CHAPTER 5

Londontown and the Continuity of Experience

"Art is the exposure to the tensions and problems of a false world so that man may endure exposing himself to the tensions and problems of the real world."

– Morse Peckham, *Man's Rage for Chaos: biology, behavior, and the arts* (1965: 314)

The title of this chapter and the quote by Morse Peckham may at first appear to be at odds with one another. Maintaining a continuity of experience with reality is exactly the thing Peckham argues that art should not do if it is to serve as a "…rehearsal for those real situations in which it is vital for our survival to endure cognitive tension…" (1965: 314). Rehearsal is the point on which this chapter and Peckham agree, however. If the rehearsal is to be effective, the work of art should maintain a sufficient degree of tension and confusion so as to be preparatory—it must create an experience that is adequately disorienting and sustain this experience throughout the work. Moments in which art's "false world" falters cause the rehearsal to break down. Cognitive tensions release and the challenge posed by the work is diminished. Its ability to prepare one to experience the world differently is lost or at best, postponed.

The research involved in creating works of Amergent music has been significantly helpful in not only seeing but hearing the world differently. Spatial concepts explored in relation to psychogeography and the Dérive produced several interesting standalone musical works. And while the results were interesting to listen to, they did not explore the potential of Amergent music in ways that demonstrate the flexibility and power of the genre. *Londontown* is an ongoing project focused on the development of a narrative-driven virtual world set in Victorian London. It involves, literally, the creation of a false world, one that is persistent and demands sonic continuity to affectively hold the world together. With its unique take on storytelling and seeded narrative, the project provided the perfect vehicle for testing the ideas behind Amergent music.

5.1 Spatial Practice: using space; living space in a virtual world

Amergent music is primarily concerned with sonic change over time. Those changes can be made relative to the environment in which the music is experienced or by specific actions taken on the part of the listener. That they are aware of how (technically or procedurally) their presence in a mediated environment shapes the music is irrelevant, but it is crucial for all musical development to be discernible and for there to be a clear connection between what they do (or have done) and what they hear. Amergent music operates as an ambience, following Brian Eno's requirement for Ambient music to be "…as ignorable as it is interesting" (1996: 296). Amergent music also represents a sonic "atmosphere," "influence," and "tint" (Eno 1996: 296), but one that will gradually shift over time. Listeners are unlikely to notice sweeping changes in their aural environment, but will discover that they are in a very different sonic "place" than they were when they first started.

Space is a useful metaphor to create and discuss music that behaves in this way. The idea that listeners can find themselves in "different places" is just one example of how powerful space, as a musical concept, can be. You sit at home or you sit in a restaurant. These are distinctly different places and each has its own sense of space. Apart from the obvious visual and aural differences, there are social differences that separate the two. In most restaurants it would be socially inappropriate to remove your socks and shoes and rest your feet on the table. At home this is your prerogative. These extremes represent two ends of a social space. And in between these is a variety of conditions that can modulate depending upon the unique environment and situation, for instance in a casual restaurant shoes off,

socks on, and feet under the table would be acceptable. Space is interesting because it is a fluid continuum. It is clearly defined, yet within it there can be a variety of conditions modulated by the extremes.

Amergent music uses this idea of a fluid continuum to pair musical potential with movement along a continuum or within a space. In practice, what has proven to be useful is to monitor movement within several different spaces simultaneously. In the way that a person may move between spousal space, parental space, employer space, and colleague space in the course of a day, it is possible to move within simultaneous musical spaces. In this chapter, the specific case of space as a tool for developing musical behaviors will be examined through a discussion and analysis of the project *Londontown*.

Londontown is a virtual world: an online social environment to be inhabited by thousands of human beings. Virtual worlds are similar to computer games that have either cooperative or competitive multiplayer modes, but they are not games. The world persists—time passes and events unfold—even when its citizens are not all present. As a project for this doctoral thesis, Londontown applies concepts of spatial practice and generative music to a narrative-driven virtual world.

I am involved with a team of writers, artists, and programmers, in creating a "vertical slice," a version of the world that has depth in its behavior and functionality but is narrow in scope. Rather than occupy the entirety of London, the vertical slice takes place in and around the Crystal Palace, at the original site in Hyde Park. I am using my style of Amergent music for the non-diegetic, character-driven music in the game. As a player-character moves through the world, his social, economic, familial, and professional experiences are made up from a confluence of prior successes, failures, romances, and intrigues—all the result of his actions in the world. Amergent music uses this tapestry of affect to construct musical underscoring that is directly drawn from the in-world dynamics of his current situation and based on a model of spatial relationships.

5.1.1 Spatial Theory: Lefebvre

The idea of space as a communicative medium has been discussed to an extent in previous chapters of this thesis. But when it comes to the specific focus of Amergent music further exploration is needed. Henri Lefebvre has written extensively on spatial practice. He differentiates physical space from social space, conceptual space, and space lived through images and symbols. He further defines a triadic relationship between representations of space, representational space, and spatial practice (Lefebvre 1991). In his essay *Allegories of Space*, Espen Aarseth (2007) discusses Lefebvre and how his conceptions of space could be useful in studying computer game and virtual world design. Ultimately, Aarseth is hesitant to pursue this thread, but I have found it to be extremely useful when thinking about ways to connect musical behavior with interactions in these sorts of environments. As the space of the imagination—one lived through images and symbols—Lefebvre's "representational spaces" (1991: 39) are particularly useful. He characterizes this kind of space as one that speaks with "…an affective kernel or centre…" (Lefebvre 1991: 42). My musical interpretation of this concept works to identify a theme or idea that is central to the mediated environment and to define it as a representational space.

An individual space is further defined by pairing it with a set of sonic possibilities. Field recordings, instrumental samples and phrases, synthesized sounds, and percussive patterns are just some of the audio elements that can be coupled with a space. It would be limiting to formalize the way sound and space are connected in this arrangement. Sounds are chosen based on a variety of variables relevant to a specific project. In the case of *Londontown*, specific aspects of the world and the way players interact with the world were chosen. The details of these are discussed later in this chapter, but in general, Amergent music aims to connect play and interaction to the mediated environment in ways that emphasize the uniqueness of each mediated experience.

As a result of this uniqueness, each space is not meant to have a binary, on/off sort of character. To

this end, the sounds of a space are chosen carefully to reflect the variety and nuance it contains. For instance, spaces that are more psychological may have an intensity of timbre but be rhythmically still, or spaces that suggest action will have more texture to introduce subtle rhythms that can be built upon if the intensity needs to be raised. These sounds are then ready to be played by generative instruments. Certain generative instruments, like the Shuffler(), are best for handling spaces where there are a variety of changes that must happen in short spans of time. In contrast, the End2End() instrument responds to change very slowly, but is much more effective for setting up foundational musical textures on which other sounds can build. The individuality of each space is defined by a constantly evolving, generative playback behavior and a specific palette of sounds. What will be heard is known generally but not specifically, which lends each space a character that is consistent over long periods of time but organic from moment to moment.

5.1.2 Spatial Theory: Debord revisited

Other spatial practices, including psychogeography and the dérive have a significant role to play in this conception of music, sound, and mediated interaction. What characterizes a space, or more specifically what is heard within a space to give it an identity is the first step in making a work of Amergent music. But for this music to reach its full potential (and have the most to offer its listeners) it is movement through space, movement across adjacent spaces, and movement within overlapping spaces that provides the most profound aural connection between one's actions and the mediated environment.

The dérive is based on the psychogeographic character of urban spaces. As you walk through the city some areas attract and draw you in; others do not and you move on until something more appealing causes you to change course. In this practice it is the boundaries and edges of attractive spaces that can provide the greatest interest. One boundary draws you towards the first space and another boundary beckons you to the next space. In the moment of transition something very interesting happens. As you move from one space to the next, you are in an intermediary space that shares the character or flavor of the adjacent two, three, or more spaces found at the given intersection. This is where the practice of the dérive holds the greatest musical potential.

It is in the "cracks" between intersections and boundaries where unimaginable spaces exist. These spaces are fleeting—almost evanescent—and indiscernible until you find yourself inside them. These are also the spaces that make Amergent music affectively powerful. They are the points at which change relative to actions taken within the mediated environment are audible. One space can be heard, but its uniqueness is thrown into relief at the introduction of another space. Simultaneously these two produce a third space which makes one's passage ever more apparent. The third space is ephemeral, and dissolves once movement from the first to the next space is complete. In an interview with Kristine McKenna, Brian Eno discussed a similar phenomenon:

> Each thing you add modifies the whole set of things that went before and you suddenly find yourself at a place that you couldn't possibly have conceived of, a place that's strange and curious to you. That sense of mystery, learning to live with it and make use of it, is extremely important. (Tamm 1995: 65)

In his contributions to the presentation *An Adaptive, Generative Music System for Games* (Larson 2010), composer Jim Hedges used this quote to discuss something that happens to musicians when creating generative music. Generative systems are generally so closely entangled that when one element changes it often affects everything else. These effects can be felt both immediately and gradually as the system is allowed to progress. When making generative music it is not uncommon to experience moments of complete surprise. Unimaginable sonic combinations emerge and dissipate, leaving the generative musician feeling simultaneously like the composer and the audience. The sense of mystery

Eno associates with unexpected "places" is exactly the feeling created by drifting from space to adjacent space, and the spatial organization of individual generative systems creates many opportunities for these effects to be heard and experienced.

Amergent music is based on the use of multiple generative systems. In the case of *Londontown,* the use of multiple spaces and the arrangement of these spaces were handled differently. Various aspects of the world—specifically those a player-character can affect and those they are most affected by—are assigned to a space. Consequently, movement within or across one of these spaces is no longer something residents are aware of. They exist in the world having conversations, doing work, and generally carrying-on in the ways that interest them most. They are focused on their experiences, but all the while the choices they make place them at a new location within each respective space. For example, as they get training in a new craft they move to a position of greater experience within their "Skills space," or when they start work for the day or are hired for a job they enter into their "Profession space." Players are not aware of these spatial adjustments. They take place in the computer code that runs to support *Londontown*. The spatial adjustments simply track player choices and the consequences of those choices, which are in turn translated into usable information for the generative music system coupled to that space. For instance, when a player-character starts work they enter their "profession space" and the rules that govern the generative system for that space take effect. If they in some way improve their lot vis-à-vis their career, they move into a different location of profession space where a different set of rules takes effect. A player-character's actions and consequences are manifested as music by triggering different sets of rules that govern the playback behavior of sound resources.

It is at these moments (between starting work and the first step towards professional success, as in the last example) where players will briefly hear a third space created by the overlapping boundaries of the first two. Certainly the difference between the two spaces is discernible, but the unique (and sometimes odd) third space acts as a sure signal that something has developed in the *Londontown* world. The affect of this musical behavior is never so drastic as to disrupt the continuity of the world (musical or otherwise), but it communicates enough of a message to help player-characters better understand their environment and situation.

5.1.3 Spatial Theory: further thoughts on urban planning as a musical paradigm

Earlier, this thesis explored the work of Kevin Lynch from *The Image of the City* (1960). It was discussed as being related to psychogeography, as Lynch endeavors to help urban planners better understand the ways in which people interpret and use the cities where they live. Among other things, Lynch calls for cities to be *legible* (Lynch 1960). He argues that if the features of an urban environment are apparent they become a sort of affordance (Norman 1989: 9) that not only reveals a general functionality but a specific usefulness for each person who encounters them. This kind of thinking was a crucial part of the musical organization that went into *Londontown*.

In the world of urban planning, a city park can have paths, benches, flowerbeds, and so on. But where these paths lead, the points at which the benches are placed, and the location of flower beds relative to both of these other features presents the park planner with a list of challenging problems: how can you facilitate various styles of movement—everything from fitness to leisure—on park paths? How do you position benches so as to provide privacy but not isolation? Can the flowerbeds work both as an invitation into the park and a reason to stay? For *Londontown* I was faced with similar questions: what sounds best communicate the idea of upper-, middle-, and lower-class status in society? Regardless of class, how does advancement in one's profession (both legal and criminal) change sonically over time? Choices can build or tarnish a player-character's reputation; how can an instrument convey the repute of the characters you meet? Ultimately the answers to these questions came down to legibility, and using a sound palette that makes a player-character's actions legible to them.

This was a difficult problem to solve. On 29 April 2010 in conversation with Lee Sheldon, the lead designer of *Londontown*, I was advised, "music should always encourage the player...use carrots, not sticks, to stimulate their experiences in the world." In the end I created an axis ranging from cloudy to lucid, where lucid communicates "what you are doing makes sense," and cloudy says "your actions are confusing." This solution involved no negative feedback. Using legible sounds and combinations of sounds, the music was affectively constructive and encouraging. When a resident enters the world and takes on a quest (a task they agree to complete for reward) they make a commitment that must be followed through. Music that can communicate the clarity or cloudiness of their actions in regards to completing that task makes a resident's actions much more legible as they move about and explore the world.

In the virtual world of *Londontown* it is likely that people will be there to earn respect, make money, gain power, and advance themselves in general. But the real focus of the world is on stories and the ability to construct a personal, narrative experience. Residents should be able to enter the world as a lower-class cobbler or upper-class gentleman thief and have two completely different experiences. In the specific case of music, what a resident hears when they are in the world as such different avatars should still convey the general musical tone of *Londontown* but a version of the music that is unique to the class and profession he has chosen and to the way he conducts himself in this role. A player-character can start in the same place but take new paths each time he visits the world. The same can be said of any urban setting. In *The Image of the City*, Kevin Lynch describes buildings, sidewalks, and other urban features as useful for the construction of personal narratives, "A landscape whose every rock tells a story may make difficult the creation of fresh stories" (Lynch 1960: 6). I heed this as a sort of warning, in that if the music of *Londontown* is too specific in its commentary on player-character actions it will run the risk of telling the same story on each visit. Even if a resident chooses to play as the same sort of character, or uses a similar strategy to get them through the challenges the world presents, their experience will not be the same and therefore should not sound the same. Amergent, and ultimately a generative, musical approach works to ensure the creation of fresh narrative possibilities with each visit to the world. Organizing the musical structure into discreet spaces creates a more responsive connection between the actions a player-character takes and the sounds that are available as musical material. And by using a variety of generative systems to organize and play those resources, there is less repetition within the music that makes each new story fresh to the ears.

5.1.4 *Londontown* Character Parameters

Spatial practice played a significant role in the musical development of *Londontown*. The project puts residents inside an idealized version of Victorian London that is seeded with potential for action, adventure, intrigue, political maneuvering, and savvy social advancement. The world is designed in such a way as to accommodate all of these possibilities, which not only adds to the variety of options set out for residents of *Londontown*, but adds to the overall texture and variety of the world. Though residents may not be specifically interested in political sparring, they can hear news of a political conflict and may have to navigate obstacles created in the wake of a particularly heated debate. In keeping with the rich, textural fabric of the world's narrative, the music must reflect the variety of situations one can encounter in *Londontown* and be able to shift tone and temperament with the changing dynamics of the world. The flexibility of a spatial approach makes this possible.

As discussed earlier, aspects of the world that most affected residents, or those they had the greatest hand in shaping, were assigned to a space. Each respective space was coupled to a generative system that best reflected the potential dynamics of the space in terms of instrumental behavior and available palette of sounds. As player-characters explored the world their actions dictated movement within and across these various spaces leading to a unique musical output particular to their present situation. The process of defining these spaces was lengthy. It involved constant consultation with the

Londontown design document, regular testing and revision of musical prototypes, and a good deal of speculative music making, where choices are made based on how something might *potentially* sound rather than how it actually sounds. This kind of guesswork is tedious but necessary. You have no idea what will actually happen in the world, so consequently you have no idea what specific events will come together to produce the music at any given moment in time. But you do have a general idea of *a set* of potential interactions based on *a set* of available behaviors. You know who the player-characters are as residents in the world (their professional and social credibility) and you have some ideas about their relationship with those they meet. The *Londontown* design document (Sheldon 2010) provided most of the information that was needed to reach an understanding of what tangible data would be available for creating music in real time. With it as my guide I developed five distinct spaces that most profoundly connect the mechanics of the world with choices a player makes.

5.1.4.1 Class Space

When players create a character they decide to enter *Londontown* as a member of either the upper, middle, or lower class. Gains or losses in financial and/or social status can cause a player to move up or down to the next class, though these sorts of changes are designed to happen slowly because it was deemed unrealistic for a player to constantly flip-flop in the social strata. Each class has a unique set of advantages and disadvantages. Players choose a class based on their preference as to the kind of experience they want to have in the world. Attaining higher levels of respect and financial security do not necessarily constitute a reward. For instance, it is demanding to maintain the luxurious lifestyle of an upper-class character while middle-class characters have the greatest deal of mobility.

With these properties in mind, Class space is intended to set the overall musical tone. It provides a continuous background or foundation to set all other musical elements in the foreground. As such, this space is constructed with two generative instruments: an End2End() instrument that plays a continuous eigentone loop, and four Shuffler() instruments playing various pitch clusters on two different synthesizer programs.

The Wobbly Harp program started as a preset for an acoustic harp but was transformed into a deep and rhythmically bouncy sound with an unpredictable texture. This quality gives the sound a stable presence that changes from rough to diffuse. The Transparent Shimmer program has more of an ethereal quality. When it plays there is a core to the sound but seemingly no boundary. The distribution of these instruments is different for each class, giving the upper class an overall "closed-in" tone, the lower class something more open and gritty, and the middle class something in between. The middle and lower classes both have a harmonic arrangement that modulates between major and minor triads, but at different rates which gives each a distinctly different mood (the lower class is heavier, for example). By comparison, the upper-class Shuffler() instruments play a series of stacked perfect 4ths to give this space an uncertain sound of tenuous stability.

The eigentone loops play a small but crucial role in further differentiating each of the three classes. "Eigentone" (Sonnenschein 2001: 187), or room tone, speaks further to the idea of space. Listening to the sound of rooms, stairways, and other architectural spaces opens one up to the wealth of sound that surrounds us on a daily basis. Not only is there *something* to hear but there is *a lot* to hear. The unique acoustic properties of the spaces we inhabit lend each an identity as individual as the color of the walls, furnishings, and overall shape and volume.

The idea that this could be put to musical use first struck me after reading a quote from Keith Rowe's liner notes to *Duos for Doris*. He said, "Somehow I wanted to move what I'm doing (intention) towards this notion of atmosphere...music as time, energising the air, making the silence (unintention) audible" (Toop 2005: 326). The idea of energizing the air and bringing greater attention to what I *was not* consciously hearing was very appealing. I was further encouraged after listening to the music

of Richard Chartier. Chartier's music is minimal to the point of being diaphanous. He recommends listening on headphones or through a quiet amplification system (Chartier 2010) which reinforces the sparseness of his aesthetic. Listening to Chartier's music has been both rewarding and instructive. I enjoy what I hear on the level of artistic appreciation; he is a brilliant musician. He is also technically astute and uses contemporary digital tools to emphasize the contrast of high/low frequency and loud/soft dynamics that permeate much of his work. Listening to his body of work has also taught me to be more sensitive to the sonic world I inhabit. Many times when listening to his work I find myself "stretching" my ears to locate a sound—what was that? From where did it come? Often times these sounds are not part of his work but something in my listening environment: the plumbing in a hotel, a car passing on the street or the dishwasher transitioning to a new cycle. Not only have I become aware of the variety of sounds that surround me but I am increasingly conscious of the musicality these sounds possess. What is easily ignored as a household machine holds equally fertile potential as an instrument sample or ingredient of a sonic texture.

Both techniques were used for the Class space eigentones of *Londontown*. The middle-class eigentone uses recordings of people talking in a large room with marble floors and walls and the occasional sound of horses pulling a carriage over cobblestones. The sound of the room worked well to convey the idea of a busy marketplace and the horses clearly connect with one mode of transportation available in the Victorian era. The upper-class eigentone was created from the sounds of stirring a teacup and a scratchy 78 rpm wax record, and the lower-class eigentone was constructed through the sounds of a blacksmith's shop: a hammer, a bellows, and hiss of a wood fire. These sounds were all subjected to digital signal processing. Sound-by-sound, this varied from light equalization and reverb to heavy time stretching and pitch shifting with a granular sampler. There were few directives guiding this work other than the idea to capture, preserve, or extract and emphasize the sound of an acoustic space present in each.

The Class space eigentones were not meant to be expressive or symbolic of anything in particular. Working from accounts in two separate books, *Victorian Soundscapes* by John M. Picker (2003) and *Pandæmonium* by Humphrey Jennings (1985), I was able to gather ideas for the sonic world that surrounded people in Victorian England. A crowd in a room finished in marble, the stirring of a teacup, a scratchy 78 rpm wax record, and various sounds from a blacksmith shop are all sounds that had a literal or conceptual connection to each class and, above all, could create three distinct sonic spaces to enhance and blend with the foundation music created by the four Shuffler() instruments.

Furthermore, class has a role to play in shaping a parameter in one of the other spaces. The Skills space is one that players enter into any time they use a learned skill or engage in training for a new skill. String instruments are coupled to this space, and the kind of string instrument is defined by class. Lower classes hear the manifestations of their skill use played by a sampled viola, while middle-class residents have a richer-sounding cello, and upper classes hear a full string section. This is one case where the stereotype of each class was enforced. A lush string section sonically connects with the luxurious lifestyle of the social elite, and as class status decreases so does the richness of each instrument. Because these are sampled sounds, I was able to further enhance these differences through electronic manipulation. Higher classes have a longer note sustain, a more dramatic attack, and a more pronounced reverberation decay. While these differences don't affect the sound of the Class space specifically, they contribute to a difference in the overall musical character of each class.

5.1.4.2 Profession Space

Doing work and having a profession is a part of life in *Londontown*. This provides players with a virtual income and gives them a means of advancement if they are interested in exploring the world in that way. This does not mean there is an expectation for productivity. Rather than pursue the industrious life of a dock manager, players may prefer to spend their time idly as a card player. In these

terms, "work" is defined loosely in the design of the world and it provides, above all else, an additional "…reason to go there" (de Kerckhove 2001: 63). And because there are so many potentially different "reasons to go there," Profession is the dimension for each player-character that has the greatest amount of breadth and depth.

In more general terms, anything a player does in relation to his working life constitutes movement within Professional space. To fit the wide variety of professional opportunities available to a player-character, this space is the most sonically diverse and expansive. Any time a player-character makes a choice that reflects on his professional life, he enters into, or moves within, the Professional space. The next section of this document elaborates in specific detail how these are treated musically.

5.1.4.3 Skills Space

Like skills in the physical world, skills in *Londontown* are acquired to help advance one's personal and professional prospects. After a player-character learns a new skill, any time they employ it they enter into the Skills space. At this point in the development of the project there is a discrepancy between what I intended to do musically with the Skills space and what is currently working in the vertical slice prototype. The Skills space and the sort of nuance it should be able to convey in future versions of Londontown is discussed in detail in chapter 7. With the current version of the vertical slice, each player has a single skill, or more aptly, a general ability to do things.

When a player-character exercises this ability he moves into the Skills space. Depending on his level of proficiency, the sound of the Skills space varies in density, where low to high levels of skill correlate with a thin to thick orchestration and intensity of phrasing. As mentioned earlier, social class standing has a part to play in defining the sound of the Skills space. Members of the lower class hear violas, the middle class cellos, and the upper class a full string section. Again, the idea was to sonically connect depth of timbre with a player-character's position in the social strata. This arrangement is further enhanced by the generative instrument used to play these sounds. The Skills space is heard through the combination of two Seq() instruments. When a player-character starts using a skill and enters into the Skills space, these instruments begin to play. Each plays through the pitches of a simple four-note scale at a rate determined by the player-character's level of ability. Over the course of his time in *Londontown* this ability increases and with it the rate at which each Seq() instrument plays through the available sounds. Player-characters with beginning level abilities hear slowly unfolding melodies; those who are more advanced hear cascading harmonies that shift over time relative to the other sounds playing in the Class and the other relevant spaces. Skills are something a player-character employs no matter what his current situation in the world. Regardless of class and ability level, the notes that belong to this space are harmonically related to all other available sounds such that they will always act to color or enhance other audible spaces but never suggest movement outside of them.

5.1.4.4 Origin Space

Origin is another player-defined space that can be determined when a new character is created upon entering *Londontown* for the first time. The Origin space is probably the smallest space overall. This is because, musically, it consists of no more than a series of melodic phrases or fragments. Each of these was recorded on instruments, and composed in a musical style native to the place of origin. These melodies play at the story beats (Douglass & Harnden 1996: 57), or significant points of arrival in a player-character's development—completion of a quest, meeting a potential ally, professional accomplishment, and so on. In terms of game mechanics, Origin is a useful space because it allows players to hear direct confirmation that they have accomplished something in the world. Furthermore it does this in a way that connects the acknowledgement sonically with their character. For instance, if the character is from Ireland they will hear tin whistle and bodhran. Origin is a space that does not currently exist in the vertical slice prototype of *Londontown* but is part of plan for future versions.

5.1.4.5 Reputation Space

Reputation is the most unique space in the music scheme. It reflects the reputation of other player-characters or non-player-characters (NPCs) you meet in the world. Your actions work to construct a personal reputation space but it is not audible to you. Rather, the reputations of other characters fill the reputation space you hear, making Reputation an "aura of approachability." You will hear the strong or weak reputation of characters you meet when you begin to interact with them.

The sound of the Reputation space is played on piano. This was a clear choice after completing some of the earliest prototypes for the *Londontown* music. Piano contributed a complementary voice to the overall sound of the project, it fit within the historical framework, and it bridged any potential gap between the three social classes. In addition, the attack of the piano and its ability to add color to existing musical material allowed me to use this instrument as the brightest and most transparent layer in the overall musical construction.

The piano that makes up the Reputation space is performed by two Scaler instruments. I approached this as the "right hand" and "left hand" of a virtual pianist. For encounters with characters of a positive reputation, the left hand plays from an available nine notes (~1.5 octaves) of a minor pentatonic scale and the right hand has an available twelve notes (~2 octaves) of a major pentatonic scale starting a minor third + two octaves above the left hand. For less reputable associates, the instruments retain all of the other parameters but switch their available pitches to notes of a half step/whole-step octatonic scale. This scale retains many of the same pitches in both pentatonic scales and introduces others that don't exactly fit the overall harmonic character of the music. In keeping with the directive to always encourage a player, the awkwardness these scales create gives each non-reputable encounter a sound that is uncertain and occasionally uncomfortable, but never sinister or threatening. In addition, this arrangement of two scaler instruments allows the piano to find a compromise for situations in which you encounter a group of mixed reputations. All permutations of the two pentatonic and two octatonic scales are possible depending on the specific situation. Lastly, to increase the authenticity of the entire performance, the left hand plays less frequently and with less activity than the right hand.

Though it is usually musically inadvisable to use a computer for something better left to the finesse of a human performer, the dynamics of *Londontown* demanded it. Generative music can respond to the myriad combinations that emerge from the narrative of the world. For all spaces—and especially Reputation—the variety of combinations would demand too many individual sound assets, all of which would have to be created for generic situations. With a pair of generative instruments I am able to evoke the performance of the music demanded and be certain that it will sound fresh every time it is heard. The notes and harmonic structure of this space were important but the phrasing of the notes and the silences between them were equally if not more important. I was inspired by *Eusebius*, movement 5 from *Carnaval* Op. 9 by Robert Schumann (1992). This piece has a lightness and sombre airiness that gave me a clear sense of many vistas appropriate to the project: the gentle slopes of Hyde Park, morning dew on the grass, a narrow strip of cobblestones, fog, and the diffuse light of a gas lamp. In the music of *Londontown* the piano takes on a mythic quality. It connects all residents and must work to create a space that has a clear sonic consistency and identity throughout.

5.1.5 *Londontown* Profession Types

Within the Profession space there are subdivisions for various kinds of professions available in *Londontown*. These were designed around the four types of MMO players defined by Richard Bartle (1996). All of the professions are suited to different styles of play that can be expected in a virtual world. Of course, enlistment in a profession never restricts players to a particular sort of engagement with the world. But by providing the kind of work expected in these professions, each creates the kinds of opportunities different players may seek. From a musical perspective the task was to look at

the possible actions and behaviors of each type and develop a palette of sounds that could reflect the potential dynamics.

5.1.5.1 Achievement Professions

These professions are for players who treat the virtual world as if it were a game. They give themselves game-oriented goals and strive to achieve them (Bartle 1996). In the *Londontown* vertical slice the achievement professions are Articled Clerk, Merchant, and Tailor (Sheldon 2010). In keeping with this idea, the sound of Professional space for an achiever is non-rhythmic but intense. This works to lend a more focused, almost pointed character to the music when a player-character is focused on setting and meeting goals in the virtual world.

5.1.5.2 Exploration Professions

As the name suggests, people who enter into these professions are those who like the thrill of investigating and wandering through new territory. According to Bartle (1996), explorers like to learn as much about the world as they can, often at the expense of advancing their character. Players can explore the *Londontown* vertical slice as a Fleet Street Reporter or Nurse (Sheldon 2010). The sound of the exploration profession is the most sonically open—contemplative and even moody so as to absorb the widest variety of musical possibilities. If explorers are likely to see the world with greater depth than others, the sound of their profession must be the most pliable and accepting of other sounds.

5.1.5.3 Social Professions

Bartle describes social players as those who use the world to engage others, which means communication and role-playing are important to them, as is the sense of community that can be derived from this sort of experience (1996). Vertical slice social professions in *Londontown* include Street Artist, Busker (street musician), Chef, Servant, and Hostess (Sheldon 2010). It is likely that player-characters in these professions will spend more of their time around others, which means that Reputation space is likely to be a dominant sound in their version of the world. Consequently, the Social profession sound is light and airy. It was created by modifying a synthesized handbell and adding some delay to introduce randomness to the decay. The sound initially speaks clearly in the overall texture of the music but decays with an open resonance allowing it to linger more subtly.

5.1.5.4 Action Professions

Bartle's fourth type includes "Killers," those who impose themselves on others in the world through kindness (which is rare) or through viciousness. The vertical slice does not support combat; consequently physical violence and murder are not currently part of *Londontown*. Killer behavior is impossible. But for those who seek a more physical existence in the world, there are the Action professions which include Consulting Detective and Lady Con Artist (Sheldon 2010). The Action sound palette was developed around a general set of ideas including "the military," "law enforcement," and "pursuit on foot." It consists of two parts: a synthesized lead and a set of percussion patterns.

The synthesized lead was designed from the ground up to have an intense, urgent, slightly brassy tone reminiscent of horns calling troops to order in the distance. Its soft attack and gradual decay allow it to fit neatly into the mix along with the other sounds but it is always heard as a clear lead in the overall arrangement. The percussion patterns were created with fragments from a commercial orchestral sound sample library. There are thirteen patterns altogether, which provides a broad range of intensity. The sounds themselves are mixed. There are clear military snare drums, noisy drums with thick skin heads, cymbal hits and scrapes, a clave and an anvil. This variety keeps with the loose theme developed for this space and provides a good deal of contrast across the various patterns. In later versions of the *Londontown* world there are design plans for light combat, making the musical ideas behind this pro-

fession extensible for features yet to come.

5.1.5.5 Movement within Profession Space

Any choices made by a player-character, or any circumstances that arise relative to their profession, will constitute a move within the Professional space. All of the professions follow the same template or general set of procedures to correlate spatial changes with sonic changes. There are five discrete locales within Profession space: a neutral point at the center, two points moving towards greater clarity and two moving towards greater ambiguity (see figure 5.1). In this case, ambiguity and clarity are determined relative to the choices a player-character has made with regards to performance of the task at hand. Within each point is a set of three notes that forms either a major or minor triad. These pitches, when heard against those of the foundational Class space, create compelling tonal combinations that bind class and profession in a single cohesive musical statement.

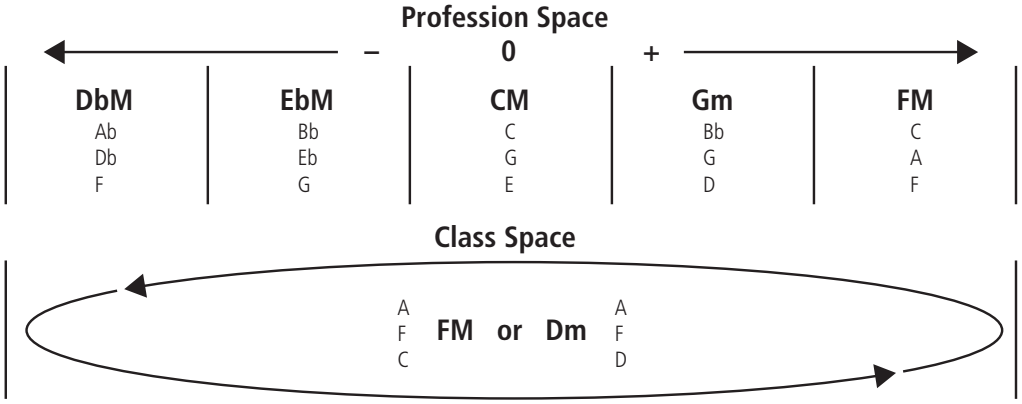

Figure 5.1: Profession space is organized along a single continuum ranging from sonically cloudy (–) to lucid (+). Each point along the axis has a harmonic structure that works to complement that of the Class space.

Visually this arrangement may seem to break with the assertion that the world will have a seamless overall musical flow that closely couples sound with interaction. What you do not see here is how this structure unfolds over time. While each space fits neatly along the axis of the space, the sounds themselves do not. When a player-character makes a choice, they enter into a new space and a new set of sounds becomes available to reflect this change. However, any sounds that are currently playing when this happens will continue to play and bleed over the edges. This means that sounds from a previous space can be winding down and decaying while sounds from the new, adjacent space are first introduced. This is the precise situation that Eno speaks of in his earlier characterization of generative music. The unexpected (and often unintended) combination of sounds leaves one listening to something strange and new, yet in the case of *Londontown*, it is exactly what they should hear given the events that leading them up to that moment. This idea is one of the core strengths of Amergent music and with any experience of music that allows listeners to hear how their presence in an environment contributes to its sound. Furthermore, the idea resonates with the experience of *becoming* that adds depth and wonder to our daily existence in the physical world.

5.2 Becoming and the Construction of Mediated Reality

The priority of Amergent music is to maintain the continuity of mediated reality through sound. In the early stages of this research, this was done through an examination of emergence, where multiple, chaotic interactions produce an ordered whole (Ascott 2003). Interaction is a means of organization that forms the work of art or music. It is not necessarily *the* work, but *a version of* the work that retains a general affective core or identity but is unique in its detail. As research progressed, the mechanics

of interaction and the construction of mediated reality gained support through metaphysics and philosophies of becoming that meditate on human perceptions of reality.

5.2.1 Process Philosophy

Amergent music uses multiple, spatially organized generative systems to sustain the continuity of a mediated reality. Movement leads to the temporary presence of a new space created by the overlapping sounds of adjacent, permanent spaces. The sound of this is unexpected, yet musically satisfying and true to the becoming of a mediated reality. Virtual worlds like *Londontown* and other mediated environments situate residents (users, players, etc.) in a reality that is emergent and ever-changing. Henri Bergson writes, "Matter or mind, reality has appeared to us as a perpetual becoming. It makes itself or it unmakes itself, but it is never something made" (Bergson 1998: 272). Bergson also draws a useful comparison between the mechanism of conceptual thought and the mechanism of the cinematograph. His metaphor poses the idea that we create reality as the viewers of a filmstrip with limitless frames. Each frame flickers into view to show reality in the making. But as this frame is replaced by the next, a new reality presents itself, unmaking the past, and revealing the potential for a future that is still in the making.

Amergent music—through the constant flux of the generative process and further revised via interactions and perturbations—has these same dynamics. It is a music that is both making and unmaking, but never made. Charles Hartshorne writes that where process philosophy "…is a doctrine of being in becoming, permanence in the novel…" (Browning 1965: xix), Amergent music is characterized by a becoming of sound. The permanence of a musical work is found in the novel and fleeting combination of sounds produced by generative techniques and perturbations to these through systems of interaction.

A musical work is only as permanent as the reality we experience. We are "in it" but we can neither slow nor freeze it. Experience is not tangible but must be recognized in the flow of becoming. Ilya Prigogine discusses this in relation to the philosophy of Alfred North Whitehead:

> For him, being is inseparable from becoming. … Physics and metaphysics are indeed coming together today in a conception of the world in which process, becoming, is taken as a primary constituent of physical existence and where, unlike Leibnitz' monads, existing entities can interact and therefore also be born and die. (1984: 303)

While Amergent music exists as part of a mediated reality, the components that comprise it are not monadic. The ingredients that make Amergent music are processes that unfold in a continuous becoming. At the most bare-bones technical level, there are digital sound files that exist in binary code on some sort of digital storage device. But this is not the music. Amergent music only exists in the process of becoming. As these sound files are played as part of a generative system they enter into process and are heard as a becoming of music.

William James considered the idea of being in becoming similarly, and put it into graphic language. Consider the illustration (figure 5.2) reproduced in *Philosophers Of Process*. James shows that three processes of thought are initiated: a, b, and c. The arc of each process illustrates how it develops, peaks, and decays. The process for a has not yet ended, the process for c is in-progress, while b is still building. The vertical line represents a "time-instant" (Browning & Myers 1998: 91) in which all three processes are present and at various states in their development. Processes a, b, and c are identical to the sounds of individual spaces in a work of Amergent music. The vertical line represents what is heard at the moment in which one's interaction moves them out of space a, into space c, and more deeply into space b. Individual time-instants are experienced like the frames running through Bergson's cinematograph. Individual moments mean little on their own, but when experienced in succession as a passage of time or movement through space, a sonic reality emerges as a becoming of music.

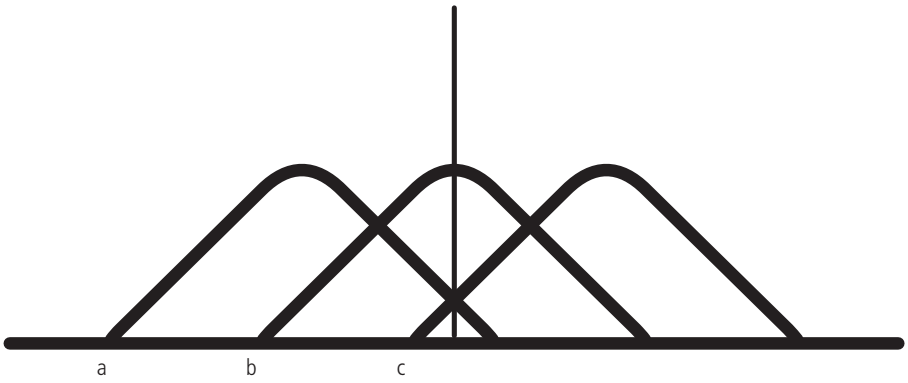

Figure 5.2: Here, James shows three "…neural processes correlated with the thoughts of those three letters [a, b, & c]" (Browning & Myers 1998: 91). At the present moment (the vertical line), each is at a different level of intensity either rising, peaking, or waning.

5.2.2 Mobile Sections, Affect & Intensity

Movement, and the movement of component parts, is foundational for Gilles Deleuze in *Cinema 1: the movement-image*. His examination of Bergson and *Creative Evolution* concludes at the idea of mobile sections. When individual, constituent parts move over time and produce qualitative change(s) within a whole, the whole becomes a mobile section (Deleuze 1986). Movement that produces a mobile section is much like the movement of individual sounds within a generative system. Though sounds don't physically move in terms of position, there is movement in the envelope of a sound (the overall shape of its amplitude), in timbral shifts, and with any other modulations or effects that change a sound over time. Generative instruments like the Shuffler() have their own sort of movement as well. Sounds set to play at varying intervals fall in and out of phase with one another in heavy gallops and gentle steps on tip-toes. Similarly, pitched sounds play in myriad combinations to produce colorful harmonic textures. As discussed elsewhere in this thesis, movements—harmonic, textural and timbral—are what make a generative system a mobile section. Sonic transformation is apparent in these qualities and it produces qualitative change within a generative system and within the space coupled to it.

As it concerns Amergent music and the research that produced this thesis, the sonic activity of a generative system, functioning as mobile section, creates movement that is the becoming of music. This music does not signify; nothing is meant to "represent." Its sound is reflective of potential in the virtual world—a reminder of the current becoming and those yet to be experienced. It reveals a confluence of relevant matters given the current situation of the player-character. What is heard in each moment is as likely to be the result of their most recent decision as it is a result of their fifth decision from last Tuesday. This music deals in the emergence of a mediated environment and contributes to the affect of situations created or discovered by player-characters.

Brian Massumi characterizes affect as "…the connecting thread of experience" (2002: 217). It is neither emotional nor personal, but "trans-situational" as "…an autonomy of event-connection continuing across its own serialized capture in context" (Massumi 2002: 217). Amergent music uses affect to maintain a continuity of experience in *Londontown*. Sounds—becoming music—are heard in passage across and through design spaces to construct a player-character's affective experience of the world. The overlapping of sound envelopes, like James' striated processes of reality, link moment to moment and event to event. In the flow of becoming constituent parts blend to form a mobile section that leads to qualitative change in the overall experience of the virtual world.

When viewed in the flow of becoming, affect can be more clearly understood as having more than a

single value but a varying mixture of values contributing to it. To account for the complexity and nuance that contributes to affect, Deleuze refers to *intensities*. Claire Colebrook explains:

> If we see the world, usually as a set of extended objects and as part of a uniform and measurable space, this is because we have synthesized intensities. Intensities are not just qualities—such as redness—they are the becoming of qualities: say the burning and wavering infrared light we eventually see as red. (2002: 39)

Intensity is the becoming of a quality; the quality of affect is intensive. The affect of Amergent music is produced through multiple, layered combinations of sound that swell and recede as they follow both their own internal order (timbre and envelope) and the order of the generative system that plays them. Each has its own quality. But in a layered configuration that varies density over time, the becoming of a quality, or an intensity, emerges. The generative systems that make up the sound of various spaces in *Londontown* (Class, Skills, Profession, Origin, and Reputation) are therefore more aptly called *Intensities*. As a player-character's experience of the world develops, the dynamics of emergence and intensity serve to connect experience in this mediated reality. Brian Massumi comments:

> Intensity is immanent to matter and to events, to mind and to body and to every level of bifurcation composing them and which they compose. Thus it also cannot but be experienced, in effect—in the proliferations of levels of organization it ceaselessly gives rise to, generates and regenerates, at every suspended moment. (2002: 33)

With this point Massumi connects James and Deleuze in a way that is most relevant to *Londontown* and Amergent music in general. A constantly churning, endlessly revising generative system can be discussed as dynamic, harmonic, textural, timbral—but it is all just a matter of intensity. In the musical system devised for *Londontown*, multiple generative systems create multiple Intensities and work together to weave the connective thread of this mediated reality. As they are perturbed by the interactions of player-characters in the virtual world, Intensities are accordingly transformed and with them the affects of one's experience.

The ontology of mediated environments is the driving force behind Amergent music. In the course of this research, metaphysics and philosophy were initially found to provide useful terms for the sake of comparison and explanation. Over time the artistic merits of these theories became apparent. Each offers a perspective against which to compare the experience of hearing Amergent music. This music does not seek to duplicate an experience of non-mediated reality, but to explore resonances between theory and artistic practice and construct a continuous and immersive mediated reality.

5.2.3 Intensity & Musical Mediation in Victorian London

For *Londontown*, all in-game music was generated relative to player choices. At the start of the project it was essential to identify the factors related to player characters that contribute to musical continuity and development. When entering *Londontown*, all players must create a character. The *Londontown* design doc states:

> Character Creation allows them to easily choose what class they wish to start out in, their names, where they are from and what they look like. Choice of Class restricts Residents to certain types of Names, Places of Origin and Physical Characteristics. Choice of Place of Origin can influence success at Professions, as indicated… (Sheldon 2010)

Because character is such an essential building block to the experience of *Londontown*, the music system was player-centric in its conception. While in the world, non-diegetic music (the musical part of a soundtrack) is generated relative to a set of in-world parameters—Intensities—that are specific to a player-character and the things they can/may do in the world.

There are three kinds of Intensities: Player-Defined, Player-Developed, and Seeded. Player-Defined intensities are established at the outset when a character is created and will form the foundation of the soundtrack. Player-Developed intensities are those most closely connected with the specific events of a player-character's growth and development. Seeded intensities are linked to third-parties: people, places, and things in the world that offer creative or strategic possibilities to a player-character. Tables 5.1-5.5 detail the various Intensities proposed for *Londontown* and the ways in which these correlate to the instruments and sounds that comprise the generative music system.

Table 5.1: *Londontown* Class Intensities

Class (Player-Defined intensity)	
Four Shuffler() instruments Sets the overall tone An ambience; present throughout the world Presence or density set by instrumentation	
Lower class	• "World is won by cunning and ingenuity and the labor of your two hands whether you are a cobbler or a thief." (Sheldon 2010) • Overall density is sparse to diffuse • FM/Dm harmonic structure
Middle class	• "World is one of mobility and money. A member of the middle class can aspire to greater things with a wider range of options (both legal and illegal) than the other classes." (Sheldon 2010) • Overall density is diffuse • Am/CM harmonic structure
Upper class	• "World is beautiful and bountiful on the surface with power and pleasure foremost. But it is always a challenge to maintain appearances and the 'right' connections (both legal and illegal) to succeed in society." (Sheldon 2010) • Overall density is diffuse to lush • Em/Asus4 harmonic structure

Table 5.2: *Londontown* Profession Intensities

Profession (Player-Defined intensity)	
Three Shuffler() instruments. Fairly dominant lead Intensity. This in addition to the class and reputation (of others heard nearby) make a complete non-diegetic accompaniment. This Intensity may not be relevant when a character is engaged in leisure or any non-professional activities, which helps enhance the distinctions between "work days" and "days off."	
Achievement profession: law, politics, commerce dock manager (middle class) tailor (middle class)	Intense; non-rhythmic. A lead sound to pull others along with it. AbM, BbM, GM, Dm, CM over class intensity
Action profession: law enforcement, security, crime constable (lower class) thief (lower class)	Intense; rhythmic. Sits "around" or acts as a frame to other tracks. DbM, EbM, CM, Gm, FM over class intensity
Exploration profession: question askers, problem solvers journalist (middle class) curator (upper class)	Moody, contemplative, sonically open to absorb a variety of musical possibilities. EbM, BbM, GM, CM, FM over class intensity
Social profession: artists, servants, leisure street artist (lower class) caterer (middle class)	Light and airy. It's plausible that social players will spend more of their time around others, so the Reputation Intensity is likely to be more dominant. A Social profession Intensity has a subtle presence. DbM, EbM, CM, Gm, FM over class intensity

Table 5.3: *Londontown* Skills Intensities

Skills (Player-Developed intensity)	
Seq() instrument A thin texture that plays when a player is required to use an acquired skill to perform a task. Density of the texture is set relative to the character's proficiency with a given skill. Two Hexatonic Major scales create varying harmonic and melodic textures	
Lower class	viola: short attack & decay
Middle class	cello: moderate attack; short decay
Upper class	full string section: moderate attack; long decay

Table 5.4: *Londontown* Reputation Intensities

Reputation (Player-Developed intensity)	
Scaler() instrument A "silent" layer: the reputation a player builds is heard only by other players Acts as an "aura of approachability" for NPCs and other player-characters Players hear a reputation track comprised of nearest player characters and/or NPCs Can act to foreshadow or warn against a potentially dangerous encounter. Fairly dominant lead layer. This in addition to the class and profession should make a complete non-diegetic accompaniment. Wherever a player goes their reputation precedes them.	
Reputable	piano (minor pentatonic/Major pentatonic); full strings (Major pentatonic)
Untrustworthy	piano (half/whole octatonic);

Table 5.5: *Londontown* Utility Intensities

Utility (Seeded intensity)	
Similar to Reputation Intensity as an "aura of approachability" but applies to people, objects, and sites within the world. Will signal whether the person, object, or place to which it is attached can be useful to a player pursuing a quest or seeking to further their interests in the world. **This Intensity is not yet implemented in the project.**	
Useful	Short melodic phrase based on Profession Intensity sounds
Not useful	No sound; if a Utility Intensity is playing, silence it

5.3 Creating a Musically Mediated Reality

The music for *Londontown* required that creative attention be focused on two priorities: that it convey an overall cinematic quality, and that it maintain a continuity of experience for players who reside in the world. The continuity of experience has occupied much of the discussion in this chapter so far. The use of generative systems and arrangement of musical material relative to potential player-character interactions with the world show that Amergent music presents a unique means of creating music that grows and changes with a persistent mediated environment.

The demand that the music take on a cinematic quality posed an interesting challenge. To be specific, "cinematic" means that the music should reference the sound of classic Hollywood scores by composers like Bernard Hermann and Jerry Goldsmith. Sampled string instruments were essential to the project, and each was prepared to blend with all synthesized and other sampled sounds to complete the entire musical piece. Compared to the strings, these sounds had a more subtle, transparent quality that worked well in situations where combined layers of sound were more important than any one individual instrument. The final music paid homage to a Hollywood score but was above all malleable, and could grow and adapt with the world.

5.3.1 System for Interaction: Londontown journalism quest walk-through

In *Londontown*, all significant interactions with the world are based on *quests*: simple tasks a player-character must complete to gain skill, money, influence, or some other advantage. In the vertical slice there are hundreds of quests and in the final version there will be thousands. Because they have such an important role in the design of the world, the design of the music system can be best explained by looking at a few specific quests.

Quests are shared with the design team as a script, but the term *script* should be understood loosely. Unlike scripts for plays and movies with a specific trajectory of action and dialogue, a virtual world script contains possibilities for action and dialogue given the range of possible choices a player-character may make in any given situation. This example outlines the steps a player-character must pursue to show they have the aptitude to work as a journalist and enter into that profession. In short, a player-character must:

1. Approach another player-character (PC) or NPC and engage them in conversation.
2. Encourage that PC or NPC to gossip.
3. Judge the validity of this gossip. If it appears to be true, share it with a newspaper editor as a story lead. The editor will either accept or reject the lead.
4. Once a player-character has accumulated three leads they are allowed to enter the journalism profession.

An example walk-through of this quest can be found in section 6 of the supporting DVD. While working to complete these steps, player-characters inevitably move into (and within) the Profession space, Skill space, and Reputation space (in the quest walk-through these are labeled as *Leads*, *Talking*, and *Reputation* respectively). In the next section, a few specific cases are discussed that pair musical events with choices made along the way to complete a quest.

5.3.2 Resultant Musical World

In the vertical slice of *Londontown* there are a limited number of professions spread over all three social classes. At the time of this writing the vertical slice was still in development. The testing done to evaluate the music was conducted with all currently available resources. Consequently, the class-profession combinations (see table 5.6) used in these tests do not represent a "best-case scenario" to any degree at all. They simply provide the mix of potential events that act as a catalyst for producing music in *Londontown*.

Table 5.6: Londontown Music Tests Organized by Profession & Class

Profession (Type)	Class	Quest Description
Thief (Action)	Low	You are hired to steal a portrait; success means financial reward
Street Artist (Social)	Low	You are hired to draw a portrait that will identify a criminal
Tailor (Achievement)	Middle	You must get organized and work your way through a mountain of orders
Curator (Exploration)	Upper	You are called to assist the head curator in an important task

The music tests recorded for *Londontown* are speculative in that they consider what is known about the design of the virtual world and explore the possibilities within that frame. This music provides answers to such questions as, "what would it sound like if...?" Given the extensibility of the Amergent music system that was created for this project, any scenario from the *Londontown* world can be set up and run through a variety of "what if..." conditions. This sort of testing serves two purposes. First,

it enables one to hear if the music system is as robust as believed to be. Compared to the Journalism quest walk-through, these tests put all of the generative instruments to work and explored a variety of changes within each Intensity. Secondly, testing produces artifacts that help to evaluate whether the sound of various in-world experiences are aurally congruent with the visual and narrative experience of the world. Test recordings of various quests and player-character class-profession combinations are discussed further in chapter 7 and can be heard in section 6 of the supporting DVD.

5.3.3 *Londontown* Eigentone Tracks

Thus far any discussion of eigentones has been framed as something "in addition to" the music when in fact this element is very much a part of the music. And while it is not subject to the constant change and development that comes from player-character interaction in the world, it is the ingredient that helps the other voices speak clearly and establishes the overall musical character I was after.

As mentioned earlier, one touchstone for the *Londontown* music was the work of Richard Chartier. In part, this was an aesthetic choice, but largely, the aesthetics were based on a required musical functionality or need I had identified for the project. One main directive for the Londontown music was that it have a cinematic quality. If you think about a narrative film as an audience's window to a new world, its music can be thought of as a pane of stained glass in that window. Speaking in very general terms, narrative film music is strongly shaded to color the story world in an incredibly deliberate and specific way. It helps the director tell a story by guiding audience interpretation of the images and sounds that are presented in the theater (Gorbman 1987). One's view through the window is entirely affected by the color of the glass. And while it may change shades it is always seen-through, permanently binding the visual and audio tracks as one (Chion 1994). Though *Londontown* is designed with narrative experience in mind, it is not *the story* being told but *a story* that has been seeded in the world and left for player-characters to discover and grow in the directions they find most compelling. Consequently, the music of *Londontown* cannot use such a heavy-handed approach that makes specific commentary on events that unfold on the screen. Future events are unfathomable and therefore it is impossible to take specific steps that musically guide interpretation. This music deals in narrative potential—the myriad choices to be made and a broad spectrum of possible outcomes in which players create their own stories.

Returning to film music and the stained glass metaphor, *Londontown* required a level of musical specificity (or tinted-ness) that was appropriate to the seeded narrative of the virtual world. As mentioned earlier, Eno's Ambient music was meant to provide an "atmosphere" (1996: 296) or hue in the listening environment. This style provided an initial direction. Richard Chartier's music was helpful as well, and I considered these two to be at opposite ends of a continuum. Eno-esque Ambient music is sparse, but still lush and immersive. If Ambient music is like glass, its tint is subtle. Chartier's ultra-minimal electronic compositions are more like gossamer than glass: it alters one's view to a world but the specific adjustment is, at times, uncertain. Chartier sets an extreme example for what I wanted to do with *Londontown*, which is best described as *gauzy*. The music, like coarse linen should be sheer enough so as to allow some of the real world to pass through untinged, but still have enough aural presence to affect one's experience in the world.

The overall texture and density of the music was extremely important to this project for several reasons. In trying to balance the sound of film music with the priority for rich interaction in a world with seeded narrative, density and texture made all the difference. A gauzy or "threadbare" music has substance that adds to the flavor and detail of the mediated world, but it also allows that world into the music. It balances the immersive ambience of Eno with the diaphanous acousmatics of Chartier to create space for the listener's experience of the world. He is not simply interpreting what he sees and hears before him, he is negotiating possible realities in the virtual world. Affect forges the connection (albeit fleeting) to the mediated environment he currently occupies.

The preparations for this music demanded hours of listening to hear how it would perform over the hours (and hours…) that pass in *Londontown*. The first conclusion was that this music cannot exist alone: it *requires interaction* to sound its best. For instance, the techniques employed in *Londontown* could not be used to make music for a comparatively static museum environment. All of the Intensities that comprise the various layers of this music have been organized to expect frequent perturbation. When there is nothing to perturb them they stagnate and the music becomes repetitious. This does not threaten the musical viability of the world. It was designed as a dynamic environment and there will always be enough happening to keep the musical mix "agitated." Even player-characters who sneak through the world will sufficiently perturb the various musical Intensities to maintain the flow of musical becoming.

The research involved in *Londontown* shows that generative music systems meant to function in mediated environments cannot be generic; there is no such thing as "one size fits all." A commonality in some shared assets is to be expected, but the particulars that couple music to environment—sounds, generative instruments, inputs, perturbations, etcetera—should have a unique configuration custom-fitted for the specific project. For Amergent music to reach its full potential all dynamics that go into making an environment, those ontological characteristics that comprise its essence, should be closely connected to the processes of music-making. Features that lend a mediated environment its uniqueness show which musical behaviors are likely to have the greatest impact in forming its sonic traits. The *Londontown* project also provided a good deal of insight on generative music systems in general and many possible directions for future projects.

5.3.4 Generative System

The generative music system developed for *Londontown* was drawn from many previous projects, especially *Dérive Entre Mille Sons* and the *Dérive Studies*. These were the first projects to experiment with interaction and spatially organized music, which form the core of *Londontown*'s generative system. Other aspects such as the sextet of generative instruments have been in progress for much longer. Systems such as the Particle Swarm Optimization algorithm were abandoned along the way. This system served me very well for many previous projects but was unnecessary for *Londontown*. The wealth of dynamics that comprise the virtual world provide more than enough data to maintain musical interest over time. Virtual life replaced artificial life as the driving force behind a musical work. In the way that prior projects created the tools necessary to complete *Londontown*, *Londontown* has done its share in helping to define additional tools for works yet to come.

One of the greatest challenges faced in developing generative music for *Londontown* or any of the other projects discussed in this thesis was testing and prototyping. Generally speaking, applications made for music production do not support generative behaviors. Conversely a piece of software intended to create generative music uses behaviors and logic that would be incredibly difficult if not impossible to duplicate in the finished work (Nodal (www.csse.monash.edu.au/~cema/nodal) & Noatikl (http://intermorphic.com/tools/noatikl) are two such examples). In addition, none of these applications offer a means of simulating the variety of perturbations that will push and pull the music in new directions.

Max/MSP is one of the most flexible audio and video processing tools available and it provided a solution both stable and extensible. All of the generative instruments were coded using objects native to the Max/MSP environment. These instruments exhibited the behavior and logic required but were not built to produce any sound. The synthesizers and samplers that run in Apple's Logic were used to fulfill that aspect of the system. Logic and Max/MSP were then connected by sending MIDI messages from one application to another using the Macintosh IAC bus (Harrop 2007). This system used Max/MSP to handle the logic and parameters for each generative instrument and Logic to render them as sound. Messages including pitch, duration, and velocity were passed to samplers, drum machines, and synthesizers to give each generative instrument its voice. Logic was used further to process these

sounds through equalization, reverb, delay and other effects that created the final mix. The system is nothing like the software that will be used for the final version of *Londontown*, but it provides a fast and reliable way to test sounds and behaviors before they are prepared for the final production.

A technical discussion as to how the sound files themselves will be played in the final version of *Londontown* is not germane to this thesis. However, one aspect of the process warrants discussion. *Londontown* will use Wwise (pronounced *wise*) by Audiokinetic (www.audiokinetic.com). Wwise is an audio middleware tool that sits "between" those who develop audio assets and the software engine running at the core of the virtual world. It facilitates sophisticated control over many audio parameters for realtime environments. Many 3D computer games use Wwise to create realistic proximity effects, simulated reverberation for 3D-modeled environments, and polyphonic management for sound effect and music tracks. The music developed for *Londontown* requires this kind of sophisticated tool to manage the logic of the generative instruments and number of simultaneous audio channels.

Wwise is not yet implemented in the final *Londontown* environment. The software offers behaviors to create branching musical structures and variable-dependent adaptive musical compositions that swap pre-composed musical tracks. These techniques are useful for some projects but they don't come close to offering the kind of musical nuance that is possible with a generative approach. Branching behaviors are limited by operations that only account for a means of playback. Initial prototyping suggests that in order to execute Amergent music, the built-in sound design behaviors are the most flexible and powerful and the most capable of processing the in-world dynamics that drive the music.

Within Wwise, the behaviors that best match those of the generative instruments are those developed for sound design. Timers, randomizers with weighted randomization, and the ability to nest one behavior inside another are vital characteristics of the generative instruments. Sound design or sound effect behaviors are meant to simulate the unpredictable and organic events that unfold and create the sound of a mediated world. Generative music also strives to be organic, and Amergent music takes this a step further. It preserves an organic quality, but exerts a level of control over the sound assets so as to closely couple sonic transformation with virtual world dynamics.

Conclusion

Londontown has proven to be an excellent vehicle for exploring the techniques and theories behind Amergent music. As a virtual world it provides a rich tapestry of dynamics from which to create music that is new at every step and reflective of the circumstances and context that have led player-characters to each moment. The world is seeded with narrative, which places all interactions in a particular story context, created through both the initial choices that define a player-character and the more gradual choices made over time. The elements that create context are organized both spatially and sonically. This closely-coupled relationship between sound and interaction produces music that is affective in the situations that arise.

The design of the virtual world creates a mediated reality for the player-characters who inhabit *Londontown*. Amergent music, as a part of this mediated reality, leverages the emergence of interaction towards a becoming of music. Sound, as a medium for continuous making and unmaking, resonates in the philosophies of becoming running through Bergson, Deleuze, and Massumi. Audio files play; the envelopes of their attack, sustain and release dovetail and collide to create a music of constantly-shifting textures and tonalities. Sounds themselves are carefully produced to fit into a spatial organization that further enhances this becoming. Like a Deleuzian intensity, single sounds do little to shape this mediated reality. The organization of layered Intensities sets the ground for a multidimensional music that reflects the confluence of negotiations and interactions between player-characters in the *Londontown* world.

The technical formalities of *Londontown* have been instructive and suggest that while tools for development and realization can be general, one's use of tools must be specific to an individual project. Techniques employed in past projects were integrated and uniquely tailored to accommodate interactions within the virtual world. The project has been a musical success, and demonstrates the extensibility of Amergent music while simultaneously showing the way forward for projects yet to come.