitch) and silence, the polyphonic manipulation of voices and the interaction of musical parameters with the semantic content of the text.³⁹

34. Payzant, *Music And Mind*, 130.

35. Bazanna, *Wondrous Strange*, 295-302.

36. Kingwell, *Glenn Gould*, 131.

37. Bazanna, *Wondrous Strange*, 302-304.

38. Hurwitz, “Towards A Contrapuntal Radio,” 256.

39. Sallis, “‘Idea of North’ And The Production Of Place,” 143.

This is perhaps the closest and most insightful musical analysis of contrapuntal radio because it incorporates both technique and thematic analysis. Even so, it still wants for more detail. Gould retrospectively suggested,

I think that much of the new music has a lot to do with the spoken word, with the rhythms and patterns, the rise and fall and inclination, the ordering of phrase and regulations of cadence in human speech.... it's unrealistic to think of that as anything but composition... I think our whole notion of what music is has forever merged with all the sounds that are around us, everything that the environment makes available.⁴⁰

North fits into the art music avant-garde. The mid-twentieth-century vogue of composition with voice (either acoustic or electronic) produced a significant number of works: Karlheinz Stockhausen's *Gesang der Jünglinge* (1955-56), John Cage's *Imaginary Landscape No. 4* and *Imaginary Landscape No. 5* (1951 and 1952, respectively; the former involving 12 radios sounding simultaneously and the latter, 42 turntables), Mauricio Kagel's *Anagrama* (1957-58); and *Cento* (1967), by Gould's compatriot István Anhalt, whose work was also familiar to Gould and similarly admired.⁴¹ Gould, by contrast, borrowed from conventional compositional concepts in 'composing' the contrapuntal radio documentaries.

Gould accomplished complex compositional feats using only magnetic tape; however, as I elaborate in Chapter One, the limitations of analog tape technology precluded extended sections of overlapping music.⁴² The mashup emerged decades later in a geographic location and musical realm far from Gould's compositional milieu. Mashup production technique demonstrated viable methods for manipulating digital audio samples into autonomous new works. Though the Evolution Control Committee produced what would become the contemporary model for the mashup with "By the Time I Get to Arizona" (1996), the mashup did not enter mainstream consciousness until 2004 with the release of DJ Danger Mouse's *Grey Album*, an entire album of mashups produced using samples drawn from the Beatles's *White Album* and Jay-Z's *Black Album*. Immediately, EMI

40. Payzant, *Music and Mind*, 130.

41. Gould interviewed Anhalt about *Cento* for CBC Radio in 1969.

42. There is an exception in *Stokowski: A Portrait For Radio* (1970) as Gould overlays a sustained chord from a Shostakovich symphony with a succession of Eastern European folk melodies that coalesce with the underlying symphonic chord. This is a simple example of overlapped music relative to more complex sustained harmonic pairings in mashups.

issued Danger Mouse, aka Brian Burton, a cease-and-desist order for his use of copyrighted material. The ensuing debate over copyright and intellectual property law, however, overshadowed the musical milestone. The following portion of this survey focuses on the scant mashup literature.

The scholarly literature on mashups focuses primarily on issues of intellectual property and copyright legislation. Most of the literature included in this review examines the copyright status quo to promote the mashup as a legitimate art form or to deride it as derivative of ‘legitimate’ music. I restrict this survey to the scholarly literature although the mashup receives a significant amount of attention in the popular press. Online forums, blogs, and other online music media publications make mention frequently of the mashup and mashup producers, though generally in short articles or paragraphs. Their commentary mirrors the content of the academic articles I examine below.

Proponents of the mashup argue from several points: 1) Those who advocate for the genre to discuss perceived deficits in the current American copyright regime;⁴³ 2) those who argue for the mashup as a site of cultural resistance; and 3) authors who sidestep the copyright debate altogether and focus on the mashup producer and the form’s implication for cultural production at large.

The copyright activists refer frequently to the 1998 Sonny Bono copyright term extension act of 1998 and the 2003 Digital Millennium Copyright Act. The latter imposes stringent guidelines on the use of licensed and sampled audio. Kembrew McLeod weighed in first on mashups and uses the *Grey Album* as a starting point for his critique of copyright and intellectual property laws.⁴⁴ The mashup’s appeal, he asserts, is its democratizing force in the music industry; the form’s indifference to elitist pop-culture hierarchies puts every genre and style on equal footing and subject to mix-and-mashing. Sam Howard-Spink

43. I reference American copyright law, as opposed to Canadian copyright law, because the discussions and debate about the mashup’s legal standing occurs on the battleground of the American justice system. The Canadian Recording Industry Association, unlike its American counterpart, the Recording Industry Association of America, has not spoken out against mashup production or publicly pursued legal action against mashup producers.

44. Kembrew McLeod, “Confessions of an Intellectual (Property): Danger Mouse, Mickey Mouse, Sonny Bono, and My Long and Winding Path as a Copyright Activist-Academic,” *Popular Music and Society* 28, no. 1 (2005), 80.

also invokes the *Grey Album* to discuss American copyright law and ‘Grey Tuesday,’ a day of organized online activism to support Danger Mouse. Spink betrays his academic objectivity with a decidedly pro-mashup perspective on the popular reception of mashups. His descriptions of early mashups recall their novelty relative to products gestated in the commercial mainstream.⁴⁵ Spink laments the mashup’s existence in a commercial netherworld where the music is effectively contraband and is only permitted to exist to the extent that it remains below the commercial radar.⁴⁶ The artist most closely associated with the mashup, Girl Talk (Gregg Gillis), releases his albums online and tours internationally.⁴⁷ Thus far, the music labels tacitly ignore his work by *not* threatening litigation. The mashup remains below the commercial radar, but only because the record labels are silent on the matter.

William Levay, in 2005, offered the first critical defence of the mashup. He points first to Marcel Duchamp’s “Bicycle Wheel” (1913) as an example of a physical mashup that, once considered an aesthetic abomination for its combination of disparate mechanical elements, is now a critical work of early modernist sculpture.⁴⁸ The thrust of Levay’s analysis seeks a definition that accounts for the authorial role of the mashup producer. There is no original musical material in a mashup but only pre-existing materials. He suggests a need to quantify the mashup producer’s authorial contribution by other measures. Winding his arguments through Walter Benjamin’s “Art in the age of mechanical reproduction” and Theodor Adorno’s “On jazz,” Levay builds a defense of the musical mashup genre as a legitimate art.

Philip Gunderson offers his pro-mashup stance on the *Grey Album* as an act of resistance at work within and against the edifice of mass music.⁴⁹

Mash-up artists such as Danger Mouse have shown how the recording industry has been rendered superfluous by advances in music production

45. Sam Howard-Spink, “Grey Tuesday: Online Cultural Activism and the Mash-up of Music and Politics,” *First Monday* 9, no. 10 (2004): “History Of Mashup” section, par. 4.

46. *Ibid.*, par. 8.

47. Writers in the popular literature associate Gillis with the mashup though mashup producers and Gillis himself do not perpetuate that association.

48. William J. Levay, “The Art of Making Music in the Age of Mechanical Reproduction: The Culture Industry Remixed,” *Anemesa* (2005): 22.

49. Philip A. Gunderson, “Danger Mouse’s *Grey Album*, Mash-Ups, and the Age of Composition,” *Postmodern culture* 15, no. 1 (2004), par. 6.

technology. Artists once had to play the record companies' games in order to gain access to precious time in a recording studio; today, a "bedroom producer" can create a professional sounding album with a personal computer alone.⁵⁰

Gunderson's article segues into an argument for considering the mashup on its own aesthetic merits. He concludes with a discussion of the mashup as a "harbinger of social change, [when] artists like Danger Mouse may be taken as cultural prophets."⁵¹

The issue of the mashup's critical reception did not reappear in the scholarly literature until 2007. Aram Sinnreich broached the topic of reception in his dissertation on configurable culture. Technology, he argues, makes pre-existing cultural products available for deconstruction and reconstruction, and subsequently they become configurable.⁵² Though Sinnreich's study is not specifically about the mashup, he highlights the genre as the clearest musical example of a highly configurable cultural product. His argument rests on the notion that that consideration of any art stands on its own merits based on the available means of production. In other words, one measures works in the context of their own history, not ahistorically. Sinnreich does not base his study solely on cultural theory, but also on popular reception and opinion gathered in fieldwork interviews. Popular opinion does not constitute empirical evidence, but it does establish a precedent for critical reception. Later studies look past the art form itself and to the practitioners who devote their time and technique to the craft of mashup production.

Ethnographic studies of the mashup community imply an author-as-proponent position for the subjects. John Shiga's 2008 study describes a community of 'bedroom producers' who work in isolation but share their work collectively in online user forums.⁵³ Shiga suggests that producers' pseudonymous participation in an underground arts community presupposes their economic disinterest in their labour. Shiga discusses a fragmentation in the community in that producers lack a common vocabulary to inform theory, practice, or

50. Gunderson, "Danger Mouse's Grey Album," par. 2.

51. *Ibid.*, par. 12.

52. Aram Sinnreich, "Configurable Culture: Mainstreaming the Remix, Remixing the Mainstream," Ph.D. Dissertation, University of Southern California, 2007.

53. John Shiga, "Copy-and-Persist: The Logic of Mash-up Culture," *Critical Studies in Media Communication* 24, no. 2 (June 2007): 93-114.

analysis for discussion; fragmentation also results from the varying educational backgrounds and skill levels represented in online forums. The issue of unequal education and skill sets poses a barrier to finding a satisfactory middle ground for productive discussion. Further, it is difficult to codify any practice without an agreed-upon vocabulary. Shiga attributes the underdeveloped metalanguage not only to producers' backgrounds, but also to the variety of digital audio workstation software used for mashup production. Each audio production application employs a similar graphical user interface (GUI) but their respective workflows and proprietary terminology work against developing a cohesive terminology to inform a communal compositional discourse. Shiga identified a key point in mashup production that, in part, fuels my study, though I do not attempt to codify a practice of mashup production, per se. Instead, my purpose is to abstract a generalized contrapuntal compositional practice as represented in mashup production.

In a later protracted ethnography, Liam McGranahan's 2010 dissertation explores similar issues among the community of mashup producers.⁵⁴ McGranahan interviews several producers to provide largely insider knowledge about motivation, of the process that varies from producer to producer, and the ethics internal to the community (authorship, economic motivations, etc.). Conspicuous by absence is a discussion of musical theory or practice (as distinct from proprietary process).⁵⁵

Jordan Roseman (aka DJ Earworm) is the only mashup producer to commit his workflow to print.⁵⁶ Roseman's text is compelling because his work bears the sheen and polish of any studio-produced album. Apart from his facility with his Digital Audio Workstation (DAW) –Sony's Acid Pro–his educational background in music and computer science sets him apart from many other producers. His book is a full-length instructional text on mashup construction though it is not a gradual process as in a 'species method' of instruction. Rather, he organizes the text to address elements of production discretely: harmony, form, effects, extracting samples, etc. Also, his extended chapter on harmony

54. Liam McGranahan, "Mashnography: Creativity, Consumption, And Copyright In The Mashup Community." Ph.D. Dissertation, Brown University, 2010.

55. In the interest of fairness, the nature of this study does not lend itself to this kind of analysis.

56. Jordan Roseman, *The Audio Mashup Construction Kit* (Indianapolis, IN: Wiley Publishing, 2007).

explains *why* some harmonic combinations work better than others; however, it does not promote an understanding of the underlying harmonic process. Roseman's text is a guide to production practices. A single chapter is not sufficient to study harmony in depth but it provides a common terminology to systematize production and reduce the practice of trial and error.

The mashup as an art form is not without its detractors. To some it is the catalyst for an epidemic of copyright infringement and cultural plundering. Wiley Publishing took a risk in publishing Roseman's book, considering the mashup's dubious legal status following the *Grey Album* furor in 2004. The text encourages producers to appropriate samples—an industry faux pas.⁵⁷ There is opposition to the mashup based on the genre's modular aesthetic, indifferent appropriation of musical material, or proclamations of economic disinterest. Their arguments reveal a superficial understanding of surface details and a fundamental misunderstanding of the underlying music theory and recording practice. The use of technology is not without its detractors. Simon Frith, in his 1986 article, "Art versus technology: The strange case of popular music," tracks critical and popular resistance to technological intermediaries in live musical performance, and outlines a common criticism of increased use of technology in music production.

Technology is opposed to art... One effect of technological change is to make problematic the usual distinction between 'musician' and 'sound engineer,' with its implication that musicians are creative artists in a way that engineers are not. What matters here is not the... issue of creativity itself but, rather, the idea of self-expression.⁵⁸

Frith wrote at the dawn of the digital age and surely did not anticipate musical developments like the mashup. His insights are still applied by some, and echo in the writings of people who argue against the mashup. Though Frith's article preceded mashup production by nearly a decade and a half, it outlines key points of the charges leveled against mashup production. One need only substitute 'producer' for 'sound

57. Roseman includes a substantial final chapter on copyright law, public domain, and respecting an artist's intellectual property.

58. Simon Frith, "Art Versus Technology: The Strange Case Of Popular Music," *Media, Culture, And Society* 8 (1986), 264.

engineer' to draw the parallel between the argument and common criticisms of the mashup.

Michael Serazio theorizes some influences and implications of the mashup on subsequent cultural movements. He positions the mashup as a response to technological, institutional, and social contexts and interprets it without rosy optimism. The mashup, he asserts, emerges as a product and symbol of a cultural era whose foundation is built on piracy and pillaging.⁵⁹ There is a ring of truth to this but the sentiment dismisses the mashup as a legitimate musical phenomenon based only on its source material and production methods. His dismissal reflects a particular blindness to other genres that are equally reliant on so-called copied ideas for their foundation.⁶⁰

Serazio notes the mashup's modular construction. Mashup production depends on sectionalized popular music for the producer to derive clean samples of entire phrases or melodic fragments. He argues that the modularity creates fluid boundaries between disparate genres. His example, "Smells like teen booty" (2002), illustrates how the producer, 2ManyDJs, juxtaposes Nirvana's gritty "Smells like teen spirit" with the slick sonic patina of Destiny's Child's "Bootilicious" without deference to their respective aesthetics or targeted audience.

The irony of [Smells like teen booty] (its widely cited greatest strength) subverts what had been Cobain's genuine lament; it undermines author intent and erases originally coded meanings and readings. Instead of a growling "I feel stupid and contagious," the listener hears, "Is my body too bootylicious for you, baby?" ... "Teen Spirit" has been stripped of its suicidal self-seriousness and Nirvana's sound is now enmeshed with precisely the sort of glossy pop that the band so despised. This, many argue, is precisely the point: to deconstruct (and mock) the arbitrarily divided and cherished pop canon.⁶¹

Serazio continues that with finessing, the finished mashup illustrates that these disparate styles are reconcilable. Despite stylistic differences in two popular music works, Serazio

59. Michael Serazio, "The Apolitical Irony of Generation Mash-Up: A Cultural Case Study in Popular Music," *Popular Music and Society* 31, no. 1 (2008): 79

60. Though it extends beyond the scope of this study, the hip-hop genre relies heavily on sampling past musics as a means of commentary, satire, or reverence for the sampled artists. Serazio does not consider artists whose work reflects distinct influences of past artists: Oasis influenced by the Beatles, the Beatles by Chuck Berry, etc.

61. Serazio, "The Apolitical Irony," 83

argues, the mashup producer manages to make them ‘work’ together; however, his assertion that the genre is “surprisingly vapid ... and bricolage for its own sake” is a stilted assessment of the practice.⁶²

David Gunkel, a professor of communications studies at Northern Illinois University, echoes Serazio’s sentiments.⁶³ His commentary aspires to neutrality, and claims to not side explicitly for or against the mashup. He outlines fundamental assumptions and his argument clearly sides against the mashup as a legitimate art. To him, the mashup is “puerile and patently criminal... illegal appropriation and illegitimate fusion of plundered materials that violates both copyright law and existing industry standards and practices.”⁶⁴ He continues, “the mash-up deliberately involves itself in and toys with derivation, plagiarism, inauthenticity, promiscuity, repetition...”⁶⁵ His stance is unambiguous.

The scholarly literature following Shiga’s and Gunkel’s articles is sparse in relation to the popular interest in the music. The next sign of scholarly activity on the mashup comes two years later in 2010 with McGranahan’s dissertation. My literature search turned up nothing of significance since 2010.

Methods and Approaches

The purpose of this dissertation is to illustrate and outline the concept and practice of digital counterpoint as manifested in mashups and with contributions from contrapuntal radio. I do this through a series of illustrative analyses, explanation, and original theory. I inform my arguments in this study by pursuing my four primary questions:

1. How and where does one proceed following Glenn Gould’s early work and embryonic ideas of non-musical sounds in contrapuntal composition?
2. How can we cultivate and foster a better musical understanding of the mashup?

62. Ibid., 91

63. David J. Gunkel, “Rethinking the Digital Remix: Mash-Ups and the Metaphysics of Sound Recording,” *Popular Music and Society* 31, no. 4 (2008): 489-510.

64. Ibid., 501.

65. Ibid., 503.

3. Using pre-existing audio exclusively precludes composing additional original musical material. How, then, do we measure the ‘original’ contributions to a study of counterpoint?
4. Given the breadth of material encompassed in this study, what are the implications for future composition?

I address these questions by melding traditional analytical frameworks from music theory with my own original analytical models. Through these frameworks, I examine various examples drawn from the mashup and contrapuntal radio repertoire as they embody elements of contrapuntal composition. I present the analyses in case studies to provide a context for the technique. My goal is not to subsume contrapuntal radio and mashups into the same compositional aesthetic. They are fundamentally different musical phenomena with different purposes. When I speak of harmony, form, and texture in mashup production I do not mean to imply that producers actively participate in academic contrapuntal composition practice (reharmonization, transposition, formal design, ‘rules’ of counterpoint’). That they may or may not be cognizant of these constructs is irrelevant.

This study involves only recorded audio because contrapuntal radio and mashups do not exist in hard copy score format. It is impossible to notate the multitude of musical parameters on paper. The mashup exists in visual representations of digital binary data in digital audio workstations; contrapuntal radio exists as lengths of audiotape mixed down to a single monaural or stereo master tape.⁶⁶ I base my analyses entirely on listening without the aid of a written score. This comes with a set of challenges: My interpretations of harmonic practice and recording practice reflect my own aural experiences and not necessarily what others might ‘hear’ in the recording. There is often more than one method for achieving a particular audio effect. My analyses and discussions in Chapters Four and Five, which concern the construction and perception of space and program, focus on the practical application of compositional technique in digital counterpoint. As such, these chapters necessarily forgo the more elaborate, technical analyses by way of *Gestalt* principles, phenomenology, and auditory scene analysis. These are important

⁶⁶ Some of contrapuntal radio is ‘notated’ as a listening graph to illustrate some parameters of the recording practice. These graphs provide a keystone for some of my analyses.

considerations for in-depth theoretical analysis but are tangential to this largely practical study of counterpoint technique. I instead reserve the theoretical, technical analyses for a future study.

Recordings of Gould's documentaries are readily available on the CBC's record label.⁶⁷ Mashups are easy to locate in online user forums, bit-torrent downloads, and online video sharing websites; however, their production quality varies significantly and is inconsistent from track to track. I acquired the bulk of my mashups for this study from Bootie Blog, a long-running and respected blog administered by San Francisco DJs 'Adrian and Mysterious D.' They are taste-makers in the mashup community and they run a monthly club night playing only mashups. Their ratio of submitted tracks to those accepted for posting is roughly 25:1.⁶⁸ Other mashups come from bit-torrent downloads of mashup collections. From these I select the 'cleanest' recordings with studio-grade polish and finesse.

I locate this study within my own position as both a musicologist and composer. I rely not only on my acquired ability to think critically about scholarly discourse and musical texts, but also on my experience with counterpoint studies, composition, and music analysis. I present and analyze several 'musical' and 'extra-musical' elements that offer a different perspective on the compositional technique of digital counterpoint. My focus on Gould's work serves a broader purpose to help fill a void in the scholarly discourse about his radio work. The extant literature largely sidesteps thorough musical analysis of contrapuntal radio. Further, this study does not attempt a comprehensive examination of Gould's complete contrapuntal radio output, only the first works for which he developed the bulk of his techniques. I restrict my discussion to *The Idea of North*, *The Latecomers*, and *Stokowski: A Portrait For Radio* to extract and establish a base of rudimentary compositional techniques for this study of digital counterpoint.

The literature on mashups does not address the musical aspects of what is essentially a musical phenomenon. I engage this work in cross-disciplinary applications of theories

67. Glenn Gould's *Solitude Trilogy: Three Sound Documentaries*. CBC Records PSCD 2003-3, 1992; *Glenn Gould Radio Documentaries: Casals • Stokowski*. CBC Records PSCD 2005-2, 2001.

68. Billy Jam, "Music for Generation ADD," New York Press, <http://www.nypress.com/print-article-16365-print.html> (Accessed April 23, 2009), par. 3-4.

and analytical frameworks; specifically, I situate the study in the disciplines of music theory, ideas from popular music studies, cultural studies, and recording practice and theory. I make clear my application of these theories and my own adaptation of these theories as they apply to this study. I situate aspects of all these practices within a larger discussion of both digital audio production and art music composition.

Chapter organization

I explore these traditional and new elements of digital counterpoint in four different chapters (Two to Five). Each chapter deals with a specific element of digital and/or analog counterpoint. Before proceeding to these discussions, I devote Chapter One to a survey of technological and cultural developments and innovations to establish a precedent for the formation of this study of counterpoint. I begin this chapter by situating my own study within a longer historical context, as my examination is an extension of compositional technique with a long history in the music academy. These techniques are possible, also, because of rapid evolution of audio production and reproduction technologies. I end the chapter with a discussion of the most recent technological developments that provide the compositional tools crucial to composing with pre-recorded audio. I introduce these technologies here so in subsequent chapters I can focus on how composers *apply* the technology.

I base my discussion of music in digital counterpoint technique on case-study analyses of contrapuntal radio (Chapter Two) and mashup (Chapter Three). Chronologically, the two musics span decades and represent different aesthetic goals. For Glenn Gould, his techniques actualize a new method of composition in the form of a radio documentary; mashup producers employ old methods for deconstructing musical works but use new methods to recompose popular music works with segments of pre-existing popular music. Both phenomena display clear signs of contrapuntal composition in that they interplay musical and non-musical voices from multiple pre-existing sources. To that extent, intuition, trial and error, and, to varying extents, knowledge guide their workflow toward what ‘sounds good.’

Gould's work and the mashup are musical and, though different, each offer nuggets of technique that contribute to a broader examination of counterpoint in the digital realm. I begin my study of harmony, form, and texture with contrapuntal radio. Gould's conception of analog tape composition with pre-existing recorded audio as counterpoint warrants inclusion here. The mashup, by contrast, takes advantage of digital audio manipulation and is more musically extensible than contrapuntal radio.

Though I discuss the musical specifics of contrapuntal radio and the mashup, I distill some overarching observations of musical elements in digital counterpoint. First, the structural barriers of digital and analog audio production and manipulation limit extensive harmonic transformation or recomposition. Second, form is idiomatic to the medium for which it is composed: contrapuntal radio takes on large forms, and mashups adopt the small song forms of their parent works. Finally, texture varies from work to work and even within single works. Complex polyphony sometimes disguises itself as homophony, and at times, textures display clear, dense polyphonic composition techniques.

I present analyses of musical elements in contrapuntal radio and mashups in separate chapters to avoid direct comparison and confusion. Over the course of these chapters, I hope to compile and derive a cohesive series of techniques to inform future composition practice with digital counterpoint. Chapter Two examines the non-musical elements as manifest in contrapuntal radio. The technical limitations of audio production with magnetic tape and working in a 'documentary' format requires a rethinking of some traditional notions of what constitutes 'music.' Mashups, the focus of my discussion in Chapter Three, embrace traditional musical materials, as it is concerned with actual pitch-based melodic and harmonic materials. The mashup is possible wholly via digital manipulation and, in relatively short song forms, reveals complex juxtapositions of segmented digital audio from a variety of sources.

After I discuss the primarily musical elements of digital counterpoint I embark in Chapter Four on a discussion of space and spatialization as an original contribution to digital counterpoint technique. The composer constructs sound worlds and dramatic scenarios in

three sonic dimensions. Spatialization is a part of mixing in recording practice. Conversely, spatialization in digital counterpoint creates a ‘never was’ studio recording session, concert performance, or ‘theatrical’ scenario. A work’s subjects do not collaborate but appear to participate by the producer’s sleight of hand. The lack of visual experience enhances the immersive effect; the listener, unfamiliar with the particulars of a contrapuntal work, focuses on the content and spatial particulars of the mix. Spatialization with digital counterpoint technique is the composer’s opportunity to programmatise sample placement.

Spatiality and movement in space presents a ‘stage’ for drama and theatre though it is not the only programmatic determinant. In Chapter Five, I explore the dramatic potential for counterpointed speech, lyrics, and narratives. Musical materials constitute only half of digital counterpoint; spoken word, sung lyrics, and narratives comprise the other half. Juxtaposing speech or sung excerpts (via a surface-level reading) or entire narratives (via audiences’ prior knowledge of the entire sampled track) is a powerful dramatic technique that creates an effect of parody, satire, or commentary (cultural or political). Ideally, the composer creates a self-contained, autonomous work. The new counterpoint narrative may spur listeners to recall the original musical works (in the case of the mashup) to consider the narrative implications. For contrapuntal radio, listeners derive their own meanings from processing multiple spoken texts.

In the following chapter I present a genealogical outline to establish historical and technological precedent for digital counterpoint composition. Within this outline, I relate each milestone’s contribution to this study and implications for future milestones.

Chapter One

A Historical Survey of Digital Counterpoint

Digital counterpoint emerges from a long history of technological and cultural developments and innovations. The current manifestations of digital counterpoint that I examine in the following chapters – contrapuntal radio and music mashups – did not form in a vacuum. Rather, their roots lie in audio technologies and art forms that exploit those technologies. In this chapter, I present a survey of these developments as they relate to the study of digital counterpoint. I do not imply that technologies grow sequentially one from the other as a generational evolution, nor do I imply that they develop independent of each other. There is significant crossover in technological and cultural development in several intertwined lineages. In some instances, an intellectual breakthrough cultivates a new use for a pre-existing technology. Trevor Pinch and Karin Bijsterveld, in their study of technologies and music, pose the question, “Issues such as virtuosity and creativity become contested: Is it the performer or is it ‘merely’ the instrument that makes the innovation?”¹

Composers using digital counterpoint technique are not necessarily aware of the origins and history of their technological aids or compositional aesthetics, nor need they be aware. Through this history, I hope to mine digital counterpoint’s lineage for clues as to *why* and *how* digital counterpoint emerged in its current form. I present the survey in five sections. First, the quodlibet is the closest relative to the mashup in the realm of common-practice counterpoint. As a contrapuntal device, it uses *only* pre-existing melodic musical material, usually for comedic or ironic exposition. Second, the record turntable has the longest evolutionary lineage of the technologies I outline in this study. Its early role in audio reproduction caught the attention of theorists and artists who used it for both reproduction *and* production. Third, both optical and magnetic audiotape introduced to composers and producers the possibility of non-linear sound editing. Tape’s malleability allowed composers and audio engineers to develop production techniques for genres and musical aesthetics that relied on extensive audio manipulation. Fourth, radio, specifically

1. Trevor Pinch and Karin Bijsterveld, “Sound Studies: New Technologies And Music,” *Social Studies Of Science* 34, no. 5 (2004), 640.

state-sponsored radio, promoted experimentation to exploit the possibilities of the broadcasting media. Broadcasters provided extensive (and expensive) technical resources to artists to explore the limits of the technology. This led to the development of *musique concrète* in France, Canada, and the United States, amongst others, and sound art projects in other countries. Glenn Gould's *Solitude Trilogy* is born out of these technologies. Last, sampling by tape and digital means simplified the audio production process and ushered in an era of home-recording artists working outside of the corporate music sphere. Later, solid-state, dedicated hardware samplers and personal computer software became the dominant mode for sampling audio. Digital audio capture contributed to an exponential increase in home audio production.

I discuss the above sections independently for the sake of clarity. The divisions are not so discrete in reality. These technologies and cultural phenomena exist in tandem. As I describe below, often developments in technology are influenced by art. Early experiments with turntable manipulation in art music led to innovative composition technique with tape; tape composition in art music bled into the commercial sphere. Elements of tape composition influenced developments in popular music turntablism and, later, digital sampling and digital audio production. I try to highlight connections between these sections as they arise. Further, I place each technological and musical development in relation to this study of digital counterpoint. The aim of this chapter is not to outline a comprehensive history of audio cultural production through the twentieth-century; other authors cover that subject in detail.² Instead, I draw on their work to present a running narrative of developments that pertain directly to the genesis of digital counterpoint.

Cultural trends and broader cultural traditions (like Western music tonality) become absorbed in a collective consciousness over years, decades, and generations. They embed themselves through media propagation, childhood indoctrination, or frequent and

2. Hans-Joachim Braun, ed., *Music And Technology In The Twentieth-Century* (Baltimore: John Hopkins University Press, 2002); Michael Chanan, *Repeated Takes: A Short History Of Recording And Its Effects On Music* (New York: Verso, 1995); Mark Cunningham, *Good Vibrations: A History Of Record Production* (London: Sanctuary Publishing, 1998); Jay Hodgson, *Understanding Records: A Field Guide To Recording Practice* (New York: Continuum, 2010); David L. Morton, *Sound Recording: The Life Story Of A Technology* (Baltimore: John Hopkins University Press, 2004); Jonathan Stern, *The Audible Past: Cultural Origins Of Sound Reproduction* (Durham, NC: Duke University Press, 2003).

widespread use. Technologies, too, become ubiquitous. Originally an expensive and rare device, the magnetic audio tape recorder evolved from a large professional appliance to an inexpensive portable device no larger than a small paperback novel. Both tonal music and audiotape, for example, are commonplace in cultural production and consumption. Artists are not necessarily cognizant of the history of tonal music or the inner workings of a tape machine. Yet, the technologies evolved over decades of mechanical, electrical, and digital innovation. Whether they realize it or not, composers and artists working with digital counterpoint participate in a centuries-old harmonic and contrapuntal practice. The following portion of this chapter engages a discussion of the quodlibet, the mashup's closest relative. With this, I hope to establish a link between traditional and digital counterpoint.

Quodlibet

Translated literally as “speak freely” or “what you please,” quodlibet consists entirely of pre-existing melodic material. Using the traditional ‘rules’ of contrapuntal compositional technique—voice leading and treatment of dissonance—composers piece together new musical works from whole melodies or melodic fragments. This is a clear predecessor to the musical mashup, which also uses only pre-existing musical material. Quodlibet technique often escapes examination in contemporary counterpoint texts.³ Its limited practicality as a serious compositional technique lends itself well to novel, if brief, works purely for humour. The *concept* of quodlibet provides important lessons in harmony directly applicable to musical elements of digital counterpoint. I divide my discussion of quodlibet into three sections:

1. A brief history of the quodlibet;
2. Notable historical and contemporary examples of quodlibet; and,
3. A discussion of similarities and differences between quodlibet and mashups.

Through this, I hope to establish a historical precedent for considering the mashup as a form of contrapuntal composition.

3. Of the counterpoint texts I examined when preparing this study only Kennan broaches the subject of quodlibet as a subset of ‘theme and variations’ by using the final quodlibet from Bach’s Goldberg Variations as an example. Likely Bach would not agree with Kennan’s categorization.

The name ‘quodlibet’ comes from the *disputation de quodlibet*, the oral examination at the theology faculty at the Sorbonne in Paris. The student answered examiner questions by quoting from lectures and other sacred texts. This continued into the sixteenth-century when German scholars adopted the practice but by quoting similar passages mockingly for comedic exposition. Wolfgang Schmelzl used the term in a musical context first in 1544 as he appropriated it to describe compositions in which the artist quotes musical texts in succession or simultaneously. Schmelzl refers mostly to musical parody using juxtaposition of melodies based on a nonsensical theme, compositions “that rely on the simultaneous combination of complete melodies whose texts are connected in a subtle manner.”⁴

Early music theorists used quodlibet to illustrate *cantus firmus* technique.⁵ Here the composer appropriates a pre-existing melody for a harmonic base and contributes original contrapuntal material above it; however, with *cantus firmus* the composer modifies the given melody rhythmically or metrically, to form a suitable harmonic base. This often renders the original melody unrecognizable. Later counterpoint texts, notably Johann Fux’s *Gradus ad Parnassum* (1725) employs *cantus firmus* in a series of lessons for composing above and below a given melody. His text did not address composition combining two or more pre-existing melodies.

Michael Praetorius provided the first systematic definition of quodlibet in Book III of his *Syntagma musicum*. Each voice is a *cantus prius factus*, a different combination of pre-existing melodies. The composer’s ability to identify harmonic and structural affinities between two or more melodies marks his/her compositional prowess. The complexity of the compositional process compounds when one considers the ‘subtle connections’ between lyric texts in the selected works. In quodlibet, unlike *cantus firmus*, melodies *must* be recognizable. The quodlibet’s success depends upon the listener’s ability to recognize the constituent musical material. When composers obscure the melodies they counter the quodlibet’s purpose as a brief work meant to impress for its

4. Maria Miniates, “Quodlibet Revisum,” *Acta Musicologica* 38, no. 2 (1966), 173.

5. Johannes Tinctoris, *Proportions In Music*, trans. Albert Seay (Colorado Springs: Colorado College Music Press, 1979); Heinrich Glarean, *Dodecachordon*, trans. Clement A. Miller (Middleton, WI: American Institute of Musicology, 1965); and Gioseffo Zarlino, *The Art Of Counterpoint: Part Three Of “Le Institution Harmoniche*, trans. Guy Marco (New Haven, CT: Yale University Press, 1968).

contrapuntal prowess, or to amuse. In the following section, I present two prominent examples of quodlibet, the first, historical and the second, contemporary.

The last variation of J.S. Bach's *Goldberg Variations* (1741) is a quodlibet of two once-popular melodies: "I have been so long away from you," and "Cabbage And Turnips Have Driven Me Away." Bach combines the melodies and still adheres to the 'rules' of counterpoint (voice leading, treatment of dissonance) while fitting them within the work's harmonic framework. The ground bass melody in the work's opening aria provides the bass voice in each of the variations. The uniting theme for the last variation is oppositional distance; one song pushes away and the other longs for return. Thematic unity here relates to the quodlibet's location in the work as the last movement. The first song, on the theme of 'being away,' may refer to its distance from the work's opening. It longs for reunion with the aria, which repeats as the work's conclusion. The second melody is 'driven away' not by cabbage or turnips but perhaps by the first iteration of the aria. Bach's quodlibet is complex, as it operates on several levels: harmonic compatibility, compatibility with the ground bass, and two levels of thematic unity between the two songs and the entire work.

Bach's choice of *Lied* may not resonate with contemporary audiences because they are unfamiliar with it. A quodlibet's success depends on a listener's ability to recognize the constituent melodies. Consequently, most quodlibets quote contemporary music, melodies that remain in the audience's collective consciousness. The more recent the selected musical work, the higher the probability for recognition. I draw my next example from a recent work that reinvigorated quodlibet technique.

The popular network television show, *Glee*, known for choral arrangements of popular music, featured three quodlibets in its first season. In episode six, "Vitamin D," the female characters performed Beyoncé Knowles' "Halo" (2008) and Katrina and the Waves' "Walking on Sunshine" (1983). The men's quodlibet consisted of Usher's "Confessions" (2004) and Bon Jovi's "It's My Life" (2003).⁶ In both instances, the singers perform portions of the songs before the quodlibet performance. This serves a

6. *Glee*, "Vitamin D," season 1, episode 6, October 7, 2009.

twofold purpose: It (re)establishes familiarity with the source songs and it impresses the listener by performing two melodies. In episode eight, “Mashup,” the men and women perform a quodlibet created for a wedding scene. The work uses Sisqó’s “Thong Song” (1999) and “I could have danced all night,” from Lerner and Loewe’s *My Fair Lady* (1964). The presentation of the quodlibet followed the same sequence as in “Vitamin D.” The performances in these episodes cement the connection between quodlibet and the mashup.⁷ Conceptually, these two musical phenomena are the same but differ significantly in practice. The quodlibet in *Glee* is performed based on a musical arrangement of pre-existing material. The mashup producer assembles a work digitally from recordings of original material for playback by whatever audio playback medium is available. The producer does not, and cannot, perform a mashup. Quodlibet performance is subject to infinite variability as is any performance. Performers breathe differently in each performance, variations in climate affect the instrument, etc. There are a number of factors that influence a performance, so it will never be precisely the same with each repetition. Because the mashup is committed to a recording medium, each repetition of the work is the same as the last. Even as the audio storage medium deteriorates the performance remains the same; only the audio fidelity suffers. The key difference in compositional practice between the quodlibet and the mashup is *repeatability*. The similarities here establish the connection between the mashup and counterpoint. Conversely, the differences form the base for a musical study of digital counterpoint technique. In the remainder of this examination of quodlibet, I discuss the characteristics that unite these forms, and the unique qualities that mark the mashup as a clear contrapuntal successor to the quodlibet.

Harmonic practice in both quodlibet and digital counterpoint follow deeply entrenched Western tonal traditions.⁸ The general ‘rules’ of counterpoint dictate what ‘sounds good.’ These rules are not static across history but change to accommodate new harmonic and melodic materials. The rules of eighteenth-century counterpoint are different than in modal, sixteenth-century counterpoint, and are different still for counterpoint governing

7. Over the course of this study, I fielded several inquiries about my research topic. In most instances when I mentioned “mashup,” the inquisitor’s response referred to specific performances on *Glee*.

8. I engage in a more thorough discussion of harmony in the mashup in Chapter Three although it warrants mention here.

twentieth-century contrapuntal composition. The contemporary standards for what ‘sounds good’ guide local level harmonic design. It also functions at the macro level for an overarching harmonic design that unifies a work from start to finish. The mashup in digital counterpoint follows these conventions inasmuch as their popular music source works follow common harmonic practice. The mashup producer brings together familiar melodies to create an element of novelty, surprise, and perhaps humour.

Compositional practice differs significantly between these musics. Where the quodlibet quotes melodies in whole for recognition, technical limits of digital audio production sometime render that practice untenable. The quodlibet relies only on melodic content for recognition in performance. The mashup depends on melodies but also on a sample’s sonic characteristics (instrumentation, familiar ‘sounds’ of a particular voice or instrument). Mashup producers incorporate instrumental samples to create an accompaniment for the vocals. The techniques of mashup composition preserve the characteristics that render samples recognizable. The continuous bass guitar riff of the Police’s “Every breath you take,” or the opening piano chords of Dave Brubeck’s “Take five” are as recognizable for their sonic characteristics as for the melodies and instrumentation. These specific sonic elements are impossible to reproduce in live performance. Performances vary in every repetition of a melody or instrumental accompaniment even if only by small differences. The sonic characteristics of a recording, say, on a shellac 78-rpm (rotations per minute) phonograph disc is impossible to reproduce in live performance.

Quodlibet composition technique is best suited to live performance. The mashup relies on digital audio technologies for composition and ‘performance.’ The phonograph is the first technology to initiate the long evolution of audio production and reproduction by mechanical means.

The phonograph and turntablism

The only lively thing that will happen with a record... is if somehow you could use it to make something which it isn’t. If you could for instance

make another piece of music with a record... that I would find interesting.⁹

We use the turntable not only for audio reproduction but also for audio production as ‘turntablism.’ I use turntablism here to describe the act of performance or composition by real-time manipulation of two or more phonograph records. It remains the central performative element of several musical genres: rap, hip-hop, dance (electronic or club), and scratching. Turntablists refer to themselves as ‘disc jockeys’ or DJs, usually accompanied by a moniker like DJ Danger Mouse (Brian Burton) or DJ Spooky (Paul D. Miller). The DJ label applies inasmuch as cello players are cellists or flute players, flautists. This examination of the phonograph and turntablism provides a brief account of the phonograph’s genesis and development, the phonograph as instrument for sound production, and the development of turntablism technique in the realms of both art and popular musics. This examination is relevant more to the mashup than to contrapuntal radio.

The phonograph is the oldest audio recording and playback medium in widespread use. Apart from incremental improvements in mechanics, audio processing, and controls to finely-tune playback, the current manifestation of the turntable is essentially the same as Emile Berliner’s first gramophone prototype. A series of nineteenth-century innovations, competition amongst inventors, and commercial interests refined the technology and compounded improvement upon subsequent improvements. Thomas Edison receives a great deal of credit for ‘inventing’ sound recording in 1877 though earlier experiments in sound recording were also successful.¹⁰ Edison’s system was notable because he developed a mechanism to capture and play back sound. His phonograph consisted of a hand-cranked spindle, a horizontal cylinder, a needle/stylus to etch a sound wave into the cylinder, and a horn connected to a vibrating membrane that moves the stylus. The first version of the device used tin foil for sound storage. Edison used hard wax and acetate for later iterations of the cylinder to extend the medium’s useful lifespan.

9. John Cage quoted in Mark Katz, *Capturing Sound: How Technology Has Captured Music* (Berkeley, CA: University of California Press, 2004), 53.

10. Alexander Graham Bell founded Volta Labs and experimented with a variety of means for recording sound, including by light and optical systems. Despite success in recording sounds, he was unable to develop the mechanisms to play back many of his prototype recordings. He marketed his later invention, the graphophone, as a business machine for dictation.

A decade after Edison's phonograph, Emile Berliner patented the 'gramophone,' a machine that used a flat disc. It still used a stylus but the groove cut a long spiral from the outside toward the centre. Berliner's mechanism employed a spring-driven vertical spindle regulated for speed, as in clockwork. The disc medium proved to be more reliable than Edison's wax cylinder, as it was designed chiefly for consumer playback, not recording; the record company reproduced the discs by creating a metal master disc with a raised relief of the original recording. The metal master was durable enough to make many copies before the groove degraded noticeably. The physical dimensions of the disc also made it ideal for storage. A shelf accommodated many more discs than Edison's cylinders, which were stored in boxes. Both Edison and Berliner employed large horns to amplify the sound waves from the relatively weak vibrating membrane; however, while the phonograph horn protruded from the front of the physical device, thereby entering the listener's physical space, Berliner suspended the gramophone horn *above* the turntable surface, reducing the machine's footprint.¹¹ The disc became the dominant format. The physical qualities of the disc format made it ripe for experimentation as a medium for audio *production*, not solely for reproduction.

Sound theorists in the early twentieth-century realized the potential for the phonograph as an instrument for both reproduction and production. Musician László Moholy-Nagy, in a 1922 essay, put forth a theory for the potential of phonograph as an instrument for performance.

Since it is primarily production (productive creation) that serves human construction, we must strive to turn the apparatuses (instruments) used so far only for reproductive purposes into ones that can be used for productive purposes as well.¹²

Moholy-Nagy referred abstractly to the phonograph as an instrument though it now applies broadly in the context of other reproductive technologies. The argument for the instrument for productive purposes was not a suggestion but an imperative to serve a higher purpose, to serve 'human construction.' Very little of the essay was dedicated to

11. Later iterations of the phonograph directed the sound wave into the machine's case. Listeners adjusted the volume by opening or closing louvered doors on the cabinet's front.

12. László Moholy-Nagy, "Production-Reproduction: Potentialities Of The Phonograph (1923)," in *Audio Culture: Readings In Modern Music*, ed., Christopher Cox and Daniel Warner (New York: Continuum, 2004), 331.

physically manipulating the turntable while it was in operation. He instead suggested a close examination of a disc's grooves in order to develop a vocabulary of patterns associated with particular sounds. In doing so, the composer could compile and implement a "groove-script alphabet."¹³ Moholy-Nagy suggested that composers might use the alphabet by etching a pattern into a disc's grooves to produce the desired sounds. By working directly with the playback medium the artist could create a work that sidestepped the necessity for a performer. Given the appropriate device, the listener would consume the work as per the composer's intention without a performer's interpretive intervention. Moholy-Nagy's groove-script alphabet represented a near direct connection between composer and listener separated only by an impartial mechanical intermediary. The groove-script theory went unrealized; however, the direct composer/listener contact by mechanical intermediary is prescient of the DJ culture that bloomed roughly half a century later.

The mechanical element was both an opportunity and a challenge to realize the phonograph-as-instrument. Moholy-Nagy worked in the pre-electric age of audio recording. Recordists relied on 'acoustic' sound reproduction, which used only the power of the sound source, concentrated by the horn, to etch a weak sound wave onto the disc. There was a significant loss in audio fidelity between the source and the final recording. Various composers experimented with the possibilities of composing for and with the phonograph with little to show for their efforts.¹⁴

The new electric recording process, available in 1928, made audio capture and reproduction in the recording industry more reliable. The combination of electric microphone and amplifier produced a stronger signal for the needle to etch the disc surface. For consumers, playback through electronic amplification produced a stronger, 'clearer' sound with better fidelity. Electric recording increased the producer's, or recordist's, fine control of the turntable, amplification, and basic audio processing. This attracted composers Paul Hindemith and Ernest Toch to explore the phonograph's compositional potential. The two composers produced a series of short works for

13. *Ibid.*, 332.

14. Darius Milhaud (1922), Ottorino Respighi for bird sounds in *Pina de Roma* (1925), and Edgar Varèse (1936).

gramophone for a 1930 concert. Hindemith's works, his *Trickaufnahmen* ("trick recordings") made extensive use of the variable speed turntables. In *Gösang über 4 Octaven* ("Song over 4 octaves"), Hindemith performs *pizzicato* viola and xylophone parts, and manipulates the speed of the turntables to alter the pitch of both instruments.¹⁵ At times, the viola *pizzicato* sounds below its normal range, like a cello, and very high in its range, like a violin. Katz, in his study of *Grammophonmusik*, suggests that Hindemith recorded the viola and xylophone parts on different turntables and recorded them playing together with a third machine. Hindemith put the compound recording on the playback machine and captured both it and him playing another part into the recording machine.¹⁶ This is a primitive and time-consuming form of layering sounds on a final recording. The work was cumbersome and there are a finite number of compositional possibilities, including varying the turntable rotation speed and spinning the platter in reverse. The results of their experiments debuted in concert, the only public demonstration of *Grammophonmusik*. Both composers discontinued their experimentation but their work was not in vain; in attendance at the 1930 Berlin concert was American modernist composer John Cage, who later incorporated turntables into his own work.¹⁷

Cage's first work with turntable was *Imaginary Landscape No. 1* (1939) for muted piano, large Chinese cymbal, and two variable-speed turntables. In concert, the performers physically manipulate the turntables in real time by varying the turntable speed, and lifting and lowering the styli rhythmically.¹⁸ Turntablism as a performance discipline takes shape here. In a later work, *Imaginary Landscape No. 5*, Cage uses 42 turntables as sound sources. Performers raise and lower the styli based on timings in the score. Unlike the first *Imaginary Landscape*, turntables constitute the entire 'instrumentation.'¹⁹ Cage represents each turntable in the score by a horizontal 'ribbon' and displays only the start and stop time for each source. The ribbon metaphor resembles the user interface of most

15. Paul Hindemith, "Gösang über 4 Octaven," *Trickaufnahmen* in *Capturing Sound: How Technology Has Changed Music* (Berkeley, CA: University of California Press, 2004). CD.

16. Katz, *Capturing Sound*, 111.

17. *Ibid.*, 123.

18. John Cage, *Imaginary Landscape, No. 1: For Records Of Constant And Variable Frequency, Large Chinese Cymbal, String Piano* (New York: Henmar Press, 1960).

19. John Cage, *Imaginary Landscape, No. 5: For Any 42 Phonograph Records* (New York: Henmar Press, 1961).

digital audio workstation applications. Visually, Cage's score addresses the problem of creating scores for works with multiple audio sources.

Cage's work represents early American experiments in turntablism and turntable-as-instrument. The art music avant-garde, in which Cage worked, signified only one facet of experimentation. Significant developments in turntablism technique transpired in the realm of popular music.²⁰ Several of those techniques form the rudiments not only of turntablism but digital counterpoint technique. I examine three key techniques derived from turntablism as they relate to mashup production. *Slip cueing* is a technique for ensuring a steady flow of sound from one record to another. The DJ aligns one record to a particular spot such that when the first record finishes a particular phrase or section he/she releases the second record to give the appearance of a seamless flow of sound. *Beat matching* technique synchronizes two records to ensure their tempi match. This involves slowing or speeding one or both turntables to a common tempo. This creates a smooth transition between records. By *back spinning*, DJs repeat short sections of a song, creating musical loops, the foundation for many mashups. Developments in turntablism are often cumulative; contributions to technique incorporate elements of existing technique.

Terry Noel, a DJ at the New York nightclub Sanctuary, in 1968 perceived a deficit in how DJs played records one after the other. There was an audible gap in time as DJs switched from one record to another. Silence, even if brief, broke the stream of music and effectively 'killed the groove.' As a response, Noel developed 'slip-cueing,' a technique that ensured a ready stream of sound between records. In lieu of rubber mats on the turntable, Noel used layered felt mats. The felt allowed the turntable to continue spinning or slipping while Noel cued the records. As one song ended, Noel released the second record. The felt provided enough friction to grab the record. Noel observed the effect of his technique soon thereafter,

20. I have not identified any crossover between turntablism in art music and popular music during this era; however, the concept of 'multiple discovery' often plays a role in parallel developments of similar ideas. David Lamb and Susan Easton devote a protracted discussion of this in *Multiple Discovery: Pattern Of Scientific Progress* (Surrey, UK: Avebury Publishing, 1984).

Sometimes I'd have to put the needle on the exact spot where I'd want it, and I used to have a felt mat instead of a rubber one, so that the turntable wouldn't hold if I held the record... Many people would come up to me and say, 'I was listening to the Mamas and the Papas and now I'm listening to the Stones, and I didn't even know.'²¹

Slip-cueing as an isolated technique maintained a gapless stream of music but the transition from one record to another was not seamless. Noel did not account for songs of different tempi following one after the other. The shift between songs at, say, 60 bpm (beats per minute) and 72 bpm jolted the dancers as they consciously increased or reduced the speed of their dancing.

Another DJ at Sanctuary built on Noel's slip-cueing technique to smooth the transition between discs while still maintaining the sound stream. Francis Grasso extended Noel's slip-cueing technique by coordinating the tempi between turntables. Using the pitch-control slider built into the deck, Grasso adjusted rotation speed of the second turntable to sync its tempo with the first turntable. In tandem with slip-cueing, Grasso's 'beat matching' engineered a smoother transition between songs such that dancers continued without consciously altering their pace. This is a fundamental compositional tool in digital counterpoint; the producer requires tempo consistency to ensure smooth transitions between parent samples when working in their DAW software I discuss this further in Chapter Three as it specifically relates to mashups.

One may also use 'beat matching' to extend a track by transitioning between points on the same album. Joseph Saddler, a.k.a. DJ Grandmaster Flash, developed the 'backspin technique.' While one section plays, Flash cues the same section on the second disc. As the section on the first disc finishes, he lets go of the second disc. While the second disc spins, he spins the first disc in reverse to the beginning of the section and prepares it to repeat. In effect, Flash extends a short section by creating a loop. As I examine later in both this chapter and Chapter Three, the loop is a common instrumental accompaniment in mashup production.

21. Terry Noel quoted in Bill Brewster and Frank Broughton, "Terry Noel: Original Mixer," in *The Record Players: DJ Revolutionaries* (New York: Black Cat, 2010), 52.

Hindemith and Toch's experimentation with phonograph composition did not bear fruit. The work provided the germ of an idea for John Cage and his experiments and compositions. *Grammophonmusik* established a precedent for phonograph manipulation, the beginnings of the phonograph as instrument for audio production. In a cultural sphere far removed from the art music avant-garde, Noel, Grasso, and Saddler's work, amongst others, developed and refined techniques to transform the turntable into an instrument for live performance. Turntablist technique is not readily transposable to other audio storage media—though possible, one rarely sees an artist manipulating audiotape in live performance—but producers adapt the *principles* of turntablism to other media. The 'tape' audio storage medium appeared decades after Edison and Berliner's respective sound recording mechanisms; tape is my focus for the following portion of this chapter, where I examine briefly its development and role in digital counterpoint.

Tape recording

I use 'tape' generically here to refer to two audiotape media: optical tape, which uses the soundtrack portion of acetate film, and iron-oxide magnetic audiotape. The latter is more malleable, less expensive, easier to edit and weighs less than optical tape. In my examination of audiotape, I outline milestones in the medium's development, and provide brief introductions to its role in subsequent cultural movements and musical genres that feed into this study of digital counterpoint.

The turntable and phonograph record are electromechanical, and tape, in its iterations, is electronic. The physical qualities of the phonograph and tape media are fundamentally different but share a common quality: both tape and phonograph discs are linear media. A playback mechanism reads data in a continuous line: the record in a spiraled groove, and tape as a reel-to-reel ribbon. Unlike the phonograph, record tape is also a non-linear medium in the process of editing. The phonograph record is a hard surface and the producer cannot remove a section of disc without destroying audio data on the rest of the disc. Tape is malleable and easily cut, so that segments can be rearranged, and reassembled into a new work. A fundamental shift in the recording process transpired with the introduction of magnetic audiotape: recordings no longer required a 'single

take.’ Non-linear editing allows the artist to assemble a *single* recorded performance from segments of *many* recordings.

Tape offers significantly more storage capacity than a phonograph record rotating at 33-, 45-, or 78-rpm. Whereas a recordist measures the maximum duration of a performance on a phonograph master disc in minutes, tape capacity extends into tens of minutes up to an hour. Artists and producers took advantage of the increased capacity to embark on ambitious recording projects, amongst them Pierre Schaefer’s *musique concrète* works, the Beatles’ “Revolution 9” (1968) among others, and Glenn Gould’s contrapuntal radio documentaries; all involve extensive manipulation of tape to great effect. I discuss these projects later in this chapter. First, I present a short discussion of two forms of audiotape technology: optical and magnetic.

‘Optical tape’ came in two forms, one photo-based, and the other mechanical. The former is a misnomer in that it is not tape but acetate film normally used for cinema. ‘Sound-on-film’ appeared with the advent of electric audio recording in 1928. Electric impulses from the microphone controlled a light that pulsed in tandem with the audio signal. By filming the light, the filmmaker created a visual representation of the sound, readable by photoelectric cells. As the soundtrack passed over the cell, it converted the electric impulses back into sound. Two hundred iterations of the technology were available to film makers and theatre owners by 1930.²² This new form of audio recording presented the opportunity to experiment in non-linear audio production. One edits sound-on-film by physically cutting and connecting lengths of film in the same way that one edits a visual film. Though used widely for ‘talkies,’ films with synced audio, proved a fertile ground for sound art experimentation. German artists, like film director Walter Ruttmann, took advantage of sound-on-film for dramatic sound collages for radio. Though it was a versatile production medium relative to the phonograph, both the film and playback mechanisms were expensive. The film medium itself was unwieldy and difficult to manipulate beyond simple splicing and speed variation.

22. Morton, *Sound Recording*, 76.

The second form of optical tape emerged in the 1940s and remained in use for several years. The Philips-Miller recorder used a mechanical optical process for recording audio. Because it did not rely on a photo development process to effectively retrieve the audio, sound was available for playback immediately. The machine could record up to 60 minutes of audio, and offered a higher fidelity than the standard wax transcription discs ubiquitous in radio studios. It was used almost entirely in Europe, though one American radio station experimented with it. The Philips-Miller machine did not take root because, unlike sound-on-film, it lacked a method to reproduce the tapes for physical distribution.²³ A new tape medium cut short sound-on-film audio production for radio. Magnetic tape was a significantly more versatile medium for production, reproduction, distribution, and storage.

The German AEG/Telefunken Corporation experimented with and refined magnetic tape technology through the late 1920s and 1930s. State-controlled radio stations used the Magnetophon recorders and tape during the war years to record political messages for radio. The physical versatility of magnetic tape made it preferable to optical tape because it was easy to produce (no film development required), replicate, and distribute: minute for minute, magnetic tape weighs significantly less than acetate film. Magnetophon technology remained within Germany's borders until the end of World War II, when an American soldier discovered a machine and tape in the Radio Luxembourg headquarters. The army exported it and several other machines for study in the United States. American singer Bing Crosby invested in the technology and used it to produce his radio show. Tape's versatility allowed Crosby to record and edit his show in advance of the air time, capturing note-perfect performances in one or more takes while maintaining the appearance of a live show. The technology in effect freed Crosby from the live radio show schedule and time slot.²⁴

Bing Crosby's investment in Ampex, a California company that manufactured tape recorders, bore fruit as a commercial venture. Their initial model, the monaural Ampex

23. David Morton, *Off The Record: The Technology And Culture Of Sound Recording In America* (Piscataway, NJ: Rutgers University Press, 1999), 53.

24. Payzant, *Music & Mind*, 28. As a champion of the technology, Glenn Gould preferred the recording process to live performance. He eschewed the 'non-take-two-ness' of concerts and put stock in the tape medium and recording process as the conveyor of ideal performances.

200 (1948) was the first commercially available tape recorder. Some recording studios were slow to adopt tape technology despite the benefits.²⁵ The expense of the new machines in tandem with skepticism about the new medium's long-term reliability may have delayed adoption.

Guitarist Les Paul also experimented extensively with audio recording. His efforts in multitracking, what he called sound-on-sound, repeated Hindemith's *Grammophonmusik* techniques: Paul recorded one instrumental line to disc, played back the disc while playing another part into a recorder and onto another disc. Paul repeated this process until he recorded multiple parts to one disc.²⁶ This usually required many generations of recording and playback before a work was finished. By the 1950s, Paul was famous for his recordings and radio performances. Bing Crosby gave Paul an Ampex 300 machine for his home studio. The guitarist acquired a second tape recording head from Ampex, affixed it to his recorder with some modification, and, in the process, enabled two-track recording capability. He used this for his sound-on-sound and for more complex projects.²⁷ His own experiments paralleled commercial development of recording equipment using more more than one track. The first two-track tape recorder for commercial sale went on the market in 1954.

Multitrack recording affords artists more options relative to phonograph or monaural tape recording. Working with single-track tape or phonograph required all artists (in the case of a band or ensemble) be in the studio at the same time. Performing into a single microphone to single-track tape captured all the elements of the performance through the single audio channel. Multitracking allowed the performer to record single instrumental or vocal parts individually. In effect, a recording project may remain incomplete at the conclusion of a studio session. The ensemble may record, say, the drums to one track and later record other instruments or voices to a second (or additional) tracks. Multitalented performers become one-man bands, recording each instrumental or vocal track independently. Multitracking also signals the rise of the producer-as-specialist that

25. Audiotape remained expensive relative to reliable acetate master discs. Tape recorders and a steady supply of tape was a significant capital investment for small studios.

26. Cunningham, "Let There Be Sound On Sound," 22.

27. *Ibid.*, 23-25. Paul's first tape 'multitracked' work is the 1951 single, "How High the Moon" with Mary Ford.

assumes a greater responsibility in shaping the final work. The producer, in tandem with the performer, controls the final product in terms of content and aesthetic. The implications of multitrack recording for digital counterpoint technique are significant: composers assemble their work from pre-existing works in a multitrack audio production environment, and at their own pace. Here we see the beginning of the digital counterpoint composition workflow.

Bing Crosby's use of tape to pre-record his show demonstrated only a small fraction of tape's potential as a medium for cultural production. State-run radio broadcasters offered a fertile ground for artists and composers to experiment with tape composition. From those experiments grew new audio production techniques and musical genres. Tape composition made its formative steps as a compositional medium in the radio studio and, in turn, formed the first physical tool for analog and, subsequently, digital counterpoint composition. I turn my attention to radio for the next section of this chapter.

Radio

Commercial radio interests adopted tape as an efficient means to replicate the function of a phonograph. State-run radio broadcasters provided artists the resources to experiment with tape. In doing so, tape became the medium of choice for avant-garde electronic music composition. Broadcasters sought ways to exploit the possibilities of radio in the early years even if only as art-for-art's-sake. Tape also served a practical purpose by supplying radio programs with miscellaneous sounds and music. In my examination of radio's role in digital counterpoint, I discuss three state-sponsored programs that fostered tape experimentation, spawning new production techniques and musical genres: the German *Hörspiel* (radio play), Pierre Schaefer's *musique concrète* sponsored by Radio France, and the British Broadcasting Corporation's (BBC) Radiophonics. These programs establish a precedent for Gould's work at CBC radio in the late 1960s and 70s; however, there is no evidence to suggest that Gould was aware of the experimental radio work in Europe.²⁸

28. Lorne Tulk, interview by author, Toronto, ON, February 4, 2011. Gould and Tulk shared many conversations about his influences for the *Solitude Trilogy* but never spoke of the *Hörspiel*, *musique concrète*, or Radiophonics. Additionally, none of the materials in the Glenn Gould Collection at Archives Canada refer to European radio experimentation.

Radio took its fledgling steps as the first mass broadcast medium in the early 1920s. With the exception of the United States, both commercial interests and governments invested heavily in the technology for widespread distribution of news and cultural content.

German state radio encouraged art experimentation to exploit the medium to its fullest.²⁹

Hans Flesch, an early experimenter, explored *Zauberei aus den Sender*, “Microphone magic” beginning in 1924. Flesch worked with Hans Bodenstadt who fashioned ‘sound portraits’ of cities, literally (re)creating sound collages of street scenes. Shortly after, in 1926, Alfred Braun created his work *Der tönende Stein*, literally “the sounding stone.” He referred to this work as an ‘acoustical film.’ Mark Cory elaborates,

Acoustical films... transferred quite consciously the techniques of cinema to the radio, so that images both flowed... in quickest succession, abbreviated images, superimposed images, alternating and blending close-ups and distant shots. Each of the short images was positioned on a particular acoustical plane, surrounded by a particular acoustical set.³⁰

One of the few surviving works from the early era of German radio experimentation is film director Walter Ruttmann’s *Wochende* (1928), or ‘Weekend.’³¹ Hans Flesch commissioned the ‘sound film for radio,’ for the Berlin Radio Hour. The 11’30” work unfolds as a collage of sounds depicting a weekend getaway with train sounds, speech, group singing (as around a campfire and at church), and other sound effects. Quick, jarring tape splices reveal limitations of working with early sound-on-film technology; however, it demonstrates the media’s potential.³² Most often, radio drama transpires in a studio and a sound effects director works in the background to supply an element of realism. Ruttmann’s sound film brings together sounds not produced easily in a live studio broadcast. This expands the possibilities of radio theatre’s dramatic potency. State-sponsored optical tape experimentation in Germany tailed off after two years, as the small

29. Mark Cory, “Soundplay: The polyphonous tradition of German radio art,” in *Wireless Imagination: Sound, Radio, And The Avant-Garde*, ed., Douglas Kahn and Gregory Whitehead (Cambridge, MA: MIT Press, 1992), 331-371.

30. *Ibid.*, 339. Cory’s definition of the acoustical film describes Gould’s work with eerie accuracy. The ‘superimposed images’ matches his counterpoint analogy; Gould, “Radio as Music,” 383-384. Gould uses cinematic metaphors to describe the uses of an artificial sound world or sound space.

31. Ruttmann committed *Wochende* to optical tape whereas Flesch and Braun’s radio works aired live without the benefit of a transcript recording to preserve the performance.

32. Walter Ruttmann, *Wochende*, In “*An Anthology Of Noise & Electronic Music/ First A-Chronology, Volume #1*. SubRosa SR190, [1930] 2000.

radio audience did not justify the production expense. Not all tape experimentation for radio resulted in theatrical works like the *Hörspiel* sound films. With magnetic tape came new methods of manipulating tape to create a virtually unlimited palette of sounds. For the next discussion of radio, I shift my focus to *musique concrète* conceptualized and developed under the auspices of Radio France.³³

Radiodiffusion-Télévision Français (RTF) engineer and announcer Pierre Schaeffer developed and defined *musique concrète* in 1948 while working with the broadcaster's new magnetic tape recorders. Schaeffer assembled the first electronic audio production studio at RTF and equipped it with variable-speed tape recorders, phonographs, microphones, and sound effects records. By this time, the fidelity of audio production/reproduction technology was sufficiently good to reproduce sounds of 'everyday' life. Schaeffer called music produced with this equipment *musique concrète* because he worked with 'concrete,' recorded sounds as opposed to prescriptive notation. Notation-based music is not concrete because of any number of variables: performer interpretation, the effect of the climate upon the instruments (temperature, humidity), or audience interference (coughing, clapping with the music). *Musique concrète* relies on media playback for performance. Like any recording, no matter the number of playbacks, the performance does not vary; it is fixed and repeatable *ad infinitum*. At the outset, *musique concrète* relies on audio samples for compositional material but it is unlike other sample-based music because the composer's transformations make them unrecognizable in their original form. Schaeffer's tape manipulations followed a systematic process. He theorized and codified the process as *sofège de l'objets sonore* or solmization of sonorous objects.³⁴ Schaeffer divorced the sounds from their source or original context to create pure sounds through electronic transformation.

If someone plays us a tape which records a sound whose origin we are unable to identify, what are we hearing? Precisely what we are calling a

33. I confine my discussion of *musique concrète* to Pierre Schaeffer to make the case for this genre's place in the digital counterpoint survey. Other composers like Canadian Hugh LeCaine and his work *Dripsody* (1955) as well as German-American Otto Leuning's *Fantasy in Space* (1956) represent milestones in the development of *musique concrète*.

34. Pierre Schaeffer, *Sofège de L'Objet Sonore*. (Paris: O.R.T.F., 1967); Pierre Schaeffer, *La Musique Concrète*, 2nd ed. (Paris: Press Universitaire de France, 1973).

sonorous object, independent of any causal reference, which is designated by the terms *sonorous body*, *sonorous source* or *instrument*.³⁵

The variable-speed tape machine allows the composer to speed or slow the tape, play it in reverse, create sound loops, or combine any of these modifications. Transformation by tape machine is only one method to obscure a sound's source. Physical modification allows the composer to remove the identifying portions of a sound. We recognize sounds by the components of its envelope: the attack, sustain, and decay; the cue that signals the beginning of a sound; the sonic characteristics that identify the sound; and the gradual or sudden reduction of sound to indicate the end. A sample is difficult to identify without one or more of the envelope components. By removing any of those components, the composer creates a 'pure sound.'

Schaeffer completed his first *musique concrète* work, "*Étude Aux Chemins De Fer*" or 'Study of Locomotives,' in May 1948. The etude starts with identifiable train sounds and, over the course of the work, Schaeffer modifies the sounds more extensively. A segment of rhythmic train sound appears frequently, perhaps as a motive. The 'chipmunk' sound of a sped-up tape punctuates the work occasionally, as does the lethargic drawl of a slowed-down tape. For his second work of *musique concrète*, "*Étude Aux Casseroles*" or "Study Of Pans," Schaeffer used the sounds of spinning pot covers, boats, spoken and sung text, harmonicas, and piano chords. He applied similar tape manipulation to repeat the effect from the Study of Locomotives. Even as *musique concrète* composers reveal their source sounds, the result of manipulation renders them unrecognizable in their original form.

Early works of *musique concrète* were brief. Large scale works with these compositional techniques posed a challenge for form, as they did not bear the typical markers of form in tonal music: changes in harmony, and rhythmic or metric patterns to indicate ends of phrases or a sense of finality. Without those musical elements as formal anchors,

35. Pierre Schaeffer, "Acoustics," in *Audio Culture: Readings In Modern Music*, ed., Christopher Cox and Daniel Warner (New York: Continuum, 2004), 79. Italics are original.

Schaeffer relied on texture- and gesture-based forms: valse, partita, and scherzo.³⁶ Guided by these forms, Schaeffer could fashion his works to conform to some elements of these forms, if not harmonic, to create a semblance of order and structure. With these forms he could sustain the work without having to ‘reinvent the wheel’ with a new formal model. The past forms establish a sense of coherence and order for the non-traditional musical contents.

I broach the study of *musique concrète* here because many of Schaeffer’s compositional concerns dovetail with concepts and techniques of digital counterpoint. Schaeffer actively obscures his sound sources to produce pure sounds; this examination of digital counterpoint maintains and highlights source sounds. Both musics involve extensive sample manipulation but for different ends. Further, Schaeffer’s term ‘sonorous object’ provides a base for discussing samples in digital counterpoint.³⁷ This implies a modular composition process and makes it easier to discuss transformation of individual samples. Other broadcasters, including the British Broadcasting Corporation, also adopted this form of audio production but for a different purpose.

The BBC established the ‘Radiophonics’ workshop in 1958 to generate sound effects for its radio and television programs. F.C. Brooker, a former BBC engineer, explained radiophonics.

The term ‘radiophonics’ is taken... to mean the production of sounds from natural or artificial sources to convey the mood of a broadcast program, but not the creation of musical compositions as such... Since the end product is almost invariably a tape recording, much of the equipment is necessarily concerned with the manipulations of tape recordings...³⁸

36. David Ernst, *Musique Concrète* (Boston, Crescendo Publishing, 1972), 11. As I discuss in Chapter Two, Gould spoke of the “terror of formlessness” when contriving a form for *The Idea of North*. He drew extensively from traditional formal models to fashion his own.

37. I devote Chapter Four to an examination of samples as ‘sound objects’ in digital counterpoint. I use ‘sound object’ there to differentiate it from Schaeffer’s own terminology, which has a well-established meaning.

38. F.C. Brooker, *Radiophonics In The BBC* (London: British Broadcasting Corporation, 1963), 5. A more detailed discussion of the Radiophonics workshop’s inception and work is available in Louis Niebur, *Special Sound: The Creation And Legacy Of The BBC Radiophonics Workshop* (Oxford: Oxford University Press, 2010).

F.C. Brooker's BBC engineering monograph on radiophonics details studio equipment, their technical specifications, and their role in the workshop. The sound engineers worked primarily on short segments of audio for mood setting and not on standalone musical works. As an exception, composer Ron Gainer approached workshop engineer Delia Derbyshire to realize his score for the BBC television series, *Dr. Who*. The theme features sounds clearly manipulated for 'otherworldly' effect but maintains a pitch-based melody and rhythmic, percussive accompaniment.

Artists approach the musical avant-garde from a variety of perspectives. Popular music borrows from art music and vice versa. American composer James Tenney incorporated popular music into a tongue-in-cheek study in tape composition, "Collage No. 1 (*Blue Suede*)" (1961). He appropriates segments of Elvis Presley's "Blue Suede Shoes" (1956) and transforms them by the techniques of *musique concrète*. A rapid succession of unrecognizable blips, distortions, and howls carry the work for the first third. Tenney inserts the first clue to the work's title at 1'17" of 3'25" when we hear brief segments of Presley's voice.³⁹ Tenney teases with short moments of the song but never a complete phrase or melody. The title 'blue suede' may appear somewhat abstract without a select few recognizable samples of Presley's voice or instrumentals.

Digital counterpoint bears little resemblance to the otherworldly transformations and effects of *musique concrète*; however, digital counterpoint employs the basic tenets of tape manipulation and incorporation of natural sounds and popular music samples. The composer employing contrapuntal techniques works actively to keep samples recognizable. In the 1950s, extensive tape manipulation crossed over from art music into popular music. The practice of acquiring sounds in *musique concrète* amounts to tape sampling. As my discussion shifts into the realm of popular music, tape sampling, and later, digital sampling, takes on a greater role in audio production.

39. James Tenney: *Selected Works 1961 – 1969*, "Collage No. 1," New World Records 80570, [1961] 2003.

Sampling (tape and digital)

Tape and digital sampling grew out of decades of development in audio production technology and experiments in production technique. I use ‘sampling’ in this section to represent the practice of capturing and manipulating tape for popular music production. The practice of tape sampling has a long, rich history of experimentation with both optical and magnetic media. In the pre-digital era of audio production, tape’s versatility made it ideal for projects requiring frequent and complex editing. Tape sampling represented a significant shift in both production technique and artists’ conception of their content. I examine two works in the following section to illustrate some uses of tape sampling in popular music: a 1956 break-in record, and a work that draws heavily from *musique concrète*.

By the mid-1950s, record labels amassed a significant cumulative catalogue of recordings spanning several genres. Artists wishing to draw on pre-existing recordings had lots of material from which to choose. Drawing on tape’s versatility, James Buchanan and “Dickie” Goodman produced the first ‘break-in record’ in 1956.⁴⁰ “Flying Saucer” incorporated twenty-one samples from contemporary popular music hits including Elvis Presley’s “Blue Suede Shoes,” The Platters’ “The Great Pretender” (1956), and Little Richard’s “Tutti Frutti” (1955).⁴¹ Buchanan and Goodman spoofed Orson Welles’ 1938 *War of the Worlds* broadcast in which alien ships land on Earth. In “Flying Saucer,” an announcer interrupts a radio program to bring the listener news of an alien spaceship hovering in the sky. He cuts frequently to an on-site reporter for updates on the invasion. For eyewitness interviews, Buchanan and Goodman insert context-appropriate music samples in lieu of actual dialogue.

Announcer: “The flying saucers are real!”

The Platters: “Too real when I feel what my heart can’t conceal...”⁴²

40. A break-in record is a specific form of novelty song in the form of a radio program. In the middle of a song, a news announcer ‘breaks in’ to read an important news report. Instead of ‘interviewing’ eyewitnesses to the news event, the recording uses contextually relevant samples from other pop music songs as ‘responses.’ The responses may be single words or entire sung phrases.

41. Bill Buchanan and Dickie Goodman, “Flying Saucer.” Luniverse 101, 1956.

42. The Platters, “The Great Pretender,” 1956.

Later the announcer turns to the news feed with the street reporter, John Cameron Cameron [sic], for some comments from eyewitnesses to the flying saucer.⁴³

On-site reporter: “What would you do if the saucer were to land?... the gentleman with the guitar, what would you do, sir?”

Elvis Presley: “Gonna take a walk down lonely street...”⁴⁴

“Flying Saucer” cuts together both original and sampled material in rapid succession. The work’s segments fall end-to-end but the humorous effect is similar to that of the mashup. The novelty of the break-in lies in sample recognition. This forms the work’s punch line. As a comedic scenario, an alien invasion is not amusing on its own. It becomes humorous when the artist recontextualizes recognizable music samples in an unusual way. Buchanan and Goodman contrive an element of interactivity between the announcer or reporter and the sampled works. The sampled lyrics respond to the fictional line of questioning. Digital counterpoint technique uses a similar dialogue model to bring together voices (spoken word or sung lyrics). Mashup producers incorporate lyrics from unlike artists to create the appearance of duets or trios. Glenn Gould brings together segments of one-on-one interviews to form dramatic dialogues. I discuss digital counterpoint dialogues in more depth in Chapter Five. The next work I examine makes extensive use of sampling but more closely resembles *musique concrète* within a popular music idiom.

John Lennon and Paul McCartney’s “Revolution 9” is unlike the surrounding musical material on *The White Album* (1968). The album falls decidedly within the realm of popular music but draws heavily from the art music avant-garde. Thomas MacFarlane, in his work on the Beatles’ tape composition, cites Karlheinz Stockhausen’s *Hymnem* (1967) as a distinct compositional influence.⁴⁵ The extended duration, 8’13,” makes “Revolution 9” the Beatles’ longest work to that point in their career. There is a clear resemblance to *musique concrète* in the way in which Lennon and McCartney, with

43. The reporter’s middle and last names were the same, “Cameron.” The character’s name was a play on early NBC news anchor John Cameron Swayse.

44. Elvis Presley, “Heartbreak Hotel,” 1956.

45. Thomas MacFarlane, “Sgt. Pepper’s Quest For Extended Form,” in *Sgt. Pepper and the Beatles: It Was Forty Years Ago Today*, ed., Oliver Julien (Hampshire, UK: Ashgate Publishing, 2008), 41. As precedent, Lennon and McCartney use reversed tape and other *musique concrète* techniques on *Revolver*.

George Martin, manipulate their tape samples. All of the work's samples came from the EMI record archives. After transformation by reversal and increases or decreases in speed, the artists linked the samples to fashion twenty tape-loops of different sizes.⁴⁶

Lennon and McCartney do not manipulate their samples as heavily as in Tenney's Collage No. 1, or Schaeffer's work. The effect of the ministrations is evident nonetheless. They extract their samples, record them in reverse, speed them up, slow them down, and truncate them. Many samples are difficult to identify because they are too short or obscured by other, louder sounds in the mix. The sounds include baby laughter, group laughter, coughing, and original material of Lennon doing a dramatic reading. One notices first the rapid succession of overlapped samples in the loops, that is, the samples in the final work are not laid end-to-end but sound simultaneously. The effect is disorienting in the complexity and sheer number of simultaneous sounds. A second notable feature of this work is the use of sound space. At the beginning of the track Lennon and McCartney opt to use the left-right stereo axis dynamically; they actively move their sound objects left and right while other objects remain stationary at the left, centre, or right.⁴⁷

"Revolution 9" is an important historical case study for digital counterpoint. Here we see many of the techniques that Gould uses for his contrapuntal radio work, *The Latecomers*.⁴⁸ Both Gould's work and the Beatles' manifestation of *musique concrète* employ discrete sound objects as compositional materials; both artists use the stereo space with stationary and moving sound objects. I do not imply any cross-influences here, only that both artists used similar production techniques. The similarities between "Revolution 9" and Gould's contribution to digital counterpoint end here. Works composed by digital counterpoint technique ideally highlight connections between sound objects. Lennon and McCartney's brand of *musique concrète* does not draw similar sorts

46. McLeod, "Confessions of an Intellectual (Property)," 82.

47. John Lennon and Paul McCartney, "Revolution 9," *The White Album*. Capitol Records B000002UAX, [1968] 1990; John Stevens, "1968," in *The Songs Of John Lennon: The Beatles Years* (Boston: Berklee Press Publications, 2002), 240-41. Stevens attempts a basic spatial 'map' of "Revolution 9" examining surface sounds. He follows the map with two possible formal analyses of the work.

48. By coincidence, the Beatles and Gould completed their projects at approximately the same time.

of connections between sound objects. Their samples are in counterpoint but unrelated in harmonic or lyric content. I do not intend to compare Gould and the Beatles' compositional goals but only draw attention to their similar use of the audio production technology and technique to derive fundamentally different musics. Composing "Revolution 9" was a complex process of mixing and keeping many tape loops untangled. Digital sampling technology, in its early stages, reduced the complexity of appropriating samples, manipulating them, and incorporating them into a work's final mix. I present an outline of digital audio production technologies and techniques in the final portion of this chapter.

Digital sampling

The tape recorder and magnetic tape medium offer composers and artists a versatile tool for electronic composition in art music and complex studio albums in the realm of popular music. While audio production with tape continued into the 1990s, artists adopted digital sampling hardware and software shortly thereafter. Audio processing with digital technologies represents the culmination of a long history of audio reproduction and production. It simplifies many processes of live sampling from turntablism such as back spinning to create sound loops. Digital sampling frees the composer or artist working with tape from the tedious process of managing numerous segments of tape.

Tara Rodgers, in her work on the aesthetics of sampling, defines a sampler as

[a] hardware or software device that records an analogue sound signal as digital information, and offers detailed ways of processing and reconfiguring this recorded sound.⁴⁹

Digital sampling also introduced a non-destructive method of sound manipulation. Tape sampling required the artist to physically cut the medium. Because digital audio exists as binary data encoded on digital storage media, one manipulates the audio by modifying the binary data, not a physical medium. The 'original' audio binary data is infinitely reproducible and modifiable with no loss in audio quality. The following portion of this section concerns the progression of digital sampling technology from dedicated hardware to computer software (both samplers and digital audio workstations).

49. Tara Rodgers, "On The Process And Aesthetics Of Sampling In Electronic Music Production," *Organised Sound* 8, no. 3 (2003), 313.

The development of dedicated hardware samplers corresponds with developments in computer processors, and the capacity of random access memory (RAM) silicon chips. Sampling quality depends on the availability of memory storage; higher quality samples require more memory, as do longer samples. The sampler processing power determines the complexity of sample manipulation and transformation. The polyphonic capability, that is, the number of simultaneous ‘voices’ of samples, is tied to the processing power; more simultaneous voices require more processing power. Early iterations of hardware samplers offered limited capacity and quality but demonstrated the practical application of solid-state audio sampling.

Fairlight’s CMI Series I (1979) was the first commercially available hardware sampler. Artists interacted with the instrument via an onscreen operating system and software sequencer. A built-in application also allowed artists to edit and draw sound waves. A keyboard provided the means to transpose samples in live performance. As an early example of sampling hardware, the technical specifications were not extraordinary: the meager processing power allowed only 8-bit, 16 kHz sampling—less than CD quality—and eight-voice polyphony. The initial cost of the CMI Series I (£18,000) made it inaccessible to all but prominent successful artists with a budget for such expenditures. Fairlight improved the specifications of future samplers though the price point measured consistently in the tens of thousands. The relatively high ‘price to performance’ ratio of early hardware samplers still favored tape technology.

Paul Théberge and Tara Rodgers identify the Ensoniq Mirage (1986) as the first broadly affordable hardware sampler. Its initial list price of \$1,695 USD made it accessible to artists who wanted to participate in sampling practice but lacked the funds to invest.⁵⁰ The Mirage offers capabilities similar to the Fairlight CMI Series I, and surpasses it in other ways. It uses 8-bit sampling at 32 kHz, eight-voice polyphony, and a maximum sample length of six seconds. The keyboard is divisible in halves to assign different samples to the upper and lower halves of the keyboard. The built-in sequencer allows the artist to trigger one or many samples, or sample loops at particular locations in a song.

50. Rodgers, “On The Process And Aesthetics,” 313-314; Paul Théberge, *Any Sound You Can Imagine: Making Music/Consuming Technology* (Hanover, NH: Wesleyan University Press, 1997), 64.

The CMI and Mirage represent milestones in the development of a purely digital form of music production. The CMI illustrates the potential of digital sampling as a proof of concept. The Mirage represents a shift in the kind of content produced. It also represents a shift in who produces the content: as the cost of hardware samplers decreases, they become accessible to a broader market. When more consumers can afford the technology, production migrates into smaller commercial studios and home studios. Composers using digital counterpoint technique for musical materials, as in the mashup, often work alone in a home studio or as “bedroom producers.”⁵¹ Their work depends on the availability of inexpensive hardware and software to complete the work independently.⁵² These applications form the core compositional tools of digital counterpoint.

Software sampling and digital audio workstations consolidated the entire recording process in a single machine. Steady progress in personal computer technology provided the foundation for corresponding improvements in the capability of digital audio software. Semiconductor companies Intel and Motorola introduced faster computer processors, and RAM capacity increased, as did the storage capacity of magnetic hard disks.⁵³ Greater processing capacity facilitates complex recording and sampling operations. It also allows for better sampling quality, approaching, or surpassing CD quality (16-bits at 44kHz); and increased RAM capacity provides more ‘space’ for containing short-term data. Data recall from solid-state memory is faster than from a hard disk drive with internal moving parts; more capacious hard disk storage allows the artist and/or producer to work with larger projects of longer durations, or more tracks. In my discussion of software, I examine the categories of digital audio workstations and software samplers. The latter category contributes the most significant compositional

51. McGranahan, *Mashnography*, 22, 29, 141, 170, 185, 193. McGranahan’s ethnography of the community of mashup producers refers often to ‘bedroom producers’ and ‘bedroom auteurs.’ He and his interview subjects use this terminology to mean producers who work on home computers and not in a dedicated studio setup.

52. Sub-\$1000 laptop and desktop computers are sufficiently powerful enough to run complex, if inexpensive audio software. Sony’s ‘ACID Music Studio’ and Mixed in Key’s ‘Mashup’ are available for under \$70. The open source application ‘Audacity’ is available free. More high-end audio software (ACID Pro or Ableton Live) cost as much as \$300.

53. “Moore’s Law,” based on a lecture by Intel co-founder Gordon Moore, suggests the number of transistors on an integrated circuit (like a computer processor) doubles every two years. More transistors yield greater processing power.

tools in digital counterpoint: pitch shifting and time stretching, an evolved form of Francis Grasso's beat matching technique.

Personal computers were sufficiently powerful to record digital audio and apply basic effects by the end of the 1980s. A few years later in the 1990s, the computer and audio software reproduced the function of early multitrack tape recorders. The first DAWs appeared between 1990 and 1993 (Table 1.1). Multitrack digital recording on desktop computers was not possible until 1990 when OSC released Deck DAW.⁵⁴ This and similar software packages used a 'track' metaphor based on multitrack tape. As with tape, the producer manipulated tracks independent of others. The producer could splice individual tracks and re-record a segment repeatedly without concern for the integrity of the tape.

Year	Company	Product	Multitracking capability
1990	OSC	Deck	4 tracks (mono)
1991	DigiDesign	ProTools (recording engine licensed from OSC)	4 tracks (mono)
1993	Steinberg	Cubase Audio (mixed audio and MIDI)	8 tracks (mono)
1993	Emagic	Notator Logic (mixed audio and MIDI)	4 tracks (mono)

Table 1.1 First commercial software digital audio workstations

Early digital audio workstation software laid the foundation for subsequent developments in audio production technologies. The early software packages created the possibility for digital counterpoint technique. The first version of 'Deck' nearly replicates a recording studio setup with multitrack tape recorder and small mixing board. It was limited in its capability to perform multiple operations simultaneously: Panning and volume controls remained static for the entirety of a work. Producers manipulated one volume or spatial parameter at a time because they had only a mouse and computer keyboard to control the virtual mixing board. A physical mixing board, by contrast, allowed the producer to manipulate many parameters simultaneously. Subsequent versions of these audio applications supported computer expansion hardware to accept multiple audio inputs from a physical mixing board. Later still the software added automation capabilities. The producer sets a change in a parameter (volume, panning, equalization, filtration) to occur at a predetermined location in a work. As the work plays back, the software adjusts itself

54. Michael Goldberg, "Consume The Minimum, Produce The Maximum," *Wired*, December 1994, 116.

without real-time manipulation by the producer. The combination of hardware and software relocated the site of the entire creative process from large studio setups to a single machine. The process of conception, working drafts, editing, and production fell under the control of a single person: the artist, composer, and producer roles merged.⁵⁵

Software samplers and loop-based software use a visual metaphor that handles audio samples as virtual objects. This is ideal for musical composition in digital counterpoint. Rather than a DAW multitrack tape graphic metaphor, these applications focus on context-sensitive tasks related to only one object at a time. Small-scale projects like mashup production benefit from this visual metaphor where heavy manipulation and assembly take priority. These applications introduce two unique tools that make contrapuntal composition possible: pitch shifting and time stretching. They make possible relatively extensive manipulation of digital audio without physically altering the recording medium. For the remainder of the chapter I discuss both of these tools and their role in digital counterpoint compositional technique.

Pitch correction & pitch shifting

Digital processing in audio production addresses one of the most significant deficits of acoustic and electronic media: media speed and pitch intertwine. As a phonograph record spins faster, the sound's pitch rises; alternatively, as the record spins more slowly, the pitch falls. The same principle extends to tape media. This was the basis of composition for audio storage media from *Grammophonmusik* to *musique concrète*. Gould and Lorne Tulk composed the documentaries with tape but those works did not include extended segments of overlapped music.

Powerful computer processors enable software developers to incorporate complex audio manipulation processes into their applications. One of these processes gives artists the agency to sever the link between media speed and pitch. Using computer algorithms based on the 'Fast Fourier Transform' (FFT) equation, the artist controls parameters of

55. The Apple Inc. iOS app store currently has available ten multitrack DAWs for their smartphone and tablet computer, including their mobile version of GarageBand, a simple DAW. All the apps are capable of capturing four or more stereo tracks simultaneously with real-time dynamics processing, filtration, and automation.

pitch and speed independently. The equation's namesake, mathematician Jean Baptiste Fourier, suggested that any sound wave is reproducible by combining multiple sine waves of varying sizes.⁵⁶ The key point in modifying pitch while preserving tempo is to preserve 'formants.' Formants are the recurrent peaks at specific frequencies in a sound wave, the sonic signature of an instrument or a person's voice. They indicate the size of the instrument (a large instrument produces a lower sound), and its distinctive timbre. Modifying the speed of an analog medium modifies the sample's formants and subsequently the sound appears to come from an instrument or body/voice of a different size with different timbral qualities. In essence, the sound then appears to originate from a different instrument or person. Using an FFT-based algorithm, the software preserves formants while it increases or decreases the pitch by manipulating the sound wave. The sonic signature of the voice remains the same, natural, but the pitch changes.

Pitch correction and shifting are the same in practice but differ in the extent of sample manipulation. I use 'pitch correction' in reference to the process of sample pitch standards that vary by small fractions of a whole tone (1/100th increments). The current pitch standard is A440Hz whereby the 'A' below 'middle C' sounds at 440 cycles per second. Digital instruments default to this pitch standard. Early-music ensembles tune to lower pitch standards (A430, 415, or lower) and some contemporary orchestras tune to a higher pitch (up to 8 Hz) to achieve a 'brighter' sound. Even small variations in pitch standard hamper mashup construction because they can introduce audible dissonance into the mix. One observes this effect on a recently tuned piano when one of the three strings on any pitch loosens even just a little bit. The fundamental pitch remains but the errant string compromises the pitch accuracy or purity. Pitch correction for music in modern digital recordings or recordings with digital instruments is likely unnecessary. Older recordings recorded on analog media often require these adjustments. Their pitch standard may vary due to a number of variables: tape stretch and small differences in tape playback speed or turntable rotation speed. While correction is for micro adjustments,

56. This algorithm is the basis for 'additive synthesis' in which audio synthesizers approximate an instrument's distinct timbral profile by combining several sine waves. The result is a somewhat convincing instrumental sound. The process proves effective for its capability to mimic a wide range of instruments in a single keyboard or rack unit.

‘pitch shifting’ is for larger adjustments in semi-tone increments. I use this term interchangeably with ‘transposition,’ as the effect is the same.

The composer must be wary when transposing, as large pitch adjustments are more obtrusive than small ones. Roseman suggests that a shift of one semitone is not noticeable for most listeners; shifts of three or more semitones are widely recognizable. One notices pitch shifts in vocal samples more so than with instrumental samples.⁵⁷ Listeners do not always react well to obtrusive pitch shifting. When they encounter a well-known but heavily modified sample, listeners recognize the work but the modification is an alienating force. In an interview with Liam McGranahan, DJ Faroff observed,

Sometimes you are listening to a song and you think about another song that would work so well... but if one is E and the other one is B then you are screwed. You would have to pitch too much, you can't do it. Sometimes you just force it a little bit like "Enter Toxman." Metallica was E and Britney [Spears] was C. Kind of distant, but I just put [pitched] Metallica down a little bit, and brought Britney up a little bit. Some people at GYBO [Get Your Booty On, online forum] were kind of upset. Not upset, but they were like, "it's not the right pitch for Metallica."⁵⁸

Pitch-shifted instrumentals are not as jarring to listeners perhaps because audiences are conditioned to accept this practice. Song arrangers transpose music frequently to suit ensembles or vocalists. Generally speaking, a work in B^b major is more convenient for a clarinetist than a work in C major; a singer with a low voice may find a song in G major more idiomatic to her voice than a song in A major.

In the digital counterpoint repertoire, DJ Overdub's mashup "Five step" is a notable example that makes extensive use of pitch-shifted instrumentals. The mashup incorporates Dave Brubeck's "Take Five" (1959) and Radiohead's "15 step" (2006). Overdub transposes Brubeck's instrumental into the same key as Thom Yorke's vocals. The transposed instrumental is noticeable but not jarring, as the performance gestures remain intact. Yorke delivers his vocal sample in a distinct falsetto and attracts the listener's focus. The potential effect of transposing the voice down to match Brubeck's

57. Roseman, *Audio mash-up construction*, 133.

58. DJ Faroff quoted in McGranahan, *Mashnography*, 43.

instrumental would be jarring because the listener *expects* the high falsetto. In addition, changing the sonic characteristics of the falsetto would sound unnatural based on the listener's past experiences of Yorke's work.

Pitch correction and shifting allow the composer or producer to adjust their samples for harmonic compatibility. This comprises only half of the requisite adjustments to prepare samples for composition. As Francis Grasso discovered decades earlier, to avoid the jarringly asymmetric meter of unsynchronized songs composers also concern themselves with beat matching and time stretching.⁵⁹

Beat matching and time stretching

Music composition with digital counterpoint technique relies extensively on beat matching and time stretching for precise rhythmic juxtaposition. Without this tool, a work lacks the 'cleanliness' to distinguish a cohesive, autonomous work from a poorly composed collection of independent samples. Beat matching in its first iteration ensured consistency of tempo between records. Adjusting the turntable speed to match tempi introduced the problem of harmonic compatibility. To mitigate the dissonance of conflicting key centers between turntables, Grasso transitioned swiftly between records. Building on Grasso's technique, digital signal processing augments beat matching with 'time stretching.'

Drawing again from FFT-based algorithms, time stretching preserves a sample's pitch while increasing or decreasing a sample's duration. The algorithm analyses the sample and creates a mathematical representation of the sound wave. The software models the sound by determining the number and size of sine waves required to recreate the wave accurately. When elongating a sample's duration with analog media, the sound wave stretches, the wave frequency decreases, and the pitch drops. With digital audio when the artist stretches a sample's duration, the FFT algorithm draws from its mathematical model of the sound wave. Instead of decreasing the pitch, the algorithm maintains the

59. Bill Brewster and Frank Broughton, "Terry Noel: Original Mixer," in *The Record Players:DJ Revolutionaries* (New York: Black Cat, 2010), 52; Luke Crisell, Rob Principe, and Phil White, "The early days of the DJ," in *On The Record: The Scratch DJ Academy Guide* (New York: St. Martin's Press, 2009), 25.

sample's frequency by inserting data based on the sound wave model. As the software augments the original wave with its own data, the pitch remains stable while the duration increases.

Jordan Roseman speaks directly to this from his experience with mashup production and FFT-based time-stretching,

[T]he more you alter a song's tempo, the stranger it may sound. Altering a song significantly (by more than 10 percent...) can have results that sound obviously altered... the less tempo alteration you perform, the better the mashup will sound.⁶⁰

Obtrusive alteration notwithstanding, time stretching is a powerful tool for contrapuntal composition. It enables the artist to align samples of proportionately equal phrase lengths but different durations. In doing so the artist effectively beat-matches the samples. For example (Figure 1.1), a four-measure sample at 72 bpm has a duration of 13.2 seconds. A four-measure sample at 60 bpm has a duration of 16 seconds.

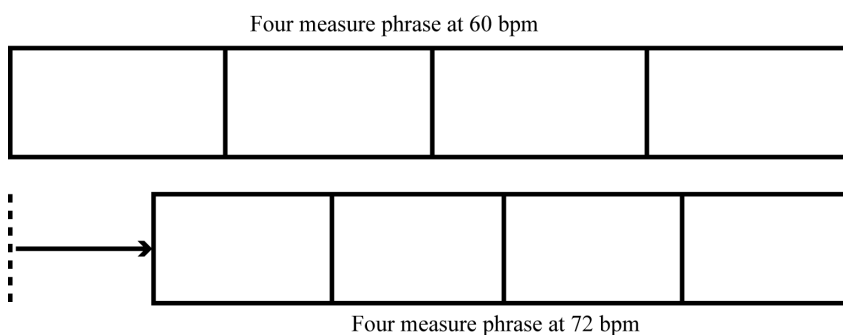


Figure 1.1 Sample A time stretched to match Sample B tempo

As in the above diagram, the artist literally stretches sample A at 72 bpm to match the duration of sample B at 60 bpm. In instances when the tempo discrepancy between two samples surpasses the suggested 10 percent the artist may opt to time-stretch both samples (Figure 1.2). By decreasing the tempo of Sample A and increasing the tempo of Sample B, the artist finds a middle-ground tempo. In the new common tempo, both samples retain their pitch without sounding altered.

60. Roseman, *Audio Mash-Up Construction*, 82.

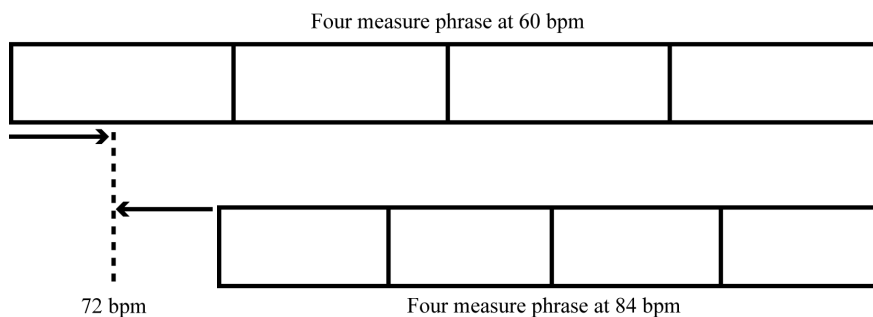


Figure 1.2 Samples A and B time-stretched to a common tempo

Chapter Summary

We cannot pinpoint a single technology or compositional aesthetic as the sole progenitor of digital counterpoint. Rather, its roots grow in a lineage of cultural and technological developments that span hundreds of years. Mashup production in digital counterpoint bears a clear resemblance to the quodlibet and its extensive use of preexisting musical material. Yet, the mashup also draws from over a century of audio recording technologies. Contrapuntal radio, too, takes cues from the quodlibet if only for its use of pre-existing material. It also draws heavily from recording technologies.

The roots of digital counterpoint technique, manipulating audio and playback media began in the art music avant-garde first, briefly with gramophones, then extensively with tape. Pierre Schaeffer's *musique concrète* wields an enormous influence on subsequent developments in tape composition in both art music and popular music. Experimentation in composition by and for analog recording media culminates in powerful digital software. The digital audio workstation not only replicates the abilities of tape and phonograph but surpasses their capabilities. The ability to modify audio in real time by automated manipulation, effects, and dynamics processing addresses significant deficits in analog media workflows. Most significantly, the capacity to divorce the parameters of speed and pitch provides the fundamental tools for musical composition in digital counterpoint.

With the succession of composition first in traditional counterpoint, then composition with audio recording and playback devices, we need a way to discuss and analyze digital counterpoint compositions. We have the means to examine traditional pitch-based notated musical material and limited means to discuss electronic music with recorded

materials. In the next two chapters, I engage in analyses of the purely musical elements of digital counterpoint. There are some caveats: Musical harmony in digital counterpoint differs from harmonic practice in traditional counterpoint because of the limitations imposed by electronic and digital audio manipulation. Pitch shifting and time stretching samples enable simple contrapuntal composition with pre-existing digital audio; however, it fundamentally changes the study of counterpoint. Samples are transposable only by small intervals without audible distortion. The compositional tools of common-practice counterpoint (pen and manuscript paper) do not impose technological limitations on the ability to transpose melodies. Composers using digital counterpoint assemble their work within a narrow framework of harmonic relations. Form follows harmonic practice and within the limited harmonic framework of digital counterpoint technique, composers find other means to construct form.

I devote the next chapter to Gould's contrapuntal radio technique. Working only with tape limits Gould's possibilities for working with extended sections of overlapping, pre-existing music materials (recorded music). It presents us with the opportunity to discuss harmony using extra-musical elements (speech and sound effects) but in a musical context. In effect, Gould uses non-musical materials *musically*. The speech material Gould uses in his radio works poses challenges for form and texture. Gould creates the effects of form and texture using non-harmonic cues. This requires me to examine semantic content and sound effects as harmonic elements, and elements of recording practice for their role in creating texture.

Chapter Two

Contrapuntal Radio as Contrapuntal Music

Introduction

Gould identified contrapuntal radio as a series of audio production techniques for radio documentary composition, with speech as its foundation.

There are, in the [Idea of North] prologue and various scenes of which “North” consists, a number of techniques which I would be inclined to identify as musically derived... [The characters] engage in the first of several instances of a technique I’ve grown rather fond of dubbing ‘contrapuntal radio.’¹

‘Contrapuntal radio’ describes Gould’s compositional voice, and also identifies a series of compositional techniques in the same way as common-practice counterpoint bears its own techniques. It differs significantly from the mashup in how composition is examined and discussed in a contrapuntal idiom. It is musically conceived and musical but contains little traditional harmonic material.² Gould adapts and rethinks three elements of counterpoint composition technique for his venture into electronic tape composition. First, the concept of ‘harmonic discipline’ supplants traditional notions of harmony. In the early radio documentaries, Gould works primarily with recorded interviews, the spoken word. He appears to construct a harmonic system of semantic content and relations between topic areas. It is only in a later documentary that he works with recorded music material. Second, traditional musical forms are not idiomatic to spoken word interviews even after careful manipulation. Gould fashions adapted formal designs for his radio works from his extensive knowledge of art music form. He adapts simple music forms (binary, ternary, and rondo), and creates new forms. Finally, the possibilities of working with overlapping spoken word provide a platform for making creative use of texture. In two scenes in *The Idea of North*, his polyphonic composition challenges the practical limits of monaural sound production and perception. In this chapter, I examine Gould’s conception and construction of these three elements.

1. Gould, “‘North’: An Introduction,” 393.

2. Gould, “Radio As Music,” 378-379. By ‘traditional’ I refer to notational, pitch-based melody and harmony.

Going forward, this study employs Gould's own terminology and adaptations of traditional terminology. The reader will notice discrepancies between traditional definitions of the musical nomenclature and Gould's use of the same terms and concepts. I map the contrapuntal radio analogies onto traditional forms to highlight the challenges in reproducing form in works using extra-musical material. There are few direct analogues between the harmonic content of notated musical material and the spoken word content of contrapuntal radio. For the purpose of exposition it appears that Gould borrows particular terms to provide accessible explanations for his composition practices. In matters of form and texture the terms follow rigid definitions solidified by centuries of practice and study. They are also informed by specific musical events (repetition, chord progressions) that simply do not exist in contrapuntal radio. In lieu of those events, Gould defines the terms by events in his works that bear the closest similarity to traditional elements. Further, Gould draws on a number of disciplines, notably theatre, music, and cinema, to describe his techniques and compositional process. By using his metaphors, I maintain some consistency between his writings and my analyses. I adopt Gould's use of the terminology with the understanding of problems arising from this methodology, but do so for the purpose of maintaining the spirit of Gould's work.

One of contrapuntal radio's primary contributions to this study is that of the non-traditional harmonic system. Gould creates a harmonic system rooted in semantics. Form in Gould's documentary is compelling for its economy of means. He uses simple forms and adaptations of those forms to create extended works, a series of formal models to extend in time large-scale works without appearing forced or contrived. Gould's experiments in texture, too, provide working models of conventional homophony and polyphony. Digital counterpoint benefits from Gould's ambitious polyphonic models.

However, to unravel Gould's compositional process for examination it is necessary to consider his discussions of contrapuntal radio, which are vague and offer only a hint of what the technique entails. His brief explanation of harmonic language reveals enough to spur further exploration. Contrapuntal radio is,

[a] highly organized discipline—not necessarily leading to a fugue in every incident, but in which every voice leads its own... life and adheres to certain parameters of harmonic discipline... [like] how the voices

came together and in what manner they splashed off each other, both in the actual sound and in the meaning of what was being said.³

I devote this chapter to a review of harmony, form, and texture in the context of the above quote. It is frustrating in its vagueness but exciting for what it reveals about contrapuntal radio technique. For my discussion I draw examples from the first two *Solitude Trilogy* documentaries, *The Idea of North* and *The Latecomers*, as well as a later documentary *Stokowski: A Portrait For Radio*. These works represent milestones toward the development of digital counterpoint technique. Gould used *North* as an early proving ground for his techniques; *Latecomers* introduced stereo sound and new possibilities for form and texture; *Stokowski* was the first work to employ multitrack recording equipment, enabling Gould to incorporate recorded music excerpts in a limited counterpoint. The first portion of the chapter examines Gould's unique harmonic system whereby he employs speech and sound effects, essentially extra-musical materials, *musically*.⁴

Harmony

Contrapuntal radio and, subsequently, digital counterpoint, encompass material beyond the breadth of traditional notions of music. The examination of 'harmony' at hand draws on methodologies that highlight the musicality of Gould's use of speech. Harmony is not only a matter of fixed-frequency sound waves creating chords or melodies, *per se*. It encompasses consonance and dissonance, and tension and release, but not only as a matter of complementary or conflicting pitches. In this portion of the chapter I outline three compositional elements of Gould's harmonic system. First, Gould's non-musical harmonic system relies on semantic content to create agreement and disagreement of ideas, opinions, and actions. Short programmatic scenarios are as ephemeral and transitional as key areas. Second, for *North* and *Latecomers*, Gould employs a kind of *basso continuo* of sound effects for programmatic continuity. Third, to link subject matter

3. Tim Page, ed., *Glenn Gould A Life In Pictures* (Buffalo, NY: Firefly Books, 2007), 31. Gould derived this definition to deflect criticism and poor reception of *The Idea of North* and *The Latecomers*. The second half of the definition switches to the past tense to explain what transpired in the documentaries and how it related to musical technique.

4. Extra-musical here refers to explicitly non pitch-based sounds. In Gould's work, 'extra-musical' represents spoken word from excerpted interviews and sound effects.

across two or more voices, Gould employs a device he refers to as a ‘crossover.’ Rooted in the twentieth-century contrapuntal technique of Anton Webern, a member of the Second Viennese School of composers, Gould uses crossovers as exchange points or pivots of ideas. Webern used the crossovers as a means to connect and extend motivic material in his contrapuntal works. This is a motivic treatment of extra-musical voices.

If horizontal melodies and vertical chords constitute traditional harmony and counterpoint, then speech and miscellaneous sounds are the harmonic elements idiomatic to digital counterpoint. The rules of voice leading in common-practice counterpoint, guided by harmonic consonance and dissonance, do not apply here though Gould composes literally with recorded voices; the ‘harmony’ of spoken narrative or programmatic scenarios displaces concepts of vertical harmony. Harmony, in a sense, becomes the practice of managing theatrics. The traditional practice of quantifying and labeling chord progressions is incompatible with a notion of harmony that relies on extra-musical material. Specifically, to form a compositional system there ought to be a semblance of order, rules, and balances. The task is to measure and quantify that which is fundamentally qualitative.

Since this section examines my notion of Gould’s harmonic system, I refer again to his definition of contrapuntal radio as my point of departure.

[E]very voice leads its own... life... [like] how the voices came together and in what manner they splashed off each other, both in the actual sound and in the meaning of what was being said.⁵

Gould does not elaborate, but the reference to voices coming together, splashing off each other, alludes to a harmonic connection with semantic content, texture, and counterpoint. Contrapuntal radio diverges from contemporary radio theatre and drama in the musical conception of composition and production. The painstaking editing of interviews and layering of voices demonstrates a clear attention to timbre *and* speech content to create dialogues, or ensemble dialogues on common themes; this is compounded by the inclusion of the ubiquitous ‘basso continuo.’

5. Glenn Gould quoted in *A Life In Pictures*, 31.

In the next portion of the chapter, I start my outline of harmony with semantic content. Specifically, I explore how Gould created a harmonic system from contrived vocal interactions. Through dialogues and group scenes, the topic areas grow from a few sentences or a whole scene, or perhaps the topic area changes within the scene. Though it is impractical to make a direct analogy, we may regard the process of rising dramatic tension and release, conflict and resolution, as akin to a chord progression or changes in key area.

Semantic harmony

Speech content counterpointed into dialogues or group scenes represents a sort of harmony in that all the speech content at any given moment relates to a common theme. This, I suggest, is the musical discipline implied by Gould in his brief explanation of contrapuntal radio. The theatrical programs, like harmony, establish a series of dramatic situations to generate a kinetic energy that propels the work forward, delineates sections, and establishes a formal structure. This is particularly important to digital counterpoint in order to establish a series of rules and norms that govern the study of theory, counterpoint, and composition. In common-practice counterpoint, the rules reflect a clearly defined ecosystem of pitches, performance instructions, and analytical tools. This is essential for any given historical style. Gould's system rests on subjective interpretations of the spoken word, vocal inflection, and dialogues contrived in an editing suite. I propose a quantitative method to inform analysis of contrapuntal composition with non-musical materials in digital counterpoint via micro- and macro-level readings of Gould's works. The case studies below illustrate Gould's harmonic system at work on two levels: first, the macro level, examining large-scale structure; second, the local level, looking how harmony functions within a scene.

Case study no. 1: Harmonic teleology in *The Idea of North*

In the first of the contrapuntal radio documentaries, Gould establishes a work in five 'scenes,' each with a distinct program. Unlike contemporary documentaries with audible interviewers, Gould's line of questioning is removed from the interview recordings. The interview subjects' responses sound as if performed in monologue and not as reactions to

an interviewer's questions. What the listener hears are monologues and dialogues edited together from multiple tape segments culled from the complete interviews. In other words, Gould contrives theatrical scenarios from the available interview content. The result ventures into the realm of radio theatre but without a clear plot or programmatic teleology. Instead, *North* progresses as a collection of five scenes on a common theme. This documentary lacks the traditional harmonic cues that indicate a work's structure and listener's location in a work. It is perhaps all the listener can do to derive each scene's program. As Gould describes in "Radio as Music," *North* is in seven formal sections: the prologue, five scenes, and an epilogue, a soliloquy by the documentary's narrator, Wally Maclean.

Scene	Synopsis
Prologue	Personal reflections on the North
Scene 1	Descriptions of the characters' 'early days' in the North
Scene 2	First experiences of Northern living with reflections on emotional and community connections
Scene 3	Reality of Northern living and de-romanticizing the North
Scene 4	Conversation in the 'dining car' about 'Eskimos' and colonial attitudes toward the North
Scene 5	Contemplation on the future of the North
Epilogue	Narrator's soliloquy on the North's philosophical meaning and relationship to Canada and what role the North will play in Canada's future.

Table 2.1 - A thematic scene-by-scene summary of *The Idea of North*⁶

There is a clear theatrical progression in *North*'s programmatic content that suggests shifts in dramatic tension. It begins with the characters' optimistic first impressions, eventual disillusionment in the reality of the North, and finally, upon reflection, a wistful longing and nostalgia for their time there. The progression of dramatic scenarios from scene to scene also corresponds with shifts in programmatic tension, levels of conflict either in monologue or dialogue content. This is not unlike the large-scale harmonic teleology of a symphonic structure;⁷ however, this is not to suggest a direct analogy to major or minor tonalities or quantification as specific chord progressions. In reviewing

6. I include a full thematic and formal analysis of *The Idea of North* in Appendix A.

7. David Jaeger, interview by author, Toronto, ON, May 2, 2010. Early in his tenure at the CBC, Jaeger produced a series of radio shows for Gould. He suggested that they collaborate on an article entitled "The symphonies of Glenn Gould," about the contrapuntal radio works. Gould agreed to the project though it never came to fruition.

North's programmatic progression, the optimistic start, disillusionment, and wistful reminiscence suggest a threefold structure; the first and last scenes behave as a 'positive' program or minimal levels of dramatic tension, a sense of rest. Inner scenes contemplate an unhappy reality, a 'negative' program that bears the highest levels of tension and leaves the listener waiting for resolution, a place of rest with low tension levels. This is not to suggest that Gould conceived his harmonic system by this logic, only that it functions this way. The intrepid analyst or composer may wish to quantify tension on a limited scale of, say, one to ten. Unlike in traditional harmonic systems with easily quantifiable chords and progressions, the task of labeling or assessing programmatic tension is significantly more subjective.

If we are to consider digital counterpoint as a complete toolbox of robust compositional techniques and 'rules,' it must have a harmonic logic, even if it is not rooted in common-practice harmony. If an unresolved chord frustrates a listener, the same is true while following a dramatic scenario with an unresolved plot conflict. Though it is impractical, even misleading, to assign particular chords or chord functions to dramatic scenes, we may use the analogy of chord progression to illustrate this system of semantic harmony. As in other traditional harmonic analysis, non-musical harmony in digital counterpoint functions in many levels. Large-scale harmonic structures contain smaller 'harmonic' units in the way each section of a sonata has its own internal harmonic design. The next case study examines local level sectional harmony.

Case study no. 2: Local level harmony in *The Latecomers*

Gould identifies a central scene in *Latecomers* as a ternary form.⁸ The discussion here does not concern form, but rather the internal harmonic design of that form:

Section one	A	Man and woman converse on the merits of staying in and leaving Newfoundland. Dialogue develops into tense argument.
Section two	B	Two old men discuss their long-past experiences living in Newfoundland. Very little tension in their reminiscences.
Section three	A ¹	Return to the man and woman who continue their argument, which escalates further.

Table 2.2 - Local level harmony in *The Latecomers*

8. Gould, "Radio As Music," 378.

Again, the programmatic sections outline a threefold harmonic progression. The discussion constitutes the first section, ‘A’; the old men in the ‘B’ section relate their reminiscences of life in *old* Newfoundland; the dialogue resumes between the man and woman, though with more dramatic tension, signaling the arrival at a modified ‘A’ section, or ‘A¹.’ The opening and closing sections of this scene engage a relatively high level of dramatic tension in the form of an argument between interviewees. Sandwiched by the opening and closing discussion, the inner section’s semantic content, and dramatic tension, is significantly less tense. The two interviewees’ speech content does not bear a hint of malice, only recollection. The inner section functions as a reprieve from the tension of the bookend dialogue. This scene’s semantic harmonic progression does not generate a kinetic energy to propel the scene. It starts with a state of high tension or unrest, moves into an area of low tension or rest, and then another state of unrest with high-level tension dialogue. This structure follows a ‘high-low-high’ harmonic progression, which inverts the large-scale harmonic structure of *North* whose middle section compelled resolution to lessen the dramatic tension.

The important lesson in harmony for digital counterpoint comes from the case studies in varying degrees of programmatic tension or the practice of managing theatrics by deft audio editing. The composer controls the severity of the ‘conflict’ when assembling the non-musical materials (speech) into dramatic scenarios. In doing so he or she also controls the strength of the harmonic relationship. These case studies are rudimentary models of extra-musical harmonic relationships in digital counterpoint that will serve to inform future analyses of Gould’s work, and the composition of works by future composers.

A musical device common to Baroque music, the ‘basso continuo,’ unites all scenes in each of Gould’s contrapuntal radio documentaries. For *The Idea of North* and *The Latecomers* Gould employs sound effects. In later works, new audio recording technology enables him to use recorded musical material for his continuo. The next section engages in a discussion of Gould’s conception of the ‘basso continuo’ in both a non-musical and musical context.

The ‘basso continuo’

A stalwart element of much baroque consort music, the basso continuo (translated literally as “continuous bass”) establishes a harmonic foundation while upper voices outline chords and define the chord quality—major, minor, augmented, or diminished.⁹ It provides Gould with a convenient musically derived element to provide a unifying element in his documentaries.

[A]nyone who has had the experience of the organ feels that need for a bass foundation of some kind... [T]hat may in fact be the reason that I’ve always felt the necessity of a continuum of some kind in everything that I’ve done in radio.¹⁰

For digital counterpoint, the continuo provides a practical lesson to mitigate the appearance of a disjointed collection of scenes and create a cohesive whole. My examination of Gould’s conception of continuo encompasses ‘musical’ continuity, but with a clear dramatic element. A device benefits digital counterpoint as an alternative to traditional music continuo. Extra-musical sounds are a staple of radio drama, film, and television to link and underlay scenes; however, the continuous sound without breaks between scenes and subtle changes in timbre is a novel contribution to digital counterpoint. This technique will inform future composition of musically conceived non-musical works to unify scene components.

Gould’s use of the basso continuo establishes a two-way relationship with other audio content in the scenes. Like a traditional basso continuo that establishes a harmonic foundation for the musical voices above it, Gould’s continuo provides the thematic premise and establishes the dramatic framework for the upper voices. It creates for the listener an expectation as to the speech content. Simultaneously, the continuo takes specific ‘harmonic’ cues from the speech content. This inverts the basso continuo’s role in which the upper voices elaborate the bass harmony. The monologues and ‘dialogues’ transpire on a train in *North* or, as in *Latecomers*, next to the ocean. The train and ocean

10. Ibid., 383.

continuo are not just sounds, but sounds with *inflection*. Rather than maintain a particular inflection for an entire scene, the continuo's timbre changes to reflect the speech content.

[Glenn] wanted variations. Moore [the producer in Newfoundland] sent us reams of tape with different— he literally went out and recorded different kinds of waves of water lapping, and some were waves hitting... We were able to go in and out of waves given the situation. If we had a situation of anger we could have a more deliberate sea.”¹¹

Inversely, Gould used the gentle waves when the situation called for peaceful dialogue or monologues. The use of the basso continuo here does not establish or outline a functional harmonic system as in common-practice counterpoint but underlines the ‘organic’ progression of ideas in conversational dialogue. In listening to *North* and *Latecomers* the inflective changes in the continuo are subtle but significant.

While a musical or non-musical basso continuo underlies the bulk of Gould's radio work, in one instance he forgoes the sound effect for the continuo and engages the scene's voices to take turns in the role of continuo. There he challenges the traditional notion of the continuo in the most liberal sense. The following case study examines an experiment with a ‘dynamic’ basso continuo.

Case study in ‘basso continuo’: *The Idea of North*, prologue

Gould identifies *The Idea of North* prologue as a ‘trio sonata’ in several locations.¹² The analogy is apt with an exception: there is no ‘fixed’ basso continuo. That is, the three voices share the role of providing the bass line, the harmonic support for the others. The voices, one female and two male, undulate in volume level but no voice in particular carries through the duration of the scene.

Lorne Tulk's illustration (Figure 2.1) of the *North* prologue reveals a map of three voices – Marianne Schroeder, Frank Vallee, and Robert Phillips – that fade in and out of the foreground by adjustments in volume. The effect of sharing the continuo role is audible with the forward and backward movement. The voice with the lowest volume level takes

11. Lorne Tulk, interview by author, Toronto, ON, September 6, 2010.

12. Gould, “Radio as Music,” 379, 385; Gould, “‘The Idea of North’: An Introduction,” 393; Bruno Monsaïgnon, *Gould The Alchemist*, DVD (EMI Classics, 2003).

on the continuo role and exchanges the role only when another voice's volume level drops to become the lowest. The frequency content of the voices—whether a 'high' or 'low' voice—is unrelated to the role of 'bass.' As with a traditional continuo, this technique maintains a continuous flow of sound, a 'voce continuo.' This is the only function that Gould retains in his adaptation of the device in the prologue. The dynamic continuo does not provide a harmonic support for the upper voices as with the train continuo throughout the rest of the work.

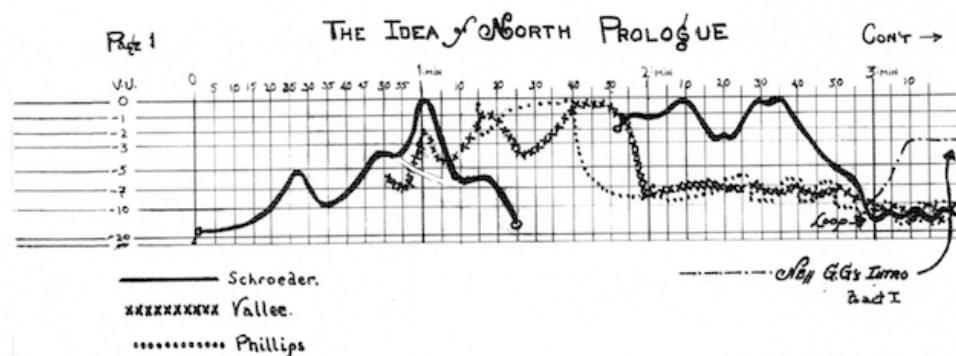


Figure 2.1 Lorne Tulk's graph of *The Idea of North* prologue (1970). The listener score illustrates the progress of the characters' voices in volume level over time.¹³

The voice exchanges through the prologue (Table 2.3) occur between individual voices until 2'00', when the pairing of Phillips' and Vallee's respective voices merge to form a compounded continuo while Schroeder occupies the foreground as the 'upper voice.' At the prologue's conclusion, Schroeder's voice joins the continuo with Phillips and Vallee; Gould's voice assumes the forefront with the three-voice basso continuo below. Experimentation in adapting or challenging the roles of traditional musical devices like the continuo establishes a precedent for similar experiments in digital counterpoint technique.

Another such device Gould engages is the notion of the pivot, often reserved for discussion of pitch or chords. His concept of the pivot hinges on a technique developed by early twentieth-century modernist composer, Anton Webern.

13. Glenn Gould Collection (Ottawa: Library and Archives Canada, [1970] 2010), MUS 109 2/5, 40 1.

Exchange	Time	Changes in the roll of 'voce continuo'
1	0'50"	From Schroeder to Vallee
2	1'06"	From Vallee to Schroeder
3	1'25"	From Schroeder to Vallee
4	1'41"	From Vallee to Phillips
5	1'56"	From Phillips to Vallee
6	2'00"-3'00"	Alternate between Phillips and Vallee
7	3'00"	Voices combine, Gould's voice enters as foreground

Table 2.3 Basso continuo voice exchanges in the *North* prologue

Crossovers, the contrapuntal pivot

Gould uses the term 'crossover' to imply an exchange of some sort between two or more objects.¹⁴ This exchange may be thought of as a pivot in traditional harmony. In the context of non-musical harmony, the pivot is an exchange and not a turning point. Gould's speech-based 'voice as harmony' is particularly idiomatic to motivicization of semantic content and ideas. I liken the speech content program to an 'independent melodic voice,' and the crossover akin to a pivot pitch or chord. The crossover is the common element that briefly unites the independent melodic voices. Gould uses the crossover in two ways: the voices exchange common words or ideas. In *Stokowski*, Gould literally crosses over, or pivots, between two musical works to maintain a seamless flow of music. If the crossover is too subtle a composition technique for non-musical works, its implementation in digital counterpoint may be effective with traditional musical material. In lieu of a pivot note or chord, the composer may apply the technique to cross over a word in a mashup lyric between two voices.

Gould explains the crossover as a common device in Webern's motivic compositions, the 'crossover in continuity.' He adapts Webern's treatment of continuity-in-crossover to isolate words or phrases as motives for programmatic inversion, to provide an alternate perspective on an idea; as a programmatic retrograde to contradict a previous idea from one or more of the voices; and also to exchange an idea with another voice. In this case, a second, and sometimes third, voice elaborates on an original idea. The crossover may be used also to shift the focus to a second voice as the first voice fades out. Gould uses three crossovers in *The Idea of North*. The crossover points are italicized:

14. Gould, "Radio As Music," 379.

Crossover	Time	Description
Prologue 1	1'02"-1'03"	Schroeder: "The <i>farther</i> North I went..." Vallee: "... they want to go <i>farther</i> North."
Prologue 2	1'14"-1'17"	Vallee: "The other fellow said 'I did a trip of <i>30 days</i> .'" Phillips: "... for another <i>11 years</i> I was in the North..."
Dining Car	39'00"	Sound effect, clank of a metal serving tray as it hits the floor

Table 2.4 Crossovers in *The Idea of North*

North's prologue illustrates three characters' trip to the North and their first impressions. The first crossover motive is distance, though the voices' semantic content represents different motivic material: Marianne Schroeder describes the view from the plane as she flew north. Her word 'further' crosses over with Vallee's 'farther' as he discusses the concept of 'northmanship,' a game of one-upmanship. The motive of the second crossover is time. Again, the program of each character's speech content is different but they share the 'time' motive: Vallee continues his disdainful description of northmanship. He relates that a man, to best Vallee's dog sled trip of twenty-two days, claims to have done a trip of 'thirty days,' which crosses over with Philip's 'eleven years,' the time he was affiliated with the North. In both crossovers, Gould creates his own one-upmanship: When Schroeder goes further, Vallee goes farther; when Vallee does a trip of thirty days, Phillips is there for eleven years. *North*'s third and final crossover is midway in the 'dining car scene.' The crossover is not a word but a sound effect that interrupts the flow of speech transition instantly between Phillips' and character Jim Lotz's respective programs. Phillips stops mid-sentence at the end of an antecedent clause and Lotz continues as if picking up the sentence.

Phillips: "...into the hands of fairly small people who don't have any institutions behind them..."

tray drops at 39'01"

Lotz: "On the other hand we've only been in the North with any strength for the last twelve or thirteen years."

After the metal tray drops and interrupts Phillips, it takes a moment to re-adjust one's ears to recognize that the voice changes. Gould takes advantage of the natural timbre of the characters' voices to smooth the crossover. Phillips and Lotz share many vocal qualities like "smooth" or "mellow" that sound somewhat similar. The last apparent

crossover appears in the *Latecomers* epilogue. As Lorne Tulk pans Lester Burry's voice to the right across the stereo field, he intersects with the narrator and they exchange their crossover "civilization."¹⁵ Through Burry's appearances earlier in the documentary, we learn that he desires a return to the 'old way of life' in Newfoundland and speaks patronizingly of the 'civilization' of modern conveniences; Harris, by contrast, dismisses the so-called civilization outside Newfoundland and is more than content in Newfoundland. Burry, Harris, and their respective speech content melodies are programmatically unrelated though they share the 'civilization' motive.

The crossover in contrapuntal radio links thematic areas at the local level. In lieu of pitch-based harmonic material to link scenes or scene sections, Gould appears to favour individual words to link motives. Later in the Stokowski documentary, Gould uses traditional music material for his crossover. I follow this section of non-musical crossovers with an examination of musical crossovers in *Stokowski: A Portrait For Radio*.

Case study in musical crossovers: Pivots in *Stokowski*

Stokowski is Gould's first contrapuntal radio documentary to employ a continuous flow of music from beginning to end. As in his first two documentaries in this style, he divides the documentary into programmatic scenes. In lieu of sound effects for continuity, Gould selects musical works from the maestro's recording catalogue to delineate scenes. This technique is not original to Gould's work. The 'sound bridge' originated in radio theatre whereby the listener hears a sound effect or music before the scene starts. What *is* original to Gould's work is that the sound not only provides a bridge, it continues for the whole work. The crossover is just the means by which Gould pivots between scenes and one musical work to the next. In this case, the crossover is literally a musical pivot pitch or chord. This case is concerned with Gould's musical crossovers and their pitch relations.

15. See 130," in Tulk's graph of the *Latecomers* epilogue (Figure 4.6).

In his production notes, Gould lists 17 excerpts with timings (Appendix B),¹⁶ though there are only 13 crossovers between the documentary's programmatic episodes (Table 2.5); one scene uses three excerpts (Schoenberg's Piano Concerto), one scene uses two excerpts (Wagner's "Good Friday Spell"). I do not consider the gap between the first scene (*Verklärte Nacht*) and the next (Beethoven's Piano Concerto no. 5) as transitional. Gould includes "between-take" studio noise from the Beethoven recording session with Stokowski. Because there is no harmonic pivot and the flow of music is interrupted, I do not consider this to be a crossover. Crossovers occur by panning left to right, or vice versa, or crossfading in the centre channel. This eases the transition between incompatible key centers as in crossovers 6, 8, and 10. Unison crossovers transpire by crossfading, as they are most effective when transitioned in the same spatial location.

Crossover	Time	Details
1	20'42"	From Beethoven Piano Concerto A major chord to D major chord in Brahms Serenade (V - I progression)
2	23'52"	From Brahms, A major chord to single pitch 'D' in Ives' Symphony No. 4. (V - I progression)
3	26'45"	From Ives, an emphasized 'B' of a G major chord to a minor-inflected diatonic pitch cluster based on 'G' in the cadenza from Schoenberg's piano concerto.
4	29'31"	From Schoenberg, B minor chord with emphasis on pitch F# to an open G chord (no 3rd) in Shostakovich's Symphony, No. 11 (iii - I progression in G major/minor)
5	37'52"	From Mormon hymn "Come, come ye saints," G major chord to B minor chord of Bach's "Ein feste Berg" (VI - i progression in B minor)
6	38'29"	From Bach, an A major chord to a single B ^b played by a cornet in Wagner's overture to <i>Rienzi</i> .
7	41'15"	From Wagner, a B ^b (single pitch) to an E ^b minor chord in Saint-Saens' <i>Samson and Delilah</i> excerpts. The B ^b leads to the 5th of the E ^b minor chord. (V - i)
8	42'35"	From Saint-Saens, D minor chord to an A diminished chord in Dvorak's Symphony No. 9 (pseudo I - v ^o progression)
9	43'23"	From Dvorak, B major chord to B major chord in Wagner's "Good Friday Spell" from <i>Parsifal</i> (Unison)
10	45'05"	From Wagner, B major chord to an A major chord in Sibelius' <i>Swan of Tuonela</i> .
11	46'23"	From Sibelius, C# minor to C# minor in Tchaikovsky's <i>Francesca di Rimini</i> (Unison)
12	51'43"	From Tchaikovsky, a single clarinet 'D' to alternating F-B tritone and E ^b -A dyads in Holst's "Neptune, the Mystic" from <i>The Planets</i> .
13	55'44"	From Holst, alternating F-B tritone and E ^b -A dyads to an F-B tritone dyad in Scriabin's " <i>Poeme de L'extase</i> "

Table 2.5 List of transitions and harmonic pivots in *Stokowski: A portrait for radio*

The above discussion of music crossovers dovetails with the discussion of harmony in the mashup (Chapter Three). There is much more to explore in contrapuntal radio and its

16. Gould lists Dvorak's Symphony No. 5 in error. It should be the Symphony No. 9.

implications for digital counterpoint. I dedicate the next and middle portion of this chapter to an examination of form in Gould's radio works. He employs adaptations of traditional forms, and forms idiomatic to other disciplines. The last third of this chapter focuses an analytical lens on Gould's experiments in homophonic and polyphonic textures.

Form

One must invent a form which expresses the limitations of form, which takes as its point of departure the terror of formlessness... [T]here are a limited number of rondos you can exploit in the radio documentary; then you... have to invent according to the criteria of the medium.¹⁷

In developing compositional techniques for contrapuntal radio, Gould relied on both traditional musical and theatrical forms. *The Idea of North*, the first work composed with this technique, is both a musical and theatrical structure, one inside the other; he took inspiration for the design from his intimate knowledge of a wide breadth of music repertoire, and childhood reminiscences of radio theatre.¹⁸ The mixture of formal structures provides compelling models for future compositions with digital counterpoint if only because they are idiomatic to large forms for musically conceived extended works with non-musical material.

Several small-scale forms constitute the large-scale structures of the documentaries (*North*, *The Latecomers*, *Stokowski*, et. al.); however, they may not be readily discernible to the listener. If one uses Gould's own musical and theatrical analogies, one is hard-pressed to identify a chorus or verse, a first or second theme, development, or recapitulation. Without traditional harmonic musical cues to indicate structural elements, one must rely on other devices. Unlike theatrical plots, form in contrapuntal radio documentaries does not follow a particular programmatic arch. Gould's form follows a clear progression of thematic *episodes*.

In the next section of this chapter, I present five case studies of form in contrapuntal radio. One through four are adapted traditional musical forms and unconventional forms

17. Glenn Gould, "Radio as Music," 379.

18. *Ibid.*, 374.

that challenge traditional notions of form; the fifth is a large-scale theatrical form that encompasses multiple smaller forms.

Case study no. 1: Binary form

Traditional binary form consists of a two-part structure, ‘A’ and ‘B’ sections, sometimes with repetition. Harmonic signposts from the tonic, or home chord, to the unstable dominant chord, which compels resolution back to the tonic, delineate the sections. One finds Gould’s concept of binary form at the lowest structural levels, within scenes. His binaries are literal ‘AB’ structures in a statement/response form idiomatic to documentary and radio theatre dialogues. The interviewer poses a question and the interviewee offers a response or dialogue participants exchange phrases. Gould, well familiar with the radio documentary and radio theatre, expressed dissatisfaction with the binary of straightforward dialogue. The second scene of *North*, in the form of dialogue, is a pure binary form.

The scene, the duration of which is approximately four minutes, follows an ABABABABAB series of sections (Appendix A). The short duration speaks to the limitations of binary form to sustain a significantly sized theatrical scene. In the second *Solitude Trilogy* documentary, *The Latecomers*, Gould applies lessons learned from *North* to inform larger episodic forms.

Case study no. 2 - Ternary Form

Again, Gould appropriates the traditional form to transform it into a form idiomatic for his contrapuntal radio works. The ternary form follows an ‘ABA¹’ structure, where harmonic cues indicate the sections with ‘tonic-dominant-tonic’ progression. Changes in meter also mark the difference in sections. The common-practice musical cues do not apply in the absence of musical materials. In his own adaptation, Gould identifies a central scene in *The Latecomers* in a ternary ‘ABA’ form. Shifts in thematic content delineate sections of this small-scale form.

The ‘argument scene’ (Table 2.6) is a threefold form, although each section is comprised of smaller binary forms. Rowe and Horwood’s dialogue follows a Gouldian binary form,

as does the ‘B’ section with the two old men in Portugal Cove. Despite the local-level binary, the ternary form reveals itself when the analyst looks up one level. It is both musical in formal conception but also theatrical and, with a duration of approximately ten minutes, it illustrates a promising model of large-scale composition with non-musical materials in digital counterpoint.

Formal section	Duration	Content
A	23’49”–29’47”	Penny Rowe and Harold Horwood present opposing perspectives of life in Newfoundland
B	29’58”–31’58”	Two men in Portugal Cove relate their own anecdotes about long-past experiences.
A ¹	32’06”–34’30”	Rowe and Horwood appear to argue in dialogue. Disagreements are more vehement.

Table 2.6 Illustration of form in the ‘argument scene’ from *The Latecomers*

Gould’s early efforts to create large forms grew from his disdain for the linearity of binary and, as he claimed, the terror of formlessness.¹⁹ His attempt to develop a form that expresses the limits of form manifests itself in *North* as a two-part linear rondo with interjections of contrapuntal dialogue.

Case study no. 3: Rondo form

As per Gould’s statement about the limit of binary and rondo forms one can exploit, Gould adapts another form for his own theatrical end. The 7-part “classical” rondo follows a clear pattern of key areas through the ‘ABACAB¹A’ structure. The second appearance of the ‘B’ section repeats in the tonic key. Instead of following the harmonic cues in the rondo form, Gould comments on the form that expresses the limitations of form.²⁰ He points to the first scene in *North*. The form is not a rondo form, strictly speaking, but there are enough similarities, at least in the variety of parts, to warrant his comparison. The local-level progression of voices falls into an ‘ABABABAB-C-DBDBDB-C-A’ form, which is more akin to the baroque *Rondeau* patterns such as those used by Bach. All of these sections operate on approximately the same scale though section durations vary due to the speech content. Each of the scene’s characters, three in all, represents a letter; there is an extra letter to represent a break in the linear rondo. The

19. Ibid., 374.

20. Ibid., 379.

opening ‘AB’ sections represent a dialogue between Wally Maclean and Jim Lotz. The ‘C’ section is a contrapuntal overlapping of both Maclean’s and Lotz’ voices. The following ‘DB’ sections comprise linear dialogue between Lotz and Robert Phillips. Another ‘C’ section follows Lotz and Phillips. Maclean’s return, ‘A,’ caps the scene. The contrapuntal dialogue ‘C’ section breaks the monotony of the binary while providing a transition to a second binary section. The overlapping voices rupture the linearity, and effectively reset and prepare the listener for another binary section. This extends the scene to a length of 13’40”, significantly longer than the pure binary that follows in scene two.

For scene three of *North*, Gould employs another modified rondo form though without any sections of overlapping dialogue. In ‘ABCBD-ACEBEBE’ form, Gould breaks the ternary pattern, within a rondo, with the introduction of the ‘D’ in place of the expected ‘A.’ The short pause between the scene’s halves again resets the listener’s ears for a modified binary that, without the pause, would appear as a modified rondo. The listener may be unable to discern the scene’s overall form, though, on paper, Gould uses the smaller, somewhat erratic, modified rondo to extend scene three to a not-insignificant 10’32” duration.

Gould’s unusual forms are compelling models for creating interest in large-scale digital counterpoint forms with speech if not in music. We also observe these forms appearing later as small-scale song forms in mashup production. These forms are not unique to Gould’s work nor do I imply that mashup composers draw any formal influence for their work from Gould. I explore this in the parallel section on form in Chapter Three.

The relatively simple unconventional formal concepts in *North* emboldened Gould to experiment with more sophisticated formal designs. He does not so much build a form but literally deconstructs it in *The Latecomers* epilogue.

Case study no. 4: Subtractive Form

Gould did not identify or assign this formal model to any of his works; this term is unique to this study but adapted from a discussion of ‘cumulative setting’ in the music of Charles

Ives.²¹ Using this form, Ives' quotes fragments of pre-existing melodies throughout a work and presents them in their entirety toward the end of the work. Peter Burkholder, in his work on Ives's musical borrowing, identifies the String Quartet No. 1 and the Symphony No. 3 as having cumulative forms.²² Gould takes the opposite approach. The epilogue from *The Latecomers* employs all of the work's characters and each voice reappears throughout the scene. Each vocal stream stays in the scene between 10 and 15 seconds before it fades out. Most curious about these vocal fragments is Gould's reuse of interview segments from earlier in the documentary. Over the course of 54 minutes, Gould introduces the documentary's characters, allows them their anecdotes, philosophizing, and reminiscences, and introduces them into dialogue or group scenes.

The epilogue inverts Ives' technique; Gould lays out a complete vocal semantic 'melody' early in the larger work and in the end presents only a speech fragment in a recapitulative section. The only 'complete' vocal melody is an original section of interview material from the narrator, Robert Harris. His voice is a base against which Gould subtracts material from the other character's speech. This form cannot sustain a lengthy scene without a large number of characters—Gould used eleven—otherwise the degree of subtraction might not be significant enough to warrant this formal classification.²³ It is a powerful formal concept that challenges the listener to distinguish the overlapping voices but also recognize the familiar speech content. This form, comprised largely of speech content, has implications for digital counterpoint composition in that it may also manifest itself using traditional musical materials as in the mashup. As I discuss in Chapter Three, the melodic fragmentation necessary for mashup composition is particularly suited to a subtractive form.

21. "Cumulative setting, a complex form in which the theme, either a borrowed tune or a melody paraphrased from one or more existing tunes, is presented complete only near the end of a movement, preceded by development of motives from the theme, fragmentary or altered presentation of the theme, and exposition of important countermelodies." J. Peter Burkholder, *All Made Of Tunes: Charles Ives And The Uses Of Musical Borrowing* (New Haven, CT: Yale University Press, 2004), 4.

22. *Ibid.*, 148.

23. The scene's 180-second duration demonstrates the spatial effect of full stereo separation, one degree for every second. The scene's brevity enhances the subtractive effect, as Gould necessarily cycles through all the characters in a relatively short time.

Gould conceived of form in his documentaries in theatrical terms, using terms like ‘cast,’ ‘soap-opera-ish,’ ‘soliloquy,’ ‘Greek chorus,’ and even direct comparisons with theatrical playwrights Thomas Beckett and Harold Pinter.²⁴ My final case study of form in contrapuntal radio explores Gould’s use of the dramatic vernacular to inform musically conceived, theatrical scenarios within a larger structure.

Case study no. 5: Theatrical form

I draw the bulk of this discussion from *The Idea of North*, as it is the most theatrical of the *Solitude Trilogy* in terms of dialogue construction, dramatic scenes (as in the dining car), and even Wally Maclean’s ‘soliloquy.’ “North... though technically a documentary, is at the very least a documentary which thinks of itself as a drama.”²⁵ Additionally, as if fearful of reinventing the wheel by conceiving a large-scale ‘documentary’ form, Gould draws from structural elements native to theatre. He refers to *North*’s form as a prologue, five scenes, and an epilogue.²⁶ He uses this terminology in his writing and interviews about this work, *Latecomers*, and *Stokowski*. The works progress in episodic scenes, each with their own thematic content though unrelated to the next beyond the documentary’s overarching program.

The theatre analogy also provides a premise for the dramatic binary dialogues and contrapuntal crowd scenes that transpire ‘on a train’ or ‘by the ocean’ as in *North* and *Latecomers* respectively. Gould goes so far as to refer to scene four in *North* as ‘the dining car scene.’²⁷ The sound effects with the train basso continuo bolster an argument for *North* as theatre.

Moreover, sketches of *North* from conception to actualization rely consistently on the theatre analogy using the terms ‘scene’ and ‘act’ to delineate formal sections.²⁸ In

24. Gould, “Radio As Music,” 375, 376, 382, 383.

25. Gould, “‘North’: An Introduction,” 392.

26. Gould, “Radio as Music,” 376.

27. Gould, “‘North’: An Introduction,” 393.

28. There is a rough, two-page formal sketch of *The Idea of North* that outlines a working synopsis of each scene. Glenn Gould Archives. (Ottawa: Library and Archives Canada, 1970), MUS 109 20/23, 82 1-2. Further, Lorne Tulk completed a polished formal outline of *North*’s structure replete with mention of ‘Acts’ and scenes. Gould never referred to ‘acts’ in his interviews or essays so I presume that, in lieu of the designation of both acts and scenes, he opted for the simpler division by scenes. Glenn Gould

constructing the documentary with a collection of disconnected scenes, Gould presents five independent forms each with their own program. Within the context of the larger work, there is no narrative teleology from start to finish. A common model of theatrical structure, Freytag's pyramid of dramatic structure (introduction, rising action, climax, falling action, resolution) does not account for Gould's idea of theatre.²⁹ This theatrical form does not recall the structure of most radio theatre works that Gould would have heard in the 1930s and 40s. In *North*, Gould provides a structure of dramatic episodes bookended by a vocal trio sonata prologue and epilogue in the guise of soliloquy. The theatrical form in digital counterpoint is idiomatic to contrapuntal radio, but that does not preclude its use in the mashup. Theatrical forms for digital counterpoint are not idiomatic to the mashup's propensity for small form popular music works; however, theatrical forms in digital counterpoint may find a better use in extended musical pitch-based musical works as in musical theatre or opera.

This discussion of multiple formal designs leads me to an analysis of texture. Gould's use of both linear, homophonic textures and varying densities of contrapuntal textures has significant implications for digital counterpoint. His experiments challenge traditional conceptions of polyphony in an attempt to transform a dense polyphony of multiple independent voices into the appearance of homophony, or vice versa.

Texture

Gould suggests that contrapuntal radio technique is an exercise in texture and not about recreating form, though form is a consequence of texture.³⁰ That is, Gould's compositional choices for simple dialogue or complex multi-voiced group scenes affect linear, homophonic and polyphonic textures. In the 'rules' of traditional counterpoint, texture is a consequence of voice leading, imperatives for how musical melodies should progress relative to harmonic consonance and dissonance between voices. Though Gould worked with speech materials and not traditional melodies, contrapuntal radio technique

Collection (Ottawa: Library and Archives Canada, 1970), MUS 109 20/5, 39 2-3. I did not have access to Tulk's outline though it is available in Sallis, "Idea of North' And The Production Of Place," 120-121.

29. L. Kip Wheeler, "Freytag's Pyramid adapted from Gustav Freytag's *Technik des Dramas* (1863)." <http://web.cn.edu/kwheeler/documents/Freytag.pdf> (accessed April 27, 2013).

30. Gould, "Radio as Music," 379.

necessitates leading the voices in the literal sense; the speech content of recorded interview segments align end to end against the constant continuo or in parallel with segments of other interviews. For the last portion of this chapter, I discuss both homophonic and experimental polyphonic textures in contrapuntal radio, and their implications for digital counterpoint.

Homophony in linear forms

One finds Gould's homophonic textures primarily in his linear forms (binary, ternary, and rondo). Gould employs the sound effects of the train and ocean in *The Idea of North* and *The Latecomers*, respectively, for his basso continuo. 'Homophony' here is a simple polyphony employing similar motion between parts. As the semantic content of the voice(s) changes, there is a corresponding change in the sonority of the basso continuo. In effect the sounds of the basso continuo 'move' in a similar motion with the voices to reflect the speech. Later documentaries, *Stokowski* and *Casals*, employ music for the basso continuo; however, the vocal segments laid end to end in the foreground do not interact with each other as in a contrapuntal texture. The single voice, in counterpoint with the constant drone of basso continuo, affects a homophonic texture as in melody and counterpoint. My discussion above of the inflected basso continuo notes that the continuo follows the rhythm of the vocal segment and its speech content.

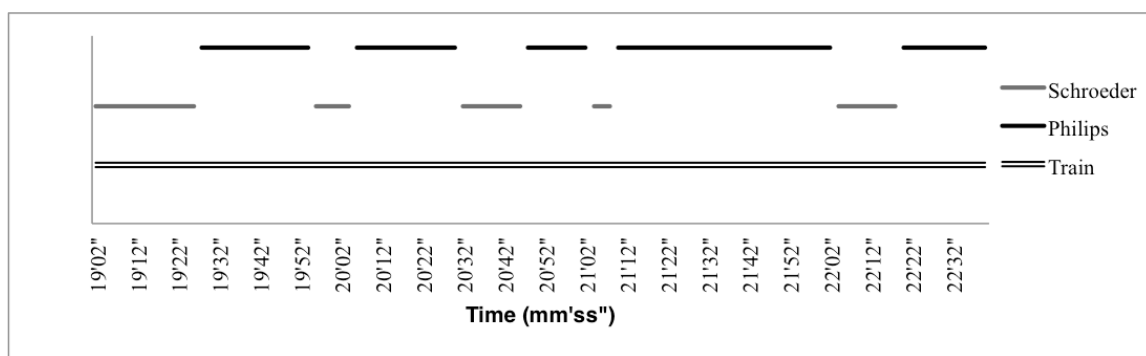


Figure 2.2 Homophonic texture in *The Idea of North*, Scene 2.

The binary form in scene two of *North* (Figure 2.2) employs two voices with continuo. The voices progress end to end with no overlap so at any given moment there is only one voice, counterpointed by the inflected basso continuo. I categorize the scene as homophonic.

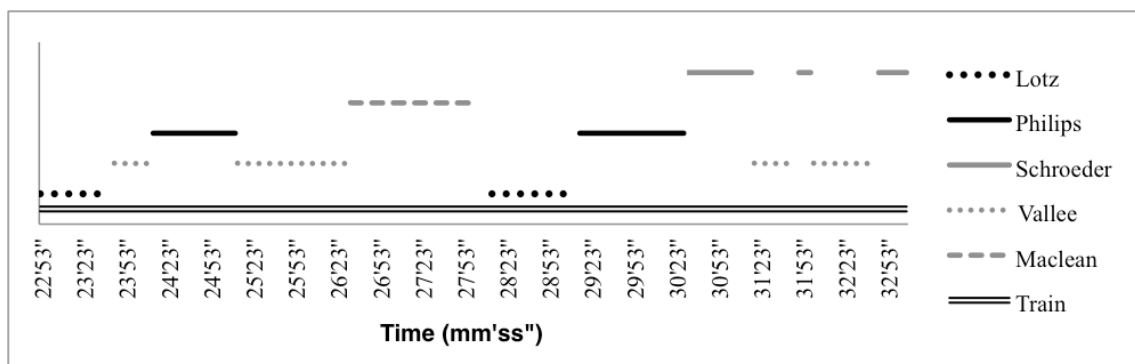


Figure 2.3 Homophonic texture in *The Idea of North*, Scene 3.

Similarly, the modified rondo of scene three (Figure 2.3) contains fragments from all five of the documentary's characters, as their interview segments follow end to end. Again, at any given moment there is only one voice, accompanied by the continuo, which leads to my analysis of the scene as homophonic.

The first scene in *North*, the modified rondo, is primarily homophonic (one voice at a time with continuo) though punctuated twice by overlapped dialogues between Maclean and Lotz. The 'C' sections of simultaneous speech are polyphonic.

The ternary form of the *Latecomers* argument dialogue, also linear, is homophonic though it also contains four distinct characters. Interview segments progress end to end and do not overlap. Gould maintains the basso continuo but, again, uses inflection to follow the dramatic situation unfolding above it. The ocean continuo follows the voices.

In the later documentaries that fête composers Richard Strauss and Arnold Schoenberg, and musicians Leopold Stokowski and Pablo Casals, the segments of interview content appear alone, counterpointed only by the basso continuo of musical material; there are no counterpointed interview segments. The music Gould uses as continuo in later documentaries overlaps frequently but only momentarily and does not constitute an extended or notable polyphony original to the documentary. This requires a more liberal interpretation of 'homophony' only because the underlying music continuo contains its own internal polyphony; however, considering that, at any given time, Gould uses only two sound sources in the stereo field, and the music changes to reflect the speech content, it does conform to Gould's homophonic compositional practice. Homophonic textures in

contrapuntal radio are not unique to that particular compositional system. Linear dialogue in the form of call-and-response or question-and-answer is idiomatic to the radio documentary format. Homophony is also common to popular music. Gould's use is notable. The interview segments, when pieced together in dialogue, consume relatively long durations, significantly more than a typical three- or four-minute popular song.

The original contribution to a study of texture in digital counterpoint comes from contrapuntal radio's occasionally dense polyphonic structures. In scenes with three or more voices, Gould's penchant for complex counterpoint pushes the limits of intelligibility. I present a discussion of Gould's conception of (and rationalization for) polyphony for the remainder of this chapter. I follow this with three analyses and discussions of the densest contrapuntal textures from his radio documentaries.

Polyphony in contrapuntal radio

Gould claimed, perhaps with tongue-in-cheek, that the impetus for the polyphony of contrapuntal radio arose from a strict time limit imposed by the CBC's radio programming schedule. His desire to retain interview material forced him into conceiving a method to present multiple interview segments simultaneously as in fugue or other contrapuntal forms.³¹ In reality, for early production meetings with Lorne Tulk, Gould came prepared with spoken polyphony as a compositional end, not the means to contain a glut of material into a given duration.³² His rationale for this counterpoint reflects a lofty aesthetic ideal rather than a practical exercise in listening.

I do believe most of us are capable of a much more substantial information intake than we give ourselves credit for. I would like to think that these scenes can be listened to in very much the same way that you'd attend the *Falstaff* fugue.³³

An operatic fugue caps Verdi's *Falstaff* in a virtuosic feat of eight-voice counterpoint. The lyrics accompanying the myriad voices are independent and are not in dialogue with each other. The analogy is appropriate. Gould's dense polyphony is not concerned with dialogue so much as many independent voices speaking simultaneously on a common

31. Gould, "Radio as Music," 374.

32. Lorne Tulk, interview by author, Toronto, ON, September 6, 2010.

33. Gould, "Radio as Music," 393.

theme. Before continuing this discussion and analyses of polyphony and contrapuntal composition, it is necessary to clarify what Gould means by fugue in the context of contrapuntal radio. In his interviews and essays on the subject he does not define his parameters. In a 1964 CBC television program, “Anatomy of a fugue,” Gould introduced the topic of counterpoint and fugue. The fugue is

[a] number of voices, a number of individual lines, which, up to a point, can lead a life of their own. But they must have in common a responsibility to some special material which is examined in the course of the fugue. And consequently each of the voices is first heard announcing the same theme. They do not, however, throughout the piece continue to follow one another mechanically... There is, in the fugue, a much greater give and take between the voices. They're less robot-like than in a round or canon. And within certain clearly formulated laws, each voice can go off in some pretty wacky tangents of its own. And it's really annoying when to indulge and when to curtail these tangents that the great fun of fugue writing lays.³⁴

Gould likely retained that working explanation as a model to inform future projects like the *Solitude Trilogy*. Specifically, the analogy of interaction and conversation on common themes is appropriate given the dialogue format of many of his documentaries' scenes. It is unfortunate that Gould did not offer an explicit definition of fugue in this instance to explain his unique use of the term. However, his 1964 exposition on fugue provides a context for my analysis and discussion of his large contrapuntal scenes: first, the prologue to *The Idea of North*; second, scene four from *North*, ‘the dining car’; and, third, the *Latecomers* epilogue.

Case study no. 1: *The Idea of North*, prologue

A texture of three voices in traditional music is not necessarily ‘dense;’ however, a texture can appear to be more dense as a work’s constituent voices display varying levels of independence. If two voices progress in tandem by melodic contour and rhythm then they are not independent. As the voices differ in melodic contour and rhythm, they are increasingly independent. When each voice carries a melody and rhythm, irrespective of the other(s), then they are fully independent apart from a common harmonic language. In

34. Transcribed from *Glenn Gould On Television: The Complete CBC Broadcasts 1954–1977*, “Anatomy Of A Fugue,” DVD (Toronto: Sony Music Entertainment, 2011).

the context of the prologue, all the voices are independent apart from the common theme: the North. The perception of independence and, consequently, density in the prologue is based on three elements: vocal rhythm and cadence, timbre, and volume level.

Gould chose Schroeder, Vallee, and Phillips for the prologue for the unique sonic qualities of their voices. Lorne Tulk recalls,

Glenn worked very hard on getting people with different timbre in their voices so they didn't even sound alike. That was one very helpful quality and, number two was... if there was a distant possibility that they might blend together... we would employ a filter. We'd simply employ some equalisation on one voice to make it sharper or brighter so it stood out... We used filters to make things more foreground... We rarely did that because most of the time just the timbre in the voice, the voice quality, was different enough that we didn't have to do that.

Glenn wanted to keep people *au naturel* in terms of the voice quality. We did not want to make people sound better or worse than they were. We wanted them to sound like who they are. If you know Harold Horwood, then Harold Horwood sounded exactly like Harold Horwood sounds.³⁵

In addition to the natural vocal timbres, all three prologue characters have different vocal rhythms and cadences: Schroeder's voice follows a slow lilt with short, thoughtful pauses at each phrase's cadence; Vallee's shotgun staccato flows in bursts between long pauses and phrase cadences punctuated by 'uh' and 'y'know'; Phillips evenly measures his speech rhythm and each cadence is sufficiently long for him to take an audible breath before continuing.

The differences in vocal timbres are just as distinct as the vocal rhythms. Schroeder's speech is melodic in its breadth of contour and is, unlike Vallee or Phillips, unique for her strong rural Ontarian diphthongs. Vallee's timbral profile resembles a chortling bassoon in its mid-low register. His staccato speech contrasts Phillips's smooth, nasal monotone. The combination of rhythm, cadence and timbre are effective elements to render individual voices distinct and emphasize independence; however, in audio production, volume level adjustments during the final mix significantly impact the perception of vocal independence and subsequent textural density.

35. Lorne Tulk, September 6, 2010.

An examination of volume level as a determinant of voice independence necessitates some discussion of ‘space.’ Though Chapter Four is dedicated to space as a compositional element of digital counterpoint, it warrants some attention here because it has ramifications for texture. Gould’s first use of dynamic spacing appears at the beginning of *North* in the prologue.

AC: The voices coming in and out [of the space]... Was that all done with adjustments in amplitude?

LT: That was all done with the fader pots... You turn them up or down like you turn the volume up or down... The pots were simply volume controls for whatever you put into that...” [voice trails off]³⁶

It is by adjustments in volume that Gould creates the appearance of ‘space’ between the prologue’s three voices and affects independence. The texture is the most dense in the segments of the prologue with three voices, between 1’15”-1’28” and 1’55”-2’00”. Here, the voices are audibly independent and it is possible, though difficult, to focus on any one particular voice, as in a fugue.

Paradoxically, the two-voice polyphony between Vallee and Phillips (1’30”-1’55”) appears as dense as the following segment with all three characters (2’00”-2’43”). As the two voices come together at a common volume level (-7 volume units or V.U.), they are no longer intelligible as two independent voices. Rather, they merge to form a single compound voice with a more active polyrhythm. Schroeder’s voice, at a higher volume level (-3 to 0 V.U.), moves to the fore. The listener’s focus shifts to her while Phillips and Vallee take on the role of a single continuous voice. In effect, the three-voice texture is no more dense than the two-voice texture. Further, when Schroeder’s voice merges with Phillips’ and Vallee’s (3’00”), the volume level drops lower (-10 V.U.) and individual voices remain indistinguishable. As Gould’s voice enters the foreground (3’00”), the texture of four voices is no more dense than the two- or three-voice texture.

The average volume level decreases in each of the three segments of two-, three-, and four-voice polyphony. Each volume decrease, despite the addition of extra voices, corresponds with the appearance of maintaining the textural density. The higher the

36. Ibid.

volume levels, the more independent the voices appear in the foreground. As the volume decreases the characters recede into the background and their voices blend into a single voice, losing their perceptual independence.

To paraphrase Gould's suggestion, *The Idea of North* prologue functions as an exercise in texture rather than form. The sleight of hand with audio production in tandem with the natural qualities of the characters' voices, rhythm, cadence, and timbre, demonstrates the illusion of thin texture despite increasing the number of voices. This provides an effective case study in texture for composition in digital counterpoint. In Chapter Three I will apply similar principles to traditional materials in my examination of texture in the mashup.

Scene four of *North*, the 'dining car,' makes use of six voices, two of which are non-musical. The texture more closely resembles fugue by Gould's definition. This too is an exercise in texture and challenging the limits of then contemporary audio production technology to facilitate composition with so many simultaneously sounding distinct voices and extra-musical sounds.

Case study no. 2: *The Idea of North*, the 'dining car'

North's prologue is a trio sonata and the dining car scene is a fugue by Gould's definition. The scene's interplay of spoken voices in four-voice polyphony with basso continuo and sound effects shares a similar textural profile with the typical eighteenth-century fugue as individual voices come to the foreground with their treatment of the 'thematic material,' or the topic of discussion. Gould also suggests that scenes with two to four voices take their construction from fugues.³⁷ The similarities to 'fugue' end there. Unlike the traditional fugue texture, in contrapuntal radio there is no subject, counter subject, or any prescribed traditional harmonic or structural relations. Also unlike a fugue, the spoken voices do not interact as a four-voice group but as two discreet conversations. Gould's own definition of fugue includes

37. Gould, "Radio as Music," 383.

[a] number of voices, a number of individual lines, which, up to a point, can lead a life of their own. But they must have in common a responsibility to some special material which is examined in the course of the fugue.³⁸

This explanation of fugue prioritizes interaction, independence, and thematic material manifested in the speech content of the scene's dialogues. In this scene, as in other scenes in *North*, Gould brings together speech elements that share a common space (the dining car) and the notion of de-romanticizing the North. The voices do not share thematic material as in a melody (a fixed sequence of words), but they all speak to a thematic topic. In this respect, by Gould's own explanation, the dining car texture resembles a fugue based on its own semantic harmony and content. Without traditional harmonic content to aid in creating texture, Gould and Tulk vary textural density in the dining car by means of *volume* and *timbre*.

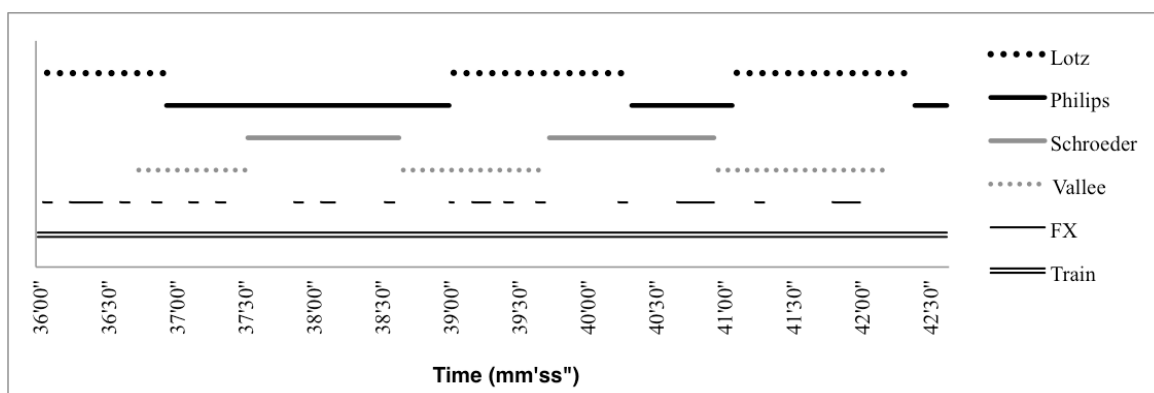


Figure 2.4 Map of textural density in *The Idea of North*, Scene Four, 'the dining car.'

Gould organizes the scene in three pairs of voices (Figure 2.4), one of which contains the basso continuo and sound effects. The other four voices are paired into dialogues. Lotz and Phillips share a conversation as do Vallee and Schroeder. Each of their conversations transpires as binary back-and-forth exchanges. At any moment between 36'45"-42'15" there are four discreet voices actively involved in the scene. Two voices are always the continuo and effects and the other two, spoken voices. The texture, owing in part to judicious adjustments in volume level, is not as dense as some moments in the prologue: the train continuo's volume level is consistently low and remains in the background; the sound effects of clinking dining accoutrements passes with little notice without a

38. Gould, "Anatomy of a Fugue."

continuous flow of sound. The perception of density rests on the volume levels of only two speakers.

We are better able to identify and focus on individual voices because there are only two speakers at any given time. Were the listener stationary in an actual dining car he or she might experience the ‘cocktail party effect,’ the “human’s ability to selectively attend to a single talker or stream of audio among a cacophony of others.”³⁹ In the real world dining car setting, the listener might be able to shift focus at will from one conversation to another. However, Gould’s concept for the scene involves the perception of moving through the dining car; “The listener’s role [is] not unlike that of a dining-car steward intent upon giving equal service to all.”⁴⁰ In this respect, the listener is not permitted the opportunity to attend selectively to the conversations. Rather, Gould and Tulk, with their hands on the fader pot, decide for the listener which character’s voice takes priority. The listener is thus forced to participate in the physical movement between voices.

Timbre is the second determinant in the perception of voice independence and textural density in the dining car scene. Gould appears to pair the characters in binary dialogues by timbral characteristics. Lotz and Phillips share similar timbral profiles while Schroeder’s and Vallee’s dialogue is notable for the contrasting timbres. Phillips and Lotz share a vocal smoothness and regular rhythm and cadence. The only notable contrast is Phillips’ monotone to the narrow contour of Lotz’s speech.

Gould alternates all four voices in the scene to achieve a number of textural combinations. The voices remain independent with a notable exception. A crossover (37’00”) actively obscures the break in Phillips’ and Lotz’s dialogue. Both voices are at the same volume level and the semantic content of their speech indicates a continuation of the same sentence. This is aural trickery, an experiment in timbre as much as an exercise in texture. In the context of developing notions of polyphony in digital counterpoint, contrapuntal radio presents another lesson in timbre and texture in the same way composition students learn of instrumentation and orchestration. Instruments with similar timbral profiles, played in tandem, sometimes do not sound as unique voices even

39. Stifelman, “Cocktail Party Effect,” 1. I use Stifelman’s definition here for its succinctness.

40. Gould, “‘North’: An Introduction,” 393; Lorne Tulk, September 6, 2010.

if in polyphony as opposed to homophony. Timbre and volume level are the determinants of vocal independence and textural density in both the *North* prologue and dining car scene. Gould discovered the difficulties presented by composition of complex polyphonic textures in monaural audio. When all the voices converge in the narrow space of mono, the scene can become crowded, which, subsequently, makes it difficult to untangle the many voices. Gould's next documentary, *The Latecomers*, in stereophonic sound, resolved challenges of composing complex polyphony.

Case study no. 3: *The Latecomers*, epilogue

The CBC's investment in stereo production equipment provided a new method for Gould to differentiate voices in multi-voice textures. The multi-directional space of stereo was a potent new option as vocal differentiator. In tandem with volume control, the illusion of complex polyphony is more 'successful' in *The Latecomers* epilogue than in *North*. Again, though space is the focus of Chapter Four, it warrants examination here as it pertains to perceptions of texture. Below I examine both space and volume as Gould uses them to compose the epilogue's multi-voice polyphony.

In what I describe above as a 'subtractive form,' all of the documentary's characters return for this concluding scene, however briefly.⁴¹ Though there are twelve spoken voices, there are never more than three voices plus the ocean wave continuo sounding simultaneously. Unlike the three-voice textures in *North*, the polyphony in this scene is significantly thicker. Tulk's generous application of panoramic potentiometers, a mechanism to position a sound's location on the left-right stereo axis, is the primary means here of determining voice independence. The wide spatial separation of voices in left-centre-right immediately clarifies the polyphony, as each voice is identifiably in a different space. Individual voices are more readily detectable.

Movement enhances the effect of space. The narrator moves from left to right and the remaining characters move right to left; the ocean continuo starts at the left and then

41. In the subtractive form, Gould presents all the characters' complete monologues throughout the documentary. Toward the end of the documentary, Gould 'subtracts' material from the characters' speech and presents only fragments of the original monologues.

moves to occupy both the left *and* right. The listener encounters the ‘cocktail party problem.’ The constant movement in the scene distracts the listener from the narrator who speaks through the scene’s duration (3’00”). However, by panning, Gould guides the listener’s focus to the left for each character’s entry, staggered by approximately 10 to 15 seconds. The listener focuses on the semantic content of individual interview segments and, in doing so, the narrator’s speech effectively blends into a second basso continuo. As Horwood’s voice appears alongside the waves, the listener is aware of his presence but not the specific semantic content of his speech. The same effect appears in the *North* prologue as Phillips’ and Vallee’s voices merge into the compound voice and the focus shifts to Schroeder’s voice in the foreground. Unlike Phillips and Vallee, the epilogue’s narration and ocean continuo do not merge to form a compound voice. The sonic characteristics are simply too different, speech and the white noise of waves crashing on rocks. The volume level of the waves and narrator speech is sufficiently high that we can distinguish both the voice and waves as independent.

Volume level, as in *North*, enhances the perceived density of the scene’s polyphony. The range of volume level is not as pronounced here as in previous case studies but it is effective nonetheless. Tulk maintains the loudness of the narrator’s voice through the scene. As each character enters the scene, their volume levels are initially lower than the narrator’s level. The volume of each character increases, reaching its peak as it interacts with the narrator, and decreases as it exits the scene. In seven instances, a voice enters the scene before the previous character exits. We understand early on that each entry is quiet relative to the narrator. To compensate, we listen intently for the entry, movement, and fade out. We are aware of another voice at the left even as we listen to one voice exit the scene at the right. Here we have a true, independent four-voice polyphony: spoken voice at the left, centre, and right, and the ocean continuo in the centre.

Gould’s exercise in texture and polyphony in *The Latecomers* epilogue presents a compelling case study for digital counterpoint. If timbre and volume level actively thin or thicken a scene’s polyphonic texture in mono sound, then space is the primary agent of distinguishing vocal independence and textural density in stereo sound. The spoken

interview segments make for compelling compositional materials with this kind of polyphonic texture.

Chapter Summary

In working with primarily spoken word and sound effects, Gould developed a working model for contrapuntal tape composition. His application of traditional musical terminology to describe harmony, form, and texture no doubt informed the composition and production process. His descriptions of contrapuntal radio technique yield nothing but vague concepts; however, there is sufficient information to inform the above examinations of harmony, form, and texture in his radio documentaries.

Gould's work with contrapuntal radio technique constitutes an early, germinal manifestation of what, decades later, would become digital counterpoint. Though he worked with analog magnetic tape and not digital media, his concepts and workflow are particularly well suited for the complex operations of digital audio production. The embedded structural limits of composition with audiotape prevented Gould from working with traditional music material in the same way as in mashup composition. Surely the ability to pitch-shift and beat-match would have endowed Gould with a significantly greater creative agency. However, contrapuntal radio contributes a great deal to digital counterpoint for its extended, large forms and exercises in homophonic and polyphonic textures. As I discuss later, digital audio production made possible a number of techniques for manipulating audio that were inaccessible to Gould during production of the *Solitude Trilogy* and subsequent documentaries.

In the following chapter, I present a similar study of harmony, form, and texture in mashup production. Mashups follow traditional notions of music because they contain all musical materials rooted in tonality. Form, with few exceptions, follows modular song forms idiomatic to popular music. Polyphony, in the context of independent voices, is limited to elided lyric phrases and juxtaposed vocal and instrumental melodic lines. The mashup's treatment of traditional music materials provides lessons for digital counterpoint in ways that extend beyond the relatively small, linear forms of popular music.

Chapter Three

The Mashup: Harmony vs. Form vs. Texture

The mashup is concerned with traditional musical materials (pitch-based melodies and harmonies) as opposed to the recorded spoken word content of contrapuntal radio. As in common-practice counterpoint, the mashup composer is concerned primarily with assembling disparate melodies and instrumental harmonies into an autonomous new work. Mashup composition in practice – the application of digital counterpoint technique with musical material – marks a departure from common-practice counterpoint composition in its exclusive use of digital audio production and manipulation. This chapter explores three areas of traditional musical elements in mashup composition: harmony, form, and texture. First, producers use a limited set of digital tools to harmonise pre-existing vocal, melodic, and harmonic materials within the technical limitations imposed by digital audio production. Second, the discussion of form in mashups diverges from traditional art music forms and instead focuses on song forms idiomatic to popular music. Because mashups are the primary examples of musical material for this study of digital counterpoint, I focus on the forms in this repertoire. These are only models in case studies and do not preclude the possibility of *other* formal structures. Third, like contrapuntal radio, mashups employ both homophonic and polyphonic textures. Whereas some of Gould’s textures appear complex, many mashups employ highly polyphonic textures while maintaining the appearance of a homophonic pop song. In this instance, multiple samples overlap and independent musical voices work together, but the polyphony sounds less complex.

For this study of digital counterpoint, the musical materials of mashups balance the extra-musical materials of contrapuntal radio. Mashups generally are brief compared to Gould’s large-scale works. They take their harmonic cues from the popular music source works from which producers extract the parent samples.¹ The limitations of working with

1. There are several examples of mashups that use material from art music, though the classical instrumentals are always the backdrop to a popular music vocal. Amongst the list are Aphex Twin’s 1997 “Heroes Remix,” a mashup of David Bowie’s recording of “Heroes” and Philip Glass’s symphony of the

digital audio force producers to work with a limited series of harmonic relationships. Contrapuntal mashup production varies significantly from traditional counterpoint in that recorded melodies and harmonies are not infinitely malleable by digital means. The special harmonic system has implications for form. As I discuss later, the composer is not always at liberty to delineate formal sections by changes in key area (Verse in I, Chorus in V, etc.) due to issues of harmonic (in)compatibility between parent samples. If harmony impacts form, then the composer must rely on other means to articulate a work's formal design. Parent samples often dictate form. In a mashup with only one vocal part, the instrumental samples follow the form from the vocal source work; in mashups with multiple vocals, form may be built from many source works. Some works adopt fluid forms with no strict formal design but progress as a steady flow of music in episodes. Still, although formal limitations are sometimes imposed by the harmonic content of their samples, mashup producers customize their musical forms to suit their parent samples.

Texture in mashup composition lies on a continuum between homophony and polyphony. Homophony, as the instrumental parts follow the vocal part, equates here with clarity, which is a compositional goal; however, the mashup producer at times achieves the appearance of homophony through multi-voice polyphony. As with Gould's work, it is difficult to maintain focus on one voice given many overlapped, competing vocals. Frequently, mashup composers indulge in light polyphony within a homophonic texture in which vocals overlap but do not compete for the listener's attention. Opposing rhythms (slow and fast) differentiate them. Instrumental parent samples overlap and create dense homophonic textures; however, parent samples may exhibit signs of independence by timbre, style, rhythm, or harmony relative to the surrounding musical material.

My discussions and analyses focus on musical elements using both music notation and qualitative description. The limitations imposed by current technologies require a different way of examining harmony: pitch shifting restricts transposition by too wide an interval and immediately restricts possibilities for harmonic combinations. To account for

same name, based on Bowie's work. More recently, DJ Phil Retro Spector produced several mashups with samples from both Philip Glass and Laurie Anderson.

this restriction, I spend a large portion of this chapter outlining a framework of compatible key-relations that appear in the mashup repertoire. Any discussions of technology pertain to pitch shifting (transposition) or time stretching as it impacts the compositional process. I focus here on the kind of music that digital counterpoint *enables* regardless of the technological limitations. It is significant because it introduces the possibilities from bringing together original recorded performances of artists from different eras and genres. To begin I engage in an extensive examination of harmonic practice in digital counterpoint as manifested in mashup production.

Harmony in mashups

The mashup is concerned with traditional notions of melody and harmony although the means of bringing them together differ. In common-practice counterpoint, musical transformations transpire by the composer's pen and manuscript paper. One cannot manipulate digital audio as extensively as written music. My discussion of harmony traverses two areas, vocal harmonization and key relations. For vocal harmonization, the mashup composer selects instrumental parent samples to accompany vocal samples based on the highest probability of harmonic compatibility. I outline a system for selecting instrumental samples by process of elimination based on the pitch content of the vocal. In the matter of key relations, digital audio software allows the composer to transpose parent samples. Too extensive a manipulation introduces undesirable sonic artifacts. As such, the opportunity for transposition - pitch shifting - is limited. Composers, then, have a limited number of compatible key relations to govern their harmonic practice.²

Before my examination of key relationship compatibility, I outline a guide to vocal (melodic) harmonization with digital counterpoint. In mashups with many source works, producers often segment their samples into short phrases. Short samples with limited pitch content are easier to harmonize because they decrease the probability of undesired dissonance. Longer vocal or instrumental melodic samples with more pitch variety are

2. I refer often to Roseman as a theoretical base for this discussion of harmony, as his work on mashup construction is the only text to give such thorough musical treatment of mashups. Other mashup tutorials focus on tactical details of mashup production without situating their work theoretically.

often supported by instrumental accompaniment with a static harmony—like a looped sample—that reduce the probability of undesirable harmonic conflict.

Harmonizing vocal parent samples

Finding instrumental parent samples to accompany vocal parent samples is difficult for melodies with too great a variety of pitch content. As the pitch variety in a melody increases there is a corresponding decrease in the potential for key compatibility. The fewer discrete pitches in a given melody, the easier the fit with a larger number of instrumental harmonic foundations. Melodies with a small interval boundary that encompasses only two adjacent pitches (a major or minor 2nd) work with a variety of diatonic chords. Likely, the producer will treat the C as the primary melodic pitch and the D as a non chord-tone. Further, the pitches may fit within diatonic triads within keys. If a melody centres on the lower pitch, C, it should belong to a chord that offers it a place of rest. When the melody arrives at the home pitch, it must be consonant with the harmonizing instrumental samples (Table 3.1).

Major keys and chord tones	Minor keys and chord tones
C Major (I, IV, vi)	C minor (i, iv, VI)
	E minor (iv, iii, VI)
F Major (I, iii, V)	F minor (i, III, V)
G Major (IV)	G minor (iv)
A ^b Major (I, vi)	
	A minor (i, III, VI)

Table 3.1 Compatible diatonic keys for melodies with a small interval boundary (M/m 2nd).

For melodies with a wider interval boundary the probability of harmonic compatibility decreases. The boundary does not necessarily imply more discrete pitches, but may introduce a pre-defined chord quality. Dyads of a major or minor third (with inversion as major or minor sixth) or perfect fifth (with inversion as perfect fourth) imply a key area to the exclusion of many others.³ A melody with a ‘C’ and ‘E^b’ dyad immediately implies a C minor harmony, as it is the defining lower dyad of a C minor chord; however, it fits with other chords diatonic to several keys (Table 3.2). The ‘added’ chromatic inflection

3. A dyad is a chord that contains only two pitches. I use it here to describe two pitches that define a chord’s quality (major or minor) or harmonic ambiguity (perfect intervals, neither major or minor).

of fitting a minor dyad into other keys carries a distinct limitation. If the producer ventures into using one of the dyad pitches as a chordal 7th or 2nd, the producer runs the risk of introducing undesirable ‘key clashes.’ Though one pitch may be diatonic to a key (directly or enharmonically), the other pitch may introduce an unwanted dissonance.

Major keys and chord tones	Minor keys and chord tones
	C minor (i)
E ^b Major (IV, vi)	
	F minor (v as modal mixture)
	G minor (iv)
A ^b Major (I, III, vi)	

Table 3.2 Compatible diatonic keys for melodies with an interval boundary of a minor 3rd.

Melodies that outline the interval of a perfect fifth are harmonically ambiguous. They do not contain a pitch that defines the chord as major or minor. The same is true when inverted as a perfect fourth. A dyad of the pitches C and G is an ‘open chord’ that establishes a C-centric harmony but without the third to indicate a major or minor quality (Table 3.3). The potential for harmonic compatibility with melodies that encompass these wide intervals is less than with melodies with smaller interval boundaries.

Major keys and chord tones	Minor keys and chord tones
C major (I)	C minor (i)
F Major (V)	F minor (v)
G Major (IV)	G minor (iv)

Table 3.3 Compatible keys for melodies with an interval boundary of a perfect 4th and 5th.

In composing a work with digital counterpoint technique, the melody may take the form of a vocal or instrumental. With this map of relationships between melodic pitch content and harmonic compatibility with instrumental accompaniment, the composer looks ahead to key compatibility. During composition, the composer brings together parent samples from different key areas within the harmonic framework of five categories of key relationships. I follow this discussion of vocal harmonization with an examination of key relations. I present them in the order of most common to least common.

Key relationships

The composer’s imperative when working with digital counterpoint technique is to find parent samples with the most compatible key areas. S/he must ensure that harmonic

content in both vocal *and* instrumental samples coalesce. Finding source songs with compatible key signatures is only one consideration. Key relationships work on many levels including key areas within a song and sectional chord progressions. A song's verse may be in key area *x*, the chorus in key area *y*, and a refrain or bridge in key area *z*. The composer's search extends to local level chord progressions for compatibility. According to Roseman, "In practice, most mashup producers simply avoid songs with complicated key changes."⁴ This sidesteps a significant technical challenge and minimizes the risk of dissonance, the so-called 'key clash.' However, I do not mean to imply that mashup producers create their work with these relationships explicitly in mind, nor do they necessarily have the training in music theory to understand *why* some samples are incompatible.⁵

Roseman outlines three harmonic relationships based on his own experience in mashup composition, two are rooted in tonal harmony while the other is based in modal harmony. The relative major and minor key combination has a high probability of compatible chord combinations, as both the relative major and minor contain the same diatonic pitches. Relations of a fourth or fifth work with key centres a fourth or fifth apart. Very few, if any, two-source mashups use this combination but it appears most often in multi-source works. Combinations of parallel major and minor keys bear some possibility of chord compatibility, as they share only four common pitches and the dominant chord, which provides a foothold for compositional options.

I include two significant key combinations here that Roseman does not address in his book. Unison key relations carry the highest probability of harmonic compatibility, as the works in the same key share all the same pitches and common chords. A work in C major likely mixes well with other works in C major. Though chord progressions differ, they often share similar key areas to delineate sections. Compound multi-key relations exist in mashups that include samples containing all of the above relations to one or more base songs. These mashups frequently use a single song's harmonic framework as a base.

4. Roseman, *Audio Mash-Up Construction*, 97.

5. McGranahan, *Mashnography*, 36-37. McGranahan suggests that the methods by which producers create their mashups are highly subjective and vary from one to the other. Some create by intuition, others from trial and error, and others by tracking key and tempo in a database.

Composition with multiple key relations is more complex than any of the other combinations but the end result often sounds simpler and does not hint at the production complexity. Works with this combination often draw significantly more parent samples from at least three or more source songs.

Though many works in the mashup repertoire combine parent samples from two-source works, the above list of harmonic categories does not presume that *all* mashups employ only two-source works. In recent years, mashups comprised of three or more source works appear increasingly on mashup blogs and user forums as mashup producers' work becomes more sophisticated and the audio production technology able to handle more complex productions. Digital counterpoint technique draws heavily from these categories of key relationship compatibility. It is not enough to understand what key relationships are most compatible, but why they are compatible. Specifically, we see in the examples below the interplay of consonance and dissonance between vocal and instrumental parent samples after composition. In the following section, I examine the five key relation categories. With one exception, I accompany each key relation explanation with an example.

Unison key relations

This may seem an obvious key relation for digital counterpoint technique if only because composition with source songs in the same key presents the greatest probability for compatibility. Composition with parent samples that share this particular key relation appears deceptively simple. The reality of working with parent samples from the same key, however, is often more difficult than with samples from disparate keys. The composer need not be concerned about discrepancies in compatible pitches in different keys if the differences produce an effect of extended tonality. Though source songs share a key centre, the melodic styling and key areas may differ and create jarring dissonance. The producer must find compatible chord progressions *within* the work. Key relations at the local level determine which source works provide the instrumentals and which the vocals. The obstacles for this key relation are conflicting chord progressions and unequal phrase lengths in one or both source songs.

Every obstacle is conversely a compositional opportunity. When the constituent source songs have a common key centre, the producer takes advantage of the modular forms idiomatic to popular music. If the source songs for the instrumental samples move to incompatible key areas, the producer may substitute instrumental parent samples from another section of the same work. Alternatively, he or she may loop a previous section, incorporate samples from another work for a new instrumental section, or extract instrumental samples from the vocal source song.

Reharmonization is the largest compositional byproduct of working in this key relation. As the composer pairs the vocal melody parent samples with instrumental samples that contain a different harmonic progression, the effect is a reharmonized vocal melody. The mashup composer may or may not be aware of the byproduct of this technique but engages with this process nonetheless. An instrumental sample outlines a key area with vertical chords, vocal melodies outline key areas via horizontal elaboration of a chord; however, the chord indicated by the vocal melody may represent only a portion (say, the upper dyad) of an instrumental triad. Without the instrumental chord to serve as a harmonic foundation, the voice may appear to suggest a different chord. The following example combines a series of arpeggiated chords on guitar as the harmonic base. The vocal melody is relatively simple with a consistently narrow interval boundary.

Analysis: Unison key relations

DJ PartyBen, “Every Car You Chase”

Snow Patrol, “Chasing Cars” (A Major), 2006

The Police, “Every Breath You Take” (A Major), 1983

Working with two-source works in the same key gives the producer the opportunity to create hybrid works by swapping instrumental and vocal parent samples. As such, there is no obligation to use one source exclusively for vocals or instrumentals. The producer can effectively extend a work by drawing parent samples from both works for vocals and instrumentals. The Police’s arpeggiated guitar riff makes the ideal instrumental parent sample because it appears at the very beginning of the source song with no trace of vocals. The arpeggiated chords (Figure 3.1) outline a standard harmonic progression:

Figure 3.1 Guitar riff transcribed from the Police's "Every Breath You Take"

A major 9 - F#minor 9 - D major 9 - E major 9
(In A major: I – vi – IV - V)

Snow Patrol's "Chasing Cars" shares a similar harmonic rhythm but uses only one chord progression throughout the song; the key centre does not shift to demarcate the chorus or subsequent sections.

A major - E major - D major - A major
(In A major: I – V – IV - I)

Snow Patrol's verses (Figure 3.2) use the same melody. Producer Party Ben's reharmonization of the vocal melody is nearly identical in every instance, with the exception of a richer, chromatic harmonic palette.

Figure 3.2 Verse melody transcribed from Party Ben's "Every Car You Chase"

The A in the pickup to m. 3 is the root of the underlying A9 chord and in the new harmonization in F#m9 becomes a chord tone as a 3rd instead of a non-chord tone in E major. Similarly, the C# in m. 4 becomes the 5th of F#m instead of non-chordal 6th in E. In m. 6, the C# is no longer the leading tone in D major, but becomes a chromatic 13th followed by the G# that becomes the new chordal 3rd in E9. The A in the pickup to the last measure is the 11th of E major but now functions as an anticipatory non-chord tone to the root of the A major chord in the next measure. Similarly, the chorus (Figure 3.3) employs the Police's chord progression for reharmonization. The C# on the first beat of

m. 4 is no longer a non-chordal 13th in E major, but the 5th of F#. The B that follows C# introduces melodic tension that functions as a non-chordal sus4. In the last measure the D is no longer the root of the previous D major chord but the 7th of E9 that transitions to the 5th by way of a non-chord C# before arriving at an anticipatory A that becomes the root of the A major chord in the next measure.

Figure 3.3 Chorus melody transcribed from Party Ben’s “Every Car You Chase”
Chorus: Original chords

The figure shows two staves of music in G major (one sharp). The top staff, labeled 'Original chords', shows a melody with chords A, E, and F#m9. The bottom staff, labeled 'New chords', shows the same melody with chords A9, D, D9, and E9. The melody consists of four measures: Measure 1 (A), Measure 2 (E), Measure 3 (F#m9), and Measure 4 (E). The new chords are: A9 (Measure 1), D (Measure 2), D9 (Measure 3), and E9 (Measure 4).

Chorus: A9
New chords

Party Ben incorporates Snow Patrol’s vocals with the Police’s instruments *and* vocals to give the work a broader harmonic framework. The composer uses Snow Patrol’s vocals for the verses (A major) while the Police’s vocals comprise the mashup’s chorus (D major) and bridge (E major). In using the Police’s vocals for the chorus and the bridge, Party Ben introduces two shifts in key areas to delineate song sections. This provides Snow Patrol’s lyrics with some harmonic variety and extends the original track by a short duration.

Relative major and minor

This combination of keys offers a high probability of compatibility if only because they share the same diatonic pitch collection. Of course, works in two keys centre on a different tonic and dominant.

Compatibility works two ways with a melody in A minor over a C major instrumental or inversely, a C major melody over an A minor instrumental. A minor contains lots of ‘E’ as the dominant. ‘E’ is the third scale degree in C major; however, an E major chord in C major introduces a conflict between the G-sharp of E major and G-natural of C major. Since A minor centers on its tonic ‘A,’ melodies in this key are consonant with a C major instrumental as the submediant, a pre-dominant chord. At cadences the A tonic provides what sounds like an evaded cadence without proper resolution to the tonic, C. Mashups

with this combination of vocal and instrumental samples work well but the composer must be wary to avoid unresolved cadences at the ends of phrases. This leaves the listener without a satisfying sense of closure or ‘ending.’

By contrast, a melody in C major over an A minor instrumental is more compatible. The tonic of C major is the third scale degree of A minor. The lower dyad of C major (C-E) is the upper dyad of an A minor chord (A-C-E). Melodies in C major that centre on the tonic, C, are consonant with cadences in A minor, and reinforce the lower chord-defining minor dyad.

Analysis: Relative major and minor

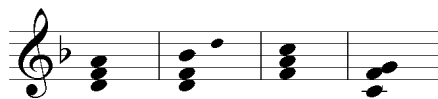
DJ Mighty Mike, “The Complicated Scientist”

Coldplay, “The Scientist,” (D minor), 2002

Avril Lavigne, “Complicated,” (F Major), 2003

DJ Mighty Mike demonstrates the effectiveness of the relative major/minor key relationship in ‘The Complicated Scientist.’ The harmonic simplicity of both source works make them ideal for digital counterpoint: both works employ similar harmonic content, reducing the possibility of harmonic conflict. Chris Martin cycles through two statements of the piano chord that opens “The Scientist.” These chords establishes a harmonic foundation progression before his vocal entry (Figure 3.4a). Martin plays four statements of the following progression to accompany each line of the verse stanzas.

Figure 3.4a Opening piano chords from Coldplay's “The Scientist”



D minor - B^b Major - F Major – C sus4

The C sus4 chord in Martin’s progression functions equally well as an F sus2 though uses a C in the bass. Instead of the F-based chord, Martin lowers the A to a G and retains the F and C. The openness of the C and G with the dissonance of the F better fits with the V chord (C) that ends “Complicated.” ‘The Scientist’s chorus is significantly shorter with a small variation (Figure 3.4b) on the verse harmonic progression.

Figure 3.4b Concluding piano chords from chorus section of “The Scientist”



There are two statements of B^b Major in the chorus and no D minor as in the verse. Chris Martin tacks a C major chord onto the end of the second statement of the original progression. The last line of the chorus, which functions transitionally, is a C7 followed by an F major chord set to the lyric text “oh take me back to the start.”

Lavigne’s vocals centre on F major and make extensive use of few rhythmic and melodic motives for the verse (Figure 3.5). With such repetition, she turns to the harmonic foundation to add interest. The vocal melody maintains its centre on F major and the instrumental parent samples provide the harmonic tension. The verse contains the same pitch collection in all four measures. In m. 4 the F, dissonant to the original C major chord is now consonant with the new C sus4 chord. The A and B is dissonant to both the original C major and new C sus4.

Later in the pre-chorus section (Figure 3.6) The vocal melody’s slow harmonic rhythm introduces harmonic tension by juxtaposition with Martin’s instrumentals. PartyBen repeats the same chord progression used in the verse vocals. The ‘G’ in m. 4 is dissonant to the B^b in the vocal melody but now consonant with the new C sus4.

Figure 3.5 Verse melody transcribed from Mighty Mike’s “Complicated Scientist”

Verse:
original chords

Verse: *D minor* *B^b major*

New chords

B^b Major *C Major*

F major *C sus4*

Mighty Mike’s treatment of the pre-chorus is similar to the verses. The vocal melody contains Martin’s pitch material without the B^b. In m. 4 the vocal ‘A’ provides the

chord's missing third and the 'G' reinforces the 'add 2' in the accompaniment. The dissonance of the 'add 2' chord provides a source of tension in m. 5 to compel resolution to the vocal 'A' in m. 1 of the chorus.

Figure 3.6 Pre-chorus melody transcribed from of Mighty Mike's "Complicated Scientist"

Pre-chorus:
original chords

Pre-chorus: *D minor*
new chords

This mashup's chorus employs the simpler harmonic progression of Martin's chorus though Mighty Mike uses one repetition of that progression to reharmonize Lavigne's vocal melody (Figure 3.7). Rather than the D minor chord in Martin's first progression, B^b major provides the harmonic foundation for mm. 1-2 and mm. 5-6. The new B^b harmonization use the pitches in the vocal melody as a sources of harmonic tension that resolve in the following measures. In mm. 4 and 6, the A on the downbeat of the measure are dissonant to the new C sus4 chord but resolve quickly to the chord tone, G. In m. 4 the C and A in the descending scalar passage fall on strong beats through, again, resolve to chord tones. The similar action occurs in m. 6 though with a slower rhythmic content. The vocal cadence on F in the last measure feels unresolved atop the new C major chord. This is the end of Lavigne's portion of the chorus and Mighty Mike includes the remainder of Martin's chorus—a C7 to F major progression—that resolves to the instrumental home key of D minor.

One of the benefits of the relative major/minor relationship lies in the potential for reharmonization of the vocal or instrumental melodic lines. In the instance of this analysis, the counterpoint does not entirely change the work's harmonic palette, but 'readjusts' the chord placements.

Figure 3.7 Chorus melody transcribed from Mighty Mike’s “Complicated Scientist”
Chorus: original chords

D minor B♭ Major F Major C Major D minor B♭ Major

Chorus: *B♭ major* *F major*

new chords

F Major C Major D minor B♭ Major F Major C Major

C sus4 *B♭ major*

G minor B♭ Major F Major

F major *C sus4* *F*

Parallel major and minor relationships

This key relationship is rooted in modal harmony in which varying scale degrees are altered for harmonic effect, the leading tone is the primary example. It appears less often in the two-source work mashup repertoire but more often than the category of fourth and fifth relations. It appears more frequently in mashups with multiple source-works though only for brief moments when the composer desires some harmonic colouration. Of the seven diatonic pitches, only four are common to both parallel major and minor keys: root, 2nd, 4th, and 5th scale degrees. Further, they share only one common chord, the dominant (V) with the altered leading tone. Melodies and instrumentals in both C major and minor often centre on the dominant G major. The V chord is the second most common chord and also key area in popular music apart from the tonic chord. The probability for key compatibility is highest in areas when both works have sections in the dominant, G.

Instrumental parent samples in C major work well with vocal melodies in C minor, as the lowered E^b injects a blues or soul harmonic inflection. Similarly, a C major melody over a C minor instrumental ‘brightens’ the minor tonality with the raised 3rd, 6th, and 7th scale degrees. Mixing instrumental and vocal parent samples with the same root but different scale degree relationships introduces the possibility of chromatic extension, using pitches outside of the diatonic pitch collection. For digital counterpoint, this harmonic

relationship offers a systematic means of selecting samples to recreate the harmonic idiom particular to the jazz and blues genres.

Analysis: Parallel major and minor

King of Pants, “Detox”

Amy Winehouse, “Rehab” (C major), 2006

Britney Spears, “Toxic” (C minor), 2004

King of Pants (KoP) follows the same harmonic scheme division Mighty Mike employed in “The Complicated Scientist.” Spears’ work contains two distinct chord progressions:

- I. C minor - B^b major - G major
- II. C minor - [E^b major, omitted by KoP] - F Major - G major

Chord progression I forms the foundation for Winehouse’s chorus while progression II, her verses. KoP segments the original harmonic progression II in his DAW to omit the E^b chord and maintain harmonic compatibility with the vocal melody. The chorus vocal melody (Figure 3.8) encompasses an interval boundary of a minor sixth at its widest, without skips wider than a minor third, and no leaps.

Figure 3.8 Verse melody transcribed from King of Pants’ “Detox”

Chorus:

original chords:

New chords: C minor

B^b major

G major

F major

C minor

G major

C major

G major

C minor

What makes this melody so compelling for contrapuntal composition is its harmonic fluidity. Often, as in mm. 1-4, the melody outlines a ‘C-centric’ tonality but does not have a chord-defining major or minor third. This provides the opportunity for KoP to reharmonise Winehouse’s melody without concern for the tonal clash of the major or minor third. When the melody arrives at a lowered third, the chord changes and the E^b is

no longer a defining chord tone but an anticipation as a temporary sus4 in B^b. Notable in Winehouse's vocal melody is the mixed modality of both C major and C minor dyads: C minor in m. 4-5 to restating G major in mm. 9-11, and returning to C minor in m. 13.

In the chorus (Figure 3.9) The first appearance of an E^b in the vocal part occurs in m. 6 an anticipates the new C minor chord. In this instance, the minor third appears not as a soulful bending of the original C major tonality, but a functional member of the counterpointed C minor home key. The vocal melody in the closing phrase, mm. 15-18, is identical to the early measures of the chorus, though KoP inserts the G major chord for harmonic interest. More troublesome is the section based on Winehouse's verses (Figure 3.9). The vocal melody contains many instances of E^b that, in theory, conflicts with the C minor accompaniment.

Figure 3.9 Chorus melody transcribed from Amy Winehouse's "Rehab"

Verse:
original chords:

The figure displays three staves of musical notation for the chorus melody of Amy Winehouse's "Rehab". The first staff shows the original chords: E major (measure 1), A minor (measure 3), F7 (measure 5), F major (measure 7), and G major (measure 9). The second staff shows new chords: A^b Major (measure 1), C minor (measure 2), E major (measure 3), F major (measure 5), and A minor (measure 7). The third staff shows further new chords: G major (measure 9), F7 (measure 11), F major (measure 13), G major (measure 15), and A^b Major (measure 17). Measure numbers 1, 3, 5, 10, and 15 are indicated above the staves.

Verse: C minor
New chords:

Modal mixture is common in blues and soul music, a literal bending of the pitch for emotional effect. Winehouse's 'bent thirds' in performance are neither a direct E^b nor E^b but a microtonal pitch that lies between the two. Further, the mutually incompatible G major chord and vocal melody of m. 14 creates an interesting harmonic tension that propels the phrase to swift resolution in C minor in the following measure. In theory, the harmonic elements between instrumental and vocals are dissonant, but they do not *sound* glaringly dissonant.

Key relations at the fourth and fifth

Works whose key centers vary by intervals of a fourth or fifth are compatible though used rarely, if ever, in two-source mashups. I include it for a more indepth discussion

here only because Roseman discusses it only briefly in his work. This key relationship is conspicuous by absence from my survey of several hundred two-source work mashups. It appears most frequently in multi-source mashups but only in brief fragments.

Key I	Key II	Difference
C Major	F Major	B ($\hat{7}$ in C Major) and B b ($\hat{4}$ in F Major)
C Major	G Major	F ($\hat{4}$ in C Major) and F $\#$ ($\hat{7}$ in G Major)
C minor	F minor	D ($\hat{2}$ in C minor) and D b ($\hat{6}$ in F minor)
C minor	G minor	A ($\hat{2}$ in G minor) and A b ($\hat{6}$ in C minor)

Table 3.4 Key relationships at the 4th and 5th.

When mashup producers use this combination, it provides a source of chromatic inflection for harmonic colouration (Table 3.5). However, as in the key relationship of relative major and minor, a source work's key centre imposes constraints as to which work provides either the vocal or instrumental parent samples. Works in popular music sometimes use the subdominant key area to demarcate a song section; movement to a sub-dominant chord (IV) is not as common as to the dominant chord (V). In mashups with an instrumental in C (I) and a vocal melody in F (IV), F major centers occasionally on C major as its dominant. Vocal cadences that emphasize F over an instrumental in C major create an evaded cadence and rest on the 4th scale degree of C major. Conversely, a work with an instrumental in F (I) and a vocal melody in C (V) provides a sense of closure to the cadence, as the V of the F major tonic chord. Works in F major frequently center on the dominant chord, C major, to demarcate song sections. The greatest compatibility in this key relationship is for vocal melody parent samples in a key area a fifth above the instrumental parent samples.

This harmonic relationship does not appear in any extended duration in any two-source mashups. This particular harmonic combination complicates extended composition due to the difficulty of finding combinations of compatible key areas between vocal and instrumental parent samples. Multi-key relations, as I examine in the next portion of this chapter, merges all of the above key relationship categories. Mashups using many key relations appear more frequently now on user forums and mashup blogs than in past years. They are as much a novelty for listeners as a display of compositional virtuosity.

Multi-key relations

This category of key relations was relatively uncommon in the mashup repertoire until recently, as DJs ventured farther afield into complex production technique. Mashups using multiple key relations use samples from three or more source songs. Composers often choose to use one source song for instrumental samples to serve as the harmonic base. They add other melodic and vocal samples on top of the instrumental foundation. In these works, it is easier for the composer to use short samples (in duration), as there is greater probability of harmonic compatibility.

There is an element of virtuosity in working with a significant quantity of parent samples from many source works. The way in which the composer brings together the parent samples to form a new work is technically demanding. The production of a cohesive work using parent samples from multiple key areas is akin to a virtual juggling act. The producer maintains a strict balance of lyrical repetition and cohesion, melodic continuity, and harmonic stability. Adhering to a key centre or series of related key areas maintains stability and avoids listener alienation. These works require significant focus to maintain a cogent harmonic progression and prevent a stream-of-consciousness harmonic framework and formal structure. For this reason production with several vocal samples with compatible pitch content *and* lyrical text content enhances the element of showmanship. Digital counterpoint technique benefits here from a system of multiple key relations with potential for sustaining extended works with multiple interlocking or overlapping parent samples.

Analysis: Multi-key relations

DJ Earworm, “United States Of Pop 2009, Blame It On The Pop”

Earworm introduced his annual “United States of Pop” franchise in 2007. The mashups are as much an exercise in production showmanship as a succinct summation of the year’s Billboard Top 25 (table 3.6). The United States of Pop series is a significant demonstration of the harmonic possibilities of digital counterpoint composition.⁶

6. Earworm cycles through 196 parent samples in 4’37”.

Artist	Title of Track	Key
The Black Eyed Peas	Boom Boom Pow (used for drum track)	C#m
The Black Eyed Peas	I Got A Feeling	GM
Lady Gaga	Poker Face	Gm
Lady Gaga w. Colby O'Donis	Just Dance	Am/CM
Taylor Swift	Love Story	CM
Taylor Swift	You Belong With Me	DM
Flo Rida	Right Round	Am (as CM)
Jason Mraz	I'm Yours	CM
Beyoncé	Single Ladies	AM/f#m
Beyoncé	Halo	AM
Kanye West	Heartless	Am (as CM)
The All-American Rejects	Gives You Hell	AM
T.I. featuring Justin Timberlake	Dead And Gone	Am
T.I. featuring Rihanna	Live Your Life	Am (as CM)
The Fray	You Found Me	A ^b m
Kings of Leon	Use Somebody	CM
Keri Hilson w. Kanye West & Ne-Yo	Knock You Down	CM
Jamie Foxx featuring T-Pain	Blame It	CM
Pitbull	I Know You Want Me (Calle Ocho)	Dm
Soulja Boy featuring Sammie	Kiss Me Thru The Phone	GM
Jay Sean featuring Lil Wayne	Down	DM
Miley Cyrus	The Climb	EM
Drake	Best I Ever Had	CM
Kelly Clarkson	My Life Would Suck Without You	GM
Katy Perry	Hot n Cold	DM

Table 3.5 List of artists, songs, and keys in DJ Earworm's United states of pop 2009, "Blame it on the pop"

Earworm uses the Black-Eyed Peas' "I Got A Feeling" for the harmonic base after pitch shifting the song from G major to A major. The transposed work centers on A major as most samples are more compatible with A major than G major. "I Got A Feeling," in its original form, recycles a short chord progression throughout the work, giving Earworm a stable harmonic framework for his vocals. Conspicuous by absence is a dominant chord, a common section-defining chord.

A major - D major – F[#] minor - D major
(In A major: I – IV – vi - IV)

Earworm does not differentiate song sections by changes in key area but by lyric repetition to indicate the chorus, "I got a feeling that tonight's gonna be a good night..." The simple chord progression affords Earworm the opportunity to counterpoint parent samples as small as one word or as much as an entire sentence, a short series of pitches or entire musical phrases. Considering the Black-Eyed Peas' narrow harmonic framework, all of the constituent songs are, in theory, compatible with one or more foundational

chords by way of any or all of the above key relation categories.⁷ Most parent samples are relatively short, increasing the probability of harmonic compatibility.

“Blame It On The Pop” segues conveniently to my examination of form and structure in mashups. The mashup producer must exercise creativity to establish the formal structure in works with a continuous harmonic progression as their foundation. This study of digital counterpoint technique with musical materials requires a discussion of both music *and* lyrics as determinants of form. I outline two categories of form in mashups in the following portion of this chapter, modular song forms and fluid forms.

Form

Digital counterpoint technique benefits from a repertoire of formal structures. Future composers using these techniques will have several models at their disposal to avoid ‘reinventing the wheel.’ Mashups restrict themselves to popular music song forms. Like Gould, mashup producers engage with structural challenges. In this section of the chapter, I explore two categories. The first, mashups with modular song forms, progress via a series of sections with pre-defined functions: verse, pre-chorus, chorus, bridge. The sections do not follow a prescribed order, are sometimes omitted, while others are repeated. Some mashups and works based on mashup production techniques employ the second category, ‘fluid forms.’ I explore two subcategories of fluid forms, those that lack a readily identifiable form apart from the repetition of key lyric phrases or complete sections, and other extended works that progress in a steady flow with little to no repetition. Works in the latter subcategory belong more to the turntablist style; however, those producers still employ mashup production tools and techniques.

The bulk of mashups either adhere closely to stand-alone, autonomous popular song forms or moderately adapt their source work’s formal construction. There are notable exceptions; for example, the artist Girl Talk produces extended works with digital counterpoint techniques used by mashup producers but his work falls closer to turntablism because of its fluid form structure, as opposed to the autonomous song form

7. Earworm pitch-shifts The Fray’s “You Found Me” up a semitone from A-flat major to A major.

structures of mashups. Girl Talk works with open, episodic forms rather than with self-contained, clearly structured forms.

Earworm, like Girl Talk, is known for making mashups that use numerous samples. Earworm has produced a series of mashups, in December of 2007, 2008, and 2009, in which he combines the 25 most popular songs of the year (according to Billboard). These tracks feature as many samples as anything by Girl Talk or the most talented of turntablists, but instead of moving rapidly from one sample to the next, Earworm layers, repeats, and interweaves the samples to construct a larger song form that features discrete sections.⁸

The structural clarity is the remnant of a century-old audio medium. Popular music forms developed and solidified over several decades by endless repetition through live performance, radio, and audio playback media. Recording historian Mark Katz refers to this as the ‘phonograph effect.’

The repetition of short pop songs over the decades almost certainly created a feedback loop in which listeners have come to expect works to be of a certain length and in which performers strive (or are pressured) to meet that expectation.⁹

The short forms of popular music, though echoing a technological ‘leftover’ of the limited capacity of early phonograph records, serve a purpose by providing a kind of continuity. Without the modular song forms solidified over decades, the producer risks alienating the listener by thwarting the expectation of a typical short work. Listeners experience repetition of short forms via their audio storage medium of choice. In theory and sometimes in practice, a medium’s storage capacity determines the maximum length of a work. Though digital audio production technology endows mashup producers with the agency to create large form musical works, most conform to the short form conditioned by the phonograph effect. Liam McGranahan, in his ethnography of the mashup community, lists several mashup producers who make form and structure a compositional priority. He cites an interview with DJ Faroff:

I think of a song, of a track, as an actual song that I would be writing, as an arrangement with an intro, verse and then chorus, verse and then chorus, a bridge... There is a big element of songwriting there and composing.¹⁰

8. McGranahan, *Mashnography*, 55.

9. Katz, *Capturing Sound*, 37.

10. DJ Faroff quoted in McGranahan, *Mashnography*, 48.

Pursuing DJ Faroff's dedication to formal design, I spend the following section of this chapter examining song form in the mashup repertoire. After outlining traditional song forms (verse-chorus-bridge, etc.) I explore non-traditional forms that adapt existing song forms or eschew song forms entirely for original forms.

Short song forms

The typical mashup relies on structures familiar to most popular music listeners. The mashup composer strikes a balance of repetition and original material.¹¹ In this section of the chapter, I analyze works whose forms follow their source songs' formal structure. I also examine two works that stray from their source songs' form.

In his discussion of structure in mashup production Roseman explains that form in popular music follows an internal logic.

[S]ong structure has evolved for good reasons. If you do not repeat sections, the listener may experience too much variety and become disinterested. A non-repeating piece requires a lot of concentration and does not offer the pleasure of a hook that allows you to listen to music and know what to expect.¹²

This logic applies outside the realm of popular music. Art and folk music, for example, both employ forms that are familiar to listeners. Expectations of a work's structure stem from familiarity with standardized sections. There are a finite number of combinatorial possibilities for formal design in the popular music. From those combinations, the work draws on sections with clearly defined functions. The introduction usually takes the form of a short instrumental section at the beginning of a song. It introduces melodic or harmonic material. The verse section repeats with some regularity and bears the same melody and harmony but different lyrics in each repetition. A work's narrative advances during the verses. Sometimes the songwriter will introduce new material after the verse but before the chorus. The pre-chorus often contains the same melodic and lyric content but does not carry the same 'hook' as the chorus. A songwriter draws a title often from the first lyric line of the chorus. In works without a strong formal structure, the chorus

11. By 'original' I mean material that is new to the listener in the context of the mashup. The mashup composer does not add his or her own original musical material.

12. Roseman, *Audio Mash-Up Construction*, 226.

provides the listener with an anchor to attenuate a sensation of formlessness. The artist sometimes inserts a bridge in an otherwise monotonous song to provide harmonic variety between the chorus and verse. The lyric sometimes contains a ‘plot twist’ or phrase that leads back to the verse. A short phrase or word repeated sometimes following a verse or chorus is called the refrain. The distinction between chorus and refrain is not always so clearly delineated. The artist ‘fills in’ lyric text against an instrumental background or repeats a lyric from another formal section. Sometimes the artist draws material from the chorus for repetition, as in Petula Clark’s “Downtown.” Like the introduction, the producer sometimes appends closing material, like a coda, to the end of a work as a short instrumental or vocal loop (as in a refrain) to close a song. This is not unlike the classical coda.

Typically, phrases of regular lengths comprise each formal section. The four-measure phrase is the most common in popular music, although two, eight, and sixteen-measure phrases are not uncommon. Regular phrase lengths appeal to mashup composers because of the relative ease of extracting parent samples. The probability of finding a lyric or melody within short phrases is higher than in a sample with irregular phrase lengths. Melodies that elide with subsequent phrases are also troublesome. Instrumentals from ‘breaks,’ sections without vocals, often provide longer instrumental sample phrases.

In mashups, instrumental phrase loops extracted from source works sometimes constitute phrases and define song sections.¹³ The loops, usually divided in segments of two, four, or eight measures, establish a harmonic and rhythmic foundation for lyric parent samples above. Loops also help the producer delineate formal sections by differentiating key areas to signal the arrival of a new formal section. The instrumentals are subordinate to the vocals, as they merely accompany the vocal melody. Roseman observes that the mashup’s form, in specific instances, is a consequence of one of the parent sample’s source works.

13. Ibid., 200-203.

This is true in a song with only one dominant vocal. Often the lead vocal forces the background instrumentation into the vocalist's structure, especially if the acapella is relatively unaltered.¹⁴

The vocal parent sample(s) determines the phrase length though not necessarily the harmonization. Mashup producers harmonize vocal samples to their satisfaction within the confines of the tonal popular music idiom. This is not to say that composers who use digital counterpoint technique *must* adhere to the standard harmonic practice of mashup production. I discuss this here, as mashups are the only current musical manifestations of this technique. I present below two case studies in which the mashup form adheres to one of the source work's form; one is based on a spoken vocal (rap) and the other a sung lyric with melody. Following those two case studies, I examine another work in which the mashup producer amalgamates formal elements of two or more source songs to construct a new form.

**Case study no. 1: Vocal melody and instrumental
MadMixMustang, "Take It Easy On Me"**

A-Ha, "Take On Me" (1985)

The Commodores, "Easy" (1977)

The challenge in mashup production is in finding instrumental samples that share a common harmonic language with the given melodic samples. This is particularly difficult when a mashup uses a dominant vocal from only one source work.

MadMixMustang's (MMM) "Take It Easy On Me" uses A-Ha's "Take On Me" as the dominant vocal while the Commodores' "Easy" provides the instrumental accompaniment. The vocals are unmodified (unsegmented) apart from beat matching to 72-bpm from 85-bpm; MMM beat-matches "Easy" from 65-bpm to 72-bpm. "Easy" remains unmodified to conform to A-Ha's structure but there is a serendipitous correspondence in both works' form. The similarity extends to the instrumental break late in each work. It is highly unusual that two-source works share this level of formal compatibility.

14. Ibid., 227. An 'acapella' in the context of a mashup is a vocal sample without instrumental accompaniment. These are often the raw vocal tracks from a studio recording. They are often sold in specialty record stores or leaked online for DJs to remix or mashup.

Alternatively, mashups that use spoken word as the dominant vocal employ other compositional techniques. The ‘phrase loop’ provides producers the means to create satisfying instrumental phrases that conform to the vocal’s formal structure.

Case study no. 2: Spoken word and music

DJ Danger Mouse, “Allure”

Jay-Z, “Allure” (2003)

The Beatles, “Dear Prudence” (1968)

Spoken word vocals have implications for form. Mashup producers may create instrumental accompaniment for spoken lyrics, as in rap, without concern for harmonic compatibility, as speech content does not demand a particular harmonic foundation. Mashup producers may opt for an accompaniment that delineates sections with harmonic variety. Conversely, the lyrics may also delineate formal sections if the producer chooses a static harmonic foundation.

Danger Mouse’s 2004 *Grey Album* fuses rapper Jay-Z’s *Black Album* with the Beatles *White Album*. Jay-Z’s lyrics remain intact in each track. Danger Mouse draws the instrumental samples entirely from the Beatles; however, he deconstructs samples into ‘micro-samples’ of single instrumental chords or percussive sounds almost to the point of unrecognizability. For “Allure,” Danger Mouse extracted samples from “Dear Prudence,” which are not obvious until the work’s coda. He assembles two-measure phrase loops with harmonic content supported by guitar chords. Also, he crafted a series of one-measure percussive loops with only bass drum and hand claps. The work’s formal structure follows Jay-Z’s original form without deviation:

Intro - Verse 1 – Chorus - Verse 2 – Chorus - Verse 3 - Chorus

The instrumental phrase loops fashioned from micro-samples establish a static harmonic base for the duration of the lyrics (See Figure 5.1 in Chapter Five). With no harmonic cues to delineate formal sections, the lyrics mark sectional changes. In the song’s last seven seconds, Danger Mouse breaks the two-measure phrase loop abruptly for a four-measure guitar outro (See Figure 5.2 in Chapter Five). The instrumental loop points

clearly to ‘D Major’ with no harmonic variation. The end guitar sample is in the same key but its surface harmony is different. It eventually returns to the original key.

Mashups that employ only one work for the dominant vocal represent only a fraction of works using these compositional techniques. Significant portions of mashups draw lyrics and instrumentals from two or more source works. In doing so, the composer may deviate from any of its source works’ form to create a new structure. It may also adapt a source work’s form for its model, creating a ‘repetition with a difference.’

Case study no. 3: New forms from old forms

“Downtown Murder,” DJ Clivester

Petula Clark, “Downtown” (1964)¹⁵

Sophie Ellis-Bextor, “Murder On A Dance Floor” (2001)

The majority of mashups incorporate vocal samples from two or more source songs. When the producer incorporates elements from multiple songs, the use of one song’s form as a model for the new mashup becomes problematic. Introducing lyrics from a second song into a mashup immediately alters the form. The mashup producer carries the prerogative to take one source song’s form for the model or construct a formal amalgam. Clivester creates a formal adaptation fundamentally different from both source songs (Figure 3.10).

Downtown Murder																																																			
Intro	V1				Chorus		V2		Chorus		V3- B section		Chorus	Refrain	V3 - B Section		Outro																																		
Downtown																																																			
Intro	V1				Chorus 1		V2		Chorus 2		Break	V3 - B Section		Chorus 3	Outro refrain																																				
Murder on a Dance Floor																																																			
Intro	V1				Chorus A		Chorus B		V2		Chorus A		Chorus B		Chorus B		Break	Chorus A		Chorus B		Chorus B		Chorus B																											
Bars:																																																			
2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102	104

Figure 3.10 Formal design of “Downtown Murder”

Clivester lifts Ellis-Bextor’s instrumental introduction for his mashup. This doubles the duration of Clark’s introduction. Both vocal verses from “Downtown” remain unaltered in the new work; a third statement of the verse uses the melodic material from the second half of the verse section, “and you may find somebody kind to help and understand

15. It is worth mentioning that Gould was particularly fond of Petula Clark. She was the subject of his article, “The Search For Petula Clark,” in *The Glenn Gould Reader* ed., Tim Page (New York: Key Porter Press, 1984): 300-307. Gould adapted his article for a radio documentary in 1967 months before he produced *The Idea of North*. It was also his first collaboration with CBC radio audio engineer Lorne Tulk, with whom Gould worked on *The Solitude Trilogy*.

you...” Clivester uses Clark’s half-verse twice in measures 58-65 and 90-97. The new work’s chorus is the latter half of Ellis-Bextor’s chorus, “It’s a murder on a dance floor but you better not kill the groove...”, labeled ‘Chorus B.’ Clivester’s draws vocals from Ellis-Bextor’s ‘chorus B’ for the refrain in addition to Clark’s repeated statement “downtown... downtown.”

For “Downtown Murder,” Clivester swerves from the formal design and harmonic teleology of its source works. Clivester maintains harmonic stasis on a macro level. The mashup remains steadfastly loyal to E Major, native to both source works. One relies on lyrics, melodic repetition, and the switch between artist vocals to locate sectional divisions. To break the monotony of the continuous E major, Clivester appears to employ an instrumental crescendo. At the beginning of verse 2, Clivester adds violins playing quarter-note chords. In the second statement of the chorus, the violins counterpoint Ellis-Bextor’s chorus melody. By reducing the instrumentation at the refrain, cutting all but the synth pads and backbeat hi-hat, he creates a signpost transition between the chorus and refrain despite harmonic stasis.

This mashup presents a case study in compositional economy for digital counterpoint technique. By reusing material and varying instrumentation and texture, Clivester creates a clearly marked song form. Other mashup composers take more liberties in the compositional process. Their formal designs challenge conventional expectations of form not by design but by taking formal cues from the variety of instrumental and vocal samples used during production. I continue my discussion of form in the next section of this chapter. There I explore fluid forms, that is, forms that challenge the limits of popular music song forms.

Fluid forms

Before or during the creative process, the mashup producer may contemplate two questions: ‘Into what kind of structure will my samples fit?’ or ‘What structure best fits my samples?’ Here, I present two case studies in fluid form. First, I explore an extended large-scale work that unfolds episodically but without a teleological song form as in mashups. I then examine a short work that employs a significant number of samples in a

relatively short duration. It has no clear form apart from traces of a form via lyric repetition.

The mashup producer faces the same dilemma as the art music composer. For example, Johannes Brahms offered his student a suggestion, “[O]ne can’t write a sonata by stringing together a few such thematic ideas through sonata form... the sonata form must be the necessary consequence of the themes.”¹⁶ Brahms encouraged his student to let the thematic material dictate the formal structure. The form must not shape the themes. To paraphrase Brahms, “the song form must be the consequence of the parent samples.” The mashup, a purely digital product, is indifferent to the limitations of four-minute capacity storage media. The producers should not feel obliged to confine their song to a short form if the samples lead them to a larger form or forms that deviate from conventional models. Mashup producers also consider their song’s primary purpose while negotiating the balance of repetition and original material. A song for listening adopts a form different from works created for ambient music or dancing. In the latter two examples, the work’s formal design is not the compositional priority, which is to maintain a steady flow of sound.

I demonstrated in Chapter Two how Gould crafts extended forms containing smaller forms. Fluid form provides digital counterpoint with a rudimentary model for extended forms with musical content. Not every musical work in digital counterpoint is a mashup, self-contained and autonomous. The following case study examines an extended work that unfolds as a steady progression of musical episodes, not as a self-contained song form.

**Case study no. 1: ‘Formlessness’ in fluid form
Gregg Gillis (Girl Talk), *Feed The Animals* (2008)**

Girl Talk’s album *Feed the Animals* is an exercise in momentum, conceived as a steady flow. His work represents a departure from mashup production in both formal design and

16. Carl Schacter, “The First Movement Of Brahms’s Second Symphony: The Opening Theme And Its Consequences,” *Music Analysis* 2, no. 1 (1983), 55. Schacter quotes Gustav Jenner, *Johannes Brahms als Mensch, Lehrer und Künstler: Studien und Erlebnisse* (Marburg in Hessen: N.G. Elwert’sche Verlagsbuchhandlung, 1905), 6.

aesthetics. Gillis, discussing *Feed the Animals*, offers, “The point of making records for me isn’t to hear 300 songs in 50 minutes; it’s to hear the 50-minute piece of music.”¹⁷ The constant flow of music maintains a ‘steady groove’ for dancing. The stand-alone forms in mashups present a start-stop succession of works with gaps of silence between songs. This is antithetical to the turntablist’s aim. Girl Talk’s fifty-minute flow of music unfolds in a series of connected, fluid episodes. The fluid form is a distinguishing element of the club DJ culture. In his dissertation on the ‘mashup community,’ McGranahan notes a difference between mashups and other sample-based musics.

Girl Talk is lauded for his ability to use numerous samples in a short period of time. This is also the case for turntablists like Z-Trip and others who are, amongst other things, celebrated for their ability to move from one record to the next quickly and seamlessly.¹⁸

Though mashups are related to the turntable DJ culture, their purpose is different: The DJ produces an extended seamless flow of music for clubs and dancing whereas mashup producers craft their work primarily for listening (and sometimes dancing). Digital counterpoint derives important lessons in formal design from Girl Talk’s work whether or not the mashup community considers him a mashup producer.

Track divisions segment *Feed the Animals* but the album works best in a long continuous flow. On the album’s original website, Gillis made available two versions of the album: 14 individual files, or a single file without breaks. Each track progresses as a series of short interlocking parent samples that make harmonic connections with swift harmonic pivots, and overlapping drum lines with end-to-end, linear transitions. In his analysis of the album, Andy Baio uses Amazon.com’s ‘Mechanical Turk’ to identify 322 samples from 264 source works.¹⁹ Some sample sources are not readily identifiable.²⁰ Angela Watercutter illustrates a formal map of “What It’s All About” from *Feed the Animals* (Appendix C). Her diagram, in circular format, illustrates 35 samples, their location in the

17. Gregg Gillis quoted in Mark Richardson, “Girl Talk,” Pitchfork. <http://pitchfork.com/features/interviews/7522-girl-talk/> (accessed June 3, 2012).

18. McGranahan, *Mashnography*, 55.

19. The Mechanical Turk, one of Amazon’s web services, is a crowd-sourced forum for computer programmers to create tasks for other forum users that computers cannot process.

20. Andy Baio, “Girl Turk: Mechanical Turk Meets Girl Talk’s ‘Feed The Animals,’” Waxy, http://waxy.org/2008/09/girl_turk/ (accessed June 2, 2012).

track, and provides a spatial representation of the samples' duration.²¹ The 'sample map' reveals a track without a clear semblance of formal organization. In listening, however, transitions are not seamless; sudden insertion of some samples shift key areas and instrumentation jarringly.

If Gillis's work represents the DJ aesthetic of the continuous flow, Earworm's work is representative of the mashup aesthetic, working in self-contained autonomous song forms. However, as I discuss in the next case study, Earworm does not follow a strict song form but a loose semblance of form.

**Case study no. 2: Loose form in fluid forms
DJ Earworm, "Blame It On The Pop"**

Like *Girl Talk*, Earworm cycles through several samples in a short amount of time: 196 samples from 25 works in 4'37". Unlike *Girl Talk*, Earworm crafts this work with seamless transitions and without harmonic conflict. He balances repetition with new material to design a song form idiomatic to his parent samples. Maintaining a four chord progression in an 'A major' harmonic framework sidesteps the issue of changing key areas to delineate form. To derive a formal structure from this work I rely on both lyrics *and* texture to mark section changes. Identifying section changes like the verses and breaks (Table 3.7) is troublesome, because Earworm uses lyrics with different melodic content in each verse. The melodies fit the harmonic framework and, consequently, verses are distinguishable only by the original lyric material relative to the repeated texts of the chorus and refrain. In other words, I distinguish the verses by process of elimination, only as they are different from the chorus, refrain, and breaks.

Determining the formal structure is difficult because one cannot rely on the harmonic base or melodic material. The lyrical content marks form here. The last two lines of the introduction, beginning with "I got pop, I got dance..." introduce material for the chorus, "blame it on the pop, blame it on the dance..." The refrain lyric reappears twice but not consistently before or after a verse or chorus. Often, the refrain is fragmented and appears

21. Angela Watercutter, "Mashup DJ *Girl Talk* Deconstructs Samples From *Feed The Animals*," *Wired*. August 16, 2008, 92.

via one of three phrases: “So don’t worry...”, “So baby don’t worry...”, or “No need to worry...”

Measure	Section	Measure	Section
1-8	Intro	63-70	Bridge
9-24	Refrain	71-78	V3
25-32	Verse 1	79-86	Refrain
33-40	Chorus	87-94	Chorus
41-44	Refrain	95-96	Break
45-51	V2	97-112	V4
52-54	Break	113-138	Verse 5
55-62	Chorus	139-142	Outro

Table 3.6 Formal structure of DJ Earworm's “Blame It On The Pop”

Earworm introduces the refrain early in the work as the primary repetitive material instead of the chorus. The chorus, which provides the work’s title, does not appear until after the first verse. An inconsistent occurrence of the chorus appears only once, immediately after verse 1. The bridge and break follow the chorus in both instances. Their brief duration and thin textures mark their difference from other sections.

Earworm differentiates verses not with melodic content, which changes from verse to verse, but primarily with lyrics. In *verse 1*, he uses a lyric rhyme scheme with the long \bar{A} sound: “awakened,” “taking,” “breaking,” “face,” “place.” *Verse 2* adopts a narrative on the theme of ‘travel to home.’ The thinner texture of *verse 3*, with only voice, piano, and synthesized strings, creates a marked contrast between its adjacent sections. Earworm bases *verse 4* around the theme of the Black Eyed Peas’ lyric, “tonight’s going to be a good night.” *Verse 5* restates verse 1 in its entirety with extra material interspersed between phrases. The repetition with a difference adds enough new material to make it sound new but familiar.

Girl Talk’s “What It’s All About” from the previous case study illustrates the formal possibilities of the absence of traditional form. A work that challenges the limits of form still bears some sort of form. The steady flow method of composition is an important model for digital counterpoint if only as a conscious avoidance of traditional forms.

“Blame It On The Pop,” by contrast, offers digital counterpoint a viable compositional model for the possibilities of *creating* form that challenge the limits of song form.

Earworm’s structure balances the need for repetition in this work with both the refrain

and chorus. The verses vary by melody and lyric phrase length, but are discernible relative to their surrounding material. Repetition of verse one material in verse five creates a sense of something repeated but renewed. Earworm challenges the rigidity of predefined song forms by incorporating formal variety into his work's structure.

Form in the mashup often relies on sudden changes in texture to signal new sections; however, texture in the mashup is deceptively simple. The appearance of homophony in the mashup is a passing nod to popular music's homophony of sung melody with instrumentation following in tandem. Creating the illusion of homophony with instrumentals and vocals from different tracks requires polyphonic composition. I explore elements of texture in mashups in the remainder of the chapter.

Texture: Polyphonic homophony

The mashup repertoire, like their original source works that provide samples, employs homophonic textures and polyphonic composition disguised as homophony. Whereas some textures in contrapuntal radio are complex, the mashup producer's imperative is to create the illusion of simplicity. In his book, Roseman instructs readers and producers,

There is one simple guideline when it comes to layering two sections that have vocals: don't... Few things are more annoying than competing vocal lines in a mashup... If...vocals happen simultaneously, the left brain is almost certain to overload and the mashup will seem like it's a bit much.²²

The mashup producer's priority is *clarity*. Vocals in popular music do not compete for attention. Overlapping vocals in mashups are therefore not common. Thinner textures offer the most clarity without resorting to a musical equivalent of the cocktail party effect. Mashup producers avoid competing vocals. The producer puts all the samples in lockstep via beat matching. Homophony, or the appearance of it, can appear when instrumental samples share similar rhythmic profiles with few symptoms of 'independence.' The instrumentals function as a cohesive unit, matching beats, measures, phrases, and sections to support the vocals. Stacking instrumental samples vertically creates varying levels of textural density.

22. Roseman, *Audio Mash-Up Construction*, 224-225.

Perception is the determining factor in distinguishing homophony or polyphony in mashups. The producer endows samples with a level of independence to distinguish them from others when vocals and instrumentals come from music of disparate genres. The paradox of independent voices in a homophonic texture is in perception. Disparate samples work together as a cohesive whole, as if created together for an original work, and sound homophonic; however, differences in genre amongst these samples provides the listener with a clue that there are multiple independent voices that function as a homophonic instrumental accompaniment for the vocals above it. I refer to this as polyphonic homophony. In the following section, I explore examples of both homophonic textures with polyphonic elements and of true multi-voiced polyphony. My analyses are readings of texture in these works. I do not imply the mashup producers create these works with the intent to produce or reproduce specific textures.

Homophony and the Mashup: “Downtown Murder,” DJ Clivester

Clivester avoids the perils of competing vocals but overlaps them for effect. “Downtown Murder” uses instrumentals only from Ellis-Bextor’s work. Using vocal parent samples from both artists (Clark and Ellis-Bextor) creates the possibility for a duet scenario. The bulk of the vocals follow a binary form of Clark’s verses and Ellis-Bextor’s chorus sections. The refrain breaks the linear homophony with the vocals (Figure 3.11a & b).

Figure 3.11a Refrain, Part I, transcribed from DJ Clivester's “Downtown Murder”



Figure 3.11b Refrain, Part II, transcribed from DJ Clivester's “Downtown Murder”



Ellis-Bextor repeats her chorus lyric while Clark repeats “Downtown... Downtown.” The difference in rhythm between the swiftly articulated chorus text and the slow, two-note

refrain renders each voice distinct and independent. The two-voice polyphony is simple but effective; Clark's and Ellis-Bextor's vocals overlap but do not compete. In the second half of the refrain section (Figure 3.10b), the instrumentation suddenly thins so that only the synth pads remain. This maintains the harmonic base and highlights the vocal interplay.

Polyphony and the mashup

Case study no. 1 - "No One Takes Your Freedom," DJ Earworm

Scissor Sisters, "Take Your Mama" (2004)

The Beatles, "For No One" (1966)

Aretha Franklin, "Think" (1968)

George Michael, "Freedom 90" (1990)

Earworm establishes a homophonic texture early in this work but develops a complex polyphony of overlapped vocals and instrumental samples. The interplay of vocals and instrumentals initially follows a binary progression of voice 1, voice 2, voice 1, etc. Near the end of the introduction, Earworm counterpoints the vocals of Scissor Sisters's lead singer, Jake Shears, with a French horn solo extracted from the Beatles' work (Figure 3.12). The horn parent sample carries a melody independent of the other melodic voices and creates, temporarily, a thin polyphonic texture. The horn sample returns in the first statement of the chorus.

In the second chorus, Earworm's thick instrumentation creates a dense homophonic texture. Here, as in the "Downtown Murder" refrain, Shears delivers his vocals with a moderately fast rhythm and counterpoints George Michael's two-note refrain, "Freedom... Freedom." Again, we observe overlapping independent voices that do not compete for the listener's focus.

Figure 3.12 Jake Shears' melody and Paul McCartney's horn counterpoint transcribed from DJ Earworm's "No One Takes Your Freedom."

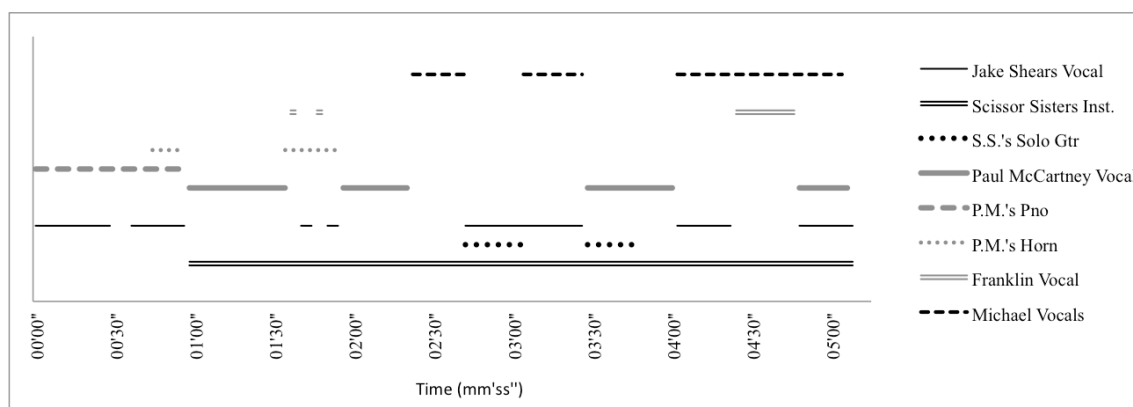


Figure 3.13 Textural density in DJ Earworm's "No one takes your freedom."

Earworm builds this work like an orchestral crescendo. Early on he uses only Jake Shears' vocals and Paul McCartney's piano sample. When the Scissor Sisters' instrumental sample enters, the texture thickens considerably. The additional solo instrumental samples (McCartney's horn and the Scissor Sisters' guitar) thickens the texture if only temporarily. Later, Earworm ignores his own advice about overlapping competing voices (Figure 3.13). In the work's outro, McCartney's, Michael's, and Shears' vocals all compete for listener focus though the work never seems too 'crowded.'

Reminiscent of Gould's *North* prologue, the multiple voices make the task of focusing on any one voice difficult. This may or may not be the desired effect, though it is an impressive feat of contrapuntal composition. Texturally, the density of the polyphony is compelling from a musical perspective. Multi-voice independent polyphony without the competing vocals provides a significant case study for digital counterpoint.

Case study no. 2: "What It's All About," Girl Talk

The work is a multi-voice polyphony similar to any of Gould's polyphonic textures. Angela Watercutter's formal diagram (Appendix C) functions also as a diagram of texture. The texture is most dense with a maximum of four voices between 0'40"-1'25" (The Cure, Ini Kamoze, Busta Rhymes, and Wilson Pickett), 2'51"-3'10" (Terence Trent D'Arby, Argent, Tones on Tail, and Wu-tang Clan), and again at 3'51"-4'04" (Jackson 5, Vanilla Ice, Rihanna, and Queen). Stylistic differences, marked by genre, vocal delivery, or instrumentation, distinguish each voice as different from the surrounding musical material; Terence Trent D'Arby is unlike Wu-tang Clan; The Cure contrasts Wilson Pickett, and; the Jackson 5 and Vanilla Ice represent disparate genres. There is no illusion of homophony in this work and all voices are readily identifiable as independent even if the listener is not aware of the source works. Abrupt transitions signal frequent breaks in the polyphony that betray any pretense of a seamless voice leading from one parent sample to the other.

The two examples discussed above represent different aesthetics yet both offer compelling case studies. Earworm's work develops like an orchestral crescendo from homophony to increasingly dense polyphony. Though the overlapping vocals compete for attention, the melodies are independent voices in counterpoint. The lessons of polyphonic texture provide insight in constructing sophisticated counterpoint within a small form and in a popular music harmonic idiom.

Chapter Summary

Traditional musical elements are the mashup's primary materials, thereby sharing commonalities with common-practice counterpoint at least in terms of melody, harmony, form, and texture. The system of key relations impose compositional challenges but make

it possible for mashup composers to experiment with samples of varying sizes and alternative harmonization.

I have presented analyses and discussions of mashups to provide models for digital counterpoint with musical materials. Mashup producers enjoy the benefits of digital audio manipulation that allow them to exploit the possibilities of working with traditional harmonic material. Digital counterpoint distills from these musical microcosms harmonic, formal, and textural composition techniques drawn from mashup production.

Contrapuntal radio and mashup production involve more than harmony, form, and texture. Working with recorded media implies involvement in two other compositional elements: composing the sonic space and using counterpoint to create a program. In Chapter Four, I explore space and spatialization as a contrapuntal element. Compositions with digital counterpoint exist as music only at the moment of composition by instant digital playback. The composer decides a sample's location in the sonic field: left, centre, right, foreground, background, etc. Space and spatialization provide an additional layer for contrapuntal composition.

Chapter Four

Navigating Contrapuntal Spaces

“Counterpoint is the total ordering of sound, the complete management of time, the minute subdivision of musical space.”¹

Introduction

In this chapter, I outline a system for composing space and spatialization in digital counterpoint and the means by which listeners experience that space. My discussion of space deploys 'mixing' in recording practice as its core. I refer to mixing only as a compositional technique in digital counterpoint. Recordists and producers position all audible elements in a sonic space to render each element distinct. The practical application of mixing technique involves positioning samples in the sonic space that I call 'contrapuntal space.' This is the audio equivalent of the composer's manuscript paper. Like studio recordists and producers, composers working with digital counterpoint technique build a sound world by positioning musical samples in the mono or stereo sound field. Fundamentally, space and spatiality in recordings is a very old concept but I use it here in a new way. My study introduces the notion of 'spatiality' as a fundamental element of counterpoint. Traditional musical elements now exist as a series of spatial relations. To illustrate my arguments I present a series of case studies that examine how Gould and mashup producers use the contrapuntal space in their work.²

In this chapter, I outline concepts of space in traditional counterpoint, then use this to establish a precedent for a discussion of space in digital counterpoint composition. Unlike composers working with pen and manuscript paper in traditional counterpoint, composers working with digital counterpoint require an entirely different set of compositional tools and techniques. I devote a significant portion of this chapter to examining how Gould and

1. Edward Said, "The Music Itself: Glenn Gould's Contrapuntal Vision," in *Glenn Gould Variations*. ed. John McGreevy (Toronto: Macmillan of Canada, 1983), 48.

2. Shortly after Gould completed *The Idea of North* and *The Latecomers*, he continued his experiments with 'space' into his recording efforts. His experiments in "acoustic orchestration" involved recording the piano with ranks of microphones placed at increasing distances from the piano. Paul Th  berge, "Glenn Gould Remixed: An "Acoustic Choreography" for Scriabin's Piano Sonata No. 5," *Glenn Gould* 13, no. 2 (2008): 69-81; Paul Th  berge, "Glenn Gould, the Acoustic Orchestrations," CD (Sony Masterworks 540657, 2012).

mashup producers create their contrapuntal space and assemble their samples in three dimensions. I subdivide my discussion of space into three subcategories: *abstract space*, *live space*, and *time space*. Because we experience works composed with digital counterpoint technique by audio playback and not live performance, listeners have few options as to how they experience the musical interplay of samples in the contrapuntal space.

Throughout the chapter, I use ‘sonic space’ and ‘contrapuntal space’ interchangeably, as they are similar enough to warrant dual use. I argue for the notion of space and spatiality as compositional elements and techniques of digital counterpoint. I position my discussion of space and spatiality in a musicological context. Specifically, my discussions and analyses focus on how digital counterpoint technique benefits from the practical application of specific audio production techniques: mixing, equalisation, and dynamics processing. In my discussions of the listener and how best to experience works of digital counterpoint, I sidestep analyses via phenomenology, Gestalt principles and auditory scene analysis. My analysis goes into a different direction. I focus on the practice of producing the mashup and also the practice of listening to the mashup. My primary concern is only that listeners can hear the effect of the spatializing techniques. A discussion of the physiological and psychological reasons why listeners hear the space would detract from this study’s focus; however, I make mention of specific relevant theories as they relate to my discussions.

Spatialization as a contrapuntal device

In terms of ‘the mix,’ digital counterpoint composition and recording practice are similar in practice; however, the theories that govern each practice differentiate their treatment of space: works composed in digital counterpoint have no real-world, acoustic counterpart because mashup producers use samples from artists that either would not or could not meet in real time. This also applies for contrapuntal radio. The composer or producer draws together samples of pre-recorded audio from a variety of genres and eras. Such work can never have a real-world performance, that is, the work exists only in recorded form. For original, studio-produced albums, sometimes music is not recorded live, as in a concert setting. Rather, the production may involve many tracks recorded at different

times, not in real time. This is not to say that the recording can not be produced live, only that it is possible to record an original album piecemeal. In other instances the musical material is so manipulated that, like works of digital counterpoint, it could never have a live performance. In a studio album, generally speaking, the artists and producer(s) *create* original musical material and add additional layers of original or sampled materials. The traditional musical elements of digital counterpoint (harmony, form, and texture) as outlined in Chapters Two and Three inhabit a contrapuntal space. Creating the space becomes a part of the composition process, and has musical and programmatic implications. I explore the issue of program more in Chapter Five.

Said's conception of counterpoint, at the beginning of this chapter, augments the numerous concept definitions of counterpoint outlined in this study's introduction. It accounts for composition in multiple spatial dimensions. The compositional process includes more than harmony, form, texture, and, to a lesser extent, voice leading. The composer, during the mixing process, creates a balance of those elements *in space*. Arved Ashby, in his book on music and mechanical reproduction, observes that when we examine any recorded sound,

Conscious of the fact or not, we experience recordings spatially. A sound is to our left or right, near or far, stationary or in motion, reverberating in a large space or muffled within close quarters.³

Surely, we 'hear' the space not only in conception, but also in performance. In his exposition of early recording technology, Mark Katz suggests that "Ambiance and acoustic space become intrinsic to the sound conception, indeed at times inseparable from it."⁴ In a piano recording of a Bach fugue, we hear the expected elements of the performance—pitch, rhythm, the sound of the piano or harpsichord—and the sonic characteristics of the performance space. Often for classical music recording, the producer positions the microphone in the recording venue to simulate the concert experience. Both record producers and composers in the realm of digital counterpoint have more options: they are free to spatialize their samples—statically or dynamically—in contrapuntal space. They bring together samples into a DAW and position the samples in

3. Arved Ashby, *Absolute Music: Mechanical Reproduction* (Berkeley, CA: University of California Press, 2010), 47.

4. Mark Katz, *Capturing Sound*, 44.

the mix by adjusting volume, panning, equalization, etc. Space in recording practice and digital counterpoint does not rely on microphone placement.

This study adapts Pierre Schaefer's term, *objet sonore*, or 'music object,' to refer to samples as composers manipulate them, the objects, in the contrapuntal space. The analogy is apt also in contrapuntal radio, as Gould worked with individual voices and sounds on segments of tape (i.e. physical objects). Similarly, mashup producers manipulate sounds as virtual objects on the computer screen. Artists working with digital counterpoint technique no longer contend with pure melodic or harmonic material; they work instead with instrumental *and* vocal music objects, spoken word and sound effects. This carries a unique challenge.

Historical Background

Space and spatiality are not the sole domain of digital counterpoint or recording practice. Spatialization is a centuries-old compositional tool. It figures prominently in the polyphonic styling of Leonin and Perotin, who worked in the cavernous Notre Dame cathedral in Paris. As choral polyphony flourished in the Renaissance period, space influenced the composition process of composers all through Europe. Large-scale sacred choral works—masses, motets, and cantatas—were integral parts of liturgical ceremonies in large, highly reverberant stone cathedrals. The Venetian polychoral style, too, featured choirs distributed around the church to create the arresting effect of being literally surrounded by the music. Composers such as Willaert, Gabrielli, and Schutz exploited the spatial potential of large spaces. Such unwieldy acoustic conditions as in cathedrals necessarily influence the music performed in that space; in such a large, reverberant space, works with active rhythmic content sounds as an indistinct smear of sound. Composers like Palestrina, Byrd, and Josquin des Prez's sacred choral music exhibit consideration for large, reverberant spaces. The influence of space in composition took other forms in early music.

English composer Thomas Tallis' choral motet *Spem in Alium* is noteworthy for its enormous performance force requirement of forty individual voices. Tallis divides the forty voices into eight small choirs of five voices each. The vocal entries of the singers in

each choir occur within four to six measures (Table 4.1). Several entries elide, as is the case between Choir 1 and 2, 5 and 6, and 6 and 7. Other entries stagger over two or three measures.

Choir	Entries in measures
1	1-6
2	4-9
3	11-14
4	16-19
5	23-27
6	24-28
7	28-29
8	33-38

Table 4.1 Vocal entries by measures in *Spem in Alium*

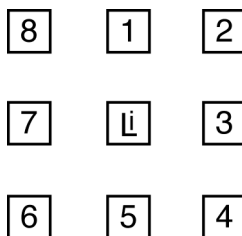


Figure 4.1 Possible spatial arrangement of Tallis's eight choirs relative to the position of the listener (Li)

The staggered entries from each choir (Figure 4.1) suggest a round spatial arrangement so that the music appears from a different position or combination of positions at various times throughout the work.⁵ The enormity of the work by the number of performers divided into smaller choirs gives the observer a sufficient opportunity to experience how Tallis composes with the space via the division of voices and physical placement of the eight choirs. Janet Cardiff's sound installation, *Forty-Part Motet* (2001), uses a recording of Tallis' *Spem in Alium*. Cardiff records each voice on its own audio channel and plays

5. There is some debate as to *how* the performers arranged themselves in the space. The original performance venue is also a matter of debate. The space used for the first performance would illuminate the discussion, though scholars disagree on this matter. Thomas Tallis, *Spem In Alium Nunquam Habui*, ed., A. Ramsbotham, P.C. Buck, E.H. Fellowes, and S. Townsend Warner (London: Oxford University Press, 1923), ii; Bertram Schofield, "The Manuscripts Of Tallis's Forty-Part Motet," *The Musical Quarterly* 37, no. 2 (1951): 177-78; Paul Doe, "Tallis's Spem In Alium And The Elizabethan Respond-Motet," *Music and Letters* 51, no. 1 (1970), 10; Davitt Moroney, "Alessandro Striggio's Mass In Forty And Sixty Parts," *Journal of the American Musicological Society* 60, no. 1 (2007), 32.

back via its own loudspeaker. She arranges the speakers around a large space and installation ‘viewers’ are encouraged to walk around during playback to experience a variety of spatial perspectives. Both Tallis’ and Cardiff’s work give credence to Katz’s statement as to the centrality of space and the practical consequences of space in the composition process. Physical space, however, is not the only spatial concern in music. In recording practice, and subsequently digital counterpoint, when producers mix their work there is no physical space, *per se*, but only the aural illusion of space.

Contrapuntal space in the digital realm

Albin Zak, in his book on rock music, comments on the production process: “[S]ome [recordists] fashion the mix after an image of a live performance while others are intent on creating a sonic world without real-world counterparts.”⁶ I use Zak’s quote to introduce two categories of space: live and ‘abstract.’ First, I must clarify the distinction between Zak’s ‘live performance’ and imagined ‘sonic world’: the live performance scenario is predicated on the model of the concert stage or recording studio with the standard practice of using ‘anchor points.’ The producer uses these points, literally, as anchors when s/he positions instrumental and vocal samples in the work’s sound space. In this spatialization, the recordist who assembles the mix positions the various musical objects to produce a track in which all the constituent elements are intelligible and balanced (Figure 4.2). Allan Moore and Ruth Dockwray refer to this kind of spatialization as the “sound box,” a predefined studio room in which the producer arranges the constituent elements of the mix—vocals, guitar, and drums—in the sonic space.⁷

Zak’s “sonic world without real-world counterparts” operates in this study on three levels: 1) a space like Moore’s sound-box but with a multitude of musical elements or processes impossible to reproduce in concert; 2) a sonic world that may not be a self-contained sound-box but an amorphous, abstract space, akin to a black box theatre whose space remains undefined without a point or several points of reference to indicate its size

6. Albin Zak, *The Poetics Of Rock* (Berkeley, CA: University of California Press, 2001), 143.

7. Allan F. Moore and Ruth Dockwray, “The Establishment Of The Virtual Performance Space In Rock,” *Twentieth-Century Music* 5, no. 2 (2010): 218-241.

or shape; and 3) time that defines a space and movement through it.

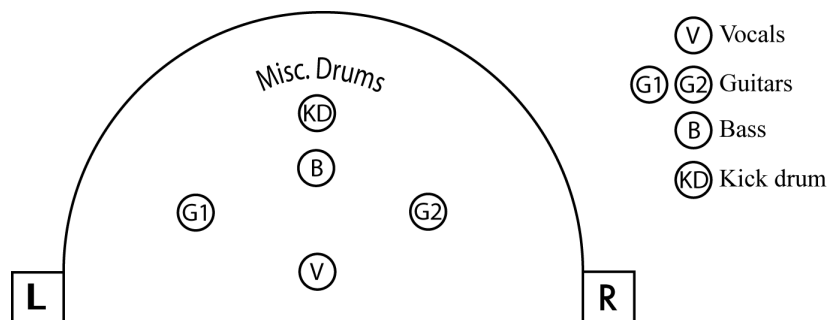


Figure 4.2 General set of balanced anchor points for the popular music mix.

Producers create space entirely by adjusting sonic parameters on a mixing board, independent of a sound's physical position when captured by microphone and stored on the recording medium.⁸ I differentiate recording practice from digital counterpoint, which only employs selected elements of recording practice. The latter is a process of transducing a performance, storing the audio data, mixing, mastering, and distribution. It is essentially a process of original content creation. Digital counterpoint dispenses with many of the processes of recording practice.⁹ In appropriating samples from other recordings, the composer sidesteps the process of transduction, data capture, and mastering. Instead, digital counterpoint begins with the process of deconstructing recordings, assembling them in a DAW, and applying the mix. Digital counterpoint is the practice of content appropriation and repurposing. There are exceptions, of course. Contrapuntal radio involves recording interviews (transduction and audio data storage). The composition process follows the digital counterpoint workflow. Contrapuntal space is the byproduct of mixing, the spatialization of appropriated and repurposed audio samples. Said's concept of counterpoint - subdividing musical space - applies to both digital counterpoint and recording practice. Digital counterpoint relies on elements of recording practice to bring together the pre-existing musical objects guided by the elements of harmony, form, and texture within space. However, not all works produced

8. Hodgson, *Understanding Records*, 150; Katz, *Capturing Sound*, 41-43. Before the advent of electric recording and electric microphones, performers positioned themselves around a horn that captured sound, condensed it, transferred it to a vibrating membrane, which in turn moved a stylus that physically cut a groove onto a spinning wax disc. The music's volume corresponded with the artists' proximity to the horn. This constitutes an early form of creating space in a recording, or 'mixing.'

9. Hodgson describes 'recording practice' broadly as "[W]hat people do to make and hear a record," *Understanding Records*, vii.

by recording practice involve digital counterpoint technique. The digital contrapuntist juxtaposes pre-existing musical material in space while conforming to some general rules of harmonic consonance. The space is just another element of the counterpoint. Studio producers and artists bring samples and *original* sounds together also for the sake of harmonic consonance or dissonance. In other words, studio artists compose original material in space while digital counterpoint composers work with pre-existing materials in the space. The difference is in *how* recording practice and digital counterpoint use the space.

Jay Hodgson asserts that the recording and mixing process constitutes a “past-tense aural narrative that describes an ideal performance.”¹⁰ The recording is a document of the ideal performance of the work that comes before it. That work may or may not ever see a live performance. Despite this, the recording is a microscope on a past live event whether real or imagined. Digital counterpoint creates a present-tense aural speculation composed from pre-recorded past-tense aural narratives. The composer creates a work that is *impossible* to actualize in real-time. With the mashup, the temporal distance between artists is a consideration. Posthumous performance renders the collaboration unlikely; for example, John Lennon and Jay-Z will never occupy the stage together at the Grammy Awards. In addition, the juxtaposition of disparate genres whose artists would not likely collaborate even in the real world complicates any chance of live performance. In contrapuntal radio, the overlapping voices, dramatic scenarios, unusual spatialization, and use of basso continuo create a kind of aural cinema impossible to recreate in a real-world performance. The work of digital counterpoint becomes a byproduct of a sonic wishing well or, more aptly, a vision in a crystal ball into which the composer projects an illusion of the fantastical and impossible.

The contrapuntal space constitutes its own sonic world; it is a vision of the imaginary, but the listener understands, however tacitly, that the vision can never and *will never* be real; the contrapuntal space is not a tangible, tactile space. Digital counterpoint draws together pre-existing audio samples to create vivid imaginary sound worlds but it is only a facsimile of a live event or dramatic scenario. The mashup is indistinguishable sonically

10. Ibid., 156.

from any other work produced by studio recording methods. Only the musical content indicates to the listener that the work is not ‘original’ but counterpointed. Gould’s documentaries composed with contrapuntal radio technique are unlikely to convince anyone that the works transpired in the real world. In fact, there is little effort to obscure the works’ origin.

The illusion of the composed space, the contrapuntal sound world, is effective only when the listener *actively* desires immersion. The music from this imaginary space is impossible to reproduce in a real world setting. The producer or composer conceives the new work and assembles it from many artists’ recordings. This is the difference between, say, the Beatles’ “Strawberry Fields” and Danger Mouse’s “Allure” from the *Grey Album*. Personal investment and active participation in the imaginary world validates the illusion of space. Peter Johnson, in his article on the illusion of space in classical music recording asserts, “[The] illusion... depends upon the capacity and willingness of the listener to hear the played-back recording as if live (in full knowledge that it is not).”¹¹ This constitutes the listener’s suspension of disbelief. The composer or producer manipulates, samples, and adjusts various sonic parameters to achieve the illusion of space. The producer uses relatively few elements to create a sonic world. The success of the spatial illusion lays in the application of the tools and techniques of recording practice. In the following portion of this chapter, I explore my own reading of how composers and producers compose the contrapuntal space in digital counterpoint.

The spatialist’s toolbox

Digital counterpoint borrows heavily from recording practice to create contrapuntal space, one of the fundamental elements of digital counterpoint. Traditional musical elements—harmony, form, and texture—do not necessarily carry pre-conceived notions of space and spatialization. These elements exist independent of a physical space until made manifest in performance; however, audio production relies on spatialising sonic objects in a mix. The space of digital counterpoint, contrapuntal space, does not have a pre-defined size or shape. In this respect, digital counterpoint gives composers the option of massaging the space to their liking. The space can take the form of a live performance

11. Johnson, “Classical Audio Recording,” 37.

hall as in a concert, a fixed space like a studio, or an abstract, empty space. The contrapuntal space may take the form of Moore and Dockwray's 'sound box' or as an uncharted wilderness.¹²

Many audio production/engineering textbooks discuss the practical and technical elements of the mixing process.¹³ Tim Warner, in his discussion of space in recorded audio, suggests that there are only two axes: horizontal (left/right), depth, and other "psychoacoustic emulations."¹⁴ Jay Hodgson, in his text on recording practice, offers a more elaborate theory of sonic space. He begins with the notion of space on four dimensions. The first is the '*auditory horizon*' or the proximal point at which sounds appear when fading in, after which they disappear as they fade out. The '*horizontal plane*' refers to the location of the sonic event on the horizontal dimension. The 'horizontal span' refers to the total horizontal width of the mix. This is context sensitive, as not every work employs the full 180-degree stereo separation. The '*proximity plane*' represents depth in the mix, the proximity of the sonic event to the listener. Finally, the '*vertical plane*' is comprised of the horizontal span and proximity plane to affect a sense of verticality. It manifests itself aurally by a sound's position relative to movement on the horizontal span and proximity plane.¹⁵ Hodgson asserts that all stereo mixes exist in these four dimensions. This excludes monaural sound, which uses considerably fewer spatial dimensions. I discuss monaural recording later in the chapter. In the following section, I elaborate on each dimension and how the composer or producer creates the contrapuntal

12. Ruth Dockwray and Allan Moore, "Configuring The Sound-Box 1965-1972," *Popular Music* 29, no. 2 (2010): 181-197.

13. Jason Corey, *Audio Production And Critical Listening: Technical Ear Training* (Burlington, MA: Focal Press, 2010); Tim Dittmar, *Audio Engineering 101: A Beginner's Guide To Music Production* (Burlington, MA: Focal Pres, 2011); Brian Eno, "The Studio As Compositional Tool," in *Audio Culture: Readings In Modern Music*, ed., Christopher Cox and Daniel Warner, 127-130 (New York: Continuum, 2004); Drew McDaniel, Rick Shriver, and Kenneth Collins, *Fundamentals Of Audio Production* (Toronto: Pearson, 2007); Woody Woodhall, *Audio Production And Postproduction* (Burlington, MA: Jones & Bartlett Learning, 2010); Albin Zak, *The Poetics Of Rock: Cutting Tracks, Making Records* (Berkeley, CA: University of California Press, 2001).

14. Warner, *Pop Music*, 102.

15. Jay Hodgson, "Outline For A Theory Of Recording Practice With Reference To The Mix For Pink Floyd's 'Speak To Me' (1973)," *Journal For The Art Of Record Production* 1, no. 1 (2006). <http://www.artofrecordproduction.com/content/view/200/104/>, "'Speak to Me': Mix" (accessed October 29, 2012). Hodgson engages in a protracted discussion of space in "Mixing: The space of communications," in *Understanding Records*, 149-188. I refer to Hodgson's work frequently for his accessible explanations of space, mixing, and recording practice.

space by elements of recording practice. I discuss these techniques only enough to introduce this practice. The primary spatial element of stereo mixing is the horizontal plane. This element liberates the listener and producer alike from the narrow sound space of mono. My discussion of space begins with the horizontal dimension.

Space in the horizontal dimension constitutes a continuum of all points on the left-right axis, a full 180-degree separation in the stereophonic field. The composer or producer adjusts this parameter by manipulating the panoramic potentiometer or ‘pan pot.’

According to Hodgson,

Pan pots split audio signals into left and right channels... Twisting the pot to the left or to the right, however, attenuates the input signal as it passes through the opposite channel. Twisting a pan pot to the left... attenuates the input signal in the right channel, making it sound like the panned track is gradually moving to the left side of the stereo plane; while twisting a pan pot to the right does the opposite.¹⁶

Panning is an aural illusion. If we imagine an object passing from one side of our body to another, it registers more loudly in one ear than the other. As the sound travels, the volume decreases in the first ear with a corresponding volume increase in the other ear. When the object sits directly in front of us, we hear it equally in both ears. Panning in stereo emulates an object’s acoustic energy as it reaches our ears. It is important to position objects on a left-right axis in digital counterpoint to create an illusion of interaction as manifested by dialogues, duets, or ‘physical’ interaction in a theatrical context. Producers use panning in two ways in digital counterpoint. Objects remain fixed in the contrapuntal space or the producer may use dynamic panning to create the illusion of movement in space. Hodgson explains that,

Mixers pan tracks for any number of reasons. Sometimes dynamic panning is done to add motion and interest to a dull and uninteresting mix... Other times, tracks are panned to direct listeners to certain musical events in a mix which might otherwise pass by unnoticed.¹⁷

Space has programmatic implications. When music objects appear at various points in the contrapuntal space, they provide fodder for counterpointed interactions. Panning also provides an element of spatial clarity. One or more musical objects become obscured

16. Ibid., 162-163

17. Ibid.

when they share similar spectral profiles. In recording practice this effect is referred to as ‘masking,’ when two sound objects that share similar spectral profiles inhabit the same location in the sonic field. This occurs when the volume level of one object (the masker) is higher than the other (the maskee). The masker obscures the maskee with the lower volume level. If both masker and maskee share similar volume levels the two may render each other indistinct and form a single object. Separating the objects along the horizontal or proximal dimensions can render the objects distinct by removing the interference of one object masking another.

An adjustment along the horizontal plane is one option for composing space. Proximity is an essential element in the sensation of spatial depth. The proximal plane provides an appearance of depth, the space that defines distance from the listener, back to front. Hodgson notes that proximity is “affected by volume and high-frequency content relative to volume and equalization of tracks nearest to the fore.”¹⁸ Further, “while sounds can be pushed back by making them less bright and more reverberant, they must be balanced by brighter, clear sounds at the front of the mix.”¹⁹ Balancing objects with different spectral profiles creates a relative sensation of depth in the contrapuntal space. Through a careful spatial balance, the composer or producer privileges one object’s proximity over others. For this discussion, I examine three methods of creating the illusion of proximity: equalization, amplitude or volume adjustment, and reverberation.

*Equalization.*²⁰ Adjusting selected frequencies creates a relative position in the contrapuntal space as the objects might sound while positioned in a ‘real’ space. Music objects with more high frequency content appear closer to the listener on the proximal plane than music objects with less high frequency content but more mid- to low-range content. As I examine in my case studies below, Gould and mashup producers do not use equalization (EQ) adjustments to create the effect of dynamic movement in a scene or mashup. Most often, an object’s volume adjustment accounts for the appearance of proximal movement.

18. Ibid., 168.

19. Paul White quoted in Hodgson, *Understanding Records*, 168.

20. I do not present an exhaustive explanation of equalization for creating space but only an introduction sufficient to set up the case study analyses.

Volume. Assuming no simultaneous adjustments of other parameters, changing an audio signal's volume creates the sensation of forward or backward movement on the proximal plane. This method is especially effective for dynamic spatialization. It is most striking when the composer or producer creates the illusion of active movement rather than incremental movement between a work's formal sections. As I discuss later, producers use this method more often to shape abstract space. Volume and equalization are only two methods of creating the sensation of space and positioning a music object in space.

Reverberation simulates “sound created by bounced reflections from room boundaries.”²¹ This implies that the music object inhabits and participates in a live-event, real-world illusion of space. With reverb, we assume that the longer the delay and return of the signal, the larger the space the sound inhabits. Conversely, a shorter delay in reverberation indicates a smaller space. Reverberation also creates a sense of ethereality, otherworldliness, or a dream-like state. The diffuseness of the sound in reverberation detracts from the music object's ‘realness,’ as it appears distant and intangible. Gould used the CBC's plate reverberators for his documentaries, hardware that creates the effect by vibrating a metal plate with a loudspeaker and then capturing the resulting reverberation with a built-in microphone.²² Mashup producers use digital reverberators, computer simulations of sound reverberating in a physical space.²³ Peter Doyle, in his work on echo and reverberation in early popular music and sound recording, explains that reverberation “...sometimes seemed to suggest... something to do with the supernatural.” He clarifies,

Echo and reverberation made it seem as though the music was coming from a somewhere—from inside an enclosed architectural or natural space or ‘out of’ a specific geographic location—and this ‘somewhere’ was often semiotically highly volatile.²⁴

The intangibility of the reverberated space, when applied to a music object, creates a spatial volatility. Questions arise: how did the object come to inhabit that space, how did

21. Hodgson, *Understanding Records*, 171.

22. Lorne Tulk, September 6, 2010.

23. James Moorer, “About This Reverberation Business,” *Computer Music Journal* 3, no. 2 (1979): 13-28. Moorer's article is an early introduction to artificial reverberation via the computer. He outlines formulas to describe algorithmic modeling of certain acoustic properties (room size, shape, etc.).

24. Peter Doyle, *Echo & Reverb: Fabricating Space In Popular Music Recording 1900-1960*, (Middletown, CT: Wesleyan University Press, 2005), 5.

it appear in the first place, and what ‘readings’ does the object support? The reverberation obscures the music object’s purpose and renders its ‘meaning’ unclear. The analyst measures reverberation relative to the surrounding music objects and how it functions relative to simultaneous-sounding music objects or within the context of the larger contrapuntal work.

The sensation of verticality in a mix is a psychoacoustic phenomenon created by simultaneous adjustments of several parameters; there is no ‘vertical’ dial or slider on a mixing console or DAW. The sounds come to the listener from an, essentially, two dimensional source (left and right speakers) but, by judicious equalisation and dynamics processing, appear as a three dimensional space. Verticality manifests itself infrequently in the contrapuntal space but to great effect, and creates the perception of height relative to the listener’s vertical perspective. Like proximity, one measures verticality relative to other music objects in the contrapuntal space. As Hodgson describes,

Sound achieves height in a mix through relational... processing. When [recordists] discuss the vertical plane... of a mix, recordists actually discuss the practice of ‘frequency balancing’... [T]racks with abundant high-frequency content simply seem to occupy a position along the vertical plane located over-and-above tracks with a duller equalization. An electric bass which lacks energy above, say, 2kHz, for instance, sounds like it emanates from an elevation under a synth pad with a high-pass filter set to shelve everything below 2kHz...²⁵

Further, Allan Moore and Ruth Dockwray, in their work on defining and outlining the ‘sound-box’ model of mixing in popular music, affirm the presence of a vertical element.

The vertical placement of a sound cannot be controlled in the same way as depth or lateral placement. The frequency of a sound determines its placement on the vertical plane, with higher frequencies perceived to be placed in the upper zone of the sound-box and lower frequencies occupying the lower section. Among engineers and producers who accept the perceived vertical placement of sounds to be an important aspect of the overall stereo image are George Martin and engineer/producer/writer David Gibson.²⁶

Listeners experience the world aurally in three dimensions. When in public we hear a

25. Hodgson, *Understanding Records*, 185.

26. Ruth Dockwray and Allan Moore, “Configuring The Sound-Box 1965-1972,” *Popular Music* 29, no. 2 (2010), 183.

bird above us in a tree while a loud car drives past at street level. We hear church bells above the chatter of the congregation. By those same principles, the producer or composer creates a similar illusion of verticality in the contrapuntal space. I predicate my discussions of space entirely on the dimensional possibilities of stereo audio production, although monaural sound remains a stalwart element in recording practice. It was the dominant mode of sonic delivery at the beginning of audio capture in the nineteenth-century until the widespread adoption of stereo recording in the 1960s. Producers still reference their stereo mixes to mono to ensure compatibility; many tabletop radio sets still use only one speaker. In the next portion of the chapter, I discuss the spatial qualities of mono.

Space in monaural sound

Glenn Gould produced *The Idea of North* entirely in mono in 1967. The CBC did not launch their stereo network until the early 1970s, so mono was the dominant sound for the radio broadcast medium. Although a stalwart of audio production for several decades, mono sound has several limitations relative to its ‘stereo’ sibling, yet it also presents the producer and composer with many compositional opportunities. As Doyle observes,

The lack of left-right axis in mono sound reproduction has been typically seen as a limitation to the fabrication of spatiality, and mono sound in general seen as a manifestly primitive precursor to stereo sound. At the same time, however, certain moments in late mono spatiality might be seen as highly deterritorialized... answered by stereo’s rigidly territorializing fixity. The absence of left-right variable axis, rather than being a limitation, might in fact provide an inherent counterterritorializing tendency. Mono spatiality is, in a sense, “unmappable,” providing a potentially wilder, uncharted sound ecology.²⁷

Doyle only references the horizontal dimension and does not mention the proximal element of mono. The only other spatial elements of mono are ‘*presence*,’ how present a music object is in a scene or musical work, and ‘*time*,’ how the events and interactions in the contrapuntal space unfold in the temporal dimension. Doyle asserts that the pressures of recreating a real-world event in three-dimensional space do not apply to mono sound. I contend that mono is the ideal medium to create abstract, undefined space. Indeed, when

27. Doyle, *Echo & Reverb*, 25.

all sounds appear directly in front of the listener, it is difficult to map an object's location in the contrapuntal space without reference to another object. One of the works I examine later in a case study challenges the practical limits of composing the contrapuntal space in mono.

In the remaining half of this chapter, I devote my discussion to three categories of space. I first discuss the notion of an undefined, *abstract space* that runs counter to the 'sound-box' idea. The abstract contrapuntal space has no mappable boundaries or chartable territory. It is elastic and exists only as long as there are music objects to inhabit and interact within it. *Live space* characterizes the image of a live event, the illusion of a past-tense aural narrative. Though the space maintains the illusion of a performance, the actual interactions of music objects could never transpire as a real-world interaction. Music exists in time, *time space*. The interactions of music objects in the time space unfold and progress in a temporal dimension. I outline two treatments of time space. Calendar time collapses as music objects of different eras come together. When the producer highlights the temporal difference, the result sometimes indicates an element of reverence for the older work or artist. The following discussion focuses on abstract space to elaborate on the wilderness of mono and the spatial territory of stereo.

Abstract space

Abstract space has no fixed boundaries or pre-conceived spatial models. It exists dynamically, shaped, and reshaped during the mixing progress as the work progresses. I suggest that the abstract contrapuntal space is elastic, constructed from the inside and pushed outward to extend only as far as required to contain all the music objects. As the objects move through the contrapuntal space, the shape of the space itself morphs. As the producer removes the music objects, the abstract space retracts until it returns to the state of an empty void, a 'potential space.'

I draw from Glenn Gould's contrapuntal radio documentaries—*The Idea of North* (1967), *The Latecomers* (1969), and *Stokowski: A Portrait For Radio* (1971)—to examine both mono and stereo in the following case studies. They each push the boundaries of the contrapuntal space. The content is primarily speech but my analyses focus on how Gould

uses space. I discussed semantics in the context of harmony in Chapter Two, and will discuss it again as it relates to space.

Case study no. 1: *The Idea of North*, prologue

Gould and his technician Lorne Tulk developed contrapuntal radio techniques to produce the ambitious *Idea of North*. Gould conceptualized the documentary as having musical underpinnings (based in counterpoint) but also adding theatrical elements of dialogue. The prologue with its three overlapping voices was Canada's introduction to contrapuntal radio (see Figure 2.1 in Chapter Two).

Mono sound presents a challenge when describing Gould's production of space. Tulk provides a clue in his graph as he correlates volume level with time. The volume adjustments create not just the characters' presence in the scene, but also their proximity as the voices appear to move to the fore and then back behind the other voices or disappear altogether (Figure 4.3). An inversion of Tulk's graph gives an approximation of the proximal movement of the voices in the contrapuntal space.

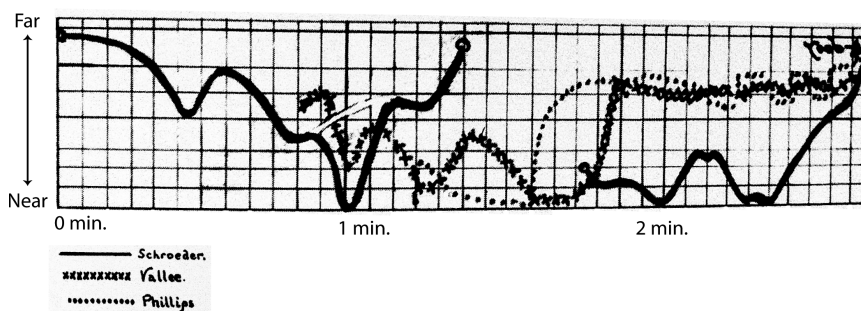


Figure 4.3 Inversion of Lorne Tulk's *Idea of North* prologue graph to illustrate proximity to the listener.

The frequency content of the voices does not change despite increases and decreases in volume. Tulk and Gould did not use equalization as the primary means of creating the illusion of space. The original quality of the voices was essential to remaining faithful to the interviewees' responses. Gould relied on the natural timbre, the spectral content of each voice, for experiments in texture later in the documentary. The voices of Schroeder, Vallee, and Phillips, who appear in the prologue, present a significant timbral variety in

addition to their unique vocal rhythms and cadences. Cumulatively, the various combinations of their voices permit Gould to play with compound sonorities.

There is a clear proximal divide as the voices converge at 3” at the -10 V.U. range, and as Gould’s spoken introduction enters at -3 V.U. It is difficult to quantify that proximal distance in this scene, as all the objects are in motion on the proximal plane. The prologue transpires in a dark wilderness without a pre-defined contrapuntal space. Rather, the voices emerge from a blank sonic canvas, move forward, retreat, and trade off their respective roles as the dominant voice. The next case study examines a significantly more ambitious exercise in exploiting mono contrapuntal space.

Case study no. 2: *The Idea of North*, ‘dining car scene’

Gould likely conceived *North* in five theatrical ‘scenes’ in order to explain the work’s extended form and to provide a dramatic premise for each scene. The ‘dining car’ scene includes four of the documentary’s characters, the train basso continuo, and other sound effects (including flatware clinking on plates, ice clinking in glasses, and background chatter). The basso continuo and the sound effects conjure the image of a train dining car; however, the listener does not have any indication as to the size of the car. Additionally the voices, again, would inhabit an abstract space were it not for the train and sounds of dining accoutrements. As the scene unfolds, the voices fade in and fade out as the listener, acting as a train attendant, moves back and forth between ‘conversations’ (Figure. 4.4).

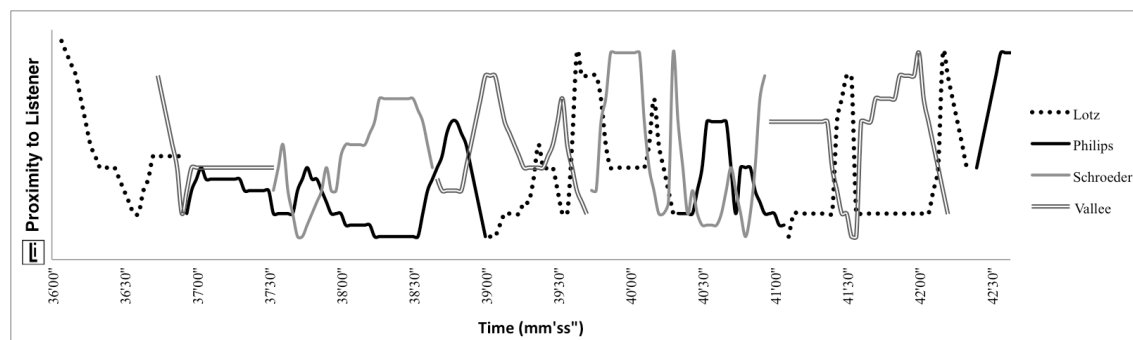


Figure 4.4 Proximity in the ‘dining car’ scene in *The Idea of North*.

Gould divides the scene into two conversations with Phillips and Lotz engaged in chat, with Schroeder and Vallee paired off in their own conversation. As Phillips finishes speaking, Lotz picks up the thread immediately. Schroeder and Vallee's conversation follows the same binary form. Throughout the scene, Gould maintains two voices running simultaneously. The volume adjustments between the two voices run in polar opposites. As one speaker's voice comes to the forefront, the other voice retreats to the back. There is an equal but opposite reaction. At times, as one voice maintains a presence far in the background, Gould changes voices in the forefront conversation.²⁸

The complex construction of contrapuntal space in this scene threatens to surpass the capacity of mono sound. The voices inhabit only a simulation of a dining car. If one removes the train continuo and accompanying sound effects, the characters' voices still behave as they do in the prologue, in a shapeless void. At the end of the scene, the space returns to its original state as the blank canvas. Working within the confines of the monaural sound palette, Gould confronted a series of compositional challenges. Later, the CBC's stereo radio network afforded Gould and Tulk the opportunity to compose a full four-dimensional contrapuntal space with height, width, depth, and time.

Case study no. 3: *The Latecomers*, 'preacher scene'

The CBC commissioned *The Latecomers* to celebrate the 1969 launch of three regional stereo broadcast locations. The work exploited full 180-degree stereo separation and dynamic use of the horizontal and proximal dimensions. This was not a new production technique, but it provided Gould with the ability to explore the programmatic possibilities of the stereo space. Stereo was a significant progression toward Gould's aesthetic ideal specifically because it offered possibilities for a broader contrapuntal space.

28. Without any production notes or diagrams to guide my graph of proximity, I developed my own measure of depth on a scale of one to ten; one is the closest to the fore and ten, the farthest from the listener, after which the voice disappears entirely. I listened to the scene several times to determine which voice appeared closest to the background. Conversely, I followed the same process for determining the voice that came closest to the fore. These two points became my 'markers' against which I measured proximity in the 'dining car.'

A notable scene employs a clear vertical dimension. A United Church minister, Lester Burry, speaks reverentially of life in Newfoundland, and its resilient residents. Gould sought to stratify the preacher both morally and physically (Figure 4.5).

LT: [Gould] was trying to make what [Burry] was saying more ethereal. He wanted it to be 'up'... in the heavens and make it more ethereal because [Burry] is talking about spiritual things. So Glenn wanted it to be more up there, above us... the reverberation might give it that effect and [Glenn] loved it.

AC: With the preacher and reverb there really is a sense of verticality.

LT: Yes, that's exactly what we were after... What we were really discussing was making something vertical.²⁹

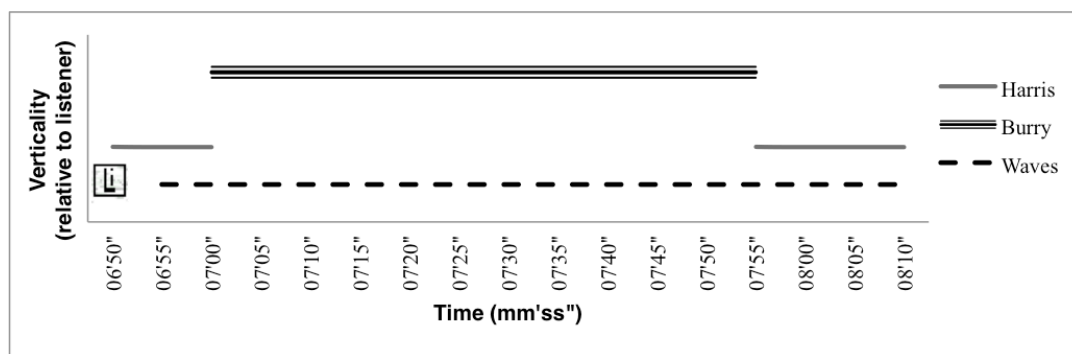


Figure 4.5 Verticality between Burry, Harris, and continuo in *The Latecomers*.

The diffuse high-frequency content of Burry's reverberant speech appears higher in the vertical dimension relative to Harris, the documentary's narrator, and the 'ocean wave' continuo. The reverb also alludes to the large space of a church sanctuary with the preacher nestled in the elevated pulpit. The illusion of this contrapuntal space suffers from twofold confusion. The ocean waves suggest the listener is in close proximity to the ocean. Given the listener's supposed location in a church, being close to the ocean simultaneously is unlikely. The reverb effect applied to Burry's voice does not appear confined in a fixed space as in a church, but in a reverberant space of an undefined size. As in *The Idea of North*, if Gould removes the continuo the reverberation applied to Burry's voice shimmers as a sonic halo, perhaps also as a spiritual presence.

29. Lorne Tulk, September 6, 2010.

Case study no. 4 - *The Latecomers*, epilogue

The *Latecomers* epilogue is a complex work simply because of the larger number of music objects in the stereo contrapuntal space. The scene transpires over 180 seconds, one second for each degree of separation in the stereo left-right axis (Figure 4.6). The continuo of ocean waves, panned to the centre channel, creates the illusion of a coastal geography in the contrapuntal space.

The dynamic use of space in the epilogue is surprisingly active relative to the spatial stasis or limited spatial movement in other scenes in *The Latecomers*. Harris, the narrator, appears panned hard right. His music object traverses the stereo field left to right over the course of the scene. His phrase, “I drive out over the road and I’m glad the road is there,” initiates the scene. The reference to the ‘road’ serves to reinforce the contrapuntal space as geography and his movement through the space. As Harris traverses the horizontal span the other documentary characters appear at regular intervals, panned hard left. They fade in and Tulk pans them quickly to the right through the complete horizontal span before they fade out at the far right.³⁰ Harris’ final phrase marks the scene’s end. Tulk increases the ocean volume level and pans it to both left and right channels before eventually fading out.

Tulk’s graph illustrates the horizontal movement over time but does not indicate adjustments of other parameters, notably volume. As Harris enters the scene, Tulk increases his volume, creating the impression of moving him closer to the fore. Harris’ volume level remains static until ten seconds before the end of the scene. In the final moments, Tulk decreases Harris’ volume and fades him out of the scene. While panning the other characters across the scene, Tulk simultaneously increases and decreases their volume level. This creates the illusion of forward and backward movement (Figure 4.7).

30. Lorne Tulk, interviewed by author, Toronto, ON, February 3, 2011. Tulk related the anecdote that Gould, in an uncharacteristically dark program, suggested that the characters have their ‘final say’ before walking into the ocean at the end of their trip across the stereo field.

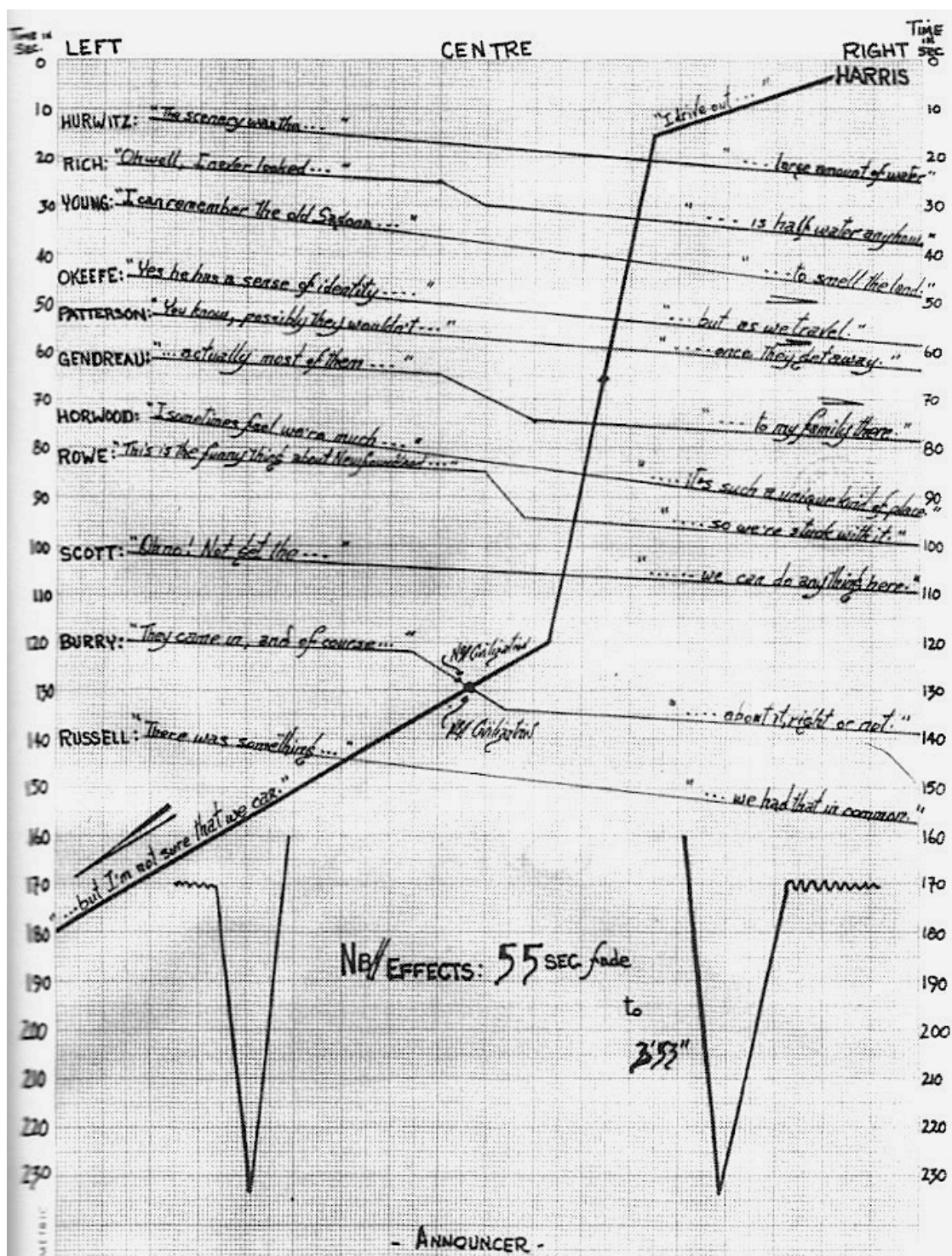


Figure 4.6 Lorne Tulk's illustration of *The Latecomers* epilogue.³¹

31. Glenn Gould Collection (Ottawa: Library and Archives Canada, [1970] 2010). MUS 109 2/5 40, 4.

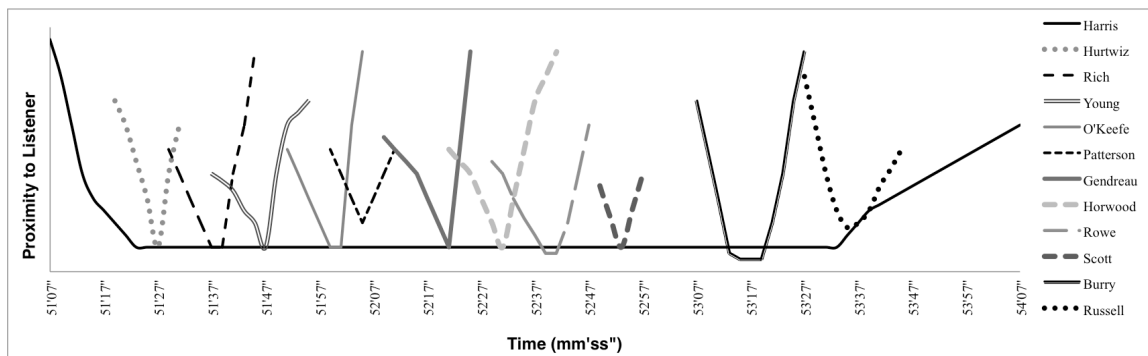


Figure 4.7 Map of proximity in *The Latecomers* epilogue.

The proximal movement creates a series of interactions between Hurtwiz and the documentary's characters. Semantically, only one character's interaction carries any relevance. As Lester Burry intersects with Harris at 2'10" they exchange at the crossover, "civilization." Shortly thereafter Burry finishes his journey through the scene to the right and fades out.

I draw my examples of abstract contrapuntal space entirely from Gould's contrapuntal radio work, as they involve both mono and stereo sound. By contrast, mashups contain examples of hybrid live-abstract spaces. At times music objects behave as though positioned in an elastic abstract contrapuntal space while other elements in the same work occupy a static space as in a live event. In the next portion of this chapter, I present analyses of the second spatial category: the simulation of a 'never was' live-performance.

Live space

Distinct from the abstract contrapuntal space is the simulation of 'live space' or the simulacrum of live-performance in a contrapuntal space. Albin Zak characterizes this spatial category as recreating the image of the ideal live-performance. The mashup 'takes place' entirely *post facto* in a software application, where a live performance is impossible. The mashup producer cannot recreate a live performance but only simulate one. Music objects come to occupy positions in the contrapuntal space and share similar spatial and sonic characteristics with a traditional studio or concert recording. Common mixing and spatialization techniques from recording practice inform the creation of contrapuntal space in the live-space category.

Pre-spatialized parent samples sometimes hinder the construction of contrapuntal space, as the contents of the samples are already spatialized. Ideally, the producer isolates a sample from its original work with no trace of ambient space by way of dynamics processing (equalization, noise gates, etc.). This renders the task of creating contrapuntal space, the illusion of live performance, less troublesome. The increasing availability of multitrack audio ‘stems’ from various artists gives the composer access to raw audio. By sidestepping the process of sample extraction, the producer acquires clean samples without undesirable sonic artifacts from the original mix. The composer creates interactions of musical objects in bringing together parents samples from disparate eras, stylistic and harmonic idioms, and aesthetic sensibilities.

With all the necessary components in place—music objects in the contrapuntal space—I subdivide the live space into four performance types: the imaginary live-concert performance; the image of a ‘never was’ recording studio session; a performance of the otherworldly or ethereal; and a performance of one’s personal or inner space. The third and fourth divisions qualify as hybrid live-abstract because they both use music objects that do not behave as they would in a real-world scenario. The music objects move dynamically through the contrapuntal space in ways not possible in live performance; similarly, effects processing creates sonic elements not readily reproducible in a real-world event. My first case study examines the simulation of a real-world concert performance. While the concert event is real, many segments of this work did not transpire at the same time. These operate as ‘embellishments’ of the live performance.

**Case study no. 1: Imaginary live-event concert performance
DJ Zebra, “With A Little Help From Soulwax,” (2009)**

“With a little help from Soulwax” comes from DJ Zebra’s 2009 album *Bootstock*. She produced the mashups with samples acquired from the 1969 Woodstock concert performances. Zebra counterpoints Joe Cocker’s performance of “With A Little Help From My Friends” with Queen’s “We Will Rock You” (1977). The track also includes an original drum track by DJ Soulwax. This technically disqualifies the work as a mashup but Zebra follows digital counterpoint technique nonetheless. I present the track here for its unusual treatment of the ‘concert experience’ in the contrapuntal space.

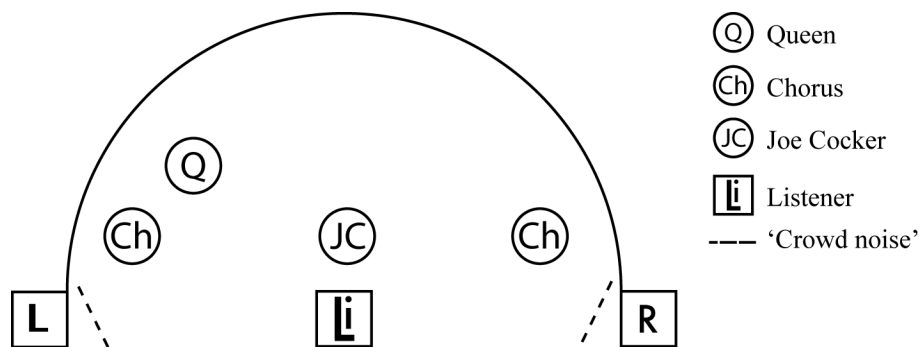


Figure 4.8 Map of space in DJ Zebra's "With A Little Help From Soulwax"

Zebra defines the contrapuntal space by including audience noise from the original concert recording (Figure 4.8). She chooses to keep the extraneous voices and transients from the amplifiers picked up by Cocker's microphone. Though the audience appears panned hard left and right. Their volume level suggests their location in the distance, though this is common in concert recordings. A low volume level and high-cut filter may be responsible for this. Cocker stands in close proximity to the listener at the microphone. Zebra positions Queen's chorus "We Will Rock You" slightly back and to the left of Cocker for their brief appearance at the beginning of the work. Likely, Zebra moved Queen back on the proximal plane by decreasing the volume level and panning their object to the left. The opening guitar riff appears to accompany Queen's chorus vocals. Combined with the ambient noise from the concert, Queen appears to participate in the live performance. The female chorus, original to the Woodstock performance, appears panned hard left and right of Cocker and at the same position in the proximal place as Queen. Zebra extracts the female chorus object from the original recording if only to adjust the chorus's position along the horizontal plane to provide a balance in the contrapuntal space.

Creating and maintaining a simulated space of a live-concert performance is problematic given the number of spatial variables already embedded in the individual music objects used. This includes transient noise from the concert venue, varying levels of audio fidelity between samples, and conflicting spectral profiles of the music objects. These factors betray the illusion that those objects are participating in the same event. Works in the second spatial division, the never-was studio recording, contain as many spatial variables. Most mashups fall under this spatial sub-category.

**Case study no. 2 - The ‘never was’ recording studio session
“Downtown Murder,” DJ Clivester**

Clivester’s mashup provides a compelling example of successful establishment of contrapuntal space, as the extracted samples of Clark’s vocals are sufficiently ‘clean’ to create the illusion of real-world performance collaboration.

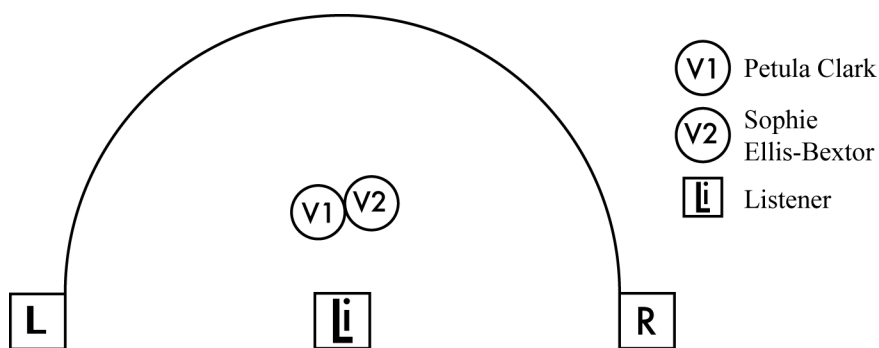


Figure 4.9 Map of space in DJ Clivester's “Downtown Murder”

Clivester isolates Clark’s vocals from “Downtown.” Ellis-Bextor’s work maintains its original spatial mix in the new contrapuntal space. There is little to no additional spatialization applied to Bextor’s work, as it is already mixed. Clark’s placement, immediately to Bextor’s left, is the illusion. Clivester retains the mild vocal reverberation from the original “Downtown” recording but enhances the high-frequency content to ‘brighten’ Clark’s sound, which creates a ‘newer’ sound. In effect, Clivester positions Clark’s body in Ellis-Bextor’s sound world.

**Case study no. 3: Otherworldliness and ethereality
DJ Earworm, “L’eau De Rose”**

Earworm combines the titles of the constituent tracks—Louis Armstrong’s performance of “Le Vie En Rose” (1950) and Air’s “*J’ai dormi sous l’eau*” (1997) to form his work’s title. He constructs his contrapuntal space to simulate the diffuse and ‘dreamy’ experience of listening to music underwater. With this technique, object edges appear blurred and details, softened. My analysis examines the introduction, where the bulk of spatialization and effects processing occurs. The song’s introduction is 1’44” long. Air’s soft synth pads establish a shimmery, adult contemporary aesthetic. The pads appear in

close proximity to the listener though depth is difficult to gauge without other objects in the contrapuntal space.

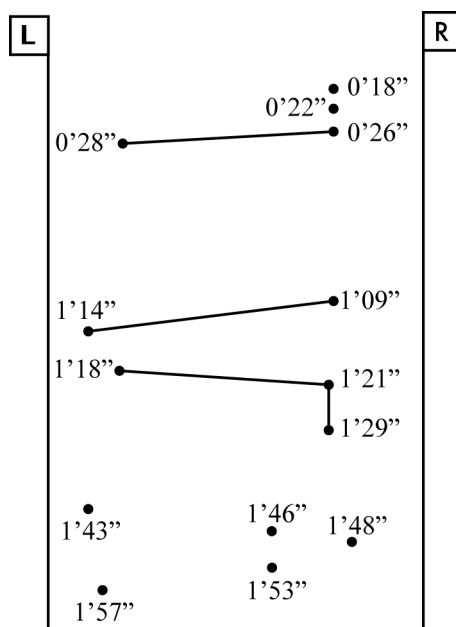


Figure 4.10 Map of piano entries along the horizontal span in the introduction to Earworm's "L'eau De Rose"

The lower volume level relative to the synth pads in tandem with a high- and low-cut filter pushes the piano backward behind the synths. The rapidly ascending scalar figures appear at various locations on the horizontal plane (Figure 4.10). Timings that appear as single points represent a short ascending glissando. Lines that connect points indicate a series of ascending chord inversions moving horizontally through space. There is a significant amount of movement along the horizontal plane in a relatively short time.

Earworm positions the trumpet and the piano in approximately the same position on the proximal plane. The volume level is, again, lower than the synth pads and emphasizes the mid-range frequency of the trumpet. The effect gives the impression of the sound of acoustic gramophone recordings. Heavy reverberation on the trumpet dulls the fine details of the attack and 'brassy brightness.' The trumpet part lasts for 1'06" and Earworm pans it from the mid-left of the space to just right of centre (Figure 4.11). The trumpet and piano parts behave independently of each other and often cross paths in the contrapuntal space.

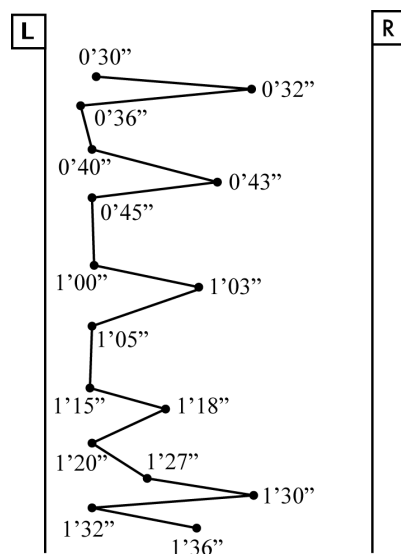


Figure 4.11 Horizontal movement of the trumpet sample in the “L'eau De Rose” introduction

Ethereality and abstract space manifest themselves in this work via the reverb processing, equalization, and dynamic spatialization of Armstrong’s music objects. Earworm maintains the illusion of a live performance even when the contrapuntal space is undefined because of the heavy reverberation. “L’eau De Rose” provides a compelling example of a work grounded in both abstract and live contrapuntal spaces. My next analysis explores live-performance contrapuntal space where one of four objects displays elements of ethereality and participation in an abstract space.

Case study no. 4: Personal space DJ Earworm, “No One Takes Your Freedom”

By personal space, I mean a series of interactions that occur external to a character/singer as in dialogue with the listener’s ‘inner voice.’ The music objects’ proximity to the listener maintains an inverse relationship between internal and external relationships. A music object positioned closer to the foreground constitutes a close external interaction as an interpersonal interaction; objects positioned in a relative middle ground constitute the inner dialogue, ‘speaking’ to one’s self. Objects positioned at the back of the proximal plane evoke the specter of an external voice if only for their proximal distance from the listener. The imagined external voice may be a spouse, or a friend. This form of space depends largely on semantic content and the lyric use of personal pronouns like “I, you,

we, me,” determine the effect of ‘personal space.’ This also leads to a discussion of programmatic content that I cover in the next chapter, particularly as it relates to this case study.

Earworm counterpoints several objects in his contrapuntal space: The Beatles’ “For No One,” Scissor Sisters’ “Take Your Mama,” George Michael’s “Freedom 90,” and Aretha Franklin’s “Think.” These artists participate in the illusory personal space (Figure 4.12).

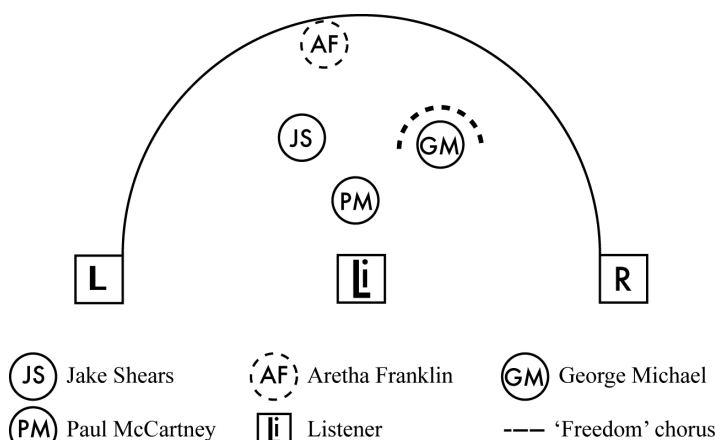


Figure 4.12 Map of contrapuntal space in DJ Earworm's “No One Takes Your Freedom”

The Scissor Sisters’ vocal object counterpoints Paul McCartney’s piano object. Earworm treats both to a low-cut filter, the volume of mid-range frequencies lowered, and leaves their high frequency range unadjusted. In the absence of another object in the contrapuntal space, locating Jake Shears’ position on the proximal plane is difficult. Later, McCartney’s voice contains more middle- and low-frequency content but Earworm raises McCartney’s volume level to bring his object forward in the space. As a result, McCartney appears as an external dialogue participant. Jake Shears (Scissor Sisters) becomes the figment of the ‘inner voice.’ George Michael appears in the contrapuntal space parallel to Shears on the proximal plane. Earworm applies a low-cut filter to ‘thin’ Michael’s sound and, consequently pushes Michael backward to act as an inner voice. The objects I discuss here remain static in the contrapuntal space. Aretha Franklin’s object, represented by the dashed-line circle, carries less high and low frequency content, a lower volume level, and carries a heavy reverberation. With these parameters, Earworm positions Franklin behind both Shears and Michael in the contrapuntal space. She does

not appear as a ‘solid’ participant. Rather, the reverb diffuses Franklin’s voice to create an otherworldly effect.

Abstract and live space and the combination of the two comprise the majority of spatial relations in digital counterpoint. Time space, a temporal geography, underlies both the abstract and live spaces. I devote the remaining portion of this chapter to time as a compositional element of digital counterpoint technique.

Time as space

In digital counterpoint, time and temporality constitute spatial dimensions. Music does not exist in stasis, frozen and unmoving. Music objects move and interact through the temporal space. Digital counterpoint incorporates time in contrapuntal space by two methods. As listeners move forward in time, they frequently look backward in the temporal geography; that is, as time progresses, it leaves open a ‘space,’ a geography. The producer or composer condenses time by bringing together artists or recordings from multiple eras. In effect, the creator collapses time for all objects to participate in a new temporal space.

I emphasize here that I do not indulge in the clichéd notion of moving inexorably forward through time, but do not deny that time is a fundamental basis for all musics. As contrapuntal space unfolds in the temporal geography, a music object leaves a path in its wake. Through these paths, we gaze at past events. We cannot see the distant past but the past as far as the beginning of the work. This relates directly to ‘repeatability.’ The whole work is repeatable *ad infinitum* but digital counterpoint works contain samples derived from extant recordings. As producers and composers extract samples from source works, they rupture the temporal continuity of the original works. The music objects, as samples, represent snapshots of past-tense aural narratives; the sample is a self-contained temporal geography. With every sample repetition, we view snapshots of the past even as we move forward in the time space.

Digital counterpoint offers another engagement with time as a spatial dimension. When composers or producers extract music objects from works originating in different eras they pull them from their own temporal space. By assembling them in the contrapuntal

space, the objects participate in a new temporal space and in a new, perhaps foreign, musical style. This technique collapses the temporal distance between music objects. In effect, the objects appear to collaborate in the same recording or performance.

Alternatively, the space of collapsed time can also function as a form of reverence to *highlight* the temporal distance. In this scenario, the producer or composer uses one object to pay homage to another object in the contrapuntal space. I draw my examinations of temporal geography and time space from three case studies: two from the mashup repertoire and one from Gould's documentary about Leopold Stokowski.

Case study no. 1: Collapsed time

I use the three works below (Table 4.1) to illustrate the concept of collapsed time space. In each, the current artists, DJs in this instance, pull together music objects from each artist in different eras. The distances between artists varied by track. Thirty-six years separate Petula Clark and Sophie Ellis-Bextor, and Louis Armstrong stands forty-seven years before Air. The distance between the older music object and the new work is longer still.

Title of work	Artist	Year
“Downtown Murder”	DJ Clivester	2008
“Downtown”	Petula Clark	1965
“Murder on a Dancefloor”	Sophie Ellis-Bextor	2001
“L’eau De Rose”	DJ Earworm	2007
“La Vie En Rose”	Louis Armstrong	1950
“J’ai Dormi Sous L’eau”	Air	1997
“With A Little Help From Soulwax”	DJ Zebra	2009
“Help From My Friends”	Joe Cocker	1969
“We Will Rock You”	Queen	1997
<i>Original drum track</i>	DJ Soulwax	2009

Table 4.2 Mashups, displayed in bold, along with their source works culled from different eras.

DJs Clivester, Earworm, and Zebra collapse the temporal distance between the artists from their respective eras. Clivester positions Clark and Ellis-Bextor in the contemporary space with little deference to Clark's canonization in English pop music. Earworm places Louis Armstrong's collaboration with Air such that he backgrounds the older object for

spatial effects. Cocker is the central figure in Zebra's work. Queen, the newer artist, plays the proverbial second fiddle to Cocker's vocals.

Case study no. 2: Reverential time space

In Gould's documentary, *Stokowski: A Portrait For Radio*, the conductor muses about his long-running career. His voice object, positioned slightly right of centre on the horizontal span, is close to the foreground on the proximal plane. Gould and Tulk engineer a kind of reverential treatment of time by manipulation of two music objects in the contrapuntal space. Stokowski relates his experiences with early acoustic and, later in the late 1920s, electric recording processes and technologies. He complains that the first efforts were sub-par, but over time, the quality and audio fidelity improve. At the end of this anecdote, he expresses his optimism for future technologies.

Gould discovered two of Stokowski's recordings of the same piece, the "Good Friday Spell" from act three of Richard Wagner's opera *Parsifal*.³² He used these recordings for his basso continuo in this scene and noted that the recordings came from early and later in the conductor's career: the first, a 1936 mono recording on a shellac phonograph disc and the latter, a 1958 stereo recording on vinyl LP. In an instance of serendipity, the two recordings coincided note for note for forty-five seconds.

We found... that they ran almost note for note in tempo for forty-five seconds... [T]here were a few places where some interesting suspensions resulted, but... in the crucial seconds where we needed them, they ran together.³³

In constructing the abstract contrapuntal space, Tulk positions the 1936 musical object with its limited frequency content and shellac surface noise to the extreme left of the horizontal span. Slowly, he pans the '36 object to the extreme right (Figure 4.13). As we hear the old recording in the left, we hear traces of the new recording in the right.

32. Richard Wagner, "Good Friday Spell," Philadelphia Orchestra. RCA Victor 14728, 1936; "Good Friday Spell," Houston Symphony Orchestra. Everest SDBR 3031, 1958.

33. Gould, "Radio As Music," 386.

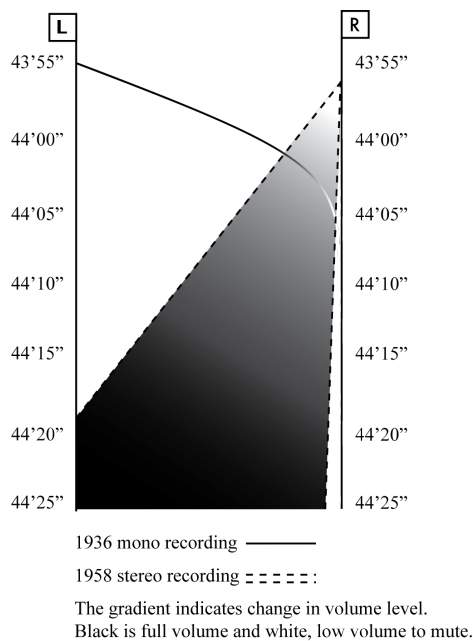


Figure 4.13 “Good Friday Spell” stereo transition from *Stokowski: A portrait for radio* illustrating panning and volume adjustments.

Gould sought a seamless transition from the older recording to the newer recording. Gradually, Tulk raises the volume level of the new recording while he pans the old recording and lowers its volume level. As the old recording finishes its movement to the right, Tulk continues raising the volume level of the '58 recording and pans it left to achieve the full stereo spread. The time warp transpires in 30 seconds. By Gould's explanation,

It sounds rather as though... the orchestra and the technicians were reaching out toward a new technological ideal and not quite making it. At this moment Stokowski said, ‘It is much better today, but I think it can still be much better than it is today’—and that’s what gets him back to the present.³⁴

The transition in space from one recording to the other illustrates progress in recording technologies. Stokowski's speech with the recordings gives the impression of a reverence for the valiant, if crude, effort of the early recording. The very techniques Gould and Tulk use in this scene—adjustments in panning and volume—create the perception of space on the proximal plane as in their previous radio works. The successful illusion of contrapuntal space also depends on how the listener experiences the works, the ‘delivery

34. Ibid.

vehicle' that gets them into the space. I devote the next and last portion of this chapter to examining how the listener experiences the creative byproduct of digital counterpoint technique in the contrapuntal space.

The listening experience

The relation of the listener's spatial position to the sound source creates the illusion of contrapuntal space. The position and 'audio fidelity' of the delivery mechanism, the sound source, also shapes the listener's experience of space. I explore two vehicles for transmitting contrapuntal space and exploring interactions in that space. While working in a recording studio the composer or producer may opt to use loud speakers and monitors to give the impression of a true separation between the right and left. For so-called bedroom producers working with their personal computer and headphones, the experience of contrapuntal space becomes fully immersive. In the next portion of this chapter, I examine the studio monitor or loudspeaker as the delivery vehicle for digital counterpoint.

Studio monitors

The loudspeakers in professional studios are the primary medium through which producers hear and experience the performance during the recording process (whether through studio recording or live-event performance). The producer or composer relies on studio monitors—selected for their 'balanced' representation of the audible frequency spectrum—to hear the mix as they adjust the various parameters. Monitor placement in the studio emphasizes the stereo separation between left and right. There is usually a single speaker for monaural mixing placed centrally on the mixing console. The separation is crucial to the mixing process for the producer to 'hear' the sample's location in the sonic space. Though studio monitors are appropriate for creating original recorded performances, the problem arises as to whether or not composers working with digital counterpoint use a similar studio setup. As Gould and Tulk worked on *The Idea of North* and *The Latecomers* at the CBC, they used studio loudspeakers to monitor the editing and mixing process. Further, in a letter to an American listener, Gould suggests,

'The Latecomers' makes use of the widest possible stereo screen - particularly in the prologue and epilogue segments and, because of the

rather complex vocal counterpoint involved, is heard to best advantage with speakers set as far apart as possible.³⁵

The speaker separation is essential to get the full effect of Gould's spatial experiments in *The Latecomers*; however, *North*, produced in mono, does not require any special speaker arrangement to perceive the sensation of space. The sound comes from straight ahead. Additionally, listening to the contrapuntal space of Gould's work with loudspeakers is appropriate if only because the works originated from studios with loudspeakers for playback. The studio monitor is not the ideal vehicle for experiencing digital counterpoint. The studio monitor, as a tool for conceptualizing space in recording an original work, is effective for creating these contrapuntal works. Producers design and construct their studios to eliminate extraneous noise. In these rooms, there is little to no interference to disrupt the sound between the monitor and the producer's ears. This is an issue particular to the mashup 'bedroom producer' using a personal computer, DAW software, and stereo headphones.³⁶ For the home listener, acoustic conditions may be less than ideal. The distance between the loudspeaker and the listener's ear allows extraneous ambient noise to interfere with the perception of contrapuntal space. As the listener reduces the distance between the sound source and the ear, they reduce sonic interference. As the distance decreases, the immersive experience becomes deeper.

Headphones or earbuds

The digital personal media player (PMP) and the accompanying earbuds or headphones are a significant development in how listeners consume audio. The battery-powered PMP breaks the physical tether to large, non-portable sound systems. The ability to transfer digital music files directly from a personal computer to the PMP's internal storage sidesteps the need for external storage media for audio data (tape or compact disc). Further, the compact form of the PMP in tandem with the small earbuds renders the device 'transparent' and away from the user's consciousness. The earbuds project the illusion of the contrapuntal space directly into the listener's ears. "As careful listening and a good pair of headphones will reveal, the use of the stereo field can add depth to a

35. Glenn Gould, Letter to Gail Stockholm, April 24, 1972 (Ottawa: Library and Archives Canada), MUS 109/32 13, 20.

36. Roseman, *Audio Mash-Up Construction*, 25

recording, both physically and expressively.”³⁷ Here, Arved Ashby, in his work on mechanical sound reproduction, does not refer to the personal media player or digital music specifically, but abstractly to the experience of listening to recorded music via headphones. Ashby’s ‘good pair of headphones’ invokes Marshall McLuhan. McLuhan makes a case for technologies as extensions of the central nervous system.³⁸ The wheel is an extension of the foot, enabling faster travel along further distances; garden sheers extend the hand and arms and enable the body to tidily cut and shape unwieldy hedges, etc. The technological medium, McLuhan argues, becomes a prosthetic that is external, but no less a part of the body than one’s own anatomy. What, then, can we say of the earbuds? Ashby argues,

If [McLuhan] had lived to experience the iPod, he probably would have seen it as a kind of... implantation of musical literacy. The trademark iPod earbuds would be symbolic here: actually penetrating into the ear canal, they reduce to less than zero the distance between reproduction and ear.³⁹

The proximity of the headphone driver to the eardrum membrane, coupled with the PMP’s volume output capacity (>100 db), carries the capability to privilege its own sonic content to the exclusion of all other external aural stimuli. The earbud and PMP becomes an extension of the auditory system or, perhaps disturbingly, a temporary *replacement* for the auditory system. When the PMP stands in for the auditory system, the audio content creates the immersive sound world; this contradicts the listener’s perception of the aural scene produced by his/her immediate physical environment. The recorded work, as a past-tense narrative, supplants the local experience and unfolding future. Journalist Paul Farhi comments on the iPod phenomenon, “The eyes flicker with consciousness, but they don’t *see*. *They’re somewhere else*.”⁴⁰ They inhabit, however temporarily, the illusion of a musical space, or, in the case of digital counterpoint, the contrapuntal space.

37. Ashby, *Absolute Music*, 50. By “good pair of earphones,” Ashby presumably refers to headphones with a relatively even response curve as opposed to the bargain bin headphones with weak bass response, heavy mid-range, and poor reproduction of high frequency content.

38. Marshall McLuhan, *Understanding Media: The Extensions Of Man* (Toronto: University of Toronto Press, 1964), 19-20.

39. Ashby, *Absolute Music*, 174. McLuhan’s comment about audio reproduction in the mid-twentieth-century was less comprehensive, “Tape and the l.p. record... made the phonograph a means of access to all the music and speech of the world.” McLuhan, *Understanding Media*, 243.

40. Paul Farhi quoted in Katz, *Capturing Sound*, 21. Original emphasis.

Again, I reiterate the difference between studio works and works composed in digital counterpoint; producers and composers create the space by the same techniques. However, unlike in original studio albums, the composer or producer working with digital counterpoint technique does not create original material. They pull together samples, music objects from a variety of sources and determine the best way to counterpoint them in the sonic space. The composer or producer creates the illusion of contrapuntal space via the DAW, personal computer, access to high quality audio samples, and a surplus of time, technique, and intuitive artistry. The result is a sound world that maintains the illusion of a live performance (in the case of the mashup) or, in contrapuntal radio, a fantastical space in an unknown geography or undefined space.

Chapter Summary

In this chapter, I argue for the notion of ‘space’ as an element of contrapuntal composition. I regard contrapuntal space as a significant contribution to this study and the first significant augmentation of traditional counterpoint for a new medium. However, the new medium also necessitates a new mode of reception. The personal media player provides the ideal immersive vehicle for the listener to experience the illusion of contrapuntal space. My discussion of space provides a context for how the listener experiences the space, and how the producer or composer creates and maintains the space, the categories of space and subdivisions thereof. From these discussions, I establish analytical models to discuss space in digital counterpoint. A theory of contrapuntal space in the broader theoretical work relies heavily on elements of recording practice to explain the sonic phenomena. Said’s concept of space within counterpoint applies broadly to all of recording practice; however, Said augments other authors’ conceptualization of counterpoint—relationships between harmonic and formal content and interacting voices. In this respect, this study appropriates limited recording practice terminology to describe the techniques of digital counterpoint composition.

Space and spatialization carries far-reaching implications for this study. *All* elements of digital counterpoint exist in contrapuntal space. Some, but not all, spatialization and interactions in that space have programmatic implications. Harmony and form remain important concerns for this theory, but using audio samples also implicates a wider net of

variables including lyric content and cultural context. In bringing samples for harmonic compatibility and formal design, the composer bears the responsibility of managing extra-musical content.

In my next and final chapter, I explore the programmatic implications of contrapuntal space. Through a series of my own readings, I isolate categories of program as manifested in the mashup repertoire and contrapuntal radio documentaries. The results of a composer's spatialization creates interactions, scenarios, and, in theatrical terms, scenes. In these scenes, the objects participate in original programs that often differ from the programs in their source works.

Chapter Five

Interaction as program in digital counterpoint

Introduction

In Chapter Four, I argue for a theory of space in digital counterpoint. Building on the description of spatialization from the previous chapter, I focus in this chapter on the programmatic implications of space. As music objects inhabit the contrapuntal space, they interact harmonically or semantically to create various textural combinations. Inside the space, they carry their external associations with them. Objects with melodic content may carry associations of a particular person, artist, or era. Lyric material embedded in objects may carry a built-in program and associations with the original work. The composer has the opportunity to create original programs through object interactions in the contrapuntal space. Throughout this chapter, I use the term “program” instead of ‘narrative,’ as the former indicates a story of some sort, but sidesteps the theoretical implications of ‘narrative.’ It is not my intent in this chapter to explore narrative theory as it pertains to digital counterpoint. In my discussion of the interactions and programs, I use the term “parent sample” instead of “musical object.” The former is conducive to a discussion of programmatic interaction, whereas the latter is more appropriate to the discussion of contrapuntal space as explored in Chapter Four.

Not all contrapuntal works created with these techniques are programmatic; however, contrapuntal works carry the possibility for program creation. A fugue by Bach, for example, does not carry any explicit programmatic content. The last variation of J.S. Bach’s Goldberg Variations, a quodlibet, bears a small program. As discussed in Chapter One, the quodlibet counterpoints a song about being ‘driven away’ and another lamenting about ‘being away for so long.’ The combination of these songs implies a program of distance. The quodlibet that caps the work is some distance, 30 variations, away from the opening aria.

Composers working with digital counterpoint have the option to focus on program creation. Gould’s contrapuntal radio works are exercises in large-scale theatrics, creating

a program through careful tape editing, splicing together segments of speech into dialogues. Of course, this is idiomatic to the ‘radio documentary’ or ‘radio drama’ format. It just so happens that Gould uses a particular series of contrapuntal techniques to achieve those programs. Mashup producers working with traditional musical materials have more options. They may create a work for harmonic compatibility, mixing a vocal melody from ‘Artist A’ and instrumental from ‘Artist B,’ or augmenting an existing work with instrumental material from another work. Alternatively, they may choose to counterpoint lyric samples from multiple artists to create the illusion of creative collaboration. A third path is intermingling the lyrics from both artists, so that a new program emerges that is different from that of the original source works.

I focus this chapter on the *possibilities* of program in counterpoint. In my first section, I detail a theoretical discussion of reading programmatic counterpoint. In the second half of the chapter, I outline a threefold system of categories to describe programmatic interactions. Non-narrative interactions that do not carry any specific program but function together in space. Critical interactions use one sample to ‘critique’ another sample. Critique also manifests itself as commentary about something external to the work like a topical issue. Interaction between samples is also a potent theatrical device for conjuring dramatic scenarios. I present the categories of interaction based on my own readings but with a significant caveat. Musical associations are highly personal and subjective. What I associate with, say, Katrina and the Waves’ “Walking on Sunshine” varies from another’s associations with the same work. In everyone’s life, there is a ‘Summer of ’72.’ My readings reflect my own experiences and do not imply compositional intent on the producer’s part. Popular works may benefit from a common interpretation but, again, readings mirror my personal experience. What I outline below reflects my own attempt to ‘read’ programs and theorize a form of contrapuntal technique.

Contrapuntal programs

This study encompasses three interactive categories of program in digital counterpoint: non-narrative, critical, and dramatic. The interactions determine the program. I derive these interactive categories by readings of how samples mingle in the space, how they

each bring their own ‘meaning’ into the space and what happens when those discrete meanings come together. The myriad interaction types in digital counterpoint invite the analyst, composer, and producer to use a scheme for reading *and* composition. As with the quodlibet, digital counterpoint brings together two or more melodies but their interactions are limited to simple programs. Though the producer brings together multiple parent samples, there is automatically an interaction if only because two independent samples cross paths in space. That, in itself, does not constitute a program.

When producers bring together samples they may or may not intend to create a particular program. Ultimately, the listener reads the program according to his or her own experiences whether or not it mirrors the composer’s intent. The listener determines the program when they hear the interaction of two or more artists’ work. Timothy Warner asserts that, “When a listener identifies the source of a sample, the extra-musical connotations... inform the... music response. These non-musical associations become part of the interpretative process.”¹ Warner’s assertion bestows on the listener a more active role in the composition process. For this study, I do not attempt to discern compositional intent, only to read a program where I perceive one.²

The notion of program is also predicated on pop culture literacy, although contrapuntal radio is not exempt from the extra-musical connotations of subjective source recognition. In *Stokowski: A Portrait For Radio*, Gould accompanies parts of the maestro’s speech with related musical examples. Romanian folk songs form the continuo as Stokowski talks about folk music in Romania. However, Gould’s interview speech content does not carry any explicitly readable associations unless the listener recognizes the individual folk melodies. I read interactions in his work, at the surface level. For the mashup repertoire, an external reference, a popular sample, has no meaning if the receiver lacks the requisite body of knowledge to recognize the reference, process it, and then integrate it in the current context. Pop cultural literacy is a fluid concept based in part on one’s involvement in a given cultural community. This includes familiarity with contemporary and past cultural artifacts. An average North American circuit-party patron, normally

1. Warner, *Pop Music*, 97.

2. I reserve theorizing the ‘listener as composer’ for a later study. This topic is tangential to the discussion at hand.

steeped in twenty-first-century club culture, may not be familiar with traditional Central Hungarian folk tunes; the same circuit-party patrons may not know the dance steps that accompany “the Charleston” melody. Native Hungarians with knowledge of their native folk music recognize the material and form the necessary connection. Anyone familiar with 1920s American popular culture through documentaries or films set in that era will recognize the Charleston melody and make the association with an early twentieth-century popular dance fad. The club-goer, in hearing those unfamiliar melodies, will only hear them on the surface; that is, they will experience the music as an original work without reference to another culture or time. As Timothy Warner, discussing source recognition, suggests,

Music pop sampling relie[s] on identification of specific samples on the part of the listener... There are various levels of sample identification which affect the way the sample functions with the piece... Identification of each sample is only relevant *in relation to* the rest of the piece.³

Interpretive readings are contextual given the sample’s place in the work and *how* the interaction transpires. The reading is troubled when the contrapuntal work contains nothing but pre-existing materials, each with their own subjective associations. To elaborate, I return to my earlier discussion of quodlibet. Recognizing the constituent melodies and interpreting the new program is the listener’s reward. Broadly speaking, sample recognition in works of digital counterpoint is more complex than the quodlibet’s simple juxtaposition of melodies. Timbre is a powerful element in digital counterpoint. In mashup production, a Motown parent sample carries the distinctly recognizable Motown sound; the distinct timbre of a particular artist’s voice evokes the same response. I respond to the distinct sonic characteristics – artifacts of the performance and recording practice – of a parent sample because of my experience of that work. Another significant element for my readings is a work’s lyric or speech content. Roseman outlines the programmatic possibilities of lyric juxtaposition.

If you are using vocal elements from more than one song, and if the words relate to each other, it can be wonderful. Songs may share key words or simply relate to each other thematically. One song may twist

3. Warner, *Pop Music*, 30.

the meaning of the other, altering the context. Another song may ask a question that the other song answers.⁴

Roseman addresses this issue as it pertains to the mashup although it applies broadly to Gould's documentary 'dialogues,' if only on the surface. The mashup repertoire carries the potential for richer readings of lyric interaction because of associations with cultural context, knowledge of a particular era, and the source works in their original form. When the parent sample is a vocal line we can read the surface meaning, the lyric, as having some semantic value. The reading may also connect with the source work and its accompanying association. Similarly, when an instrumental segment forms the parent sample, the reading may extend to that work's lyric content. When reading interactions one should resist the urge to indulge in an endless web of obscure associative connections. This often detracts from productive and meaningful analysis. I suggest that this type of reading is unusual for the average listener when experiencing a mashup; however, I analyze mashups from my perspective as a musicologist with a focus in popular music studies, and a relatively stable knowledge of Top 40 popular music from the 1960s through the current time. Further, the rigours of academic inquiry compel me to examine the works in question more closely. Through this I may find commonly accepted extra-musical connotations that could impact my readings.

Often the mashup is a rich collection of programmatic associations. The popular music that producers use as source works for their parent samples get absorbed into a collective cultural consciousness by repetition (Top 40 radio and online proliferation). Listener exposure to this material also happens when experiencing multiple variations of works through remixes and television and radio commercials. Not all works of digital counterpoint are programmatic. The contrapuntal radio documentaries I examine in this study do not contain popular music so they lack the potential for the sort of personal associations that saturate the mashup. However, in the last *Solitude Trilogy* documentary, *The Quiet in the Land*, Gould inserts segments of Janis Joplin's "Mercedes Benz" during a monologue about materialism. Using Joplin's music, Gould highlights the cognitive

4. Roseman, *Audio Mash-Up Construction*, 80.

dissonance of young Mennonites who must decide between the materialism of the outside world, and the staid conservatism of their home community.

I follow my discussion here with a more thorough examination of contrapuntal interactions. My readings of interactions in both mashups and contrapuntal radio, both programmatic and non-programmatic, inform my categorization.

Categories of interaction

The interaction types fall into three primary categories with several sub-categories to account for specific interactive characteristics. ‘Non-programmatic’ or ‘absolute’ music comprises the first category. I refer here to a combination of lyric and instrumental content from two or more different artists. The term ‘absolute music’ in the art music realm refers to instrumental music with no explicit program. This music does not contain an explicit narrative. This interaction category offers no new program, only a reiteration of a dominant parent sample’s source work with added musical or lyric material from another work. My second category focuses on two types of ‘critical’ interactions: commentary and critique. These interactions take the form of a comment on an issue external to the new work. As an example, the counterpointed parent samples create a program that comments on a particular issue like alcoholism, domestic violence, or poverty; conversely, a critical interaction may turn inward as one parent sample appears to critique or counter the other parent sample(s).

The third category, ‘dramatic’ interactions, encompasses three sub-categories that I describe broadly as programmatically theatrical. Type 1, the ‘closed dialogue’ counterpoints two or more source works but uses parent samples from only two sources for vocals. The producer or composer brings together samples in the space to appear in dialogue. They interact with contextually appropriate reactions to the each other’s comments or questions. Type 2 incorporates parent samples from a minimum of three source works in an *ensemble cast*. Any fewer constituent sources constitute a dialogue. Parent samples with lyric/speech content in this subdivision assume the role of ‘characters’ and interact in clearly defined positions in the contrapuntal space. In an ‘exclusionary’ interaction, the listener only observes the program. Alternatively, the

‘inclusive’ interaction implicates the listener as an active participant in the program. In Type 3, ‘*voyeurism*,’ the listener becomes a passive participant in the contrapuntal space, not the program. The listener actualizes this interaction as he or she moves, or, more aptly, as the producer *moves them through* the scene by way of dynamic spatialization. In actuality, the producer moves parent samples around the contrapuntal space dynamically to convince listeners that they are moving through the space. During movement, the listener observes the interactions. This sub-category engages the listener in more depth than in Type 2, though in a passive role, as they do not participate in the interactions.

The program that results from the interactive category types is as much an element of digital counterpoint as harmony, form, texture, and space. I attempt to construct an exhaustive schema to outline all the interaction types in the current digital counterpoint repertoire; however, this does not preclude new categories or sub-categories based on future compositions.

Category 1: Non-programmatic interactions

Producers of works in this category usually incorporate lyric and instrumental parent samples from different works. Sometimes they incorporate other instrumental samples to augment or ‘flesh out’ another work. The works in this category form in two ways: producers segment lyric samples to conform to the instrumental’s harmonic structure, or, inversely, the producer truncates the instrumental parent samples to provide the harmonic foundation for the lyric samples. The repertoire in this category comes largely from the mashup, as it is a musical phenomenon. Contrapuntal radio, however musical in conception, uses very little traditional musical content. For this reason, contrapuntal radio is under-represented in this category.

Example 1: “Five Step,” DJ Overdub

“15 Step” by Radiohead’s Thom Yorke benefits from added instrumental parent samples from Dave Brubeck’s quasi-improvised “Take Five.” The jazz standard and Yorke’s work form a novel interaction especially considering that both works share the unusual, asymmetric 5/4 meter. “Five Step” warrants inclusion in this category, as Brubeck’s work does not have a formalized program; it is a work of absolute music. DJ Overdub extracts

three key samples from Brubeck: the opening drum track that establishes the meter, the E^b minor inflected piano chords, and the smooth saxophone melody.

Song Section	Timing	Description
Drum Intro	0'00"- 0'10"	Brubeck's drums augment original 'drum and bass' style intro
Chorus	0'11"- 0'41"	Yorke starts singing
	0'22"- 0'40"	Piano part starts
Space between	0'41" – 0'53"	Saxophone part starts. Piano drops out. Guitar part from original track starts
Verse 1	0'53" - 1'13"	Only drums stay through this section
Verse 2	1'14" - 1'45"	Saxophone part starts with more active rhythm. It counterpoints Yorke's slow, sustained notes.
	1'40"	Saxophone part drops out
Space between	1'45" – 1'59"	Piano part starts. Accompanies Yorke's reverbed "Ooh"
Verse 3	1'59" - 2'23"	Saxophone part starts. Counterpoints Yorke's faster vocal rhythm.
	2'22"	Saxophone and drum parts drop out. Original instrumental texture thickens.
Space between	2'23 – 3'09"	Original instrumentation
	2'30" - 2'38"	Instrumental texture in original work thins. Guitar part drops out, original drum part thins.
	2'38" - 3'08"	Instrumental texture thickens again. Guitar part starts again. Saxophone part enters with fast rhythm relative to slow rhythm of synth pads.
Chorus	3'09" - 3'57"	Saxophone part drops out as vocal starts. Original instrumental texture is denser. Work modulates and is incompatible with Brubeck's work. Work ends at 3'57".

Table 5.1 Sectional divisions of Overdub's "Five Step" with interactions of parent samples.

Overdub uses Brubeck's instrumentals to effectively thicken Radiohead's instrumental texture (Table 5.1). Not only do the parent samples add instrumentation, but they also fill out the frequency spectrum in some sections. Brubeck's jazz drum kit and cymbal fill in the upper register and reinforce the 5/4 meter to complement Yorke's bass drum intro. The first entry of the piano parent sample at 0'22" adds some instrumental variety in the middle of the chorus. The piano here highlights the timbral profile of Yorke's voice, which is roughly similar to the alto saxophone sample. The vocal melody bears a resemblance to the saxophone melody at least in terms of melodic contour. In the space between the first and second iteration of the chorus, Overdub uses the saxophone sample to maintain a melodic flow and add more instrumental variety in the absence of original

material apart from the bass drum. Later, during Verse 2, Overdub uses the saxophone sample again as a counterpoint to the harmonic foundation provided by Yorke's sustained vocal rhythm. This pattern of sample use repeats itself through the track in various iterations. The interactions do not carry any programmatic meaning.

Example 2: “Allure” *The Grey Album*, DJ Danger Mouse

Danger Mouse's landmark *Grey Album* contains several tracks in which the interaction of the Beatles' instrumentals and Jay-Z's lyrics create a critical interaction, or an interaction that provides an external commentary. Danger Mouse extracts parent samples from “Dear Prudence” to accompany Jay-Z in “Allure.” He uses bass drum kicks, sonorously dense guitar chords (likely created by combining multiple parent samples) with sitar and cymbal crashes, and handclaps (Figure 5.1). The samples are sufficiently short and resemble ‘micro-samples.’ They are so short they bear absolutely no resemblance to their source work. The sonic characteristics of the parent samples appear to be relatively generic without indicating in advance that all the instrumentals come from *The White Album*. The nine-second guitar lick that closes “Allure” (Figure 5.2) is the only sample that identifies one of the source works.

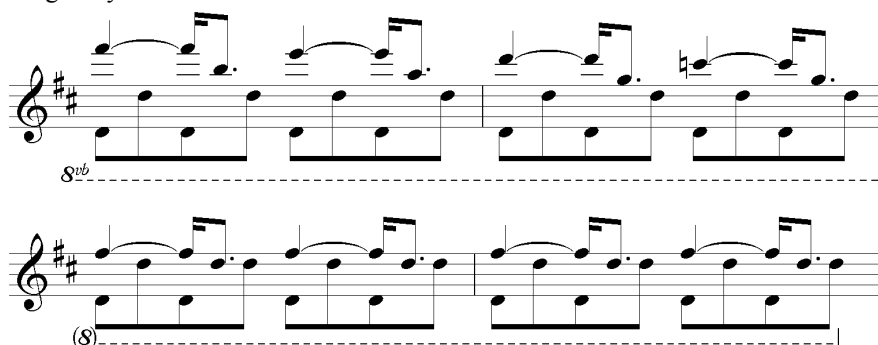
Figure 5.1 Guitar and percussion instrumental loop transcribed from Danger Mouse's “Allure”

The figure shows a musical score for a guitar and percussion instrumental loop. It is written in 4/4 time and consists of two systems. The top system includes a guitar staff with chords and a percussion staff with cymbal, handclap, and bass drum. The bottom system is a duplicate of the top system.

In the first example, the collection of guitar chords with accompanying percussion are divided into such small samples that they function only as instrumental accompaniment to Jay-Z's rap.

Danger Mouse extracts the four-measure guitar sample from “Dear Prudence” wholesale, with no modification. Its sudden appearance at the end of the work jars the listener and does not offer any programmatic association. I cannot find a link between the Prudence and Allure lyrics. On the surface, John Lennon encourages Prudence to ‘come out to play’ and justifies his entreaties with evidence of good weather. Jay-Z’s program focuses on the glamorous benefits of being a drug dealer despite the dangers of the trade.

Figure 5.2 Closing guitar riff transcribed from Danger Mouse’s “Allure,” originally from the Beatles’ “Dear Prudence”



Example 3: *The Idea of North*, epilogue ‘soliloquy’

As a final flourish to the *North*, Gould gives Wally Maclean, the documentary’s ‘narrator,’ a heroic treatment as the final arbiter of the Northern experience.

One of the five [characters]—Wally Maclean—was restrained by a caprice of editing from all [interaction] except with his own poetic vision of the north and with the last movement of Sibelius’s Fifth Symphony.⁵

Gould pieces Maclean’s monologue together from several segments of his interview. He times Maclean’s spoken phrases and cadences to coincide with phrases and in cadences in Herbert von Karajan’s 1965 recording of the Sibelius symphony.⁶ The last movement of the symphony does not carry any formal program, at least not in the context of *The Idea of North*. In this instance, Maclean’s interview segments interact with the symphony solely as spoken word with musical accompaniment. Kevin McNeilly, in his article on

5. Gould, “‘The Idea of North: An Introduction,’” 393.

6. An archived pocket score of Sibelius’s Symphony No. 5 bears notes in Gould’s own hand indicating where Maclean’s syllables align with the music. Glenn Gould Collection (Ottawa: Library & Archives Canada), MUS 109, S44-7.

North, concludes that Sibelius's music serves as "muted background to Wally Maclean's quasi-philosophical reflections on the meaning of 'North'."⁷

In terms of interactive categories, the 'non-narrative' is the simplest in terms of analysis if only for its distinct lack of programmatic interaction. This is not to dismiss it as an important interactive category. If anything, it gives us a valuable method to analyze how the composer segments and counterpoints the source works. Because there are no programmatic interactions in this category, only musical, it lends itself most to 'traditional' modes of musical analysis if one is required. We find a more fertile field of programmatic interactive possibilities in the next interactive category, critical interactions.

Category 2: Critical interactions

I read critical interactions and their sub-categories as the exclusive domain of the mashup repertoire. This category does not and, as I illustrate, cannot include contrapuntal radio. Reading interactions in this category requires that the analyst have significant pop culture literacy. Again, the readings vary based on the reader's experiences. Authorial intent is a troublesome issue for this category. I eschew the notion of authorial intent (at least for readings) early on. Critical interactions appear to communicate a clear programmatic agenda at times, though I do not dismiss entirely the role of serendipity in programmatic interaction. I subdivide the critical interaction category into two types: external and internal commentaries/critiques. In every example, I attempt to provide as deep a reading as possible without resorting to obscure associations.

Critical Type 1: External commentary/critique

Parent samples in this category interact to form a commentary or critique on an element external to the programmatic interaction. The external 'factor' may be a tangible person, place, or thing. It may also be an issue of culture or politics. DJ PartyBen's "Single Ladies in Mayberry," offers a commentary on American 1960s sexual mores. PartyBen counterpoints segments of Beyoncé Knowles's "Single Ladies" (2008) and the entirety of

7. Kevin McNeilly, "Listening, Nordicity, Community: Glenn Gould's 'The Idea Of North'," *Essays On Canadian Writing* 59 (1996), 101.

Earl Hagen's "The Fishin' Hole" (1960), better known as *The Andy Griffith Show* theme song.

The source works for these parent samples fall at polar ends of the cultural spectrum: one is a twenty-first century R&B send up of sexual independence, and the other a familiar, if oft quoted, melody long associated with tranquility, 'old-time values,' and the mythologizing of simpler times.

Beyoncé foils the Mayberrian idyll as she issues a rallying cry for single women to reject male indecision, jealousy, and infidelity. She delivers a monologue using the second-person pronoun "you," as if addressing her former lover; in the lyric, she asserts her sexual independence and declares her liberty. She speaks of her appearance and a potential suitor's interest as leverage to convince her ex-partner that he failed his romantic obligations. The interaction of the *AGS* theme and the parent samples from Beyoncé suggests a potent commentary. The title character of the *AGS* steps out of cultural and temporal context as an artifact of nostalgic American pseudo-purity. Parent samples taken from Beyoncé's work comment upon the samples extracted from Griffith's theme song.⁸ Her performance in this work characterizes the persona of a saucy, seductive chanteuse who asserts her independence as the romantic aggressor. Beyoncé's potent posturing makes Hagen's melody and accompanying associations seem like naïve cultural anachronisms.

My reading of the program interaction offers one potential scenario. Alternatively, PartyBen's work functions musically as a non-narrative interaction. The narrow melodic contour of Beyoncé's vocals counterpoints Hagen's instrumental parent samples with only fleeting harmonic conflicts. In this category's next subdivision, the internal commentary, I explore a similar interpretive path to read programmatic meaning into the interaction.

8. PartyBen repeats Hagen's "The Fishin' Hole," in its entirety as the harmonic foundation for Beyoncé's vocal melody.

Critical Type 2: Internal commentary/critique

Here, the commentary or critique aims itself inward as one parent sample comments on or critiques the other. DJ Tripp's "Express This Way," counterpoints parent samples from Madonna's "Express Yourself" (1989) with parent samples from Lady Gaga's "Born This Way" (2011). Tripp's mashup demonstrates the clear harmonic and melodic similarities between the two works. Traditional musical elements aside, I offer a dual reading of this interaction. The internal commentary suggests that Lady Gaga's artistry is derivative of her predecessor's stylings. The strong harmonic, melodic, and formal similarities suggest that the derivation is not coincidental.

A thorough reading of an interaction is not always necessary to recognize an internal commentary/critique program. DJ G3rst's "Bloom To Me" positions parent samples of Nirvana's "In Bloom" (1991) with Koop's "Come To Me" (2006); the former a gritty embodiment of late Generation X teenage angst, the latter a Swedish electro pop group. Koop's reputation grows from their elaborately constructed original songs composed only of audio samples. Koop's bright brass section and jazz drum parent samples recall pre- and post-war American dance band optimism. Koop accompanies Kurt Cobain's chorused lyric parent samples and reharmonizes Nirvana's minor-inflected melody with an up-tempo, major tonality. The reharmonized lyric melody negates Cobain's brooding pessimism. Our understanding of the internal commentary/critique in "Bloom To Me" does not depend on reading programmatic associations. Koop's instrumental is the major-inflected, bright contrast to a laboured vocal delivery of the decidedly negative lyrics.

The dramatic contrast of parent samples in "Bloom To Me" presents a convenient segue to the next category, 'dramatic' interactions. It is the most 'programmatically' rich of the three interactive categories and the most theatrical. In the final portion of this chapter, I explore dramatic interactions in three subdivisions to delineate significant variations within programmatic types.

Category 3 - Dramatic

Gould's contrapuntal radio work figures more prominently in this category. This should come as no surprise, as Gould intentionally composed his works for theatrical effect. The

variety of scenes in all his documentaries represents the panoply of dramatic subcategories, though I do not explore them exclusively here. Gould structured *The Idea of North* with a “prologue, five scenes, and epilogue”—explicitly theatrical terms, or, at the very least, terms borrowed from theatre as a means of building an unorthodox kind of documentary making.⁹ I draw my examples here from both contrapuntal radio works and the mashup repertoire.

Dramatic type 1: The ‘closed dialogue’

As with other interactions in the contrapuntal space, the composer forms the ‘dialogue’ by bringing together parent samples that interact as dialogue. Lyric or spoken word parent samples interact in the contrapuntal space, appear aware of each other, and respond appropriately. The interaction does not invite any further involvement than to listen to and witness the dialogue or duet as a public discussion or performance.

Example 1: ‘Dialogue scene,’ *The Latecomers*

In the preparatory stages of producing *The Latecomers*, Gould travelled to Newfoundland to conduct interviews with thirteen native Newfoundlanders. As with *North*, Gould reviewed the interview transcripts and extracted parent samples from the source tapes. He puts interview segments back to back to create the illusion of a dialogue in space. In a central scene in *Latecomers*, Gould creates an active conversation with interviewees Harold Horwood and Penny Rowe. The level of interactivity in this scene is notable, in that the conversation grows more aggressive as it progresses. As Horwood philosophizes on the virtues of isolation in Newfoundland, Rowe’s pragmatic escapist desires form a stark contrast to Horwood’s ‘stodginess.’

Horwood: I believe people who are removed from the center of a society are always able to see it more clearly... I think a Newfoundlander living apart from Canadian society can see Canadian society more clearly and see where it’s going and perhaps form opinions about what it shouldn’t do, better than someone living in the middle of it. It’s always difficult to see anything from the centre. It’s much more easy to see it from the outside.

9. Gould, “Radio as Music,” 376-377.

Rowe: Your attitude is so warped because you think you're the best educated, the most knowledgeable. You think that you're the greatest in the world. It's so easy to be stagnant. It's so easy to be a big frog in a little pond, and this often makes people unattractive...¹⁰

The illusion of dialogue is successful because both Horwood and Rowe frequently use the personal pronoun “you” to indicate an element of real-time interaction. I return to the notion of contrapuntal space to highlight the spatialization of the Horwood/Rowe parent samples. Gould positions Horwood left of centre and Rowe to the right. They appear as if separated physically at a table or pair of chairs while engaged in chat. The interaction transpires in close proximity yet the dialogue does not suggest participation, only observation. Gould's contrivance of dialogue and judicious use of space creates a distinctly theatrical program.

An alternative to the subcategory title of ‘closed dialogue’ might be ‘eavesdrop.’ The perspective of the listener leaves no option but to observe or ‘overhear’ the interaction from a stationary position. This style of interaction, at least from the listener's perspective, varies from the later subcategory, voyeurism, in that the listener does not participate in the scene and does not move through the scene to actively observe the parent samples' interactions.

Example 2: DJ Shyboy, “You spin me upside down”

Theatrical dialogue interactions occur frequently in the mashup repertoire. DJ Shyboy brings together vocal and instrumental parent samples from Diana Ross' “Upside Down” (1980) and samples from Dead or Alive's “You Spin Me Around” (1985). Shyboy forms a dialogue in which Ross and D.o.A. express a mutual interest by counterpointing these samples. Spatialization does not contribute any programmatic content to this mashup. Again, as the parent sample lyrics from both artists employ the personal pronoun “you,” the composer maintains the illusion of dialogue but in the form of a duet.

Ross: “No one makes me feel like you do...”

DoA: “You spin me right round baby, right round...”

10. Gould, *The Latecomers*, 28'38”–29'35

Later, in the chorus Ross and DoA appear to complete each other's sentences.

DoA: "You spin me..."

Ross: "Upside down."

DoA: "Like a record, baby..."

Ross: "Round and round."

Ross and DoA's dialogue is theatrical as a two-person 'call and response.' The back-and-forth delivery created by completing each other's sentences or phrases is a structural element of that rhetorical device. Again, the closed dialogue does not invite active participation but the frequent use of the metaphor of the spinning record to display their mutual affinity leaves the distinct impression of eavesdropping on a private discussion.

Dramatic type 2: The 'ensemble cast'

Interactions often function at a higher level when the composer introduces more parent samples into the contrapuntal space. A busy set of interactions offers the potential for a more complex program. Instead the contrapuntal space becomes the location for an 'ensemble cast.' The parent samples in this interactive program assume the role of 'characters' and appear to interact with each other as in a theatrical scene; the interactions are not necessarily evenly distributed amongst the characters, that is, some 'characters' figure more prominently than others. There are feature dialogues, side dialogues, and even monologues within the ensemble, depending on the number of parent samples and complexity of interactions. A successful reading of this interaction type requires active listener participation; listeners experience a kind of 'inner theatre' or drama in the 'personal space' as they internalize the drama. Listeners project themselves onto an unseen character to participate in the scene as they observe and process the interactions. I do not implicate the listener in taking an active role in the compositional process (by interpretation). Rather, the listener's active involvement in the drama is a natural consequence of this interaction type. My accompanying example comes from the mashup repertoire. DJ Earworm's "No one takes your freedom" illustrates the ensemble cast subcategory as a micro-musical drama. I present this example here as a follow up from my spatial analysis in Chapter Four where I outlined Earworm's use of contrapuntal space. The parent samples' spatial proximity to the listener contributes as much to the program as the lyric content.

Jake Shears (Scissor Sisters), Paul McCartney, and Aretha Franklin use the personal pronoun, “you,” often. As I noted above, this implies some form of interaction between parent samples or, in this case, the listener. The parent samples’ lyric text implicates the listener as the stand-in for the work’s subject. The samples as characters do not interact with each other, but the interactions form a theatrical ‘intervention’ with the listener/subject. The first person pronoun, “I,” appears for the first time when George Michael’s parent samples enter the space. His ‘character’ addresses Aretha Franklin’s samples directly. Michael’s sudden entrance in the contrapuntal space relieves the listener of their participation as the subject.

A program of domestic strife emerges from the interactions. Jake Shears and Paul McCartney address the listener/subject directly using the pronoun “you.” I read their respective parent samples role in this program as the subject’s empathetic friends whose lyric text initiates the program and establishes the context.

Shears: “... But now your girl has gone missin’ and your house has got an empty bed/ Folks will wonder ‘bout the wedding, they won’t listen to a word you said/ We’re gonna take your Momma out all night...”

McCartney: “Your day breaks, your mind aches/ you find that your words of kindness linger on when she no longer needs you/ And in her eyes you see nothing/ no sign of love behind the tears, cry for no one/ a love that should have lasted years.”

While McCartney speaks directly to the listener’s sense of loss, Shears’ lyric provides a broader context for the program. The subject’s girlfriend (‘Momma’) left him and called off the wedding. He and other friends try to placate her or keep her mind off whatever problem initiated the breakup. In the next verse, Shears issues the subject an imperative with interjections from Aretha Franklin’s parent samples.

Shears: “Do it...”

Franklin: “Think about what you’re trying’ to do to me...”

Shears: “So she’ll have no doubt we’re doin’ all the best we can/ Go an’ do it...”

Franklin: “Let your mind go, let yourself be free...”

Shears: “You can stay up late ‘cuz baby, you’re a full grown man.”

The effect of reverberation processing on Franklin’s voice creates a sonic ethereality. She appears to exist in this space only as an apparition, an evocation of the subject’s girlfriend

as an ‘inner voice.’ The subject’s conscience employs Franklin’s voice, imploring him to be mindful of his hurtful actions. Her tone changes as Franklin (as ‘inner voice’) directs the subject to ‘be free.’ Shears follows Franklin’s sentiment with a similar lyric. This counters the previous statement for the subject to reflect on his behavior. I read this as Franklin reflecting on the impact of the unresolved personal issues that repelled her initially. The subject receives and processes the interaction when Franklin and Shears ‘invert’ their message. The drama’s subject, George Michael’s parent sample, appears in the next verse after a possible revelation.

Michael: “I won’t let you down, I will not give you up.../ I won’t let you down, so please don’t give me up/ ‘cuz I would really, really love to stick around/ oh yeah.”

A chorus accompanies Michael later, “Freedom, Freedom, Freedom, you gotta give what you take.” This parent sample functions as an admission that he was not sensitive to his partner’s needs. The chorus, as his own inner dialogue, assures her that he will give her the ‘freedom’ she so desires. George Michael enters the scene abruptly and displaces the listener from active participation in the dramatic interactions. I also read his entrance as the listener’s ‘inner voice’ involuntarily expressing his empathy for his lover. The latter interpretation does not displace the listener so much as, literally, put words in his or her mouth. This may or may not reflect their reaction to the dramatic interactions. Earworm constructs and contains a relatively complex program in a short but tidy 5’11”. The work functions autonomously but still follows a dramatic theatrical arch (Table 5.2).

Section	Participant(s)
Introduction of Issue	(Theme 1) Shears
Introduction, continued	(Theme 2) McCartney
Rising action	Shears and Franklin
Climax	Michael and Franklin
Resolution and end	All

Table 5.2 Programmatic arch of DJ Earworm’s “No One Takes Your Freedom.”

‘Ensemble cast’ interactions, while complex, involve the listener as a static observer and, sometimes, participant. The next subcategory modifies the ensemble cast interaction but uses the space dynamically. It also implicates the listener as a natural consequence of the interactions but only in a passive role.

Dramatic Type 3: Voyeurism

Dramatic or theatrical scenarios in voyeuristic interactions differ from the ensemble cast via an active use of the contrapuntal space, and the listener not as the subject but the observer. It is a subtle but significant variation. The listener shares the auditory experience with the scene's parent samples and participates in the scene even though the parent samples can not possibly indicate their awareness of the listener's presence. This interaction is most similar to the 'closed dialogue' subcategory but with more interactions in the contrapuntal space. The listener, though passive, acts as the sonic conduit for the interacting parent samples. By conduit, I refer to the 'voyeuristic' element of this interactive subcategory; as per the composer's whim, the listener moves or is moved through the contrapuntal space to 'observe' the interactions. In actuality, the listener as voyeur remains static but the composer moves all the parent samples through the space to create the sensation for the listener of moving through space. The dramatic interactions are not possible, or at least the audible portions are not possible without the listener as conduit. I draw my examples from contrapuntal radio as it offers the most compelling illustration of this subcategory if only for the strong appearance of program in space. My survey of the mashup repertoire did not turn up any works that fits in this subcategory though that does not preclude music works using this type of programmatic spatial interaction.

The 'dining car scene' in Gould's *Idea of North* is a prime example of the voyeur interaction.

One such is the scene [of complex contrapuntal radio] devoted to the subject of the Eskimo, which takes place... in a dining car aboard a train... and in which Miss Schroeder, Mr. Vallee, Mr. Lotz, Mr. Phillips are more or less simultaneously occupied in conversation—the resultant distractions making the listener's role not unlike that of a dining-car steward intent upon giving equal service to all.¹¹

The train 'continuo,' along with the parent samples of utensils hitting dishes, and ice clinking in scotch glasses, creates the programmatic premise for the following interactions. However, because we rely on the listener to overhear the interactions, if an

11. Gould, "'North': An Introduction," 393.

interaction occurs in a dining car and no one is around, does it really occur? Gould intended the dining car scene participants to appear as if interacting in conversations though the realization of the scene's final version 'sounds' like a series of five monologues on a common theme with little appearance of conversational interaction. The effect of 'moving' between parent samples provides spatial context to legitimate the premise of discussion and voyeuristic observation.

This category of interactions—dramatic—contains the most programmatically rich of the interactive categories but they are difficult to construct because of the complexity. The composer's imperative is primarily to construct an autonomous work. The type of work depends entirely on the aesthetic. If using musical content as in a mashup, the work should conform to a listener's expectations of common harmonic and structural practice; the programmatic elements are equal to the musical elements. The programmatic interactions do not succeed if the musical elements do not align. Gould, in working with the contrapuntal radio technique, addresses programmatic elements exclusively with speech content. Creating theatrical or dramatic interactions from segments of unscripted interviews is time consuming and akin to conceptualizing a jigsaw puzzle, carving the puzzle segments, and assembling until the puzzle's image emerges. Drama and theatricality is clearly a formidable compositional challenge for composers working with digital counterpoint techniques.

Chapter Summary

My discussion of programmatic interactions here is a necessary consequence of my examination of space in Chapter Four. The discussion of contrapuntal space naturally leads into an examination of interactions between music objects in that space. Those interactions carry programmatic consequences. I attempt to categorize the variety of interaction types to foster an understanding of the possibilities of space and program for contrapuntal composition.

The mashup repertoire forms the bulk of interactive categories because they contain the richest accumulations of samples that personal associations. When the composer positions multiple parent samples in contrapuntal space from multiple source songs, the

field of programmatic interactions increases. Reading the samples' associations creates the program. A work's fit within a given category or subcategory relies largely on pop cultural literacy to draw associations, though it does not diminish a work's value if the parent samples go unrecognized.

I derive some categories or subcategories entirely from Gould's contrapuntal radio works. The constituent parent samples in *The Idea of North* and *The Latecomers* contain no associations in the same way that popular music works accumulate and incorporate the same associations. I distill the most complex interactive categories from both Gould's work and the mashup repertoire though examples of this kind of interaction in the latter are infrequent. Clearly, both contrapuntal radio and mashup offer a rich variety of interactions. However, some categories are more idiomatic to specific kinds of works. I offer these interaction types to explain extant works. This does not preclude future analysts from augmenting this study with additional interactive categories or subcategories.

Conclusion

Digital counterpoint is a fledgling concept that describes the underlying compositional techniques of a relatively recent repertoire. I derive this study not only from current repertoire but also from technological evolution and corresponding changes in cultural production. Digital counterpoint will develop with more compositional techniques as digital audio production technology evolves and renders recorded audio more malleable. Better software tools will give composers and producers the agency to create increasingly complex works. The definition and scope of digital counterpoint will change and diversify to reflect changes in technology and new musics.

Composers incorporated digital recording technologies into their creative practice decades ago; however, they do not appear to engage with those technologies as did Gould or mashup producers with their contrapuntal works. Counterpoint underlies a wide swath of musical works regardless of genre. We recognize counterpoint readily in art music composition yet deny popular music the same consideration. Of course, we cannot expect contemporary pop music artists to adhere to ‘rules’ of strict counterpoint in the style of eighteenth and nineteenth-century Austro-Germanic composers. In his lone contribution to popular music studies, Gould cast aspersions on the Beatles for their ‘musical transgressions,’

Tonally, the Beatles have as little regard for the niceties of voice leading as Erik Satie for the anguished cross-relations of the German postromantics. Theirs [the Beatles] is a... belligerently resourceless brand of harmonic primitivism. Their career has been one long send-up of the equation: sophistication = chromatic extension.¹

Of course, one cannot equate the Beatles with the countless musical genres huddled under the umbrella of ‘popular music’ but Gould’s sentiment presages a now-subsiding disdain for popular music in the academy. As further ammunition for naysayers, a recent study posits that, based on parameters of melodic complexity, timbre, and sonority, popular

1. Gould, “Petula Clark,” 304.

music is increasingly homogenous.² Such accusations as to musical homogeneity notwithstanding, the mashup is clearly contrapuntal. Contrapuntal radio, too, receives short shrift in the academy. Scholars do not embrace it to discuss the musical intricacies of Gould's work. This is not for lack of interest but perhaps because the interested parties lack the vocabulary or analytical methodologies to discuss the documentaries to any satisfactory end.

I present several case studies over four chapters as investigations into the nature of digital counterpoint. I dedicated Chapters Two and Three to a study of traditional contrapuntal elements in both contrapuntal radio and the mashup. Harmony, form, and texture manifest themselves in both musical and extra-musical elements. The speech content of Gould's documentaries contributes to a coherent harmonic system rooted in semantics. The experiments in form and texture take their models by parallel examples in traditional counterpoint but are sufficiently different to warrant consideration on their own merit.

Chapter Four examines the issue of space in digital counterpoint. The composer is responsible not only for the musical composition but also for spatializing samples in the contrapuntal space; this is a fundamental practice for working with recorded audio. The composer makes conscious decisions when positioning samples in the space for audibility and programmatic function. In doing so, the producer or composer creates the illusion of a new sound world, conversations that transpire in a room or scene, or musical performances that occur in a studio session or concert setting. 'Contrapuntal space' is vitally important to this study, as it is a significant original contribution to counterpoint. Space is also best examined in terms of the programmatic implications, which I explore in Chapter Five. As in the quodlibet, the issue of program arises when the composer brings together two melodies with similar or opposing narratives. In digital counterpoint, the program emerges not only from melody and lyric text but also from spatialization, sonority, and timbre. In the case of the mashup, a famous instrumental sample featuring a distinctive guitar riff or performance of a melody may elicit associations with the particular artist or the source work's program. Crossing two pre-existing texts (popular

2. Joan Serrà, Alvaro Corral, Marián Boguñá, Martin Haro, and Josep K. Arcos, "Measuring The Evolution Of Contemporary Western Popular Music," *Scientific Reports*. <http://www.nature.com/srep/2012/120726/srep00521/pdf/srep00521.pdf> (accessed August 21, 2012).

music) creates the program either by compositional intention or listener interpretation. In this respect, program becomes a contrapuntal element. Digital counterpoint grows to encompass harmony, form, texture *and* space, sonority, and program.

I use analogies and models drawn from common-practice counterpoint only for exposition in illustrating the concepts herein though I acknowledge that digital counterpoint has few if any direct analogies. The study does not seek to create an entirely original study, but to develop a compositional system rooted in counterpoint to account for recent compositional trends outside the limited sphere of academic art music. I focus on examples that display clear contrapuntal qualities that most embody the particulars of this study. In my examinations, I abstract and distill specifically *what* is contrapuntal about these works and conjecture at the compositional techniques used to affect the counterpoint.

This study establishes a foundation for future studies in several areas: digital counterpoint instruction in the classroom, issues of authorship, and a discussion of ‘violence.’ My study of digital counterpoint is in the form of analysis. But, based on the analyses, digital counterpoint can be crafted into a teachable curriculum for classroom instruction. The curriculum should address the challenges of instruction without the aid of a written score, and the means to assess the quality of a work. Further, the nature of the work may make digital counterpoint suitable for individual learning outside of the classroom.

Once in the classroom, educators and composers will contend with the thorny issue of copyright law and intellectual property law. The use of pre-existing audio recordings comes attached with the danger of legal action. Copyright disputes, at their core, are about authorship. Digital counterpoint challenges the traditional notion of the author as the person who creates an original work. Specifically, when music compositions contain only pre-existing recordings, measuring the producer’s or composer’s contribution becomes problematic. Without adding any original material to the work, the ‘authorial voice’ is not quantifiable by conventional means—harmonic language, melodic patterns, stylistic idioms. We may find a workable theory of authorship in digital counterpoint by revisiting post-structuralist discussions of authorship and recent works on musical

intertextuality.³ Exploring different authorial roles in composition using digital counterpoint technique will make an important contribution to the discourse of authorship in music.

If I speak of authorship, I must speak conversely of other stakeholders in digital counterpoint: the artists whose works are incorporated into new works, and the listeners. Artists/participants (interview subjects in Gould's case) and listeners endure an aural trickery. For mashups, the sampled artists' work is segmented and they unwittingly participate in sometimes unlikely musical collaborations. Further, listeners sometimes experience a visceral response to mashups that use well-familiar works. The listener has an expectation that a song will unfold in a particular way based on their experience of the work. If a mashup producer thwarts that expectation by inserting a vocal sample from another artist in place of the expected original artist, the surprise is sometimes jarring. Contrapuntal radio, similarly, is a counterpoint of deception, with ethical and moral implications. Gould manipulated interview subject voices into dialogues and changed the context, if not meaning, of their responses. Journalists frown on this practice but when composed under the guise of art, the boundary blurs and the practice passes under the regulatory radar.

I implied a system of listener involvement when I outlined my methodology for reading programmatic in Chapter Five. The mashup repertoire relies heavily on the listeners who are called upon to draw their own associations and connect them to form a total program. While digital counterpoint provides a catalyst for a study of the author, it also provides fertile soil for a study of the listener as an active participant in the composition process. The composition, in this instance, refers to reception, sound perception, and reading associations rather than the actual assembly of parent samples. This study could incorporate more theoretical analyses by phenomenology, *Gestalt*, and auditory scene

3. Michel Foucault, "What is an author?," in *Rethinking Popular Culture: Contemporary Perspectives In Cultural Studies*, ed., Chandra Mukerji and Michael Schudson (Berkeley, CA: University of California Press, 1991): 446-464; Roland Barthes, "The Death Of The Author," in *Authorship: From Plato To Postmodern, A Reader*, ed., Seán Burke (Edinburgh: Edinburgh University Press, 1995): 125-130; John Cuciurean, "Through the Looking Glass: Mimesis as Interpretive Discourse in György Ligeti's *Selbstoportrait*," in *Music, Function, and Value*, ed., Teresa Malecka. (Krakow: Musica Jagiellonica, 2012): 518-530.

analysis. The analyses should focus on why and how listeners hear and interpret works composed by digital counterpoint techniques.

These questions aside, this topic leaves many avenues open for further exploration. There are many types of compositions not represented in the repertoire, specifically large-scale musical works that do not unfold episodically. Future studies may conjecture as to how large-scale, symphonic structures may come out of these techniques. I propose to explore the topics I raise here with a particular *modus operandi*. Analysis must continue to examine future works through the analytical lens of digital counterpoint to form a more robust toolkit of compositional techniques. In turn, through discovering new works and techniques idiomatic to this counterpoint we generate a broader technical palette to inform future compositions.

This study proposes an analytical model, or series of models, for a specific type of composition. I attempt to draw quantitative analyses of qualitative musics and rely piecemeal on existing analytical models for harmony, form, and texture. I use several methods of illustrating space, each specific to the discussion at hand, though none that illustrate all dimensions at once. Similarly, programmatic analysis flows into qualitative discussions with tables for reductive analysis. There is much work left to do on digital counterpoint for an exhaustive set of compositional guidelines and analytical models. I hope that with this study I have established a solid base by which to discuss an increasingly common repertoire. However, digital counterpoint is also a stepping-stone in developing analytical models for future compositions. In how many years will someone produce a similar study of quantum counterpoint?

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Appendices

Appendix A: Formal diagram of The Idea of North, excluding the prologue, with plot synopses.

Scene 1

Synopsis: The beginnings of the characters' 'Northern experience'

Cast: Maclean, Lotz, and Phillips

	Voice	Time	Summary
A	Maclean	5'14"	Discusses time on the train and being captive audience for chatter
B	Lotz	7'51"	Relates his experience of when he went North. As a geographer he experienced a "land of thin margins."
A	Maclean	9'37"	Refers again to the gentleman going North for the first time. Infers a link with Lotz earlier monologue
B	Lotz	9'52"	Continues story of going/being North. He went for work on a 'scientific expedition.'
A	Maclean	11'11"	Paraphrases myth of Sisyphus
B	Lotz	11'52"	While on his third trip to the Northern ice shelf, talk turned to food. They had a drop of fresh vegetables.
A	Maclean	12'54"	Speaks generally about people going North. He's "up against his own sad self."
B	Lotz	13'19"	First work task: Study of squatters in Whitehorse
C	Maclean & Lotz	13'50"- 14'42"	Both speak
D	Phillips	14'43"	Explains his "love affair with the North." How he came to like the North and his frustration with Canadians' ignorance of what goes on there.
B	Lotz	15'30"	One cannot talk about the North until one is out of it. Best related upon reflection.
D	Phillips	15'54"	1954, Beginning of administrative revolution in Canadian government's dealings in Northern affairs.
B	Lotz	16'14"	Most government work in the North is 'quick and dirty' studies. Make a report of recommendations. Send to the office and are summarily ignored.
D	Phillips	16'31"	Decided he would apply for a position with Northern Affairs.
B	Lotz	16'51"	He spent summers in the Yukon
C	Maclean & Lotz	17'17" ^c - 18'00"	Maclean ruminates on a young man in search of himself. Again implicated Lotz in the narrative
A	Maclean	18'01"	Being in the North is about getting along with one's self. Question is can a man get along with himself?
		18'51" ^c - 18'57"	Silence and then more train sounds.

Scene 2

Synopsis: Characters' first experiences of living in the North. Reflections on emotional and community connections.

Cast: Schroeder and Phillips

Voice	Time	Summary
A Schroeder	19'02"	Told that the North is no place for a single woman. Settling down and child-bearing is preferred occupation.
B Phillips	19'27"	"It takes a strong person to go to the North. You can escape life and go to the North but when you are in an isolated village in the North, there is no escape.
A Schroeder	19'56"	You live with many people.
B Phillips	20'06"	You get to know each other intimately.
A Schroeder	20'32"	"Everyone knows everything; not by official news but by the grapevine. It was impossible to keep anything from anybody."
B Phillips	20'48"	The friends you choose are not really a choice.
A Schroeder	21'03"	It is a conglomeration. You do not choose to live with them [community members]. You find them or they find you.
B Phillips	21'09"	Decries the uniformity of the Northern experience and common tropes of living spaces and communal activities. You convince yourself that it's "the life."
A Schroeder	22'04"	If you are depressed, you can just visit someone. There is an intimate sense that you are sharing something.
B Phillips	22'19"	You exclude yourself from the world that will never understand. You make a new life with these people and ask if you've made peace with yourself.

Scene 3

Synopsis: The reality of North and de-romanticizing the North

Cast: Lotz, Vallee, Phillips, Maclean, Schroeder, and Vallee

Voice	Time	Summary
A Lotz	22'53"	"On reflection one realizes how reliant one has become on each other and on Northern living. Its vastness diminishes you."
B Vallee	23'44"	"The wide-open space is deceiving. It is open but surrounded by dangers."
C Phillips	24'13"	"A nation is great as long as it has a frontier. Canada still has that. Canadians have a civilization that does not conform to North American ideas."
B Vallee	25'13"	He didn't have a romantic reason to go North. Warns about building a cult of personality by living the stereotypes of Northern living.
D Maclean	26'34"	"One becomes a hermit by choice or necessity. Are you escaping by going North (or any direction)?" Evokes Shakespeare, "Sweet are the uses of adversity."
Silence. Only train	28'01"- 28'12"	Break in the scene.
A Lotz	28'13"	Anecdote about Inuit children who see themselves on television for the first time by CCTV setup.
C Phillips	29'15"	His illusions of the North were shattered by his experiences. Cannot maintain illusions when one sees disease, filth, and discrimination. Romantic condition is ugly by today's standards.
E Schroeder	30'31"	Was enticed by the romance but felt lost when first arrived.
B Vallee	31'18"	"It's like marriage. When the honeymoon period has passed, time reveals all."
E Schroeder	31'51"	"What is my purpose? One questions one's self and motives."
B Vallee	32'01"	People are disenchanting.
E Schroeder	32'46"	By the time she left she didn't want any part of the North anymore. Now she thinks she would like to go back.

Scene 4, The “dining car”*

Synopsis: ‘Conversation’ centres around ‘Eskimos’ and colonial attitudes

Cast: Phillips, Lotz, Vallee, and Schroeder.

*No linear formal analysis. See diagram of textural density.

Scene 5

Synopsis: Contemplations on the future of the North

Cast: Maclean, Phillips, and Lotz

*Linear formal analysis is difficult. It is free counterpoint.

Voice	Time	Summary
Maclean	42’50”	Talks of the noise of civilisation. Paradoxically you can not escape it until you accept it. Being able to select the noise you want/need to hear makes you a good analyst.
Phillips	44’09”	The North won’t be made up of miracle developments. It won’t be as economically rich as Alaska but it may look like the rest of suburban Canada.
Lotz	44’56”- 46’14”	
Phillips		“Many things won’t happen in the North because it’s not what Canada does. But it will do dramatic things but not necessarily good: Oil wells as an example. It will not do phony things.”
Lotz	47’42”	Thinks future should hold a look at the problems of social change in the North. He talks about the ‘phoniness’ in the North (antithetical to Phillips’ prognostication).

Scene: Epilogue, Maclean’s ‘Soliloquy’

Summary: Philosophies on what the North means and will mean to Canada.

Cast: Maclean, Sibelius’ symphony No. 5, 2nd movement.

Voice	Time	Summary
Maclean	49’58”- 58’54”	Philosophizes on what the North means and will mean to Canada. Follows the form of the music.

Appendix B: Glenn Gould's list of musical excerpts for *Stokowski: A portrait for radio*.¹

1973-20

7,105

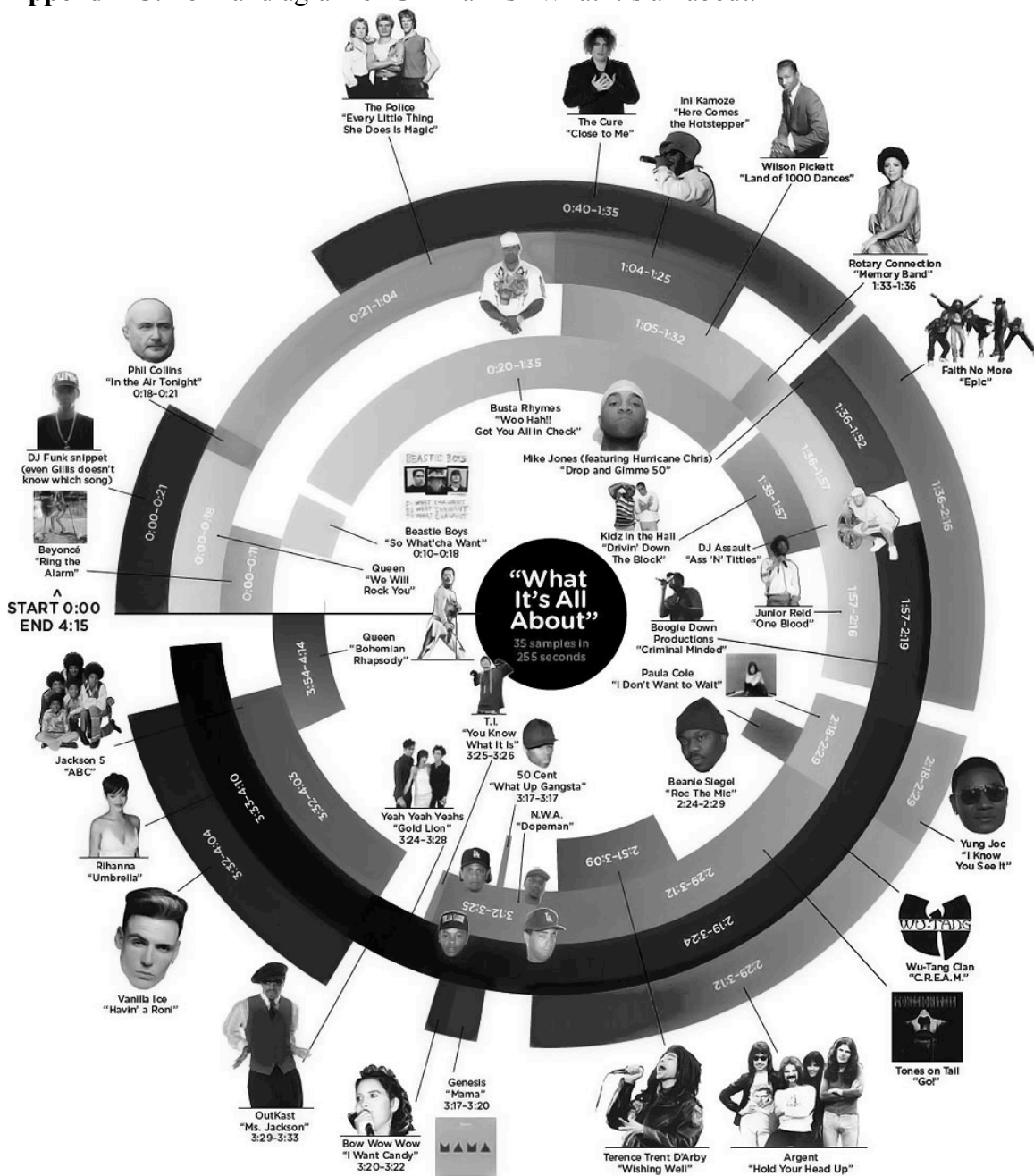
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STOKOWSKI - MUSICAL EXCERPTS

<u>T I T L E</u>	<u>COMPOSER</u>	<u>RECORDING COMPANY</u>	<u>T I M I N G</u>
1) Verklarte Nacht	Schonberg		9 min. 30 sec.
2) Piano Concerto No. 5	Beethoven	Columbia	4 min.
3) Serenade No. 1	Brahms	Decca	3 min.
4) Symphony No. 4	Ives	Columbia	3 min.
5-a) Piano Concerto cadenza	Schonberg	Columbia	1 min.
b) Gurrelieder	Schonberg	RCA	35 sec.
c) Piano Concerto cadenza	Schonberg	Columbia	1 min.
6) Symphony No. 11	Shostakovitch		7 min. 30 sec.
7) 'Come, Come, Ye, Saints'	Mormon Hymn	Columbia(?)	40 sec.
8) Ein feste Berg	Bach arr. Stokowski	RCA	35 sec.
9) Rienzi Overture	Wagner	RCA	45 sec.
10) Samson and Delilah Excerpts	Saint-Saens	RCA	1 min. 20 sec.
11) Symphony No. 5	Dvorak	RCA	40 sec.
12-a) Good Friday Spell	Wagner	RCA	40 sec.
b) Good Friday Spell	Wagner		1 min.
13) Swan of Tuonela	Sibelius		1 min. 20 sec.
14) Francesca da Rimini	Tchaikowsky		5 min. 10 sec.
15) The Planets	Holst		4 min.
16) The Poem of Ecstasy	Scriabin		2 min.
17) Good Friday Spell	Wagner		4 min.

1. Ottawa: Glenn Gould Collection, Library & Archives Canada. MUS 109 20/ 7, 105 1, [1970], 2010.

Appendix C: Formal diagram of Girl Talk's "What it's all about."²²



2. Angela Watercutter. "Mashup DJ Girl Talk deconstructs samples from Feed the Animals." *Wired* August 16 2008, 92.

Curriculum Vitae

Name: Anthony Cushing

Post-secondary Education and Degrees: Acadia University
Wolfville, Nova Scotia, Canada
1999-2002, B.A.M.

The University of Southern Maine
Gorham, Maine, USA
2003-2005, M.M.

The University of Western Ontario
London, Ontario, Canada
2007-2013, Ph.D.

Honours and Awards: George Proctor Award
2011

Related Work Experience Teaching Assistant
The University of Western Ontario
2007-2011

Publications:

Cushing, Anthony. "Glenn Gould and 'Opus 2': An outline for a musical understanding of contrapuntal radio with respect to *The Idea of North*." *Circuit, Musiques Contemporaines* 22, no. 2 (2012): 21-35.