

FORM AND TONAL SPECTRUM IN 12-TONE MUSIC:
APPROACHES TO ANALYSIS IN SCHOENBERG, WALKER, AND WEBERN

by

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THESIS ABSTRACT

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Title: Form and Tonal Spectrum in 12-Tone Music: Approaches to Analysis in Schoenberg, Walker, and Webern

Approaches to analysis in 12-tone music have been predominantly focused around the concept of atonality. Building off of ideas first imagined by theorists such as Heinrich Schenker and Arnold Schoenberg, I propose that all music can be understood as tonal using nature's model, the overtone series. Through a detailed description of the organic nature of tonality, my work suggests that what was once understood as a dissonance can be reimagined as a new type of consonance. Analyzing passages of 12-tone music from Arnold Schoenberg, George Walker, and Anton Webern, I provide a means for expanding upon traditional Schenkerian Analysis, which has been traditionally limited to music of the 18th and 19th century. I suggest that all music with "tones" can be considered tonal, and that background-level graphs representing higher partials can be used to categorize musical passages as "more" or "less" tonal, in a traditional sense.

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INTRODUCTION

Defining the human experience has led many great minds to challenge societal and cultural norms that govern how we live and relate to one another. To comprehend the world and the events within it through an array of perspectives and levels enables us to act with consciousness and allows us to take refuge in life's big picture, without overlooking the infinite considerations to detail in that image. It is within this image that men and women have strived for meaning and purpose of being since the beginning. Each and every one of us seeing the world in a truly unique and beautiful way have all played a part in weaving a collective tapestry, an image that represents our humanity and suggests a common background of unity. It is in this very spirit that I intend to align my approach towards musical analysis, to parallel the human experience and reflect a growing need for expansion as we seek coherence amongst the ever-growing plethora of musical styles. What unites us all as human beings is our shared experience and connection to a common source. Many believe this source to be of a divine nature, having created us with intention as part of its own image. Other views suggest an infinite sequence in agreement with natural law from which we were born, and that we exist within this natural image. Nonetheless, these matters are navigated within the heart, and it is within the heart that we find faith in what we believe. This method of obtaining personal truth signifies one of our deepest connections, one above all other relations within an ever-changing surface. In a similar manner, nature reveals hints of our origin within the mind, providing us with a reference point to interpret life's fractal pattern down to the minutest of details. Music as an art form has evolved throughout time based

on our increased understanding of how it relates to the natural world. Specifically, the concepts of tonality and harmonic structure being rooted in their relation to the naturally occurring phenomenon known as the “overtone series.” This pattern found within the musical tone itself yields an infinite quality that often goes unappreciated in our contingent world. However, if we truly experience unity in our relation to the heart, our source of truth, then perhaps tonal unity can be achieved through the very same means. It is the truth from within that expands outward toward infinity, and though our hearing may be select, the truth inside each tone sings the same song as the one before it. It is within this master’s thesis that I intend to make a case for all music being inherently tonal, and since all tones contain an identical pattern of infinity, it remains the task of humanity to embrace a deeper connection amongst itself to find truth, a collective truth within the human image. I’ve decided to test this theory of tonal unity by applying its principles to one of the most complex musical systems that has largely rejected an association with the concept of tonality. This is the system of 12-tone composition.

The objective for this project is to explore some of the different approaches to analyzing music beyond “traditional tonality,” in an effort to highlight the differences as well as similarities of various musical languages and how they relate to form. I’ll be addressing the concept of tonality vs. atonality in 12-tone music with the goal of analyzing structural levels in a given piece by comparing its specific harmonic language to nature’s tonal model, the overtone series. I’ve chosen to analyze three 12-tone compositions from three different composers, all of which utilize the 12-tone method but demonstrate progressively less amounts of “traditional tonality.” The specific examples I’ll be analyzing include Arnold Schoenberg’s *Klavierstück*, op.33a, George Walker’s

Spatials, and Anton Webern's *Variations*, op.27 movement III. I believe this select group of works will provide a unique insight into the minds of three different composers that sought to integrate their views of the world into their music. All three composers were masters of their craft and have been revered for their skillful approaches toward composition. They shared a drive to express life's most personal and intimate experiences in the art they knew best, their music. Each one of them found spiritual truth in the music they wrote through different avenues, but nonetheless were unified in their belief of musical transcendence. Life placed them at different starting points, with different minds, and different skin, but from there they pursued the same goal, a way to manifest truth as they saw it.

CHAPTER I: ART AND ARTIST

One of the main goals in this project is to build upon several of the current analytical systems widely associated with tonal music in an effort to reach beyond the “traditional” definition of tonality associated with western art music. Specifically, I’ll be applying many of the concepts first conceived in musical terms by Heinrich Schenker to what some have referred to as atonal composition. I intend to do this first by highlighting the strengths of his theories and how they align with nature, the ethical reasons for expanding on topics rooted in his work, and also how many of Schenker’s own inconsistencies and biased ideas have been largely to blame for a stunted interest in hierarchic analysis. Traditional Schenkerian Analysis at its core suggests that by understanding tonal music through the lens of a natural system of hierarchy, we can then begin to look deep inside a given composition and appreciate its beauty the same way an architect appreciates the beauty of a building blueprint. The idea that a foundation must be laid before further construction relates directly to both physical architecture as well as musical structures. If there were no systems of hierarchy built into a city skyscraper, we certainly wouldn’t feel safe moving in and around it. Like an architect knows the importance of structural beams versus decorative attachments, a composer understands how to identify the same frame and build upon it as a means of generating new material. This concept of a hierarchic structure can be understood in terms of “traditional tonality,” as well as what many refer to as “atonality.” Heinrich Schenker’s work remains a highly effective tool for understanding music of the 18th and 19th century. However, where his method remains limited in applicability toward examples of 20th century works, several

of his students, as well as more recent scholars have succeeded in expanding this tool to define structural levels in post-tonal music.

Several of Schenker's students that moved to the United States such as Hans Weisse, Oswald Jonas, and Felix Salzer were largely credited for the theory's mainstream adoption. However, Schenker's students had mixed ideas about how closely to preserve their mentor's teachings. Oswald Jonas would go on to work with Ernst Oster, who translated Schenker's *Free Composition* in 1979, and can be considered a purist, loyal to the teachings of Schenker. Felix Salzer on the other hand, wrote his own book *Structural Hearing* in 1952, attempting to expand upon Schenker's method before an English translation of *Free Composition* was available. This upset those that were loyal to Schenker such as Oster, and contributed to a rejection of prolongational analysis in 20th century music. Edward Laufer, a student of Oster's, is known for his work applying Schenker's technique to examples of 20th century music. Perhaps Laufer can be thought of as Oster's rebellious student, like Salzer was to Schenker. Roy Travis, a student of Salzer's, has also done similar work applying Schenkerian techniques to post-tonal music. In the spirit of Salzer, Travis, and Laufer, I seek to expand upon traditional Schenkerian limitations in an effort to understand the outer reach of tonality. Many scholars within the last 50 years have also attempted to push the boundaries of prolongational analysis in "post-tonal" music.

Robert Morgan discusses the concept of dissonant prolongation, an idea that rejects Schenker's claim that only consonance can be prolonged. In his 1976 article, "Dissonant Prolongation: Theoretical and Compositional Precedents," he critiques

Schenker's practice of only understanding "music in terms of a consonant background."¹ He then explains how Schenker's work created a template for an understanding of 20th century music in a tonal context, but failed to account for any dissonant prolongations in music of the 19th century. Morgan continues on to discuss how some of Schenker's inconsistencies, such as allowing the prolongation of a 7th within a dominant seventh chord, suggest a case for growth and expansion to a more direct form of analysis of dissonant prolongations. Joseph Straus would argue the other way, suggesting that since triadic support of structural notes in "post-tonal" music is not always present, that the ability to prolong anything is no longer an option in a tonal sense. In his 1987 article, "The Problem of Prolongation in Post-Tonal Music," he explains how collections of notes that aren't directly related to the tonal system, such as the "octatonic" collection, may provide a convincing case for prolongation outside of traditional tonality. However, I would argue that the octatonic collection lives within the overtone series as well as any collection of pitches. If it stems from the overtone series, it can be understood as tonal. Fred Lerdahl would suggest a more contextual understanding of "post-tonal" prolongation. He critiques Straus's requisite conditions for harmony and voice leading as being too circular; suggesting the lack of tonal conditions implies only a lack of "tonal prolongation." In his article, "Atonal Prolongational Structure," he explains a series of different ways that atonal music can contain prolongations based on a comparable function to tonal examples. In this way, he aligns with the idea of Morgan's dissonant prolongation, but subscribes not to consider that an aspect of tonal motion.

¹ Morgan, Page 53.

² Boss, "Ornamentation," Page 202.

Jack Boss, a leading scholar in the music of Arnold Schoenberg, has played a large role in inspiring my research. In his 1994 article, “Schoenberg on Ornamentation and Structural Levels,” he discusses several methods of justifying the “atonal ornament” as a concept in the first song of Schoenberg’s *Vier Lieder*, op. 22. In one of Boss’ points, he highlights the danger of analyzing certain atonal excerpts as having various structural levels if the material can’t be understood as organically connected. According to Boss, “When lower levels do not grow out of higher levels, either through tonal prolongation or some kind of ornamentation, it is difficult to understand how they can be called structural levels at all.”² I agree with Boss’ objection to structural levels containing unrelated material. This creates a series of musical systems merely existing side-by-side, not to be understood as more or less structural than one another. The “traditionally tonal” measuring stick does not necessarily help us in terms of contextual elements such as dynamics or repetition. However, to say that there isn’t a complete “tonal image” within a given piece because not all levels appear to be connected overlooks the idea of an “implied connection.” If I were to count ascending integers 1, 2, 3, and continue to 13, 14, 15, one could say the lack of a visible connection between the two groups discounts their relatedness. However, most of us are familiar enough with the implied integers 4 - 12 to close the gap. The same can be said about music deriving from lower and higher partials in the overtone series. The “implied middleground” can help us to understand disjunctive material as a sort of scrapbook, containing snapshots of the harmonic series at various points.

² Boss, “Ornamentation,” Page 202.

Catherine Nolan provides us with another approach to prolongational analysis in atonal music. In her article, “Structural Levels and Twelve-Tone Music: A Revisionist Analysis of the Second Movement of Webern’s ‘Piano Variations’ Op. 27,” she compares several approaches from theorists before her that have analyzed Webern’s Op. 27 Mvt II in different ways. She critiques Peter Westergaard’s analysis of the movement for highlighting structural levels with no regard to how they are connected, an objection also discussed by Boss. Nolan claims to have adopted a somewhat “case-by-case” basis to understanding structural levels within 12-tone music. She agrees with Roy Travis’ “Salzer-inspired” style of going beyond row order to determine form, allowing a given piece to be defined contextually. Nolan is in favor of understanding atonal music in terms of structural levels, yet perhaps falls short of breaking ground in terms tonal analysis used to explain large-scale form. She, like Fred Lerdahl, suggests a purely atonal approach to prolongation in 12-tone music, and claims that set-classes characteristic of a given piece may be prolonged.

In a practice much closer to my own, Olli Vaisala approaches prolongation in post-tonal music using harmonies derived from the overtone series. In his article, “Prolongation of Harmonies Related to the Harmonic Series in Early Post-Tonal Music,” he discusses his method of analyzing post-tonal music using up to the 11th partial of the overtone series. My own system, which I will go over in great detail in the following chapter, doesn’t place a limit on the amount of partials available for tonal analysis. However, Vaisala’s approach makes great strides going beyond the purely Schenkerian allowance of up to the 5th partial. Vaisala discusses the idea of “virtual pitch,” a term first coined by Ernst Terhardt in 1974 used to describe the presence of a fundamental root

based on the overtone series for any given material. Vaisala explains how virtual pitch may in fact be understood as a root even without sounding, informed by what could be considered the sounding “upper partials.” This bares much resemblance to the concept I will propose called the “implied fundamental.” Where my own method differs from Vaisala’s and Terhardt’s is that an “implied fundamental” is always in reference to a harmonic root tone, whereas “virtual pitch” can be purely psychoacoustical.

The harmonic aspect of my theory stemming solely from the overtone series, one of nature’s hierarchical models, leads me now to the concept of hierarchy in general. There has been an ongoing debate in recent years whether or not it is ethical to analyze music in terms of structural importance. Schenker’s racism and whether or not we should continue to use analytical techniques associated with his ideology has been a highly controversial topic. However, hierarchy as a concept is not or should not be what we’re fighting against. Richard Pellegrin of the University of Florida cites his own master’s thesis, “Fractal Geometry and Schenker’s Theory of Organic Unity” in his response to Phillip Ewell’s article “Music Theory’s White Racial Frame,” in the 12th volume of the *Journal of Schenkerian Studies*. He states that “Hierarchy is natural, often a matter of life and death, and is in and all around us—from the fractal, branching structures of our circulatory and nervous systems to those of rivers and snowflakes; from networks of paths and roadways to electrical, plumbing, and delivery systems; and from rhythm and meter in tonal music to harmony and voice leading.”³ This specific volume of the *Journal of Schenkerian Studies* has played an interesting and substantial role in the recent debate about music theory’s future and how to combat racism and sexism in the field.

³ Pellegrin - “Fractal Geometry and Schenker’s Theory of Organic Unity”

Since the summer of 2020, I've witnessed a deep rift within the field of music theory that parallels a larger political and philosophical tension felt throughout the nation. It saddened me as an aspiring music theorist early in my career to take the plunge into graduate school and devote my life to working in a field that seemed to be unraveling and showing less support toward many of the concepts that allured me to begin with. Racism was not one of these interests. I have always approached music theory through the lens of a composer, eager to connect new lines of thought as I strive for a deeper connection to music and the world around me. I myself am a white male from a Christian background who has been particularly drawn to the practices of Schenkerian Analysis as they apply to music. This in my own words was "an organic development." I was introduced to Schenker's concepts while taking a graduate theory course in my undergraduate studies. I then learned the basics of the system and although not right away, eventually learned the value of "seeing depth" in music. This course didn't focus too much on the man behind the theory, but rather how to graph and develop Schenker's technique using Allen Cadwallader and David Gagné's, *Analysis of Tonal Music: A Schenkerian Approach*. I began grad school with some knowledge of Schenker's concepts and took the second term of Schenkerian Analysis with Jack Boss. We did discuss Schenker's racism more in depth in this course, but continued to hone our ability to graph and analyze longer passages and forms using Allen Forte and Steven E. Gilbert's, *Introduction to Schenkerian Analysis*. I obtained much of my knowledge about how to do Schenkerian Analysis from multiple sources before the summer of 2020. After Philip Ewell published his article "Music Theory's White Racial Frame," what seemed to be an uproar of theorists either defending or attacking the practice dominated the discussion for months

and has seemingly forever changed the course of music theory. Perhaps these growing pains were long overdue for the relatively young field, but as a white male who had enjoyed studying Schenker's theories, I found myself overwhelmed with what I had jumped into. I now write this master's thesis two years later not to attack Philip Ewell or excuse Schenker's racism, but to fight for a higher truth that we all share in our collective journey in music theory and in life. The more I read from Ewell, the more I understand his perspective to be a unique one, and one that certainly has and will continue to play an important role in music theory's future. He states that, "To an extent, I confess to being sexist. To an extent, homophobic, antisemitic, islamophobic, transphobic, ableist, among others. Regrettably, I am all of these, for I am human."⁴ I found this to be a truly sincere and a beautiful statement about humanity. To be part of the human race, a collective body and mind, is to be part of a unifying foundation, one that circles our entirety and too often gets overlooked. In Ewell's article (find), he reveres Maurice Berger, a white cultural historian, curator, and art critic, for his efforts toward fighting racial injustice in the field and states that, "Berger was able to break out of the art world's white racial frame and, in doing so, he "learned how to see." It is high time that we in music theory broke out of our white frame and learned how to hear as well."⁵ Again, I've found Ewell's passionate approach towards seeking truth as something to learn from. What remains unaddressed by the masses is this simple question... If we are to free ourselves from music theory's "white racial frame," whose frame will we exist in next? I believe this question should be an essential and prominent part of our next steps toward truth. Even Ewell's humble words about "being human" suggest that all humans are flawed, a statement we are in

⁴ Ewell – "Music Theory's Future," Music Theory's White Racial Frame

⁵ Ewell – "New Music Theory," Music Theory's White Racial Frame

agreement on. Who then is equipped to prescribe a way forward? Since a significant argument from Ewell's followers is that art shouldn't be separate from the artist (a case used against Schenkerian Analysis), then from this very logical approach I don't feel that humans by themselves are capable of a long-term solution to this problem. If one were to consciously exit a flawed framework and exist within an improved but still flawed framework, where is the end goal? Is it in sight or even discussed? Even under a collective "human framework," we must still understand perfection and our relation to it.⁶ The truth as I see it, is that we must strive for examples of perfection within our frame, knowing that we will fall short in this process, and forgiving those around us when this occurs. I don't believe it is necessary for complete agreement on defining perfection, but as long as we understand it can't be us, then we have a starting point towards defining unity. The basis for my work and philosophy on truth is understood through my own personal truth, the only one I have access to, making up just a fraction of the larger collective truth. For example, if one hundred people each had 1% of the truth, how much truth is that? I believe that if anyone is to deny a fellow human his or her right to personal truth, then they are denying truth as a whole. Only when we understand the value of our collective truth in a horizontal sense, can we understand our connection to a common source, our common root. So to once again address Philip Ewell's call to arms, to an extent I am inspired by his sincerity, to an extent I agree with his prescription for the field, and to an extent I believe he's found truth. What I remain firmly against is fighting

⁶ "Since imperfect consonances specifically lack perfection, and cannot express relaxation, the beginning and end must be made up of perfect consonances." – Fux, *Gradus Ad Paranassum*, Page 28.

fire with fire, pitting anti-racial discrimination against racial discrimination, and prioritizing success over truth as I see it.

Schenker's method of applying hierarchical concepts to tonal analysis was truly groundbreaking, but it was most certainly not his own design. It points toward an understanding within his own personal truth of how he related to God. In Schenker's *Der Freie Satz (Free Composition)*, a final formulation of his theories, he states "All that is organic, every relatedness belongs to God and remains His gift, even when man creates the work and perceives that it is organic. The whole of foreground, which men call chaos, God derives from His cosmos, the background. The eternal harmony of His eternal Being is grounded in this relationship. The astronomer knows that every system is part of a higher system; the highest system of all is God himself, God the creator."⁷ I've found this to be a part of my personal truth as well. In a similar spirit, I try to align my work with the words of Jesus Christ, "I am the vine; you are the branches. If you remain in me and I in you, you will bear much fruit; apart from me you can do nothing."⁸ Indeed I believe that art shouldn't be understood as separate from the artist. I encourage those on the fence in this regard to build upon their own foundational truth, to seek the perfect Artist, one without flaw. After all, can art exist without a frame?

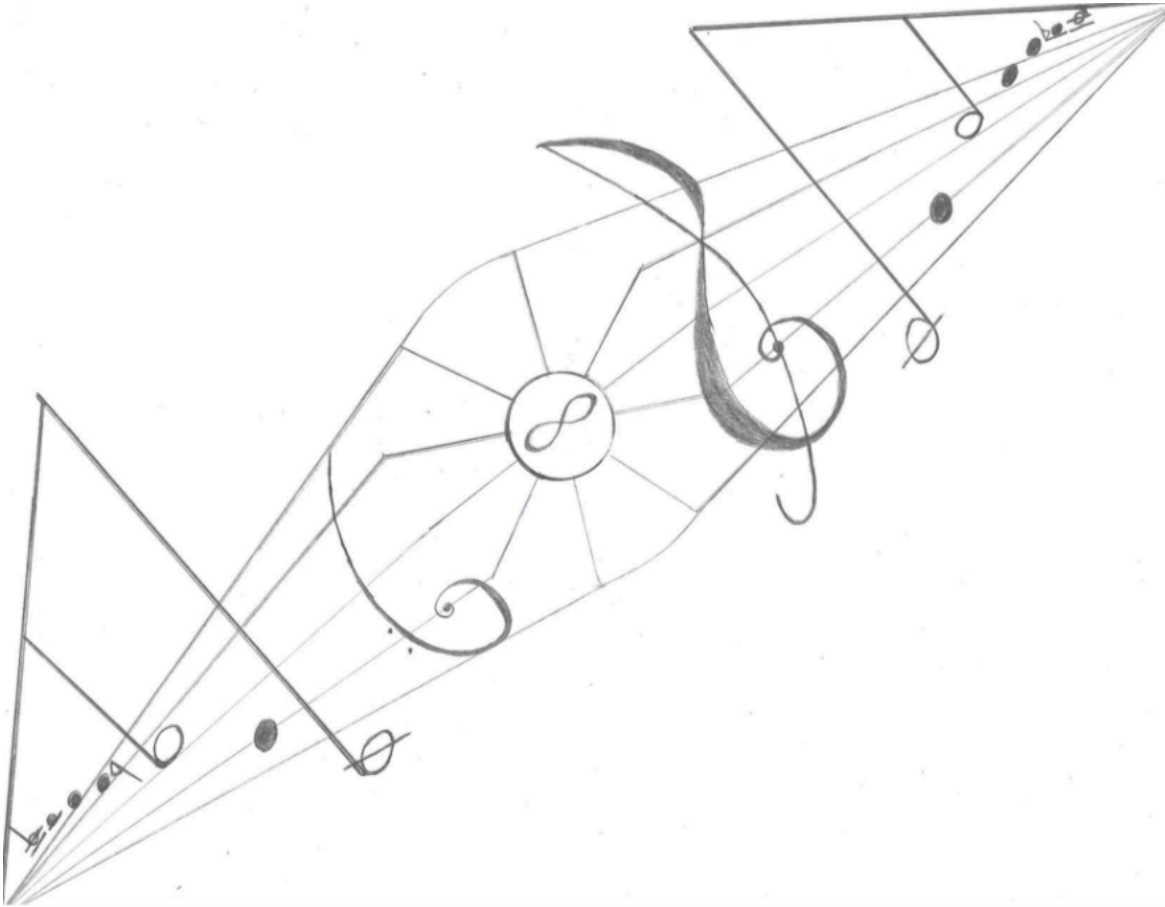
It remains collectively undecided whether or not art can exist without an artist. Though, if the two were bonded from the point of conception, would they not both feel loss if that connection were severed? A parent's relation to their child is grounded in good intentions, yet the child inherits bias and imperfection along with their parent's love. To deny a child of opportunity or advancement due to their imperfect parent is

⁷ Schenker, *Free Composition*, Page xxiii.

⁸ *Gospel of John*, Ch. 15, Verse 5 - NIV

wrong and promotes discrimination. We should celebrate our ancestor's good virtues and address their shortcomings with a compassionate yet firm correction. I envision a bright future for music theory, one that through trial and error will come to appreciate all opinions and demographics equally. I may not live to see it, but I have faith that it's coming, and will continue to take steps forward with that goal in mind. In many ways the process can feel uncomfortable and remind us of our imperfection, but I sincerely believe an organic movement is in motion, one that requires no individual to bear the weight of this goal alone. Those that signal virtue and romanticize a rate of change either faster or slower than nature intended, undermine the immense amount of beauty in the present. An artist has no choice whether or not to paint the world as they see it. The choice they have is whether to paint what appeals to the mind, or what leads to the heart.

Figure 1: “Infinity Tone” – The infinite fundamental...
Music, like time, expands infinitely.



CHAPTER II: TONAL SPECTRUM

As my belief that musical patterns parallel those of nature continues to align with my core, a growing desire to develop tools capable of highlighting such connections leads me now to the topic of origin. In a language consistent with the present time, we must “de-frame” our view of nature and the world in which we live as being solely a source of inspiration for art, and not art itself. Such an adjustment allows us to view humanity as a work of art inspired by the art before it, capable of “framing,” “de-framing,” and ultimately “re-framing” its own self-contained ideas. As I have mentioned before that each perspective is unique, it does not seem out of the question to imagine our own personal frame as an attachment, being carried with us wherever we may go as it both expands and compresses due to life’s many obstacles. I understand periods of growth or even increased levels of consciousness as an expansion within a given framework. If music theory in fact exists within its own frame, then perhaps a productive way to increase its diversity would be to expand that same framework and invite people of all demographics in, rather than “re-framing” it. A re-framing would suggest that in fact we were responsible for its framing, and in my mind that occurred long ago. If there is indeed a “racist frame” within music theory, then it lies wholly within the hearts of racist music theorists.

If indeed humans relate to one another on a social spectrum, like tonality, then perhaps the idea of consonance and dissonance felt between one another can be viewed as a result of identity found within “closely” or “distantly” related keys. Schenker claims that “the most baleful error of conventional theory is its recourse to “keys” when, in its

lack of acquaintance with foreground and middleground, it finds no other means of explanation. Often its helplessness is so great that it abandons even this most comfortable means of avoiding difficulties. Nothing is as indicative of the state of theory and analysis as this absurd abundance of “keys.” The concept of the “key” as a higher unity in the foreground is completely foreign to theory: it is even capable of designating a single unprolonged chord as a key.”⁹ Perhaps the abundance of complexity found within our human composition remains the reason we tend to compress our frame, to adjust it daily for convenience’ sake. I’d like to imagine that when we were children, we related to one another not in terms of a “key,” but in relation to our fundamental root. Charles Darwin states in *The Origin of Species*, “When I view all beings not as special creations, but as the lineal descendants of some few beings which lived long before the first bed of the Cambrian system was deposited, they seem to me to become ennobled.”¹⁰ In this way he places an emphasis on nature’s framework as a whole. He then states in his closing remarks, “There is grandeur in this view of life, with its several powers, having been originally breathed by the Creator into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being evolved.”¹¹ The continued distinction between “tonality” and what many refer to as “atonality” is perhaps due to a collective delay we’ve shared in an ability to process one’s relation to the other. In fact, music’s own evolutionary progression born out of the Second Viennese School seems to align significantly with Darwin’s ideas. He states that

⁹ Schenker, *Free Composition*, Page 8.

¹⁰ Darwin, *The Origin of Species*, Conclusion, Page 506.

¹¹ Darwin, *The Origin of Species*, Conclusion, Page 507.

“the chief cause of our natural unwillingness to admit that one species has given birth to clear and distinct species, is that we are always slow in admitting great changes of which we do not see the steps.”¹²

Arnold Schoenberg was not convinced he had discovered a “new” system of generating harmony, but rather an expanded view of the tonality he understood in nature. He states in his book *Theory of Harmony*, “What today is remote can tomorrow be close at hand; it is all a matter of whether one can get closer. And the evolution of music has followed this course: it has drawn into the stock of artistic resources more and more of the harmonic possibilities inherent in the tone.”¹³ His understanding of harmony was perhaps aligned with what he believed to be tonality’s “lineal” progression. On the other side of the spectrum, Schenker sought to explain with every effort how tonality functioned within a frame he believed to be a joint effort between nature and man. He most certainly succeeded in compressing his own framework long enough to dive deep within its depths, without feeling the need for expansion in a certain sense. The more he hunkered down into his frame, the more jaded he perhaps became in regards to differing approaches. The frame he championed throughout much of his career sought to limit the amount of overtones used in defining tonality to what he referred to as the “Mysterious Five,” harmony derived using only up to the “5th partial.” Thus he became increasingly condescending toward composers, particularly the French, who at the time were experimenting with extended harmony. He most certainly was aware of the overtone series’ infinitive quality, and consciously limited his theory of fundamental structures to include only intervals near the fundamental, near unity. He prioritized “Perfect” intervals

¹² Darwin, *The Origin of Species*, Conclusion, Page 499.

¹³ Schoenberg, *Theory of Harmony*, Page 21.

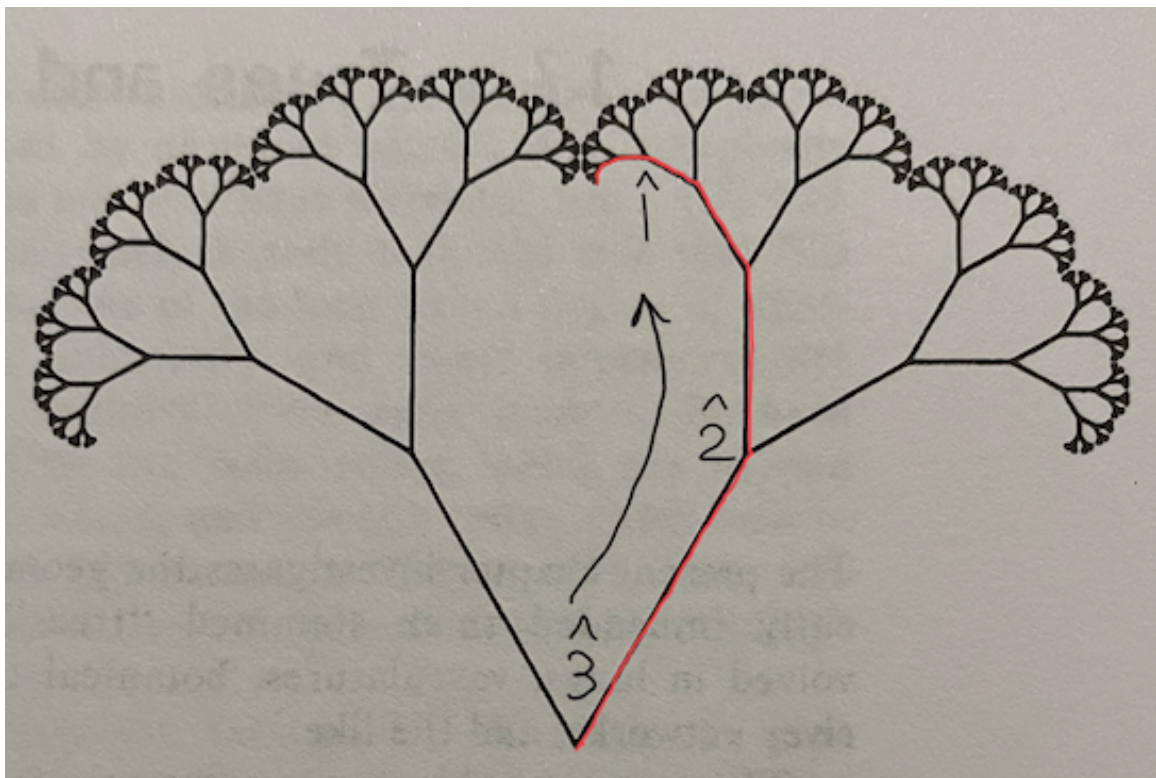
above all else, and claimed only the bass arpeggiation of a Perfect 5th was sufficient support for a given melodic line at the background level. In some ways, he is right. He understood the Perfect 5th as the only interval capable of establishing new roots with their own infinite line of overtones. Where I believe he is right is in regards to the 5th being the first new tone within the overtone series capable of becoming a new root, but that discounts the entirety of nature's design. All fruit within life's Vine may bear fruit as long as they remain connected to the source.

By comparison, all partials within the overtone series first generated from a fundamental, may then generate their own infinitely long lineage of partials. This natural pattern found within the "tone," is what Benoit Mandelbrot first defined as a type of "Fractal." In his book, *The Fractal Geometry of Nature*, he mentions the concept of "scaling" within self-similar fractal patterns. He discusses the infinite quality of the harmonic series and compares it to the "Modified Weierstrass Function." Mandelbrot then discusses the self-similar quality of musical composition stating that "musical compositions are, as indicated by their name, composed: First, they subdivide into movements characterized by different overall tempos and/or levels of loudness. The movements subdivide further in the same fashion. And teachers insist that every piece of music be "composed" down to the shortest meaningful subdivisions. The result is bound to be scaling!"¹⁴ Another striking example of fractal types within Mandelbrot's book that aligns with music is the comparison between his "Fractal Canopy Tree" and Schenker's concept of self-similar motives at various structural levels. Both demonstrate a source or fundamental background that scales either vertically or horizontally using the same

¹⁴ Mandelbrot, Page 374.

pattern at different levels of the image. The main difference between Mandelbrot's "Fractal Canopy Tree" and Schenker's "Background" is that while Schenker's background structure remains the "top" line, unfolding in only one direction, Mandelbrot's model stems from the fundamental in two directions. Musically, this seems to align more with the idea of both overtones and undertones being generated from a single fundamental. If we imagine the red line (shown below), representing the background level of a Schenkerian Graph, we could then imagine

Figure 2: Mandelbrot – Fractal Canopy Tree/Schenkerian – Background Comparison¹⁵



¹⁵ Mandelbrot, Page 155.

that very same model flattened down to a horizontal structure, showing us all the various instances of “motion towards an inner voice,” first being derived from the Uraline.

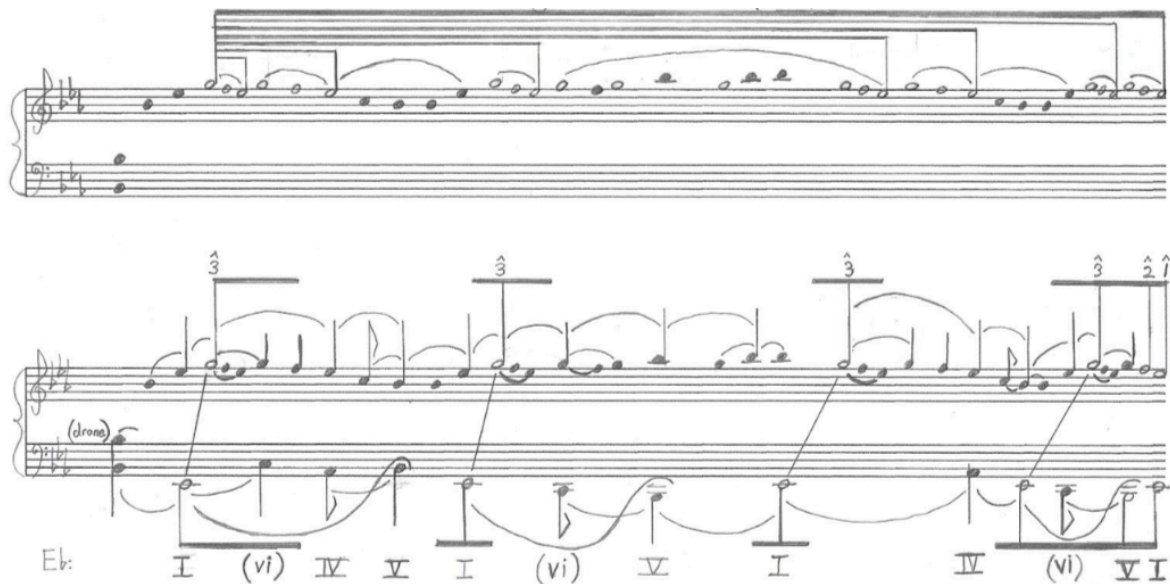
One of the most profound comparisons between fractals within nature and fractals within music is that they both have been linked to having a “transcendental” like quality. This experience is quite often felt subjectively, yet the concept of scaling remains a topic that many have linked to outer body or spiritual experiences. Merriam-Webster’s online dictionary defines the word “transcendent” as – being beyond the experience of all possible experience and knowledge: being beyond comprehension: transcending the universe of material existence. The way we feel transcendence beyond our sense of self may remain subjective, but Linda Carter suggests in her article “Amazing Grace,” that the underlying mechanism may be more similar than we might think. She talks about how “locating a balanced domain within “the [collective] window of tolerance” can come into being through relationships: with others, the natural world, and the arts of all kinds. This kind of “regulated, integrated state” can ultimately be recognized and known as a “state of grace” that goes beyond the human and leads into something larger and inexplicable. Such a state of equilibrium is a kind of “self-state” where a fullness of being and *peace transcends*.”¹⁶ Carter’s article discusses how “Amazing Grace” has continued to touch the hearts of those who hear it and yields tremendous potential to transcend into the heavens. I’ve enjoyed it’s melodic qualities and touching lyrics since I was young, but only after studying the music more closely have I realized the many instances of fractal “scaling” within it’s melody. I believe it’s the ability to recognize self-similar patterns within art and the world around us that transcends an individual experience and connects

¹⁶ Carter, Page 8.

us to our fundamental structure, a single “key” perceived within both the conscious and subconscious mind.

I’ve analyzed “Amazing Grace” as a model of typical Schenkerian Analysis, and intend to use this approach to highlight the many self-similar qualities within the melody at different structural levels as well as discuss how a perceived gravity within the overtone series can help us to understand musical form. (Shown below in Figure 3)

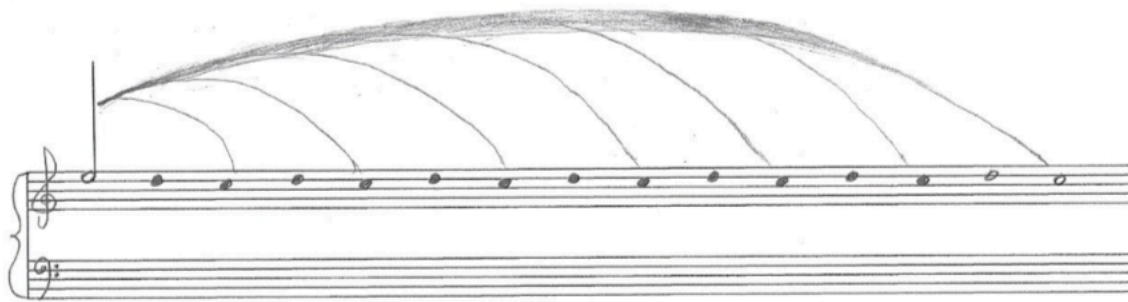
Figure 3: Traditional Schenkerian Graph Below: Self-Similar \wedge^3 , \wedge^2 , \wedge^1 Motive Above



As we can see in the second graph, Schenker’s method allows us to look into the depths of melodic movement and distinguish between a surface-level \wedge^3 , \wedge^2 , \wedge^1 motive indicated by slurs from below, a middleground connecting stemmed notes of harmonic significance, and ultimately the background beams, which span the entire piece. As I’ve demonstrated above, the seven instances of \wedge^3 , \wedge^2 , \wedge^1 all fall within three different levels of depth. If we strip the basic skeleton down even further to only the notes that contribute to the nested melody, we get an image that resembles the seven-color rainbow. (Shown

below in C major). Various combinations of the number “seven,” as well as “three” are mentioned throughout *The Bible* as having special attributes, and may even contribute to a transcendental quality.¹⁷

Figure 4: 7-in-1 Fractal Bow in C Major: Nested $\wedge^3 \wedge^2 \wedge^1$ Motive

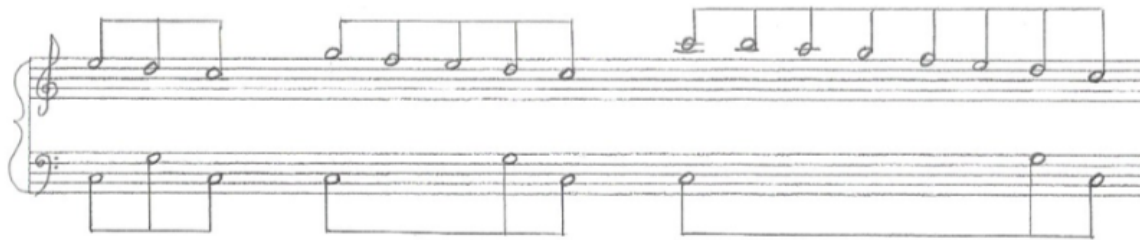


What adds to the fractal-like nature of “Amazing Grace,” is perhaps another type of scaling relating to word and musical meaning, the “grace notes.” Most effectively demonstrated on the bagpipes, “Amazing Grace” yields an abundance of grace through its many “grace notes.” A piper typically adds embellishments in-between structural notes of the melody, adding yet another level of depth to what decorates the background. If we refer back to the graph on the top of the previous page, we see that the first, third, fourth, and sixth iteration of the $\wedge^3, \wedge^2, \wedge^1$ motive serve as decorative material, leading to the second, fifth, and seventh iteration in the middleground. The seventh iteration also serves a dual function to bring down the background $\wedge^3, \wedge^2, \wedge^1$ as well. “Amazing Grace” not only provides us with a great example of self-similar motivic material, but it also allows us to compare the many adaptations and different arrangements that may or may

¹⁷ Jesus’ lineage to God consisted of 77 generations - *Gospel of Luke*. “Holy Trinity” “Sevenfold Spirit.” Jesus’ crucified at age 33, resurrected after 3 days. The overtone series also increases in number of partials between each fundamental by increments of 1, 3, 7, 15, 31, etc....

not observe details like the grace notes, or even instances of the foreground \wedge^3 , \wedge^2 , \wedge^1 motives. The amount of detail one desires to add around the core melody is a choice based on style. I often think about the various structural levels within a 12-tone composition as being a choice of style, consisting of many layers that may indeed boil down to a background just as simple as “Amazing Grace.” Perhaps an Ursatz of some sort, the most basic of fundamental structures, can be found in all music if we know how to look for it.

Figure 5: Fundamental Structure in C Major: 3-Line, 5-Line, 8-Line

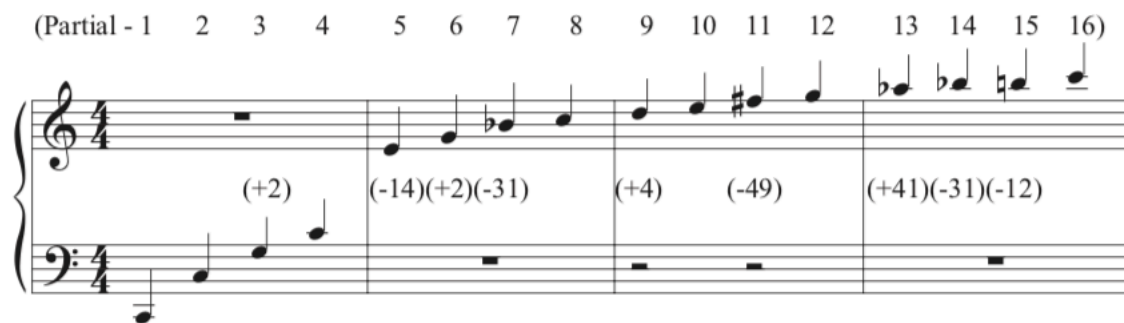


(I V I) (I V I) (I V I)

In search of a method to measure the “tonality” within 12-tone music, I first began with what Schenker and many other theorists have wrestled with, the reasons by which tonal harmony has become universal in our society and daily life. The fact that our equally tempered tuning system was a result of joint effort between nature’s overtone series and our own understanding of that design, suggests that one inspired the other. Hence our tonal system is not necessarily packaged in its final form, but rather resting in alignment with our current understanding of the picture it was painted after. Schenker’s “Mysterious Five,” utilizing only up to the 5th partial would provide us with a major triad as a starting point in defining tonality. In C Major, the first five ascending overtones are

C, C, G, C, and E. Many models of the overtone series typically go up to the first 16 partials, like the diagram shown below. I've included plus and minus indicators labeling each partial according to "cents" either sharp or flat in comparison to our common equal-temperament tuning system. Notice that nature's perfect 5th is two cents sharper than a perfect 5th in equal temperament. Likewise, the major 3rd is also fourteen cents flat in comparison with the equally tempered major 3rd.

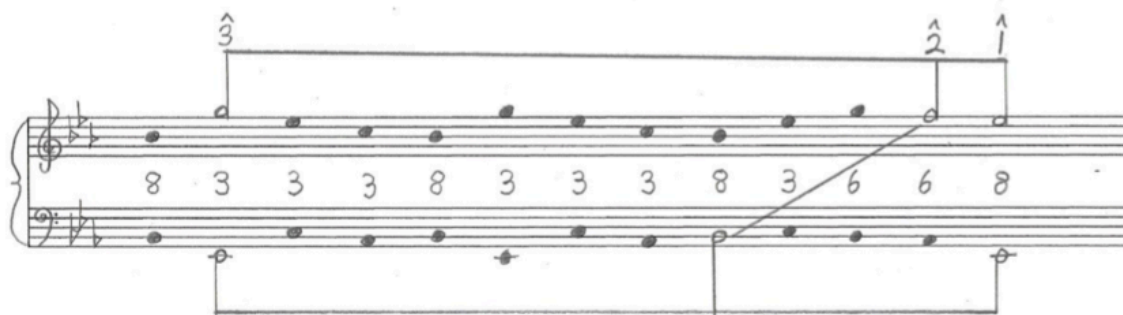
Figure 6: Overtone Series up to 16th Partial



The first interval between the first and second partial is the octave, followed by a perfect 5th between the second and third partial. The perfect 4th found between the third and fourth partial is not represented typically in a fundamental structure as defined by Schenker, since each interval should also be consistent with its relation to the fundamental. The final interval within Schenker's frame is the major 3rd between the fourth and fifth partial. Therefore, we see that a naturally ascending group of intervals consisting of a perfect 8^{ve}, perfect 5th, and major 3rd can be heard in the resonance of any tone. Schenker's fundamental structure (shown on the page above in Figure 5), would then suggest that a gravitational pull back toward unity is what makes music so pleasing to the ear. The descending group of intervals in order of the major 3rd, perfect 5th, and perfect 8^{ve} provides us with resolution and creates balance. If we compare this

phenomenon to Fux’s model of 1st species counterpoint we see the same basic structure. What often begins with a perfect 8^{ve} or a perfect 5th then proceeds to transpose variations and inversions of the major 3rd, either diatonically or chromatically before returning to a perfect interval for a point of rest or closure. I’ve included a version of “Amazing Grace” below that reduces the main voice leading components down to 1st species counterpoint in the bass and soprano.

Figure 7: Amazing Grace, 1st Species Reduction



The graph in Figure 7 remains consistent with Fux’s rule of “no more than three” instances of either a 3rd or 6th in a row, and favors the more structural 3rd before reaching the dominant-supporting 5th in the bass arpeggiation. If we exclude the repeated material in the second phrase, (shown below in Figure 8) then the background descending major 3rd, perfect 5th, and perfect 8^{ve} is only prolonged in the middleground through two transpositions of the structural major 3rd. The vertical octave above the Bb in the bass can be excluded since the bass is providing structural support to the ^2 F in the soprano. Furthermore, the two 3rd transpositions can also be thought of as inner voices.

Figure 8: Amazing Grace Fundamental Structure

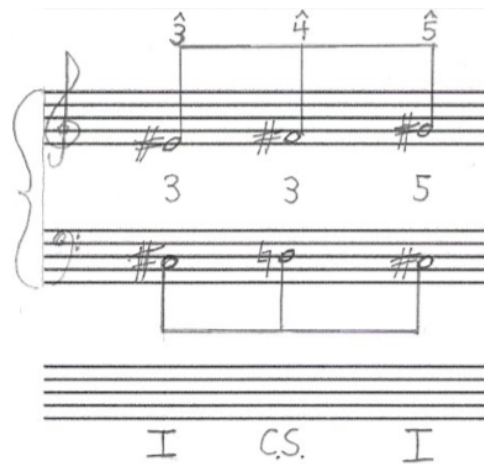


This formal outline founded on the intervals of up to the 5th partial within the overtone series is what I would call “nature’s primary frame.” Schenker believed that all great composers who wrote tonal music understood how to build upon this framework, whether it was done consciously or not. His views were most likely reinforced due to the many years he devoted to unveiling the formula within strictly tonal examples of the 18th and 19th century. However, his work has since been expanded upon by several of his students as well as more recent theorists who sought to apply the technique to non-western music and examples of extended tonality. It is my goal to take this one step further and develop a system of measuring tonality based on a given piece’s framing within the overtone series, even if the fundamental must be implied.

Felix Salzer, a student of Schenker’s, sought to expand upon his mentor’s technique by applying it to an array of musical examples, ranging from Gregorian chant, all the way to 20th century chromaticism. Salzer seemed to understand that though Schenker created groundbreaking tools for analysis, he had not yet learned to wield these tools without bias. He states that “Schenker, with very few exceptions, used as illustrations music of the eighteenth and nineteenth centuries only, the music which lay so close to his heart and mind. Within the last fifteen years I have become completely convinced, however, that his ideas apply to widely diverse styles of music and that the

broad conception underlying his approach is not confined to any limited period of music history.”¹⁸ Below I’ve provided an example of Salzer’s modified background structure as applied to Bartok’s “String Quartet No. 5” from his book, *Structural Hearing*. Here we see no instance of a full resolution to nature’s unifying perfect 8^{ve}. Instead Salzer highlights a chromatic transposition of the major 3rd at the background level, before resolving to a perfect 5th over tonic. In this case, the perfect 5th is not represented by a dominant harmony, but in place of the octave resolution over tonic. Instead of a true Dominant chord, Salzer labels the 3rd transposition as C.S. (Contrapuntal-structural chord).

Figure 9: Bartok Fundamental Structure



This 3rd transposition used to support ^4 replaces the Dominant in function, and what we now have is essentially a snapshot from within a complete harmonic framework. If we think of this structure in a purely intervallic sense, we can imagine a frame similar to Schenker’s “Mysterious Five,” but now compressed to only include the major 3rd and

¹⁸ Salzer, Page XVI-XVII.

perfect 5th, thus the perfect 8^{ve} resolution remains “implied.” The lack of a true dominant effectively creates a stagnant background. With the absence of bass arpeggiation and “traditional background movement,” what would be considered middleground in a piece like “Amazing Grace,” is now promoted to the background-level.

Figure 10: “Fundamental” Structure - Frame

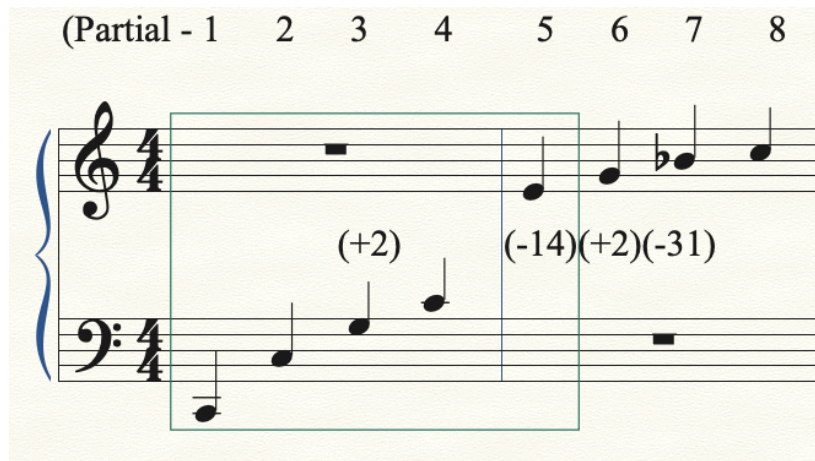
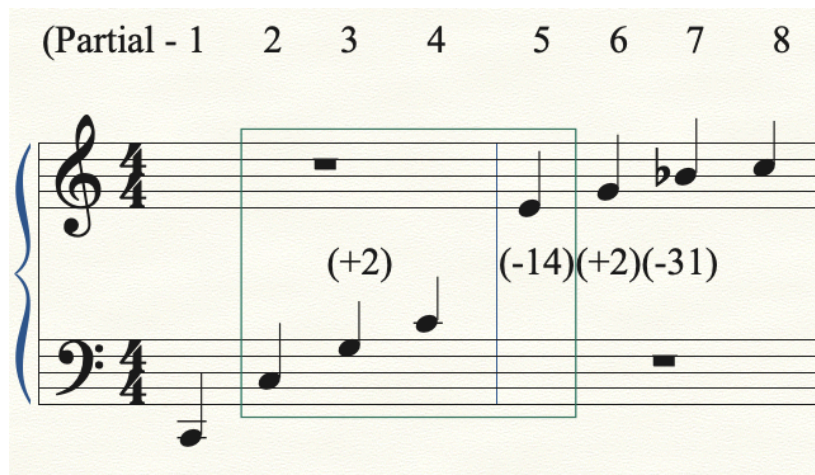


Figure 11: “Implied Fundamental” Structure - Frame



The images above demonstrate a practical way of measuring how closely a given background structure’s framework relates to the intervals near unity. The Bartok structure

utilizes intervals produced by the second through the fifth partial. We can call this type of structure an “implied fundamental” structure. Since the resolving perfect 5th is analyzed as a tonic chord, it wouldn’t be out of the question to claim that the tonic within the piece is more of a “local tonic,” and in fact exists within the dominant of an “implied fundamental” structure. If we break down tonal frameworks into two main categories, “structures with a sounding fundamental” and “structures with an implied fundamental,” we can then subcategorize each of these structural types based on how far up the overtone series their frame travels, as well as how many of the intervals from unity must be implied. I often feel like life, as we know it may be an “implied fundamental” structure, and perhaps resolution as we’ve come to experience it may only be in relation to nature’s 3rd, the imperfect consonance.

Many of the analytical strengths within Schenker’s theories remain bonded to their original conception and framework. Salzer was convinced of the benefits that might arise from expanding on his mentor’s work. Though after Salzer and several of Schenker’s other students established the practice within the university system, many theorists have since been satisfied as labeling themselves “purists,” and have remained loyal to the idea of Schenker’s tonality. However, Schenker’s definition of tonality isn’t necessarily as inclusive as my own understanding would suggest, nor was it enough to satisfy Arnold Schoenberg. To be clear, I believe Schenker’s tonal conception in relation to nature’s overtone series was thorough and consistent with his conception of counterpoint and voice leading, which in tandem defined his approach toward analysis. He developed his craft centered on nature’s major scale and triad. What he lacked was the desire to wrestle with the rest of an infinitely long series of partials, knowing that both

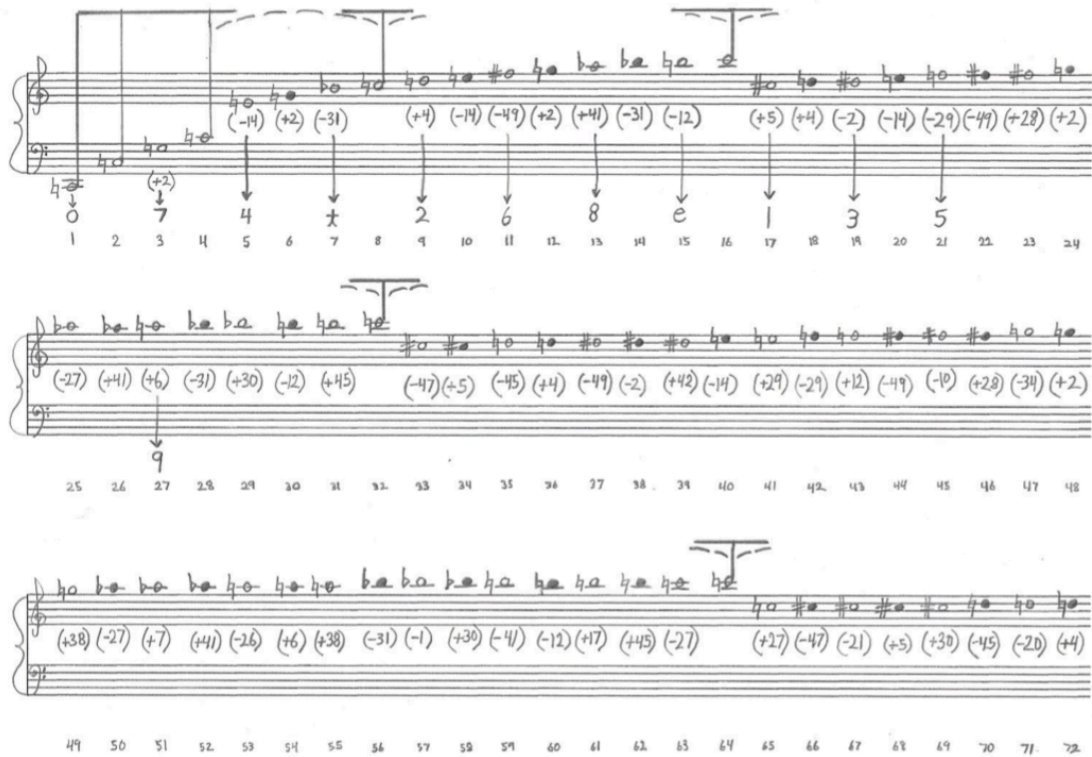
meaning and function can become less clear as one travels up the series. However, I do believe that Schenker's work taps into a certain fundamental truth, in my opinion, that previously existed and will continue to exist indefinitely. It becomes self-evident if we focus on the "background" themes within his theory. He states in *The Masterwork in Music: Volume III*, "Although truth is perceptible only through our senses, it has something irreducible to it, just as our sense organs always possess irreducible characteristics. No matter that a particular truth may fade out of human consciousness: it will always return, as was the case, for example with Copernicus's teachings. We can see from this that a truth loses none of its force through being forgotten for a time."¹⁹ It seems that every so often in Schenker's writings, he was compelled to discuss his views about truth and how he experienced it in relation to nature and the art he loved. He states five years earlier in *The Masterwork in Music: Volume I*, "Everything in the realm of creation is wondrous. It emanates from God, the originator of all that is wondrous. Where there is no wonderment, there can be no art; where there is no faith, too, there can be no art."²⁰ My understanding of faith suggests that all humans can be artists, and that since all of us recognize beauty within our own frame, that the desire to project this experience outwardly is instilled within us. The collective whole that makes up the overtone series is truly "just." Why would such a pattern that brings us joy and fulfillment up till a certain point then stop abruptly? More realistically, the amount of dissonance or tonal range one craves from the music they hear would likely expand in whichever direction provided them with a new piece of a lifelong puzzle. Many of us tend to assign higher amounts of value to present interests, but it is our larger understanding of music as well as more

¹⁹ Schenker, *The Masterwork in Music: Vol. III*, Page 70.

²⁰ Schenker, *The Masterwork in Music: Vol. I*, Page 116.

general concepts we've built on as a whole that desires expansion. Schoenberg states, "Tonality is no natural law of music, eternally valid."²¹ I believe that we can find meaning within our own understanding of this system. It may be that we tend to notice beauty in the art around us created out of consistency rather than gnostic truth. If this is indeed the case, then perhaps a system to bring all tones together may hopefully serve a parallel purpose within a higher system, one to bring all things together.

Figure 12: Overtone Series up to the 72nd partial in C Major: "Overtone Row"



The overtone series (shown above up to the 72nd partial) can be experienced to varying degrees in almost every sound we encounter. With the exception of the Sine Wave, which generates no partials past its fundamental frequency, all sounds contain

²¹ Schoenberg, *Theory of Harmony*, Page 8.

varying amounts of both fundamental frequencies and their overtones. The amount of resonance and amplitude of a given sound can be the designating factors that control how many partials we are able to hear. Schenker's stance on limiting his system to the 5th partial was based on his claim that, "The human ear can follow Nature as manifested to us in the overtone series only up to that overtone which results from the fifth division. This means that those overtones resulting from higher subdivisions are too complicated to be perceived by our ear, except in those cases, where the number of divisions is a composite which can be reduced to a number representing the lowest, perceivable, order of division by two, three, or five."²² He then states that, "The overtones, 7, 11, 13, 14, etc., remain totally extraneous to our ear."²³ While this may have been Schenker's own experience, composer Olivier Messiaen would starkly disagree with this view.

Messiaen described what he called "Natural Harmony," as "the true, unique, voluptuously pretty be essence, willed by the melody, issued from it, pre-existent in it, having always been enclosed in it, awaiting manifestation."²⁴ He also derives what he calls the "Chord of Resonance" from the overtone series, defining the chord as containing, "Nearly all the notes perceptible, to an extremely fine ear, in the resonance of a low C, figure, tempered, in this chord."²⁵ This collection of partials can be found in its entirety within his 3rd "mode of limited transposition" (shown on next page in Figure 13).

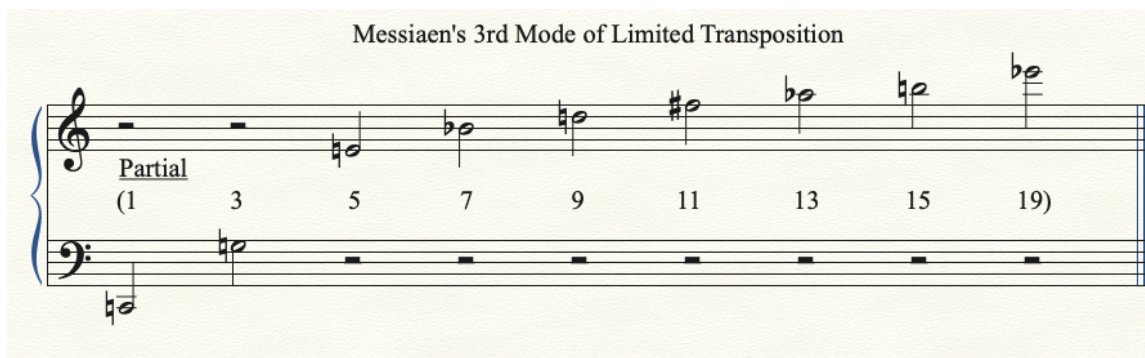
²² Schenker, *Harmony*, Page 25.

²³ Schenker, *Harmony*, Page 25.

²⁴ Messiaen: *The Technique of My Musical Language*, Page 52.

²⁵ Messiaen: *The Technique of My Musical Language*, Page 50.

Figure 13: Messiaen's "Chord of Resonance"



He also discusses the ability to perceive nature's more remote partials stating, "In the resonance of a low C, a very fine ear perceives an F sharp."²⁶ This furthers the case that one's own understanding of the overtone series and willingness to explore its possibilities may be a main factor in whether we allow connections to be made within its vast spectrum. I would defend the statement that both Schenker and Messiaen understood tonal harmony in a uniquely rich and complex manner. However, they came to recognize beauty within nature's system with differing goals in mind. Schoenberg also sought to expand his understanding of nature's possibilities, and describes the partials further up the overtone series as "remote consonances (today called "dissonances")"²⁷ His 12-tone system sought to include all pitches, so that a listener may decide for themselves the meaning within this expanded harmonic language. In my own efforts of analyzing tonal hierarchy within 12-tone music, I've found myself gravitating toward first drawing a distinction between 12-tone music that seeks to be perceived as an extension of tonality, and examples that perhaps seek to sever such a connection linking it to an apparent fundamental. Another way of phrasing this distinction is between 12-tone music that embraces tonal harmony, and 12-tone music that rejects it. After much thought and

²⁶ Messiaen: *The Technique of My Musical Language*, Page 47.

²⁷ Schoenberg, *Theory of Harmony*, Page 21.

contemplation, the question I might ask is as follows. Can “music of the tone” truly escape its root?

One of the methods I’ve explored in my effort to measure tonality within 12-tone music is through a comparison between a given piece’s primary row form and what I call the “Overtonal Row.” This specific 12-tone row form is derived from the order in which all twelve pitches of equal temperament appear (as approximations) in an ascending overtone series. The graph on page 27 shows us that we achieve approximations of all twelve pitches by the 27th partial, and that in the order they first appear we can create a type of 12-tone row. The order of all twelve pitches starting on a low C natural, represented as pitch-class integers would be as follows, (0, 7, 4, T, 2, 6, 8, E, 1, 3, 5, 9). This is perhaps the “most tonal” 12-tone row (aligned with the overtone series), and by comparing the order within a given piece’s row forms and the pitches emphasized within them to this “Overtonal Row,” we can essentially measure its tonality. The hierarchy contained within the “Overtonal Row” suggests three layers of depth, first stemming from the fundamental, second from the 3rd partial, the 5th above the fundamental, and lastly from the 9th partial, the 5th above the 5th (shown in Figure 14). In this particular instance, the beams above and below the graph do not imply a bass or soprano function, but rather distinguish between each lineage of partials based on their local root system.

Figure 14: Overtone Row Hierarchy: 1st, 3rd, 9th Partial as Roots: Relation by “Fifths”



All partials within the overtone series are indeed contingent on the first fundamental; however there are parallel structures that exist within the larger scheme that mimic the primary relation of the fundamental and its partials, while being in fact part of that same collection. For example, in C the first new pitch derived is a G natural at the 3rd partial, a perfect 5th (plus an octave) above the fundamental. From that G natural, we see a parallel structure occurring every 3 partials within the larger series that treats G as a root. The D natural at the 9th partial can be understood as the first G natural’s “3rd partial,” yet ultimately being the 9th partial of C’s series. This is where the topic of “partial function” comes up, suggesting that the D natural is both a partial of C as well as G. Since this D natural is both related to C’s series as well as G’s, it would be a correct statement that one could support the D natural with either bass note. The result would either be a type of Tonic 9th chord with C as a root, or a type of Dominant with G as a root. Furthermore, the D natural has its own ability to generate a parallel series within this larger system, occurring every 9 partials within C’s overtone series. Every partial that follows the fundamental shares this same pattern, even the octaves. Some partials such as the 9th (D natural) are reinforced in a new line overtones as well as being part of C’s

larger collection, however as Schenker pointed out, partials such as “7, 11, 13, 14, etc.,” present issues in tuning and have no additional support from the lineage of preceding partials. Since they can be thought of as only being related to the extended lineage of C’s series, they have fewer options in terms of how we can analyze their functionality. The first group of partials that we can consider being “primary harmony,” meaning that they share no partials with any of the other series generated from contingent roots, consists of the 1st partial, and the following 3rd, 5th, 7th, 11th, 13th, 17th, and 19th partials, pitches (C, G, E, Bb, F#, Ab, C#, Eb) shown below.

Figure 15: Nature’s Tonic: Pitch Class Integers 0, 7, 4, T, 6, 8, 1, 3)

The figure displays two musical staves for piano (Pno.). The top staff begins at measure 2, and the bottom staff begins at measure 11. Above each staff, a sequence of pitch class integers is listed: (+2), (-14), (-31), (-49), (+41), (+5), and (-2). The music consists of chords in both hands, with notes connected by ties and slurs, illustrating the progression of the 'Nature's Tonic' series.

This collection that I call “Nature’s Tonic,” excludes any octave doublings and stops before what would be the next partial related only to the fundamental’s lineage, the 23rd. The reason being is at this point, the 23rd partial presents us with another F#. Not the same F# (-49 cents) first presented at the 11th and again at the 22nd partial, but a new one that’s (+28 cents). After the 23rd, many partials related to only the fundamental begin

filling in the cracks between repeated iterations of the earlier partials. What's special about the pitches (C, G, E, Bb, F#, Ab, C#, Eb), or represented as pitch-class integers (0, 7, 4, T, 6, 8, 1, 3), is that they form a complete collection of distinct pitches that only relate to the fundamental in the early stages of the overtone series. If we think about this collection of pitches as a subset within the "Overtone Row," we can distinguish between Tonic, Dominant, and Pre-Dominant groups (shown below).

Overtone Row - [0, 7, 4, T, 2, 6, 8, E, 1, 3, 5, 9]

Nature's Tonic - (0, 7, 4, T, 6, 8, 1, 3)

Nature's Dominant - (7, 2, E, 5,) 1, 3, 8, T

Nature's Pre-Dom. - (2, 9,) 6, 0, 8, T, 3, 5

The bolded pitch-class integers above make up the "Overtone Row" in its entirety. The remaining four pitches of the Dominant collection and six pitches of the Pre-Dominant represent a complete transposition of the Tonic collection at T7 and T2, however at this point they would also be reiterations of pitches first presented in relation to the fundamental root if heard in equal temperament. Though the collection I call "Nature's Tonic" is similar to what Messiaen called the "Chord of Resonance," it differs in the way that Messiaen's collection includes the 9th and 15th partials, which I exclude since the 9th partial is also the "3rd partial" in relation to the 3rd partial as a root, and the 15th partial is also the "3rd partial" in relation to the 5th partial as a root. Messiaen's collection highlights "nearly all the notes perceptible" within nature's resonance, and my own collection includes only partials that have a single lineage. The pitches in common

between these two collections both share one very important characteristic; they both end with pitch-class integer “3,” the 19th partial. Both collections outline a minor 3rd, nature’s minor triad.

Messiaen’s “Chord of Resonance” – (0, 7, 4, T, 2, 6, 8, E, 3)

Didier’s “Nature’s Tonic” – (0, 7, 4, T, 6, 8, 1, 3)

Pitches in Common – (0, 7, 4, T, 6, 8, 3)

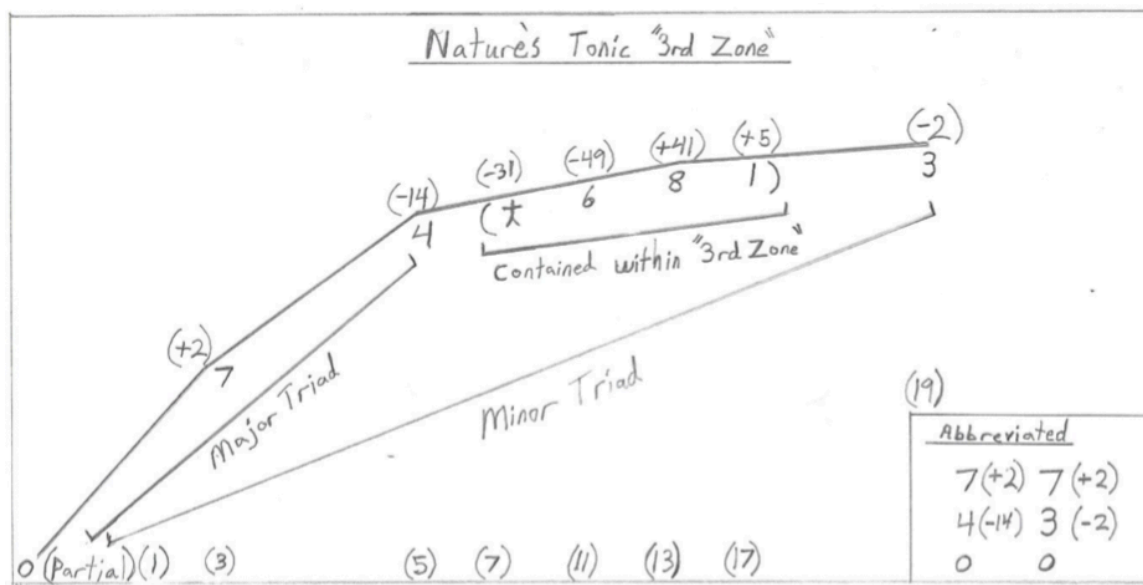
In Schenker’s *Harmony*, he describes the “minor mode” by stating, “Any attempt to derive even as much as the first foundation of this system, i.e., the minor triad itself, from Nature, i.e., from the overtone series, would be more than futile.”²⁸ He viewed the major triad as the highest form of naturally inspired art in music, and explains the minor triad as a synthetic phenomenon. He claims that, “deeply rooted in the artist, too, is the feeling for the major mode as the *ultima ratio* – how every passage in minor yearns to be resolved into major, and how the latter mode absorbs into itself nearly all phenomena.”²⁹ I suggest that explanations of the minor triad in root position may indeed be explained with the overtone series. I will discuss other possibilities in the pages to come, but sometimes the details possess great truth. My case is as follows... The “just” perfect 5th found in nature is (+ 2 cents) in comparison to equal temperament, the “just” major 3rd is (-14 cents), and the “just” minor 3rd, the interval between the 1st and 19th partial, is (-2 cents) in comparison to equal temperament. The minor triad played in equal temperament is closer to nature’s ratio than that of the equally tempered major 3rd. The relation

²⁸ Schenker, *Harmony*, Page 49.

²⁹ Schenker, *Harmony*, Page 54.

between the perfect 5ths (+2 cents) and the minor 3rds (-2 cents) also implies even tension against the root. Therefore, the complete line of partials emanating from their fundamental, and their fundamental alone, outlining a minor 3rd, can be thought of as tonic's "secondary" presentation. Schenker's comment about how "minor yearns to be resolved into major, and how the latter mode absorbs into itself nearly all phenomena," would then align with my concept of a minor 3rd (19th partial) descending down through the "3rd zone," the 17th, 13th, 11th, and 7th partials, to then be completed upon arrival at the major 3rd (5th partial).

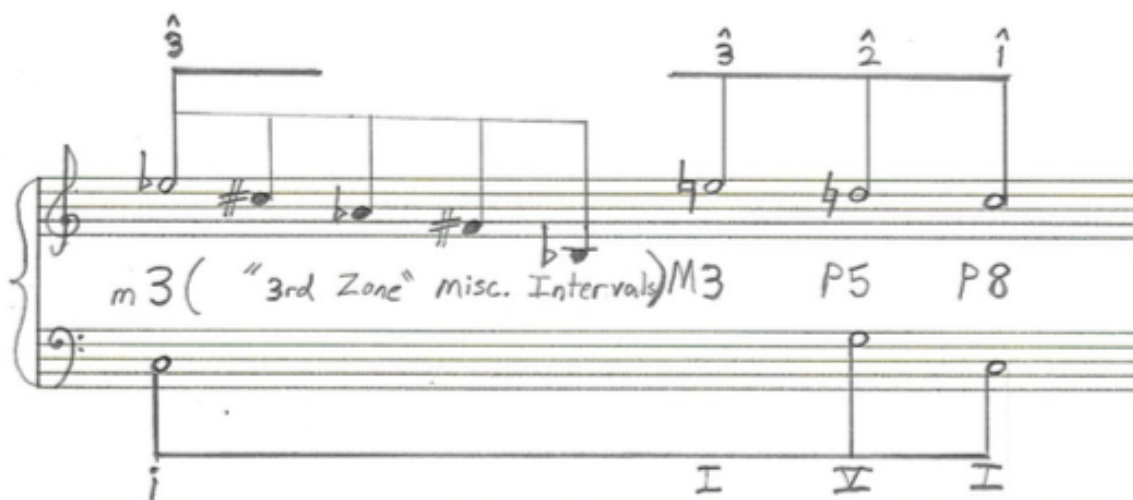
Figure 16: Nature's Tonic "3rd Zone"



In the graph above, we can see "Nature's Tonic" broken down into three zones, the major zone, the 3rd zone, and the minor zone containing both major zones and 3rd zones. We can think about the "Picardy 3rd" as a sort of post-cadential reference to this phenomenon, "descending" down the overtone series to the major 3rd, often in abbreviated form. A functional representation of this relationship would be an "initial ascent" up to a minor 3rd, "skipping over" an implied major zone, and descending back

down into either the major mode, or “skipping over” yet again an implied major zone to resolve toward unity. Emphasis of intervals related to the partials within the “3rd zone” could be thought of as a choice of style, and imply a middleground level. One could even think of an Ursatz such as the one below as representing “Nature’s Tonic,” at the background and middleground levels. There are perhaps other convincing ways of interpreting tonal relations between minor and major modes, however this particular model remains consistent strictly within the concept of the overtone series. The overtone series represents the aspect of tonality we can physically experience, but it most certainly is not where a theoretical understanding of harmonic balance would have us stop.

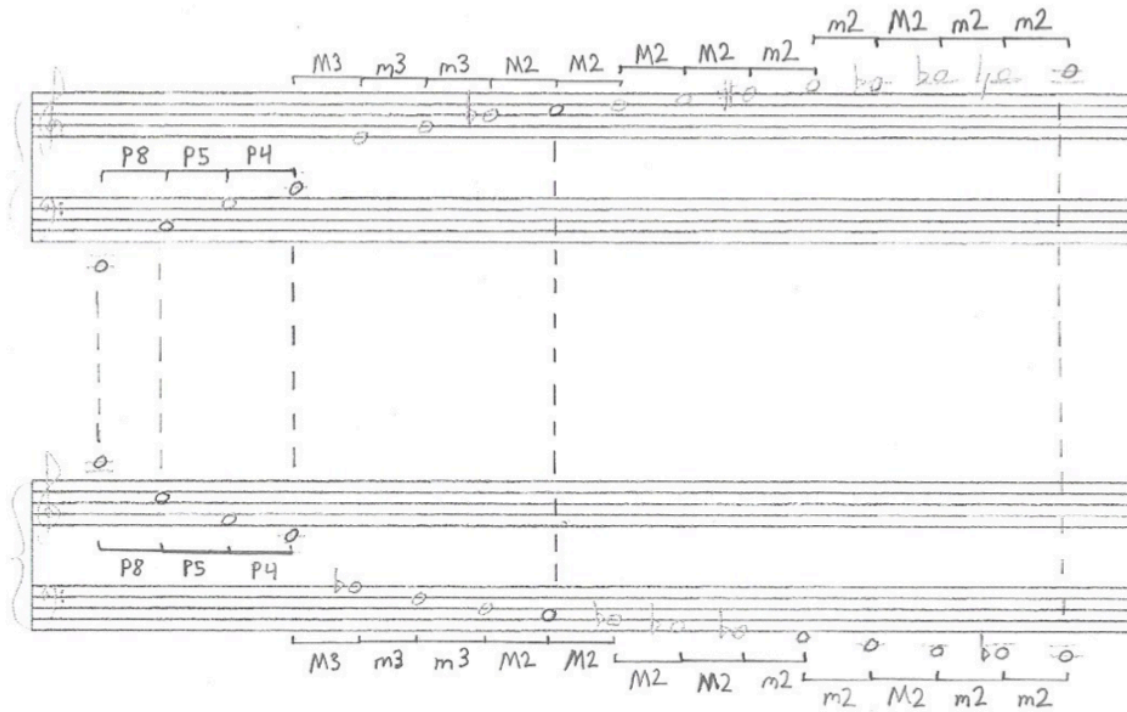
Figure 17: Potential “3rd Zone” Structure



The graph in Figure 18 is a representation of how we can expand the definition of tonality by deriving both “overtones” and “undertones” from a given fundamental source. The major scale as we’ve come to know it relies on this concept of “sub-partial” below a fundamental, and would have no way of justifying $\hat{4}$ without it. All other scale degrees within the major scale can be justified as a potential root through a relation of ascending

Perfect 5ths (C>G>D>A>E>B). However, this pattern would produce an F# if it were to continue, suggesting the Lydian mode.

Figure 18: Overtone & Undertone Series in C)



If we use the addition of the undertone series in our model of tonality up to the 5th partial, we now have a collection consisting of a major triad in root position and a minor triad in 1st inversion. The descending partials of the undertone series are inversions of the overtones above, and continue to get closer together and more dissonant the further down one goes in relation to the fundamental. The F minor triad in 1st inversion in this case is derived from its 5th, the fundamental C natural. Theorists like Hugo Riemann have based their work on the minor triad in relation to the 5th, and would therefore abbreviate the spelling in “just intonation” as such, F (-2 cents), Ab (+14 cents), and C (+/- 0 cents). As we can see, this minor triad is tuned differently than the example justified from the

overtone series. I believe if both interpretations were to be understood as equally true, and one were to compose in “just intonation,” the tuning itself could be a method of distinguishing between the minor 3rd derived from the undertone series and that of the overtone series. The 4th scale degree of the major mode derived strictly from the overtone series would be justified by the 21st partial (-29 cents) that stems from the 5ths lineage. If perhaps we were to support the ^4 in a descending 5-line Urlinie over a Dominant harmony, then the 21st partial (-29 cents) would indeed be correct. However, in a Pre-Dominant ii6 chord, the bass note ^4 would be justified by the 43rd partial (+12 cents), the “5th partial” within the 9th partial’s lineage. Finally the ^4 as it’s own root must be interpreted as the “5th below” the fundamental, thus being tuned (-2 cents). (Shown below in Figure 19)

Figure 19: Three different tunings of ^4 based on its root relation

The figure shows two musical staves. The top staff is a treble clef with notes 5, 4, 3, 2, 1. Below these notes are intervals: (+2) between 5 and 4, (-29) between 4 and 3, (-14) between 3 and 2, and (+4) between 2 and 1. The bottom staff is a bass clef with notes 5, 4, 3, 2, 1. Below these notes are intervals: (+2) between 5 and 4, and (+2) between 4 and 3. Below the notes are Roman numerals: I, V⁷, I, V, I. A 'vs.' is written between the two staves. The right side of the figure shows a similar structure with notes 3, 2, 1 and intervals (-14) between 3 and 2, and (+4) between 2 and 1. Below these notes are Roman numerals: I, ii⁶, V, I, IV, I.

As we aim to expand beyond the strictly overtone measuring system of 12-tone tonality, we can factor in three basic row forms, the “Overtone Row,” the “Undertone Row,” and two types of what I call “Tonal Rows.” As we’ve previously discussed, the “Overtone Row” consists of pitch-class integers (0, 7, 4, T, 2, 6, 8, E, 1, 3, 5, 9). If we invert this row around its fundamental, we get an “Undertone Row,” consisting of pitch-

class integers (0, 5, 8, 2, T, 6, 4, 1, E, 9, 7, 3). Lastly, if we reach outward from a fundamental source in both directions, it would make sense to include a row form that utilizes both the overtone and undertone series simultaneously. We can spell this row in two different ways. The first row that we'll call "Tonal Row V.1" is spelled (0, 5, 7, 8, 4, 2, T, 6, 1, E, 9, 3), and first pulls from the undertone series before the overtone series as it expands. The second row that we'll call "Tonal Row V. 2" is spelled (0, 7, 5, 4, 8, T, 2, 6, E, 1, 3, 9), which pulls first from the overtone series before the undertone series. The 4 rows are shown below.

Overtonal Row – (0, 7, 4, T, 2, 6, 8, E, 1, 3, 5, 9)

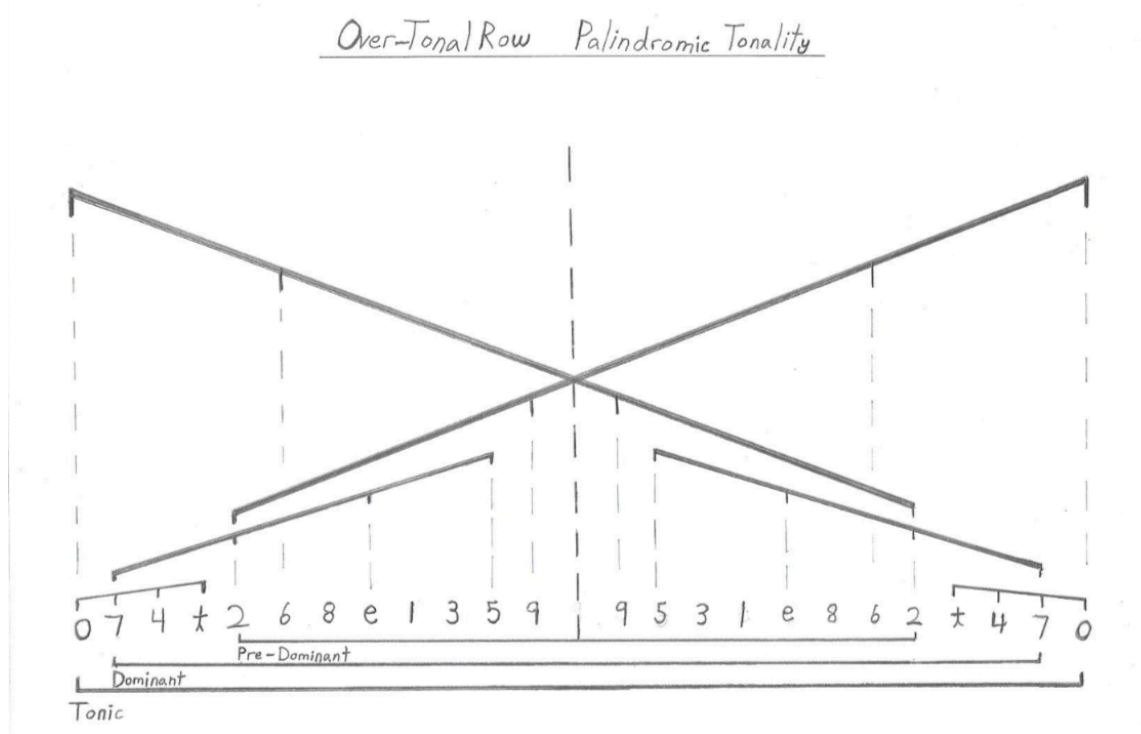
Undertonal Row – (0, 5, 8, 2, T, 6, 4, 1, E, 9, 7, 3)

Tonal Row V.1 – (0, 5, 7, 8, 4, 2, T, 6, 1, E, 9, 3)

Tonal Row V.2 – (0, 7, 5, 4, 8, T, 2, 6, E, 1, 3, 9)

One of the issues I've encountered while attempting to use the row forms above as a device to measure tonality in 12-tone music, is that there can be no return to unity in a single row by itself as there is within a "traditionally tonal" Ursatz. My solution led to the idea of what I call "Palindromic Tonality," the last factor that I'll be implementing into this system of tonal measurement, (for now). The concept suggests that since any given 12-tone row is only capable of providing a fundamental pitch once, that we by necessity, must factor in the presence of it's retrograde form as a means of phrase completion. For example, if we use the "Overtonal Row" as a measurement of tonality, we can create a diagram (shown below) that illustrates both the three levels of phrase structure (PD, D, T), as well as the lineage of partials associated with each root, in this case up to the 7th partial.

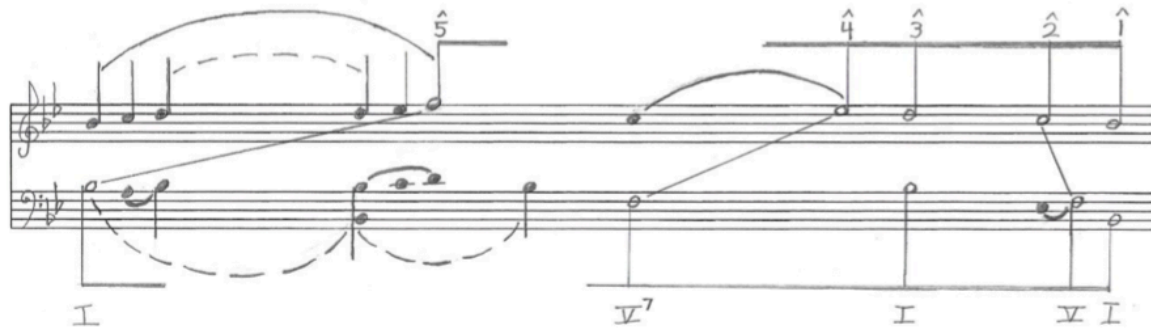
Figure 20: Over-Tonal Row Palindromic Tonality



By understanding how a given 12-tone row behaves as a palindromic figure, we can then ask ourselves whether this model is aligned with what the ear hears in nature, the overtone series. If the majority of tonal music tends to ascend towards a “primary-tone” in the early stages of a phrase-model, then it is within the retrograde portion of the palindromic graph that a tonal piece would pursue its fundamental closure. Since human ears crave what relates to the heart, a prolonged descent toward unity may suggest a sense of hope and affirm the idea that dissonance is a means to consonance. However, it might perhaps be appealing to have an even amount of ascending and descending motion present in a piece. For example, Allen Forte discusses how rare of a phenomenon it is for music to move equally in both directions. In *Introduction to Schenkerian Analysis*, he demonstrates this by graphing Handel’s “Suite No.1 in Bb, Air” (shown below), and then discusses how “the ascent and descent balance each other in length (not a usual

occurrence); the breadth of each, moreover, allows for various diminutional prolongations within the larger linear motion.”³⁰

Figure 21: Handel, “Suite No.1 in Bb, Air”: Balanced Ascent and Descent



If a balanced ratio of time spent ascending and descending suggests an experience not typical of “traditional tonality,” then perhaps we can keep this in mind as another form of measurement for evaluating 12-tone tonality.

If palindromic relationships exist within the core of tonality, paralleling earth’s gravitational pull, we can imagine a melodic line moving closer toward unity even after the last dissonant note. The same theory suggests an eternal pendulum, absorbing all of nature’s momentum for a time before allowing its return in variation form. This idea may seem abstract, but it can be easier to see in terms of a relation between the IV chord and the V chord in a given phrase model. The “I-IV-I-V-I” opening progression symbolizes a departure from unity toward the sub-harmonic series, ascending then past unity into the harmonic series and eventually returning to rest. This balancing motion remains justified through “nature’s laws” only half the time, yet for a chord to remain impactful it must never lose its sense of presence while others sound. The “Tonal Row V.1” is perhaps the most aligned with tonal opening material since each overtone is approached with

³⁰ Forte, *Introduction to Schenkerian Analysis*, Page 149.

momentum from the preceding undertone. In fact, a continuous amount of energy would be distributed across the “Tone Series” if our palindromic graph consisting of an ascending “Tonal Row V.1,” was then followed by a descending “Tonal Row V.2” in retrograde form. This would however be a study of two similar, but not identical row forms. What we will need to keep in mind as a rule of thumb while analyzing the following 12-tone pieces will be to always let each piece speak for itself. While it can be tempting to boil the details down into a golden rule, the benefits that follow an adaptable approach should prove to be most satisfying.

CHAPTER III: SCHOENBERG'S OP 33A

In Arnold Schoenberg's *Theory of Harmony*, he discusses how an unfavorable phenomenon has manifested itself within the realm of music theory. He asks, "Should we trust in the authority of the theorist? Why then? If he offers no support for what he says, it is then either just something that he knows (that is not what he himself has discovered, but rather what he has learned [secondhand]), or what all believe because it is experienced by all. Yet, beauty is not something in the common experience of all, rather, at most, in the experience of individuals. Above all, however, if that sort of judgment could be accepted without further justification, then justification would have to follow so necessarily from the system itself that to mention it would be superfluous. And here we have hit the theorists' most vulnerable spot: Their theories are intended to serve as practical aesthetics; they are intended to influence the sense of beauty in such a way that it will produce, for example, harmonic progressions whose effect can be regarded as beautiful; they are intended to justify the exclusion of those sounds and progressions that are esteemed not beautiful."³¹ Here Schoenberg questions the judgmental instincts of the theorist and whether or not beauty can be shared among the masses. While one has the ability to pursue the knowledge of others, I believe "discovery" occurs within us as a gesture. All the knowledge in the world cannot lead to discovery without new connections within us. I intend to present my own connections through the following analysis and how they relate to Schoenberg's 12-tone music.

³¹ Schoenberg, *Theory of Harmony*, Page 10.

Schoenberg believed that music should speak for itself, and welcomed a variety of interpretations in regards to his compositional technique. Much of my source of insight into the realm of Schoenberg's music has been thanks to an extensive amount of time spent studying with Jack Boss, a leading scholar in Schoenberg's music. In Boss' book, *Schoenberg's Twelve-Tone Music: Symmetry and the Musical Idea*, he interprets Schoenberg's compositional approach as possessing a consistent mechanism, which he refers to as the "Musical Idea." Boss defines musical idea as "an analytic framework: a process spanning the whole piece in which some sort of opposition or conflict between musical elements is presented at the beginning, elaborated, and deepened through the course of the piece, and resolved at or near the end."³² He then states that his method of analysis "should be understood as suggestions to hearers and readers of this music concerning one way they can make sense of it, and invitations to them to respond with their own ways of describing the Idea."³³ My own experience analyzing Schoenberg's music has yet to suggest any sort of objection with Boss' concept, but has rather ignited a personal interest in Schoenberg's ability to transpose his compositional "Idea" into the extended realms of the nature's tonality.

Schoenberg's *Op. 33a* provides a compelling opportunity to establish my approach to tonal categorization in 12-tone music. The first step in this process will be to directly compare Schoenberg's primary row form (PT), to the "Overtone Row" as I've mentioned in Chapter 2. After discussing the differences as well as similarities between Schoenberg's row and my own referential row, I'll then discuss any instances of tonal form or structural levels in relation to a potential fundamental structure. Schoenberg's

³² Boss, Page 1.

³³ Boss, Page 3.

primary row (PT) can be seen below in the first measure of *Op.33a*. Only after the row is presented in a strictly horizontal statement (measure 32), can we confirm the exact row order, since the first iteration consists of three tetra-chords. The row order is as follows, (T, 5, 0, E, 9, 6, 1, 3, 7, 8, 2, 4).

Figure 22: Op. 33a Measures 1-7

KLAVIERSTÜCK 51

op. 33a

Mäßig (♩=120)
cantabile

PT - T, 5, 0, E, 9, 6, 1, 7, 8, 2, 4

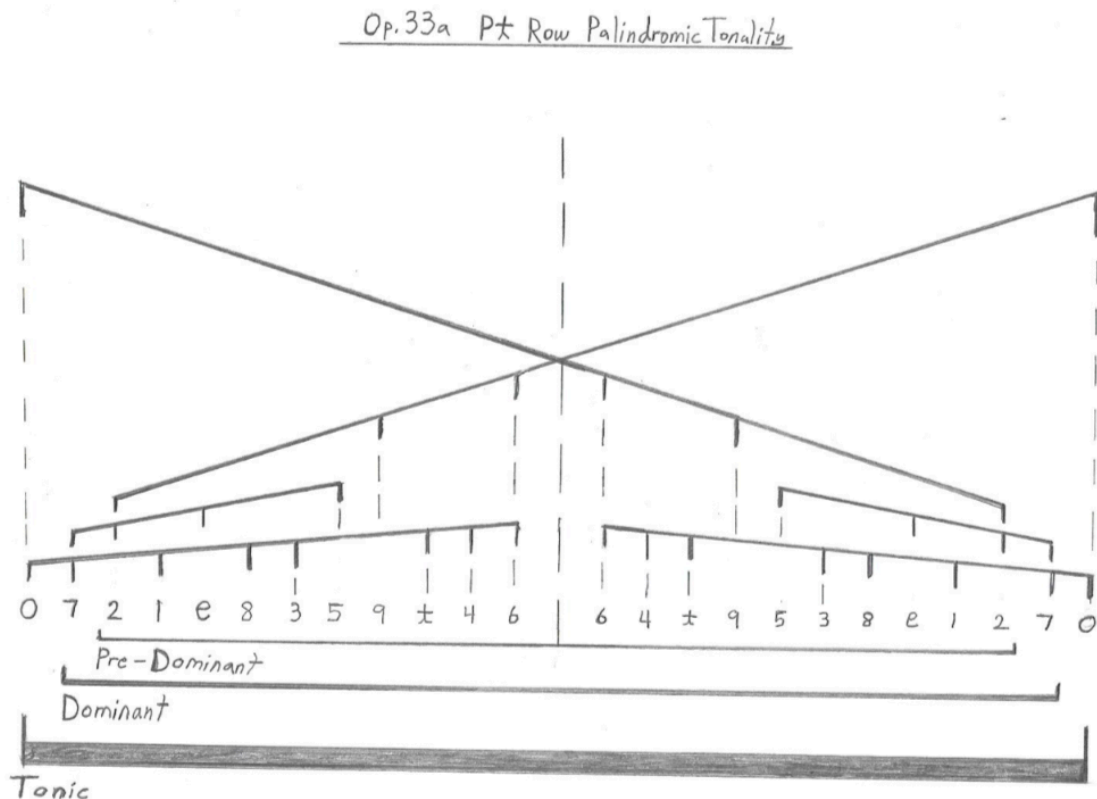
Overtone Row – (0, 7, 4, T, 2, 6, 8, E, 1, 3, 5, 9)

Op. 33a [PT] Row – (T, 5, 0, E, 9, 6, 1, 3, 7, 8, 2, 4)

If we align Schoenberg's Primary Row against the "Overtone Row" (shown above), we see that the first two pitches of each row outline the interval of a Perfect 5th. This will prove to be a vital point in my analysis to follow. If we arrange Schoenberg's PT row in the form of a palindromic graph (shown below transposed to C), we can see a

few key differences in comparison to the “Overtonal Row,” (page 40). This graph shows us that the first three pitches of the row are made up of ascending 5ths, and that the longest pitch prolongation would occur in what I’ve labeled the “Pre-Dominant” section. I’ll be revisiting this graph after a comparison between two different approaches I’ve used to analyze this piece. What would make this piece a “self-similar” fractal, or what Schenker would refer to as a work of “genius,” is if a clear background structure could be found underneath the surface material relating directly to the foreground row forms. My approach suggests that a combination of “Tonal Analysis,” paired with an understanding of Schoenberg’s “Musical Idea” may be key in understanding this piece in a deeper way.

Figure 23: Op 33a Row Palindromic Tonality



My first attempt at graphing *Op. 33a* and analyzing its potential structural levels, was in an effort to highlight what I called “Atonal Music” with “Tonal “Backgrounds.”

The piece appeared to be loosely based in the key of Bb, due to a consistent relationship between Bb and F throughout the piece's entirety. After much time spent digging through surface-level row forms and comparing several approaches, I found what felt like a distinct line between what could be a tonal background and an abundance of dissonance near the foreground. However, after reconsidering the amount of time in which a harmonic zone may take to unfold, I've since modified my approach to analyzing "Tonal Backgrounds." I've included a full score at the end of this chapter with markings that lead to my first graph, which I'll be referring to as "Op. 33a Graph #1." I'll be referencing this score as I walk through my process and systematic approach used in the analysis.

Figure 24: Op. 33a Graph #1: Initial Descent/Fundamental Structure

(m.2 m.14/21 m.22 m.28 m.32 m.34 m.36 m.38 m.40)

Op. 33a

Bb: I (ii⁶ V⁷) I ii^(23/2) I I (V V) I (V)

Step number one, while searching for a tonal presence or any potential structural levels, I sought to follow a "standard" procedure of first identifying a tonic and dominant

sonority. I use the term “sonority” rather than “chord” to differentiate between “harmonic spelling” and “harmonic function.” A sonority implies that, while a certain cluster of notes could in fact contain major or minor triads, that the job in which the cluster does remains more important than its spelling. My first efforts also sought to trace any possible “Urlinie” (Fundamental Line), figures in the key of Bb that align with a potential bass arpeggiation. As I soon learned, the temptation to project patterns and structures I desired to find into Schoenberg’s dense texture proved to be a great one. After all, any pitch one needs to create a specific system will eventually present itself in 12-tone music. Edward Laufer, a renowned proprietor of extended Schenkerian techniques, once discussed this common pitfall new students often experience when dealing with 20th century music in an interview with Stephen Slottow. Laufer claimed that he often refrained from teaching new students about linear analysis in atonal music until they formed a foundation, noting how it can be “dangerous to give students (these tools) without a certain kind of background, because otherwise they think that anything goes, and unless one develops certain principles, it’s difficult to refute that idea—why is it this and not that?”³⁴

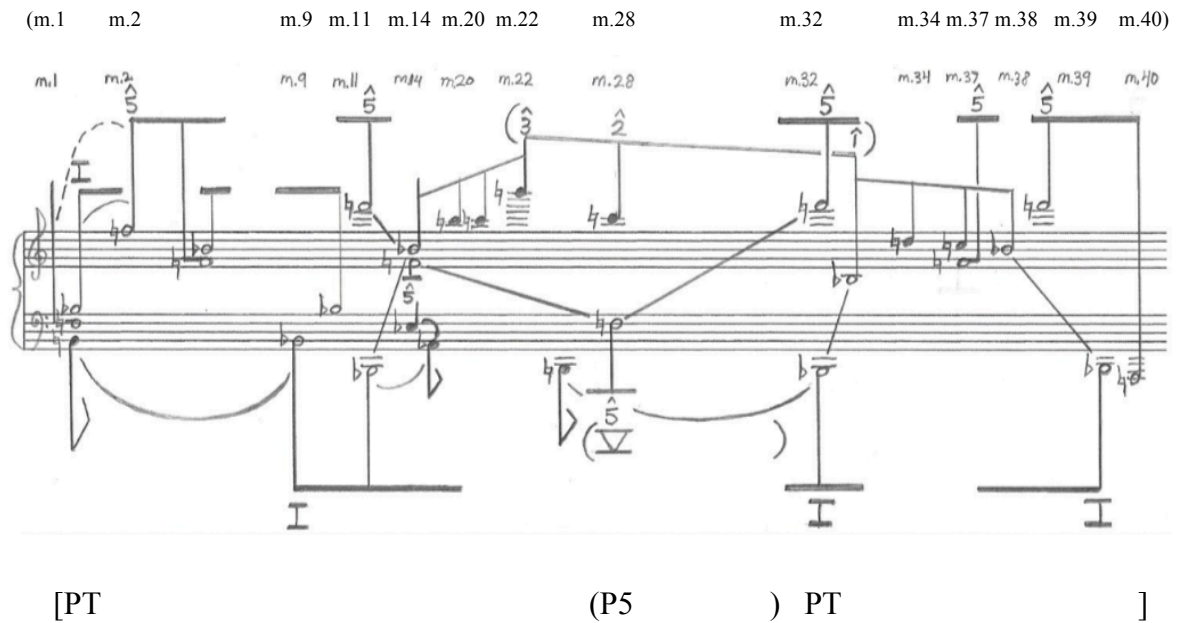
My first attempt to graph *Op. 33a* does highlight a valid relationship between Schoenberg’s (PT & I3/RI3) and (P5/R5 & I10/RI10) row groups serving as both tonic and dominant sonorities. Boss talks about how Schoenberg uses these “rows together in inversionally combinatorial pairs to create harmonic areas.”³⁵ However, my struggle to bring the suspended \wedge^5 (F natural) all the way down to \wedge^1 in a convincing way at the background level, is what led me to reconsider my approach in a second graph.

³⁴ Beach, Page 342.

³⁵ Boss, Page 243.

Analyzing the initial ascent to $\hat{5}$ in measure two proved to be convincing, however a lack of harmonic justification to support a potential $\hat{4}$ presented me with the tempting impulse to project harmonic significance where there was none, (or perhaps not enough for the background). I ended up loosely interpreting both measures 14 and 21 as possible locations to bring down the line to $\hat{4}$. First in measure 14 in the form of a ii_6 as well as measure 21 in the form of a V_7 . Looking back, it seems that the stronger case was indeed the V_7 in measure 21. However, what created a strong case for dominant harmony supporting $\hat{2}$ (rows based on P_5) spanning the development section, was not present in either location I suggested $\hat{4}$. Since the material one would use to justify $\hat{4}$ was weak at best, I instead labeled both $\hat{5}$ and $\hat{4}$ as an “Initial Descent,” arriving at $\hat{3}$ in measure 22. Though the case for a dominant sonority supporting $\hat{2}$ at measure 28 seems to be substantially more convincing, the $\hat{5}$ still persists in the soprano voice until the piece’s completion, even serving as a surface-level root supporting the C natural above in the last measure. This idea of the soprano line serving as a local bass support zone for material closer to the surface is a recurring phenomenon, which ultimately happens at different levels as well. I’d like to now discuss my second graph (Figure 25: Op. 33a Graph #2), in which I attempt to represent the persisting $\hat{5}$ solely within the background.

Figure 25: Op. 33a Graph #2: Implied Fundamental Structure



The graph above represents my final linear analysis of Schoenberg's *Op. 33a* at the mid-ground and background levels. Here I've graphed the piece having a consistent pedal in both the soprano and bass voice outlining a Perfect 5th. The Bb from the very first measure persists as consistent support for ^5, and creates a stagnant framework in which the piece lives. The B natural in the bass at measure 1 serves as a long-range upper neighbor tone, creating a "sense of arrival" as it resolves to Bb in the lower registers of measure 9 and 11. One might ask how useful it is to reduce a fundamental structure down to a motionless state. Yet, Schenker discusses the 8-line Urlinie as a valid structure, which can essentially be thought of as a stagnant state as well. Perhaps a true 8-line structure represents the unity of a Perfect 8^{ve}, which is then "recharged" with an embedded bass arpeggiation. Other descending 8-line structures with less support at the

initial octave, or perhaps an abundance of support at $\wedge 3$ & $\wedge 2$ may in fact suggest an “initial descent,” not containing background rest. However, what we have here is a stagnant Perfect 5th, an interval not capable of resting indefinitely at the background level. The (now middleground) descending 3rd progression may serve to “recharge” the stagnant background, yet the structure at large is waiting for resolution. This is why I claim that the piece temporarily rests within it’s “Implied Fundamental Structure,” and according to nature’s intervallic principles, the piece exists within a larger overtone series based in “Eb.” The graphs below illustrate the piece’s tonal origin in relation to Eb, embedded within the space inside both tones of the Perfect 5th.

Figure 26: Stagnant Background Containing Musical Idea

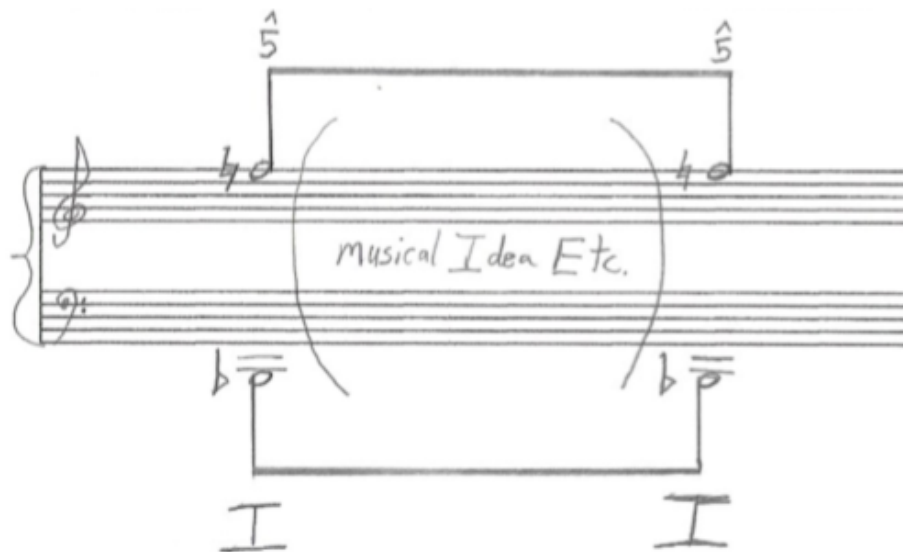


Figure 27: Op 33a as Fundamental Eb

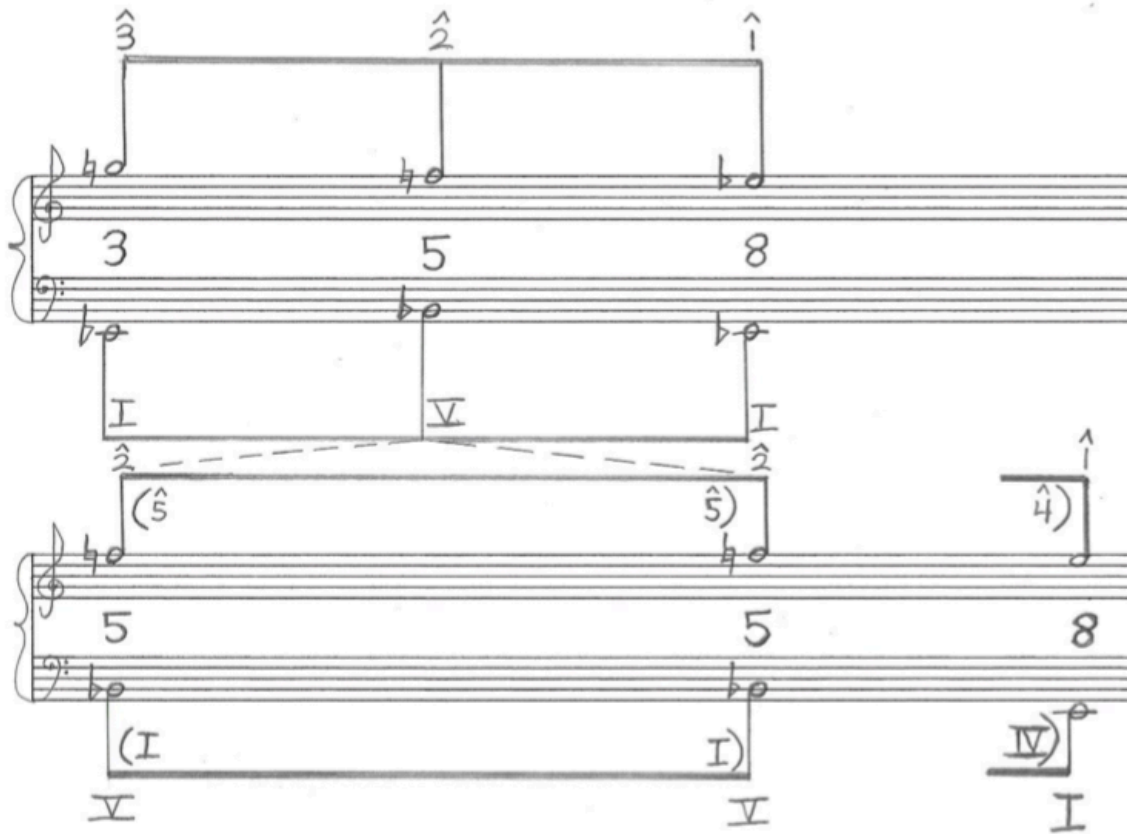
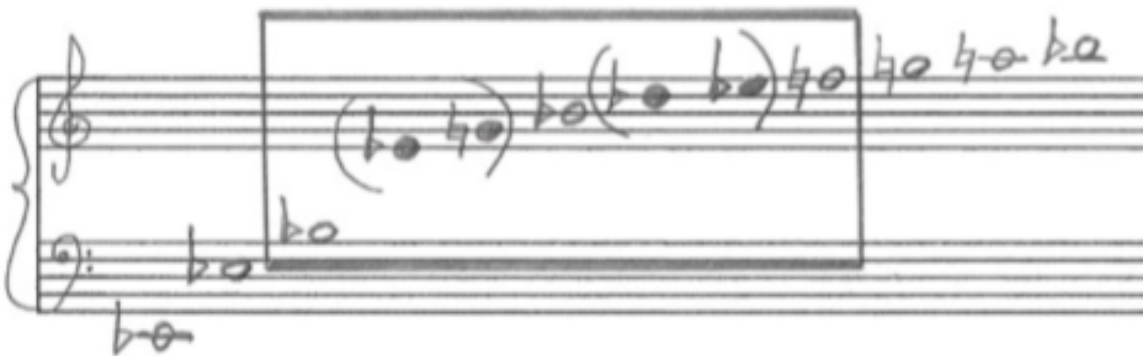


Figure 28: “Implied Fundamental Structure”: 3-9 Partial Frame Outlining Perfect 5th)



The image directly above represents the total range of *Op. 33a*'s background, spanning a Perfect 5th from the 3rd to the 9th partial in Eb. Though the resolution to an

octave resting point (and further yet the unison) cannot be heard within Schoenberg's written material, the music may then indeed "latch" onto nature's motion as it was originally modeled after and inevitably resolve as a dependent attachment in that image. For example, in "space" one cannot hear sound, so perhaps at some point before our known atmosphere was established, an initial tone or perhaps a "big bang" gave way to the "original overtone series," one that contains all music and continues to expand along side our cosmos. Some astrophysicists suggest that at some point in the distant future our world may start to again compress, reverting back to its origin and reigning in the tonal series along with it. At that point we can be certain that no dissonance, imperfect consonance, or even perfect interval beyond that of its fundamental will go without rest. As abstract as this idea may seem, it aligns with the properties of species counterpoint as defined by Johann Joseph Fux in his *Gradus ad Parnassum* (see footnote, page 8). A "Perfect Interval" marks the beginning and ending of any given phrase or exercise. One's relation to faith may be based in a similar understanding of a lifetime phrase model. Schenker makes an interesting statement relating to this topic in *Counterpoint Book I*, stating that "in free composition it is the scale degrees that have their own secret law of progression, and precisely our intuitive familiarity with that law of progression makes plausible the assumption of those ideal tones that lie outside the realm of actual voice leading. Regardless of all the freedom of free composition, even there the first principle of the theory of counterpoint—"In the beginning is consonance!"—has practical significance: even in free composition, that which, as dissonance, cannot and may not be substantiated, must be placed upon the foundation of consonance."³⁶ Every so often as I

³⁶ Schenker, *Counterpoint Book I*, Page 112.

read Schenker's writings, I'm reminded why it's important to read with patience. The presence of "dissonance" in some of his views may also "be placed upon the foundation of consonance." I find that most people speak of their experience as being based in consonance, yet too often interact with one another through dissonance, perhaps due to social pressures or their own frustrations. Schenker is no exception, and after stating how many connections humanity shares in this world, he often follows with an unfortunate remark about groups he viewed as lesser value. However, I believe that certain truths do make their way to each generation in the hearts of consonance.

I'd like to conclude my discussion of Schoenberg's *Klavierstück Op. 33a*; with a comparison between what I believe are two of the most fascinating ways to analyze this piece. The amount of detail one can analyze in the foreground is truly where the excitement of Schoenberg's style shines brightest. My analysis suggests that the piece indeed lives within tonality, however an expanded understanding of tonic and dominant relationships within a "fundamental key" suggests that dissonance can in fact contain further "dissonance," all being relative to the structural frame and its location on the overtone series. What function then remains after "traditional harmony" becomes subordinate to the sonority cluster? My answer embraces the foundation of traditional tonality, in which hierarchy provides clarity. Boss notes that the piece begins with a "perfect" symmetrical interval pattern in measures 1-2, which is then degraded and re-established to a lesser degree in measure 32.³⁷ If the "most perfect" group of intervals, the

³⁷ "The vertical symmetry becomes obvious when one compares the unordered pitch intervals of the three of three chords in m. 1 with the three chords in m. 2 <4,2,3> to <3,2,4>, and <6,2,3> to <3,2,6>. But the temporal placement of these interval combinations and their inversions creates horizontal symmetry at the same time: <1,5,5> and its inversion come first and sixth, <4,2,3> and its inversion come second and fifth,

“palindromic ideal,” is established right away and then another “lesser form of perfection” is established in measure 23, one might make the comparison of the “Perfect 8^{ve}” leading to the “Perfect 5th.” In this case, the sense of arrival may in fact be stronger when the 2nd degree of perfection aligns with the 2nd degree of perfection sustained in the background. To put it simply, the piece is most “at rest” once all levels of 2nd degree perfection are aligned. Schoenberg’s Musical Idea in this case would suggest a statement about degrading perfection, within an extension of perfection. The graph I’ve shown below illustrates the journey from measures 1-2 leading to measure 32, suggesting that what I call “1st Degree Perfection,” equal in value to the Perfect 8^{ve}, can essentially be thought of as a long range upper/lower neighbor “idea” in relation to the “2nd Degree Perfection,” equal in value to the Background-Perfect 5th. This narrative would then suggest that Schoenberg’s Musical Idea introduces “too much” perfection and solves the problem by reducing the amount to a consistent level. The row form also becomes clear in its purely horizontal form above an Eb in the bass, perhaps further supporting an implied resolution past the double bar line.

and <6,2,3> and its inversion come third and fourth. Thus the palindromic ideal of Op. 33a is even more perfect than that of Op. 25, No. 1: it demonstrates symmetry in two dimensions.” Boss, Page 247.

Figure 29: “1st Degree Perfection” as Neighbor to “2nd Degree Perfection”

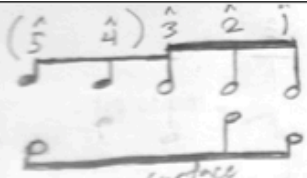
Figure 30: Schoenberg’s *Op. 33a*: Palindromic Structure in Relation to P3

In my final illustration (shown above), I align the “Fundamental P3 Row” with the larger structural points of the piece in the form of a palindromic graph. My claim is that since the piece lives within an “Implied Fundamental Structure” built on Eb, the fundamental pitch itself (pitch-class interval “3”) may not appear highly structural in the score due to its “implied pedal,” hence the lack of support for a potential \wedge^4 . In other words the Eb is “too busy” fulfilling its role behind the scenes. The exception is of course

in measure 32, as I just mentioned Eb providing bass support for PT as the 5th below. I include the low Eb in my graph as the fundamental, instead of what could only be considered $\wedge 4$ in relation to the PT row. Notice the lack of structural significance of diatonic $\wedge 4$ in the palindromic graph.³⁸ Perhaps the perfection of a complete structure such as Mandelbrot's "scaling" or "self-similar" fractal would include an inverted iteration of the "Fundamental Line," wrapping around the low Eb. Schoenberg's row form prioritizes the Perfect 5th and hides the significance of the Perfect 4th. Though the implied relation to Eb in this piece is not particularly easy to hear by ear, perhaps in time we can learn— "to hear it correctly!"³⁹—to understand the subtle nuances of nature's contrapuntal model, the overtone series, as we form a deeper connection to our source of inspiration.

³⁸ The main function of $\wedge 4$ (Ab), or $\wedge b7$ in the key of Bb, is to serve as a lower neighbor to Bb in the bass, leading then back to the upper neighbor, B natural, as seen in measures 14-27.

³⁹ Edward Laufer reflects on a fellow student "hearing" it wrong; "I remember, in a class which Oster had at Princeton years ago. That's as far as the student got, because Oster snapped back at him, "Well then, try to hear it correctly!"" – Beach, Page 345. (Oster however was a purist in every sense, and perhaps wouldn't "hear" of Laufer's later work analyzing atonal music.)



deep middleground "Initial Descent"

Here is Op. 33A in its entirety.

Pt Mäßig ♩: 120 a) *canzabile*

① *B♭: I*

Pt ⑥

⑧ *poco rit.*

Pt ⑩ *a tempo*

133 Pt

Handwritten musical score for piano, page 134. The score is divided into systems with various performance instructions and tempo markings.

System 1 (Measures 12-14): *poco rit* - *molto rit*. Includes dynamic markings *fp* and *p dolce*. Handwritten annotations include *I 3* and *pt/h*.

System 2 (Measures 14-16): *a tempo* and *p cantabile*. Includes dynamic marking *p*. Handwritten annotations include *pt/h* and *I 3/h*.

System 3 (Measures 16-18): *p cantabile*. Includes dynamic marking *p*. Handwritten annotations include *pt/h* and *I 3/h*.

System 4 (Measures 18-21): *heftiger* b) *f martellato* c) *poco rit*. Includes dynamic marking *f*. Handwritten annotations include *pt/h* and *I 3*.

System 5 (Measures 21-23): *ruhiger* d) *cantabile*. Includes dynamic marking *p*. Handwritten annotations include *pt/h* and *I 3/h*. A circled note is labeled "Head Note".

Legend:
 b) more vehemently
 c) martellated
 d) calmer

Page number: 134

rit $Px/h1$ - - - - - a tempo Px dolce

$I3/h1$ f energisch $I3$ fz p

$schizzando$ $Rx/h1$ steigend f $RI3/h2$ p martellato

New Harmony (VI) $Po/h1$ $Ix/h1$ Po $I5/h1$

$I5$ f $I5$ f

Ix $P5$ Ix $P5$

Page 1 of 1
135

The image shows a handwritten musical score for piano, consisting of five systems of staves. The notation includes treble and bass clefs, notes, rests, and various performance markings. Handwritten annotations in black ink are scattered throughout, including tempo changes like 'rit' and 'a tempo', dynamics such as 'p' (piano), 'f' (forte), and 'fz' (forzando), and articulation like 'dolce' and 'martellato'. There are also specific performance instructions like 'schizzando' and 'steigend'. Roman numerals and letter combinations (e.g., $I3/h1$, $Px/h1$, $RI3/h2$) are used to denote chords or fingerings. A large handwritten 'VI' is written on the left side of the third system, with 'New Harmony' written above it. The page is numbered '135' at the bottom center, with a 'Page 1 of 1' label above it.

Handwritten musical score for piano, consisting of five systems of staves (treble and bass clef). The score includes various musical notations, dynamics, and performance instructions.

- System 1 (Measures 31-32):** Starts with a treble clef and a key signature of two flats. Measure 31 is marked with a circled '31' and 'R5'. Measure 32 is marked with a circled '32' and 'Return Recap'. Dynamics include *ff* and *p*. Performance markings include 'RIT' and 'RI3'. Time signatures 5/4 and 6/8 are present.
- System 2 (Measures 33-34):** Measure 33 is marked with a circled '33' and 'rit - - - Ruhig (3) g)'. Measure 34 is marked with a circled '34' and 'p dolce'. Performance markings include 'Rt' and 'Ant'. Time signatures 6/8 and 4/4 are present.
- System 3 (Measures 35-36):** Measure 35 is marked with a circled '35' and 'steigernd'. Measure 36 is marked with a circled '36' and 'p cresc.'. Performance markings include 'Rt', 'RI3', and 'Ant'. Time signatures 3/4 and 4/4 are present.
- System 4 (Measures 37-38):** Measure 37 is marked with a circled '37' and 'rit - - -'. Measure 38 is marked with a circled '38' and 'ff'. Performance markings include 'Rt', 'Prt', and 'I3'. Time signatures 3/4 and 4/4 are present.

Additional markings include 'I3', 'VI', and 'V' with various accidentals and slurs. A legend at the bottom left shows '2) Calm' with a dashed line and 'Lun' with a solid line. The page number '136' is written at the bottom center.

CHAPTER IV: WALKER'S SPATIALS

George Walker's *Spatialis: Variations for Piano* provides an interesting opportunity to analyze the 12-tone method and harmonic vocabulary of a composer who only wrote one 12-tone composition. Walker was heavily influenced by classical traditions in regards to musical form, and decided to compose using the increasingly popular style near the middle of the 20th century, composing with a 12-tone row. Walker's background as a classical pianist adds another unique layer to his style, a compositional influence that perhaps had been less common in the background of other prominent 12-tone composers such as Schoenberg or Webern. Walker was also an African American man who specialized in playing and composing in the classical style. This perhaps makes him a fairly unique individual for his time, having what some would call a musical background associated with "whiteness." How to navigate this rather unfortunate line in the sand between what can be considered "whiteness" or "blackness" has not necessarily been agreed upon within the field of music theory. In Philip Ewell's opening paragraph to his article "Music Theory's White Racial Frame," he states, "Music theory is white. According to the Society for Music Theory, roughly 84% of the society's membership, 90% of full-time employees, and 94% of associate and full professors are white. Aside from this literal version, there is an even more deep-seated figurative whiteness that manifests itself in the composers and music theorists we choose to study. Thus, for example, I am a black person—the only associate professor who self-identified as such in the Society for Music Theory (SMT) demographic report—but I am also a

practitioner of what I sometimes call “white music theory.”⁴⁰ Here Ewell claims to be a part of music theory’s “whiteness.” As I’ve mentioned before in Chapter 1, I’ve sincerely learned a lot from Ewell’s convictions and vision for music theory’s future. However, I believe in a social hierarchy that boils down to one group of humans, all within the human color. Some may call this an over simplification, and that by focusing on this view that I as well am contributing to whitewashing. It is my most sincere hope that whoever may jump to such a conclusion might first value my opinion as an equal, just as I would hope to do in return for them. George Walker was an African American man who dedicated his life to playing and composing classical music, the art that he knew. By approaching Walker’s *Spatialis* using the analytic tools I know, including Schenkerian Analysis, I intend to highlight the many wonderful qualities of his work as well as attempt to expand the boundaries of tonal analysis in my effort to accommodate all “music of the tone.” In response to Ewell’s comments regarding Schenker’s technique and “non-white” music, I’ve cited Kofi Agawu’s rebuttal in the footnotes below.⁴¹ It is my sincere desire to honor George Walker and his musical insight as a result of this chapter.

⁴⁰ Ewell, Page 324.

⁴¹ "if one argues that the hierarchic thinking that lies at the core of Schenkerian theory is white and racist, what is one to make of the fact that in West Africa, too, modes of hierarchic thinking are pronounced and functionally indispensable to an understanding of many an expressive structure, musical as well as non-musical? The worst consequence of claiming technical procedures for whiteness is denying the existence of shared ways of proceeding, and in effect enjoining our hypothetical West African theorist to go look for something different, a new grounding principle, better if it is anchored in nonhierarchy, something uniquely his own, something 'black.' The domain of blackness is thus defined in its non-intersection with whiteness. I fail to see how such a strategy can be empowering for black scholars." – Agawu, Pages 15-16.

Figure 31: Walker's *Spatials* Measures 1-3

SPATIALS
Variations for Piano

George Walker

Statement ♩ = 120

P1- 1, 4, T, 0, 3, 9, 8, 6, 5, 2, E, 7.

George Walker's *Spatials* is a 12-tone composition written for solo piano in theme and variation form. The typical approach to analyzing a theme and variation form places a large amount of emphasis on the middleground structure, which can often be found loosely within each variation. In most cases, the ornamentation as well as various modes of perception may differ as the piece progresses through each variation. However, the core compositional ideas are almost always represented within the structure of each variation in some way or another, differing in severity on a case-by-case basis. Walker's *Spatials* is composed entirely using the 12-tone system, specifically based on the P1 row (1, 4, T, 0, 3, 9, 8, 6, 5, 2, E, 7). As we see due to register and phrase level arrangements of these pitches, he tends to favor the pitches C# and G# (1 & 8) in the bass. Each of Walker's variations not only contain an internal structure outlining a Minor 3rd, but also contribute to a long-range arpeggiation of a perfect 5th (C#>G#) due to the transpositions of each variation. In several ways, *Spatials* models the behavior of a "traditional sonata form" in a minor key.

Figure 32: Foreground P1 Row: “Diatonic Spelling Won’t Work”

$P1 \leftarrow (1 \ 4 \ \sharp \ 0 \ 3 \ 9 \ 8 \ 6 \ 5 \ 2 \ e \ 7)$
 row count (0) (1) (2) (3) (4) (5) (7) (8)
 C#m: i
 V? (No D# 2) (use enharmonic Eb?) (D# not in C#)

As we can see in the graph above, there appears to be an issue of spelling that prevents us from analyzing any sort of \wedge^2 in C# minor without considering an enharmonic equivalent or a non-diatonic scale degree. Much of my efforts while analyzing *Spatialis* have been to highlight any potential structures in the middleground or background level of the main theme zone (measures 1-11) that might suggest a fundamental structure. For example, $(\wedge^3, \wedge^2, \wedge^1)$ or $(\wedge^5, \wedge^4, \wedge^3, \wedge^2, \wedge^1)$. However, after comparing my graphs from past efforts with those reflecting an expanded definition of tonality, I can accurately explain why this piece is both “close to unity” in the foreground as well as background, but not necessarily in the same way. Walker’s P1 row in comparison to my “Overtone Row,” emphasizes partials further up the overtone series. As we can see in the row comparisons below, the interval between row order numbers 0 and 1 in the “Overtone Row” implies the Perfect 5th, in comparison to the *Spatialis*’ P1

Row, which implies the Minor 3rd. This will play a large role in determining which intervals are found at the background level in both the “theme” and “macro levels” of the piece.

Overtonal Row – (0, 7, 4, T, 2, 6, 8, E, 1, 3, 5, 9)

Spatials [P1] Row – (1, 4, T, 0, 3, 9, 8, 6, 5, 2, E, 7)

Overtonal Row – (0, 7, 4, T, 2, 6, 8, E, 1, 3, 5, 9)

Spatials [P1] Row – (1, 4, T, 0, 3, 9, 8, 6, 5, 2, E, 7)

Since the “Overtonal Row” is not necessarily a row designed for composition in the “most creative” sense, it serves as a sort of measuring stick to compare tonal references within a given piece to perhaps what can be considered the most literal ordering of the overtone system as an approximation. As I discussed in Chapter 2, the sub-section within the “Overtone Row” known as “Nature’s Tonic,” consists of pitch-class integers... (See below).

Nature’s Tonic – (0, 7, 4, T, 6, 8, 1, 3)

N. T. Transposed by T1 – (1, 8, 5, E, 7, 9, 2, 4)

Therefore, *Spatials*’ P1 Row emphasizing the Minor 3rd might suggest a preloaded tonic zone, perhaps containing the first 10 integers of the “Overtone Row” embedded in its intervallic span. My conclusion (for now) leans towards the idea of the row itself being stagnant after the initial statement of first two pitches, C# and E natural. The low G# emphasized at the row and even middleground level may in fact be a reference to what will eventually become structural as the six variations eventually transpose Walker’s system by T7, synthetically creating a long-range bass arpeggiation. The Minor 3rd resting on its root throughout the entirety of each variation will remain a constant device,

creating an ascending Minor 3rd structure in the deep middleground from the theme zone to the last variation. My final claim, which I attempt to highlight in the foreground of the main theme (m. 1-11), is that the theme itself provides a main clue in how we might interpret the background motion as a static structure, justified by the C# frame (m. 11) which never left. However, I'd like to also discuss some of my previous work on *Spatials* before coming back to these conclusions regarding its "Fundamental Structure."

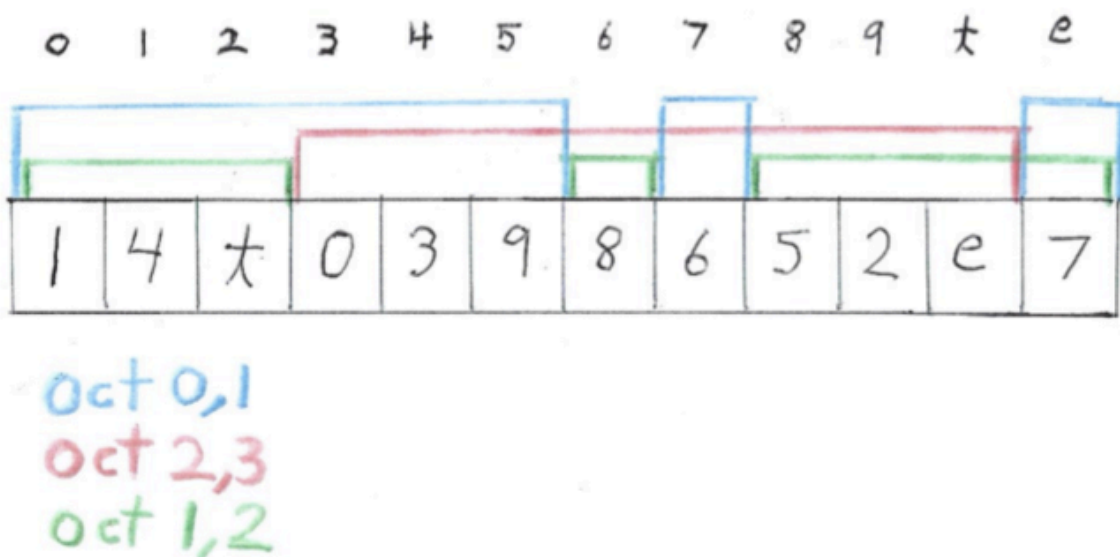
Figure 33: Main Theme: Oct 0,1 collection right hand, remaining 4-28(0369) in left hand



Another method one might use to analyze the various structural levels in Walker's *Spatials* is by comparing the different octatonic collections he uses. As we see in the graph above, much of Walker's structural elements remain intact within the octatonic collection, Oct (0,1). I'll be referring to "order numbers" in this section, meaning the numbered order of pitches in row P1 (0-E) as they appear in the music. We can also refer back to the score on page 64, noting that in measure one, the first five pitches consisting

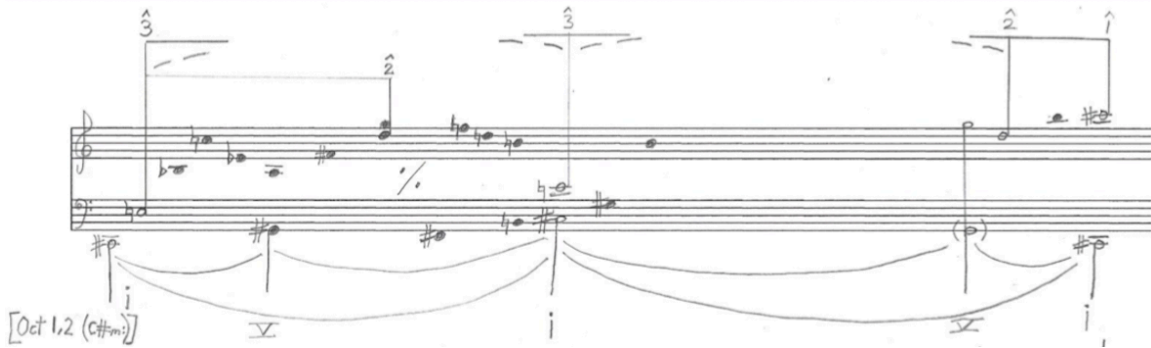
of order numbers (0-4) are grouped together compositionally, making up set-class 5-10(01346), which also consists only of pitches within the octatonic collection, Oct (0,1). Instead of including order number (5) as well, we see that (5) is compositionally arranged together with order numbers (5-7), making up the set-class 3-2(013), which relates to Oct (2,3). Lastly, the remaining order numbers (8-E) make up set-class 5-28(02368), which suggests a relation to Oct (1,2). These alternating groups of octatonic collections can be understood as a sort of tonic [Oct. (0,1)] and either pre-dominant [Oct. (2,3)] or dominant [Oct. (1,2)] sonority relationship. The true dominant remains less defined than the tonic zone since neither collections Oct. (2,3) or Oct. (1,2) provide the diatonic \wedge^2 , which is found in the Oct (0,1) collection spelled as an Eb. Nonetheless if one were justify a tonic and dominant relationship in the foreground using octatonic sonorities, the Oct (0,1) collection would provide substantial support for a tonic zone, which after cycling through collections Oct. (2,3) and Oct. (1,2), would serve again as a source of row-level closure during the onset of each P1 row, or end of each R1 row.

Figure 34: *Spatials* P1 Row and Octatonic Subsets



The illustration above in Figure 34 demonstrates how Oct (1,2) may also contain the structural elements necessary for a fundamental structure if one were to “borrow” from C natural’s tonal collection. What must be interpreted with a slight sense of subjectivity is the matter of accidentals. Both collections Oct. (0,1) and Oct. (1,2) could successfully support an \wedge^3 E natural (4) by its root C# (1), however, when it comes to scale degree \wedge^2 , we are left with several choices. One option could be to use the D natural as initially supported by the interval of a diminished 5th using the G#, which doesn’t prove as strong of a candidate in a traditional sense. Since there would be a stronger sense of support in the case of a perfect interval, perhaps the (G#/D) relationship might not qualify as a background level option. In fact D# is mostly absent where it is needed near the G# in the bass. It’s not until measure 8 that we see an option to support \wedge^2 as being spelled as Eb with support from its 5th below, now spelled as Ab. However, if one were to interpret this piece as actually being in C major, the last four order numbers of the P1 row would provide a clearly audible descending V7 chord in root position. It could be that C# might serve as an upper neighbor to C natural, and the Minor 3rd supporting the E natural would then resolve down to a Major 3rd. This somewhat “multi-key” approach based on consisted pitch letter names (regardless of accidental), is what led me to create my first graph, (shown below in Figure 35). Here we can see the tonic root C# and dominant root G natural outlining the bass arpeggiation of a diminished 5th. In many ways, the descending G7 chord at the end of P1 suggests the most prominent nod towards a “traditional tonal” chord spelling.

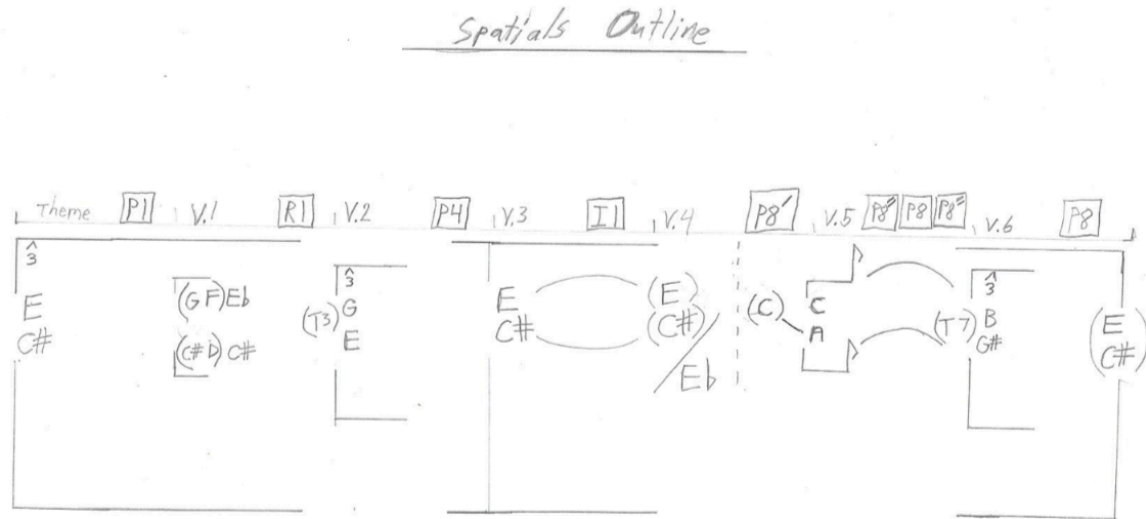
Figure 35: Original Graph: ^3, ^2, ^1 supported by Diminished 5th Arpeggiation



The reason I've touched on the idea of these octatonic collections playing a role as possible sonorities in the foreground, is because the key to any convincing tonal analysis quite often is due to one's ability to highlight an over-arching compositional mechanism, found at various structural levels within the piece. I believe that quite often in the foreground of a 12-tone composition, one must look beyond the cut and dry instances of tonic and dominant spelling, and begin to approach each piece on a case-by-case basis in order to discover what functions as "consonant" and what functions as "dissonant." After all, the deciding factor which determines if a given harmonic network has decided to embrace "tonal behavior," or if it has decided to reject it all depends on its portrayal of consonance and dissonance. I've searched for a tonal frame in my own analysis of this piece, yet the connections between what I've formerly considered "traditionally tonal" elements in a foreground texture have become increasingly difficult to pin down without a "Musical Idea" to unify the tonal analysis at various levels. As I've now become more accustomed to letting the music speak for itself, and not projecting

tonal significance onto passages where perhaps there is none, my final outline of Walker's *Spatials* reflects what I believe is his equivalent of Schoenberg's "Musical Idea," a middleground sequence of ascending minor 3rd's, all within a stagnant "Fundamental Structure," supporting $\hat{b}3$ over tonic.

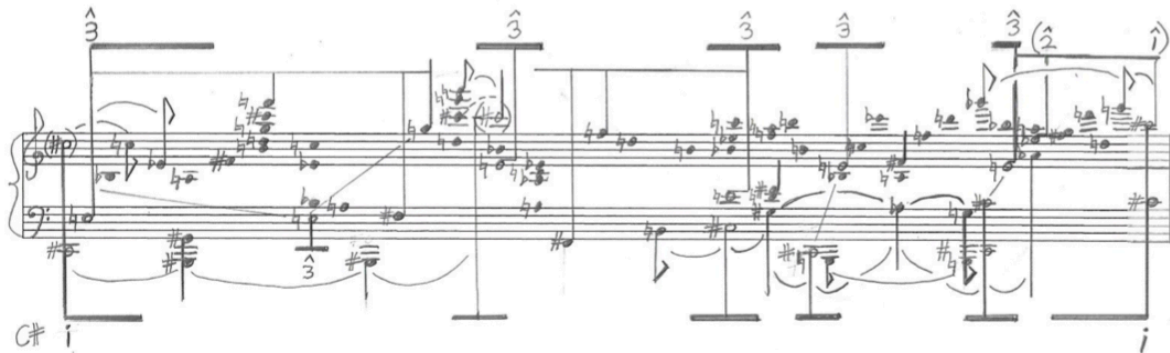
Figure 36: *Spatials* Outline: Variational Transposition as Contrapuntal Structure



Walker's approach to composing *Spatials* was either consciously or unconsciously based on a "self-similar" structure (ascending 3rd's within a 3rd), one that was present in the theme alone as well as at the macro-level of the piece. The illustration above shows us each level of transposition Walker's system is shifted by in relation to each variation. We also see that certain variations can be understood as more or less structural in relation to the overall structure. If we follow the middleground root movement, we see a reduction suggesting C# (Theme, V.1) > E (V.2) > C# (V.3, V.4) > [A (V.5)] > G# (V.6), and I imply the stagnant C# (Codetta) after the last variation, suggesting that since the "scaling" thematic material is ever present throughout all variations, that the C# octave of measure 11 is indeed implied as a final frame to the piece at large. The graph shown in Figure 37 represents the majority of foreground

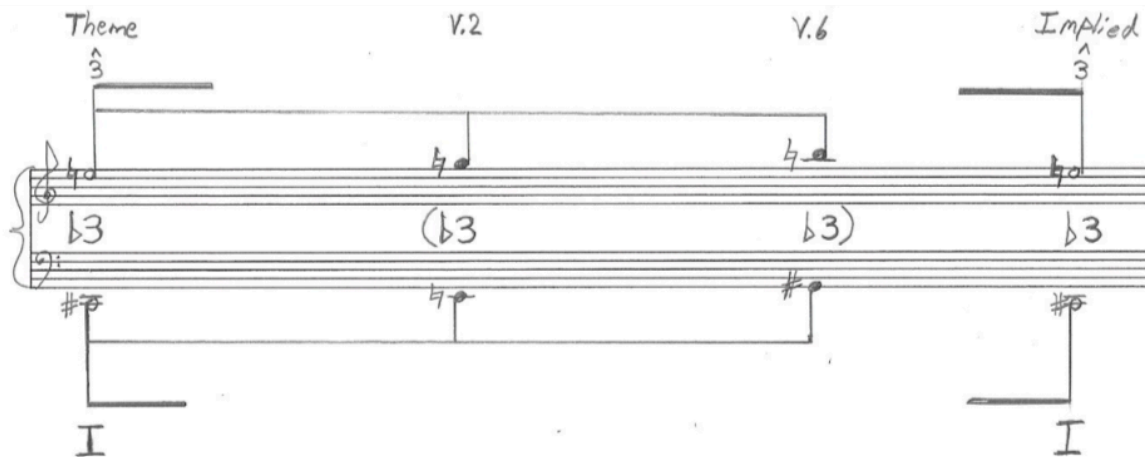
analysis in measures 1-11, the “Theme.” Notice the C# octave framing the entire theme zone. The thematic foreground illustrates a middleground instance of both E natural (^3) serving as a local root to support G natural, as well as G# supporting its minor 3rd, B natural, in the latter half of the graph.

Figure 37: *Spatials:* Theme Foreground/Background



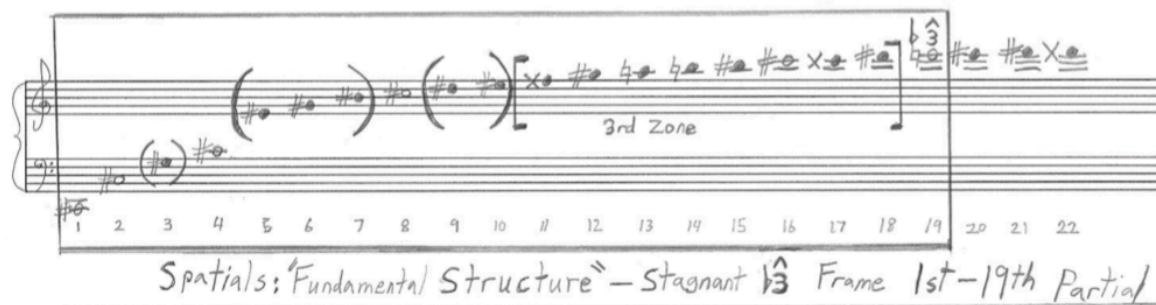
I also include a less structural middleground 3rd progression in the last section of the graph, which can be considered codetta material. I justify the local dominant support since G# is now respelled as an Ab to (more convincingly) support ^2, spelled as an Eb.

Figure 38: *Spatials:* Macro-Level Background



The graph shown in Figure 38 represents my final analysis of *Spatials*' "Fundamental Structure" at the Background-Level. I understand the piece as having a stagnant Minor 3rd pedal, which remains present throughout the piece. Variations two and six serve as a deep middleground contrapuntal structure that prolongs the Minor 3rd first at \wedge^3 and then at \wedge^5 , creating what could be understood as an unfolding of the tonic triad in C# minor. However, without any structural dissonance to serve as passing motion, the stagnant triad may in fact only function as local support for imperfect consonance in the middleground. The "Fundamental Structure" is indeed in relation to its sounding "Fundamental" C#. However, the background is not at rest in its stagnant form. The minor 3rd, though representing an expansive tonic quality, is not at rest, and seeks to fall back toward the Perfect 8^{ve}; it's natural resting point. The contrapuntal structure that awaits *Spatials*' after the it's last implied C# octave (still in support of \wedge^3), seeks to first find rest through its 3rd partial, the 5th capable of providing support for a structural dissonance, and then ultimately back to its "most perfect" form, the structural octave/unison. I've illustrated *Spatials*' "Fundamental Structure" in relation to the overtone series in C# below.

Figure 39: "Fundamental Structure": 1-19 Partial Frame Outlining Minor 3rd



George Walker's *Spatialis* has an abundance of analytical potential yet left to uncover, marking his only 12-tone composition as a truly inventive and unique piece of art. Walker successfully created a 12-tone composition that outlines a tonal sonata in the minor mode. His method of modulation used to arrive at the relative major ($\hat{3}$), and again at the dominant ($\hat{5}$) implores structural transposition, a technique typically associated with atonal music. With the absence of a tonic/dominant relationship in the foreground, Walker relies on his understanding of contrapuntal motion relating to consonance and dissonance as a way of replicating tonal function through octatonic sonorities. Tonality can be defined as a mixture of both vertical harmony (relating only to foreground), and a long-range unfolding of any given interval present within the overtone series. Walker's foreground shows little signs of triadic function, which instead is replaced with octatonic sonorities. However, what defines *Spatialis* as 12-tone composition that "wants to reference" tonality is its middleground unfolding of the tonic triad. Not only does Walker prolong the static $\hat{3}$ in the background, but he is able to do so while referencing a traditionally tonal background structure, contained within his static frame. Perhaps it's a lack of background movement that we associate with "atonal" music, essentially creating an image within a single interval rather than a frame of background movement.

It is my hope that George Walker's music may continue to be explored further by many future theorists and enthusiasts alike, and that they may also come to appreciate his style as a purely "human" art form. Walker's legacy will be remembered as a true inspiration for those who have dealt with racial prejudices and have strived to overcome them to do what many people take for granted. I also hope that his memory will serve as

a reminder that music is not capable of being “white” or “black,” and we should be able to take part in whatever style we choose to. Whether it is a choice of composition, analysis, research, or any other musical nuance, a genuine interest should never go unnurtured.

CHAPTER V: WEBERN'S OP 27 MVT III

The music of Anton Webern has been understood as perhaps the most “atonal” of all the composers to come out of the Second Viennese School. A student and contemporary of Arnold Schoenberg, Webern sought to surpass his mentor’s efforts towards disguising tonal function in 12-tone music. Schoenberg strived to understand what many have referred to as dissonance as a new type of consonance, all able to govern various “contextual” dissonances closer to the foreground. Webern’s music typically seeks to flatten any and all hierarchical structures that might resemble major and minor triadic harmony. Webern’s *Op. 27* for solo piano is perhaps one of his most “atonal” compositions, and I’ve found his third movement to be the perfect finale for my efforts to expand the boundaries of tonal analysis. Another theme that I’ve discussed through this project is the idea of “self-similarity” at various structural levels, be it within nature or within music. As I pointed out in my analysis of *Amazing Grace*, the ability to consciously perceive these self-similar patterns at various levels in a given system is quite often what creates a sense of transcendence within our being, tapping into the spiritual connection which reaches beyond our physical existence.

Webern in fact pursued spiritual knowledge through the act of composition, and was highly influenced by the musical representation of angelic beings. He often confided in Schoenberg regarding these matters, once writing to him in a letter saying, “In the end the man who casts off, one after the other, the qualities of lower forms of life also has to refrain from that which reproduces humankind in the animal sense. That, then, is a path: from the animal to the dissolution of material substance as such. I grasp that completely

clearly. The utmost peak of morality: the earthly shell falls. If there is a development, then it can only be this: Out of the animal-man a living being gradually grows that comes to realize that it does not need life on this earth. Thus the human being disappears again, the physical one. This path leads directly to God. This eliminates the objection that someone might say: If everybody follows this insight, there won't be any human beings left, but probably that's exactly what is meant, away with them.⁴² Webern's *Op.27 Mvt III* represents perhaps one of the most vivid examples of a "self-similar" fractal, present throughout the various structural levels of the entire work. However, at the row-level we see a disjunctive relationship between foreground and middleground. The self-similar aspect of the piece is then maintained as a pairing of two ideas that can be understood as middleground and background as well. I'll begin with a comparison between Webern's P3 Row form and the "Overtone Row," taking note of any similarities or differences before the row is realized in context with the musical material. What will become clearer as a result of this analysis is that musical context becomes increasingly more important the further away from triadic harmony one desires to go. All intervals are no more or less related to the overtone series. However, the more dissonant a background structure is, the harder it can be to point to a specific fundamental root.

⁴² Pedneault-Deslauriers, Page 87.

Figure 40: Webern Op 27 Mvt III Measures 1-6

III

P3 - 3, E, T, 2, 1, 0, 6, 4, 7, 5, 9, 8

If we compare Webern’s Primary Row P3, with the “Overtone Row” (shown below), we see right away that the natural order of the overtone series has been strategically placed to disperse the partials closest to unity farther apart from the fundamental. This wouldn’t necessarily make a large difference if Webern were to emphasize the primary intervals such as the Perfect 5th and Major 3rd. However, what he does emphasize more than any interval is the descending Minor 2nd motion, often offset and displaced by large leaps in register. Webern composed *Op. 27 Mvt III* using a “Theme and Variation Form,” similar to Walker’s *Spatialis*. However, he does not indicate the beginning or end of his theme zone or following variations with labels in the score. For this reason, I’ve included a full score with my variation markings and row labels at the end of this chapter for reference. As we can see in the first 4½ measures

(shown above), there is little to debate in terms of row order or vertical harmonic material. The entire theme zone (m. 1-11) consists of three horizontal iterations of P3, I3, and R3, essentially creating a parallel ascending structure making up half of the larger palindromic figure, which spans the theme.

Overtone Row – (0, 7, 4, T, 2, 6, 8, E, 1, 3, 5, 9)

Op. 27 Mvt III [P3] Row – (3, E, T, 2, 1, 0, 6, 4, 7, 5, 9, 8)

Overtone Row – (0, 7, 4, T, 2, 6, 8, E, 1, 3, 5, 9)

Op. 27 Mvt III [P3] Row – (3, E, T, 2, 1, 0, 6, 4, 7, 5, 9, 8)

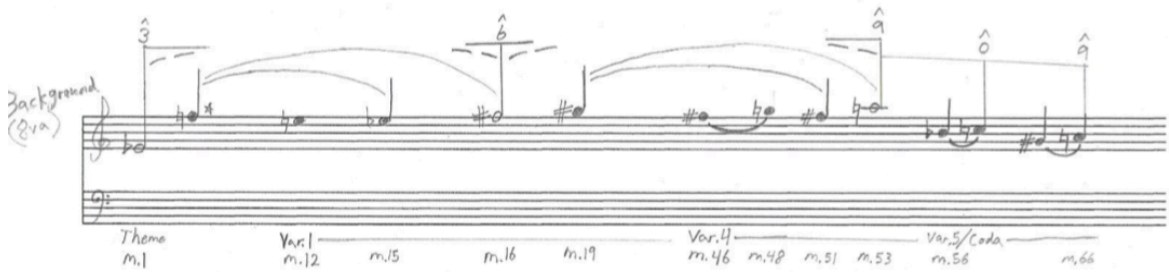
The lack of any vertical harmony in the main theme zone makes it particularly difficult to match structural pitches in the soprano to potential supporting bass notes. There is apparently a descending linear motion that remains consistent throughout the piece, suggesting four groupings of tri-chords within the P3 row. This can also be understood as two larger hexachords, which appear to be chromatically offset from one another in the music. The note durations established in the first two measures provide a valuable clue as to the first level of middle ground structure beneath the surface. If we look at the note length of the first and fourth order numbers, (3) and (2), we see that these whole-note pitches are related by minor 2nd and create a middleground descending motion within a single row. The pattern “(3) > E > T... (2) > 1 > 0...” suggests that order numbers 2 and 3 (as well as 5 and 6) are left out of the middleground, hence the option to analyze the Bb (order number 3) as the 5th above the Eb (order number 1) begins to weaken.

Figure 41: *Op. 27 Mvt III: Theme – Contextual Graph – No Bass Support*

As a first attempt to graph the main theme, I've illustrated (above) a perceived hierarchy based purely on contextual relationships such as the prevalence of the descending minor 2nd and its complement, not factoring in bass support. One additional intervallic relationship that is further supported by the piece's macro-level is the ascending minor 3rd intervals (enharmonically spelled as #2 and #4), consisting of Eb > F# > A natural. This collection outlines an augmented 4th interval (tri-tone), which can be understood as an unfolding background structure relating to the 11th partial. In fact my claim is that since the structural framework remains present all the way from the row-level to the background, that the piece provides the means for a tri-tone charged surge of transcendence. One of the reasons why I've graphed the theme zone without bass support is because the perfect 5th above Eb (Bb) has been compositionally devalued to the point of weak structural significance. One could make the case that since the pitch is present, though not emphasized, that its very presence can secure a 5th relationship. However,

there seems to be a more deliberate compositional mechanism happening in the extremely high and low registers of the middleground and background.

Figure 42: Background Structure: Contextual Due to Register – No Bass



The graph shown above illustrates the ascending minor 3rd progression at the background level. If we look through the score at the end of the chapter, we notice that the F natural first introduced in the 4th measure serves a dual function. It acts as both a row level lower neighbor (though its higher) to the preceding F#, and also a middleground lower neighbor leading to the F# in the extreme register at measure 16. This extremely high register is what I have identified as a potential background/deep middleground Urlinie. The true fundamental structure is stagnant at the background level due to a lack of structural bass motion. What can be thought of as merely gestural relationships between upper and lower neighbors makes up the remaining 9 order numbers of the P3 row. The structural $\hat{1}$, $\hat{\#2}$, $\#4$, remains active in the deep middleground due to the dual function of the initial Eb providing bass support throughout the entire piece. Since the “diminished triad” is highlighted as structurally more significant from the onset of the very first P3 row, the tones remain active throughout the piece as a single sonority. The background remains stagnant as a unison/octave $\hat{1}$ Eb. I

call this a “Fundamental Internal Structure.” Essentially the entire piece rests in the unison, within Eb itself. However, the lack of consonance in the middleground remains what the ear and eye are lured to. The graph below illustrates the stagnant bass unison in the Theme.

Figure 43: *Op. 27 Mvt III: Theme – Contextual Graph – Stagnant “I” Bass Support*

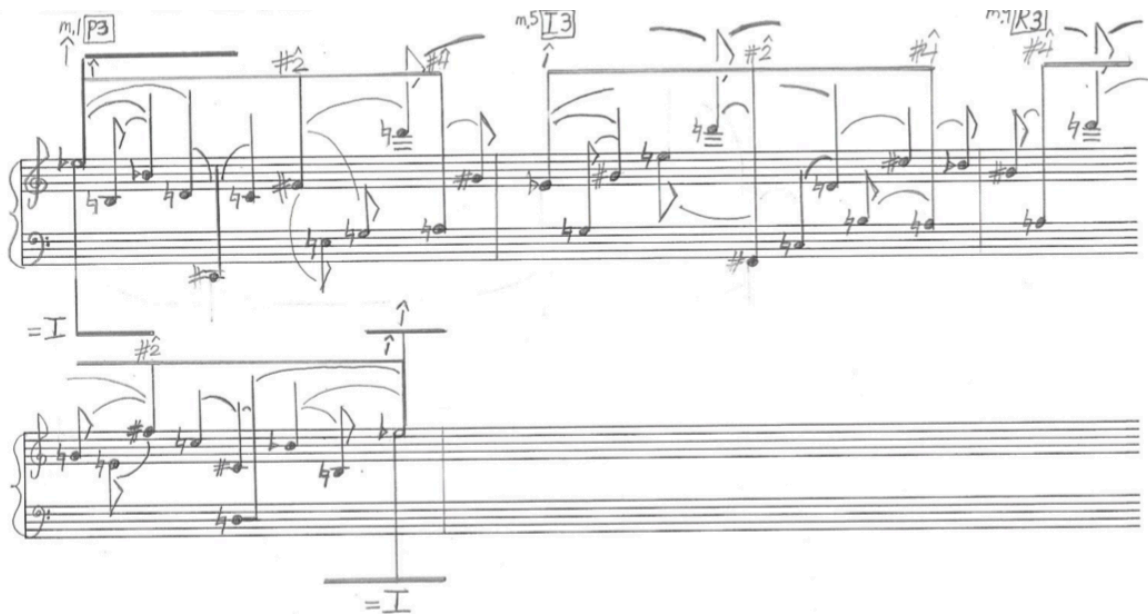
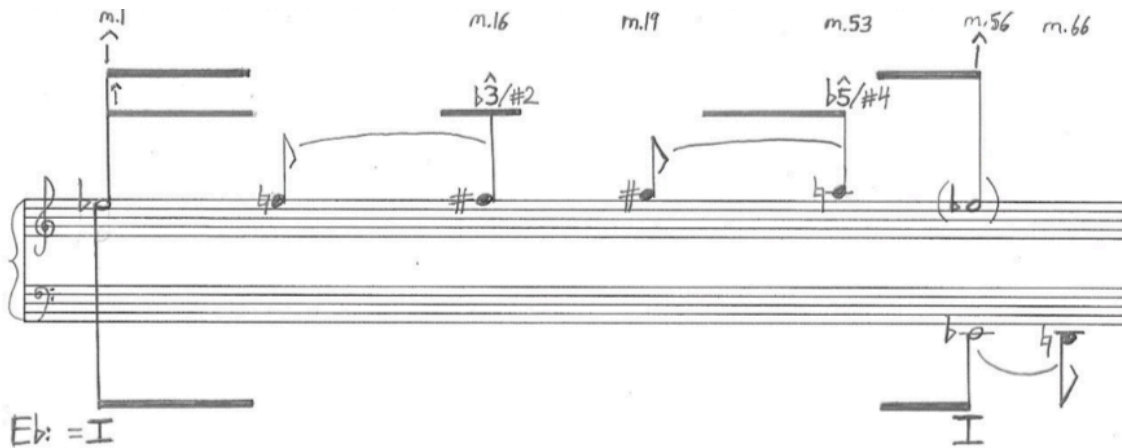


Figure 44: *Op. 27 Mvt III: Background – Middleground Diminished Triad Unfolding*



frame. The atonal quality that we associate with being further removed from “traditional tonality” seems to have much more to do with a lack of background motion than the actual interval itself. Even an alternating 2nd and 3rd sequence provides reference to tonal behavior. It is the lack of movement that strips tonality of its function.

Webern’s *Op. 27 Mvt III* is a tough piece to fit into traditional tonal analysis. The interval which unfolds over time is highly dissonant, the augmented 4th/diminished 5th. This creates a constant amount of tension, which fails to connect to its background. It may be that even an “Implied Fundamental Structure,” such as *Op. 33a*’s background is capable of creating complex phrases that pull away from and return to its stagnant 5th. Webern’s music provides the ultimate challenge for those that seek tonal unity even in a still frame that doesn’t understand its origin, blurred by two contrasting ideas. It is this blurred relation as a whole that can be thought of as “self-similar.” What I intend to accomplish by analyzing this piece the way I have is to provoke a new way of understanding tonality. If a background structure and a middleground structure appear to be unrelated motivically, then perhaps the piece has a disjunctive amount of perfection across its structural levels, and while the background is at rest, the middleground continues to deal with its internal dissonance. The infinite quality of the overtone (and undertone) series suggests that as long as there is motion, the music hasn’t yet come to a definite state of closure. Webern’s ability to create an image within a still frame is truly phenomenal. It takes a true understanding of “tension and release” to replicate the harmonic charge of triadic harmony. Roy Travis, an advocate for expanding Schenker’s method to accommodate dissonant harmony, defines tonality as any “musical motion

which unfolds through time a particular tone, interval, or chord.”⁴³ In *Op. 27 Mvt III*'s case, we can understand perhaps all three of these examples. The tone Eb itself is sustained in the background, while the deep middleground unfolds both the interval of a diminished 5th as well as the diminished triad. This definition of tonality defined by Travis has been seen as a particularly controversial one in the eyes of Schenkerian purist Ernst Oster. However, I believe that Travis' theory, as well as his mentor Felix Salzer's builds on what can be thought of as the fundamental concept of horizontal tonality, first credited to Schenker. Webern's *Op. 27 Mvt III* will continue to serve as a piece I return too in order to test the limits of tonality as defined by the theorists before me, and as a point of reference for my own work.

⁴³ Travis, Page 263.

#3

Webern Op. 27

7

III

Flowing Calmly
 (p 1 2 3 4 5 6 7 8 9 t e)
 P3 -3 c t 2 1 0 6 4 7 5 9 8

Ruhig fließend $\text{♩} = \text{ca } 80$

Theme

1 2 3 4 5 6 7 8 9

10 11 12

rit. - - - tempo

12-23
 Traxler
 - Reich

schönberg
 op. 25

U.S. 10881

Handwritten musical score for piano, measures 13-27. The score is heavily annotated with handwritten notes, including chord symbols, performance instructions, and structural markings.

Measure 13: Treble clef, piano (*p*). Bass clef, piano (*p*). Chords: $C\#$, B (missing A/a), $F\#$, F . Handwritten notes: $P3$, $overlap$.

Measure 14: Treble clef, piano (*p*). Bass clef, piano (*p*). Chords: A , G , E , $G\#$. Handwritten notes: A , G , E , $G\#$.

Measure 15: Treble clef, piano (*p*). Bass clef, piano (*p*). Chords: $C\#$, B (missing A/a), $F\#$, F . Handwritten notes: $C\#$, B (missing A/a), $F\#$, F .

Measure 16: Treble clef, piano (*p*). Bass clef, piano (*p*). Chords: D , $C\#$, $F\#$, A . Handwritten notes: D , $C\#$, $F\#$, A .

Measure 17: Treble clef, piano (*p*). Bass clef, piano (*p*). Chords: G , E (missing Eb), $G\#$, A . Handwritten notes: G , E (missing Eb), $G\#$, A .

Measure 18: Treble clef, piano (*p*). Bass clef, piano (*p*). Chords: D , Eb , $C\#$, G . Handwritten notes: D , Eb , $C\#$, G .

Measure 19: Treble clef, piano (*p*). Bass clef, piano (*p*). Chords: A , $F\#$, E , G . Handwritten notes: A , $F\#$, E , G .

Measure 20: Treble clef, piano (*p*). Bass clef, piano (*p*). Chords: $C\#$, E , F , A . Handwritten notes: $C\#$, E , F , A .

Measure 21: Treble clef, piano (*p*). Bass clef, piano (*p*). Chords: A , $F\#$, E , G . Handwritten notes: A , $F\#$, E , G .

Measure 22: Treble clef, piano (*p*). Bass clef, piano (*p*). Chords: E , G , A , $F\#$. Handwritten notes: E , G , A , $F\#$.

Measure 23: Treble clef, piano (*p*). Bass clef, piano (*p*). Chords: $C\#$, E , F , A . Handwritten notes: $C\#$, E , F , A .

Measure 24: Treble clef, piano (*p*). Bass clef, piano (*p*). Chords: A , $F\#$, E , G . Handwritten notes: A , $F\#$, E , G .

Measure 25: Treble clef, piano (*p*). Bass clef, piano (*p*). Chords: G , E , F , A . Handwritten notes: G , E , F , A .

Measure 26: Treble clef, piano (*p*). Bass clef, piano (*p*). Chords: $C\#$, E , F , A . Handwritten notes: $C\#$, E , F , A .

Measure 27: Treble clef, piano (*p*). Bass clef, piano (*p*). Chords: E , G , A , $F\#$. Handwritten notes: E , G , A , $F\#$.

Annotations: $RI3$, $P3$, $overlap$, $mid ground$, $linear echo of *$, $P2$, $P1$, $RI2$, $Var 2$, $(23-33)$, $(017)?$, $te 5$, oi , $R9$, $5-5 (016)$, $missing (A)$.

28 *R4* rit. - - - - tempo 29 30 *RI9*

31 rit. - - - - tempo 32 33 rit. - - - - tempo *Var 3*
var./over loop

Var.3 34 *mf* *pp* molto rit. - - - - tempo 35 36 *mf* *pp* molto rit. - - - - tempo

37 *mf* tempo 38 *p* *f* *pp* 39 *f* molto rit. - - - - tempo

40 *pp* *f* *sf* molto rit. - - - - tempo 41 42 *sf* *cadenzial effect*

U.E. 10881

10 (there) v.1 v.2 v.3 v.4
 Static
 RI2
 V4
 Var. 4 mm 45-55 (retransition)

accel. -----
 43 44 45
 ff ff
 up to speed again, but moving
 wieder im tempo, doch bewegt

46 47
 ff p ff
 F# P6

48 49
 rit. ----- tempo
 dim. p ff
 RI5

50 51
 P9 RI8
 ff p ff
 overlap with 2 trs

52 53
 P0
 molto ff
 B C B

U.E. 10881

oda Var. 5
Recap.?

P3

(quiet again)
wieder ruhig

subito pp

p

Handwritten notes: Eb Bb, C, G#, A, C

rit. - - - - tempo

59 60 61 62

pp p

Handwritten notes: A, A

rit. - - - - molto

63 64 65 66

p pp ppp

Handwritten notes: C, F#, Eb, A*

1936

10 Min.

CONCLUSION

The purpose of this thesis project has been to expand my understanding of tonality and how that expansion might apply to the music of Arnold Schoenberg, George Walker, and Anton Webern. I feel as if I've opened a door to a future with less "keys" in my understanding of tonality. It has become increasingly clear that some patterns we experience in life are projected outward from within us in a way that doesn't necessarily represent truth as a whole, but rather a more personal truth. I believe that my earlier efforts of trying to find tonal material in 12-tone music may have served a positive foundation for my current and future understanding of tonal "truth." Perhaps returning to given piece after a while may allow a conscious mind to recharge and reinterpret the piece in a new light. I've approached each piece in this project from at least two different schools of thought, each represent my understanding of the piece at a different time. Each instance of analysis has been a necessary step toward the current understanding that I now have of extended tonality. There is no need to nail down the very last piece to a given puzzle, for that would require a level of "omnipotent" insight past our reach. Just as any source of inspiration or a religious text may provide new meanings for various points in ones life, I believe that returning to familiar music with a new analytical toolkit can provide highly rewarding results. I believe that almost all forms of analysis that remain popular in music theory today have one important factor in common. They were all born out of enthusiasm for a deeper connection to music.

My work builds upon not only the work of Heinrich Schenker, but also the work of his students and student's students that have wrestled with defining tonality and how it

applies to form. Theorists such as Johann Joseph Fux and C.P.E. Bach paved the way before Schenker's time, and played a large role in teaching many new generations of composers and theorists. I believe my own work may in fact be a unique offshoot from the theorists before me in the way I've come to understand tonal origin. The tone itself holds all information one might need to write a symphony. The collection "Nature's Tonic," an infinite series of partials derived solely from a root, is made up exclusively of prime numbers and can be considered stagnant by itself without reference to the partials of contingent lineage. The complete list of known prime numbers (understood as number of partials) can then be understood as our present understanding of "tonic," nature's pattern. Schenker's system handles 18th and 19th century tonality very effectively, however perhaps structures up to only five partials may begin to sound like a reference and not a true representation of nature as we continue to understand the origin of tonal function. It is my goal to continue this work in an effort to include all styles of music, from 12-tone and extended tonality, to rhythmically driven music of a single tone. I believe in a future for music theory where textural and linear analysis in tandem point towards a more universal understanding of tonality. I believe in a future for music theory where all ideas are encouraged for the benefit of all, not only for the chance to exist unattached to life's greater picture. It is with great passion that I seek higher truth in life, and I am fortunate to have made great strides due to my work in this project

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