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Silence for Orchestra: Incorporating Silence in Musical Language through Theories of Expectation

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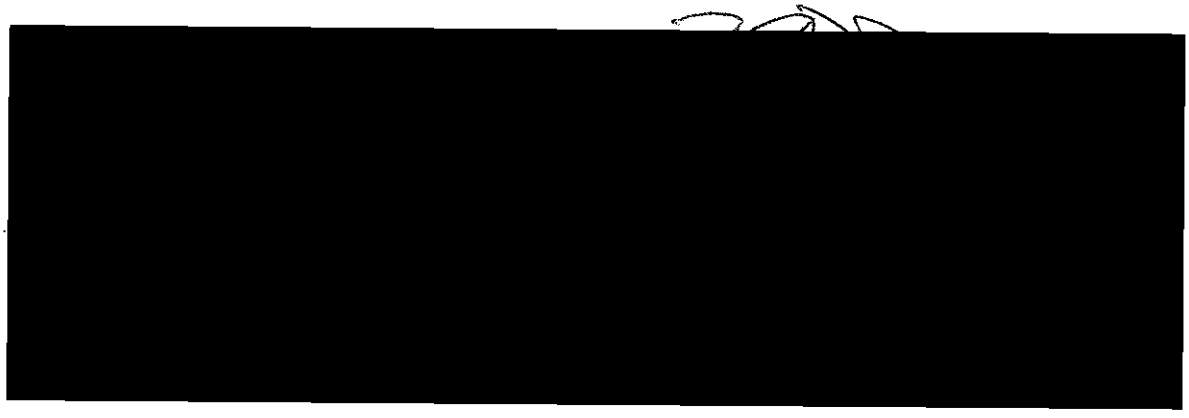

Silence for Orchestra

Incorporating Silence in Musical Language through Theories of Expectation

BY

Kari Darby

Thesis

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2016

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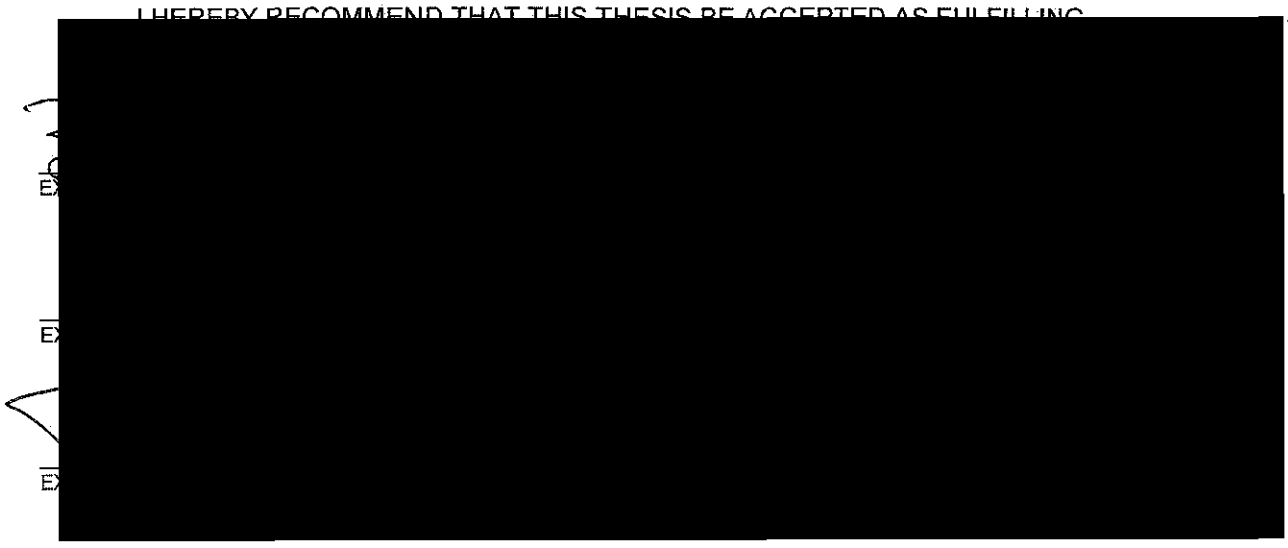

Abstract

Silence for Orchestra:
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Kari Darby

The purpose of *Silence: for Orchestra* is to incorporate silence as a captivating source of musical language. *Silence's* goal is to encourage the audience to appreciate silence as musch as music. David Huron's research in musical expectations served as a guide to create a piece that develops, contradicts, and conforms to a listener's expectations. Elizabeth Hellmuth Margulis's work describes five functions of silence found in music. These functions can be applied to the silences used in my piece in order to further conform to the listener's expectations.

Acknowledgments

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Introduction to Silence and Expectations

When talking about music, we speak of sound: pitch, duration, dynamic, timbre. This makes sense, as we need sound to create music. Elizabeth Hellmuth Margulis states the goal of Western tonal music is to "justify breaking the silence at its start and to motivate returning to silence at its end."[1] Silence is often perceived as an unrelated circumstance that frames musical occurrences. Perceived silence is relative. There is no such thing as absolute silence, as there is always some form of noise. What determines our perception of silence is dependent on noise to frame silence. John Cage's *Lecture on Nothing* articulates this point. "What we re-quire is silence; but what silence requires is that I go on talking... But now there are silences and the words help make the silences."[2] Margulis also notes that the silence that music returns to is rarely the same silence it broke. The interdependency between noise and silence makes silence just as valuable a stimulus as the noise we value as music. However, our current expectations cause us to expect music to be filled with noise; we do not link silence and music together on our own and need to be primed to listen to silence just as intently as we listen to music.

The issue is how to bring silence to the forefront of the listener's attention, and to make the audience listen to the silence as intently as they listen to musical sounds. Cage expresses his frustrations, "Why is it so difficult for so many people to listen? Why do they start talking when there is something to hear?"[3] Listening to silence is unusual. It is not part of most people's listening expectation when they attend a concert, and displaying

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[1] Elizabeth Hellmuth Margulis, "Moved by Nothing: Listening to Musical Silence," *Journal of Music Theory* 51, no. 2 (2007): 245.
[2] John Cage, "Lecture on Nothing," in *Silence: Lectures and Writings* (Middletown: Wesleyan University Press, 1961), 109.
[3] John Cage "Composition as Process, "in *Silence: Lectures and Writings* (Middletown: Wesleyan University Press), 48.

silence can easily lead to confusion or anger if listeners are not primed for this listening experience. The premiere of John Cage's 4'33" on August 29, 1952 was met with harsh criticisms and frustration. Many felt that they were victims of a hoax.[4] This misunderstanding is partly due to the audience's expectations and their listening habits. Although one goes to a concert to listen, this action is saved strictly for sounds that they have already classified as music. This preconceived idea of music limited their ability to listen to the *incidental music* Cage was trying to display. As Cage states, "What they thought was silence, because they didn't know how to listen, was full of accidental sounds."[5] 4'33" reminds us that there is no such thing as absolute silence. In my music, I use silence knowing that it is relative. In the framework of music, one hears the absence of musical noises as silence. The discussion of silence to follow will use this definition.

Margulis lists five types of silences used in music: boundary silence, silence as interruption, silence and the internal ear, silence and meta-listening, and silence as communication. Boundary and interruptive silences serve the acoustic part of music, but are rarely evaluated on the same level. The audience listens to silence with the expectation that the music will continue. When a piece has reached its end, the most attentive audience will appreciate the last reverberations and the return to silence for a brief moment, but will stop listening soon after. They came to listen to music, not silence. Yet, given the interdependency of music and silence and the ever-changing sound of silence, silence can be just as beautiful and interesting to listen to as the sounds we call music. The last three types of silence require more attentive listening; these silences are

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[4] Kyle Gann, *No Such Thing as Silence: John Cage's 4'33"* (New Haven: Yale University Press, 2010), 4.
[5] John Cage, as quoted in Gann, *No Such Thing as Silence*, 4.

used as a space for interpretation, yet they still might be seen as only there to serve the music. In my work, *Silence: for orchestra,* I have used Margulis' five functions of silence as a way to approach silence organically, so as not to cause alarm to listeners.

I have also used David Huron's work on musical expectations to help condition the listener to expect silence to be an important part of the music and therefore listen to silence as a beautiful and relevant part of the piece. Huron, a researcher in cognitive music, tries to explain our reactions and experiences of listening to music based on our expectations. He formed the ITPRA theory, which defines five responses that we experience in reference to a stimulus. This includes two pre-outcome responses, Imagination and Tension, and 3 post-outcome responses, Prediction, Reaction and Appraisal.[6] Although the development of these responses can be explained from an evolutionary standpoint, these reactions affect how we perceive everyday life, including listening to music. Huron's research finds that people who listen to Western music tend to expect notes to move in a stepwise direction and for leaps to occur upwards followed by descending stepwise motion. These examples should sound familiar as they are presented in music frequently.[7] Their familiarity is part of what makes them enjoyable to listen to. Studies show that people tend to favor a more familiar stimulus over an unfamiliar one.[8] However, if a person is consciously aware of the fact that the stimulus is familiar, they often choose the unfamiliar option in order to pick something novel. The properties of music that occur at high frequency are pleasing to us because they are familiar, but not overtly so. They can be presented in different tone colors, contexts, and

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[6] David Huron, *Sweet Anticipation: Music and the Psychology of Expectation* (Cambridge: MIT Press, 2006), 8-15.
[7] Ibid, 74.
[8] Ibid, 132.

voices. This allows listeners to both enjoy something familiar and actively appreciate something new. We are satisfied when a piece coincides with our expectation, but can also experience a different pleasure when music surprises us.

Of these responses in Huron's ITPRA theory, tension, prediction, and appraisal play the biggest roles of creating pleasant reactions to my piece. Tension occurs as one prepares for an event to occur. In order to conserve energy, the brain tries to wait until the last possible moment to increase attention.[9] Depending on the event, one cannot always predict the timing of the event, or the *when* occurrence.[10] In these events, the body prepares for the earliest possible moment and stays in this heightened state of arousal until the event occurs. Another problem in the tension stage is that one might not know the height of arousal that is necessary if one is unsure of the outcome of an event, or the *what* occurrence.[11] This forces the body to be at a high level of awareness in order to prepare for the worst possible outcome. Uncertainty of both the event and the time it will take place leads to high alert levels. If these levels are sustained for long periods of time, it can cause stress regardless if the event is positive or negative.[12] In music, it is not necessary for a listener to be able to predict every moment. As music builds, listeners are able to appraise this and anticipate the climax. Although listeners may not be able to describe the exact nature, they are able to predict the outcome enough that they can heighten their arousal the correct amount for the *what* occurrence. The familiarity of Western music also helps listeners predict the *when* of such events, as they usually occur on a strong beat. However, composers also use these expectations to increase tension.

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[9] Ibid, 9.
[10] Ibid, 10.
[11] Ibid, 10.
[12] Ibid, 13.

When an event does not occur when expected, the listener stays in this heightened state. As long as being in this state too long does not exhaust the listener, the lengthened tension can create a more pleasurable response when the event occurs.[13]

Prediction can highly influence how a person responds to a stimulus. Studies show that we are rewarded for correct predictions. This creates an influx of dopamine, which is often misattributed to the stimulus that we correctly predicted.[14] By structuring my use of silence around those already perceived in music, I am conforming to some of the expectations of music. To make silence an appreciated foreground in music, I used Huron's work on forming musical expectations so silences are expected and therefore enjoyed due to the correct predictions.

When an event occurs, we have two responses. The first is a quick reaction response, such as a reflex. The second, appraisal, is a slower response that occurs when we are able to fully assess the situation.[15] This response lets one reflect on the event that has just occurred and evaluate whether his initial reaction response was correct. Unlike the reaction response, the appraisal response requires conscious engagement. The longer one considers a stimulus, the more appraisal responses can develop. As music develops, a listener may decide that a previously unpleasant stimulus is now pleasing given the context of the rest of the music.

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[13] Ibid, 21.
[14] Ibid, 12.
[15] Ibid, 14.

Chapter 1. Boundary Silences: Conditioning

Evolutionarily, our responses can either be innate or learned. The initial reaction to a stimulus happens quickly in order for us to be able to promptly respond to negative stimuli, while the appraisal response allows us to evaluate the stimulus and modify our original response. As we appraise a stimulus, we are learning from this new scenario. Our appraisal of the stimulus creates a new learned experience that our subconscious can use when forming new predictions of future events.

The most common use for silence is to signal the ends of phrases or larger sections within a piece.[16] These boundary silences are common in music and are already part of our expectations. A suitable example of this appears in Franz Schubert's second Moment Musical (Fig. 1). The natural decay of the piano leads the listener to perceive silence at the end of each gesture. Although there are few notated silences, the soft dynamics can lead to a brief moment of auditory silence after the decay of the chord, depending on the interpretation of the performer. A notated silence then occurs after the larger phrase.

Another use for boundary silence is to signify the end of larger sections in a work. Schubert's Impromptu No. 4 contains several contrasting sections. Each section has a slight pause before the next. In this sense, the impromptu has four smaller sections of music that each must justify the breaking of and return to silence. The piece contains two main themes, each with an A and B theme. Shubert uses boundary silences to separate the two sections, but also as a divider between the introduction, development, and conclusion of the piece (Fig. 2).

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[16] Unpublished study by David Huron, cited in Margulis, "Moved by Nothing," 252.

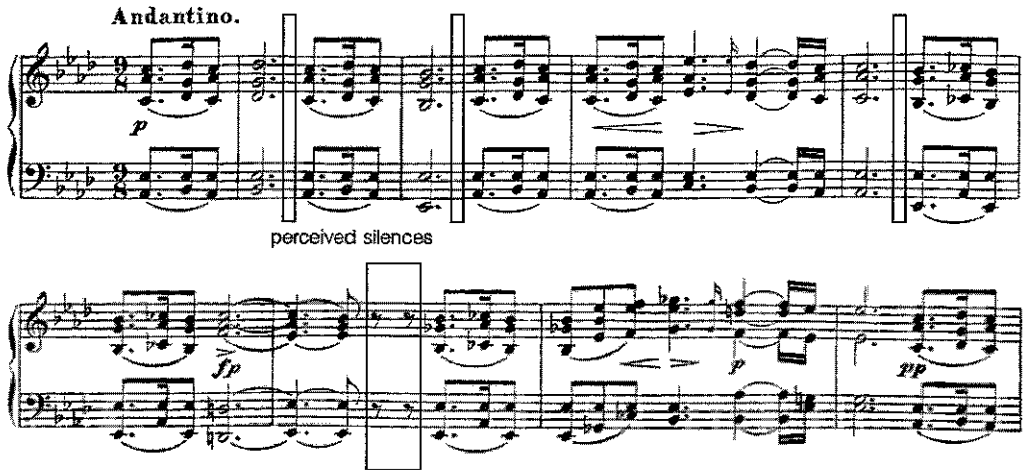

Figure 1: Schubert, *Moments Musicaux, op. 94 no 2,* mm 1-6. Short silences can be perceived after decay of each motive with a larger silence to conclude the phrase.

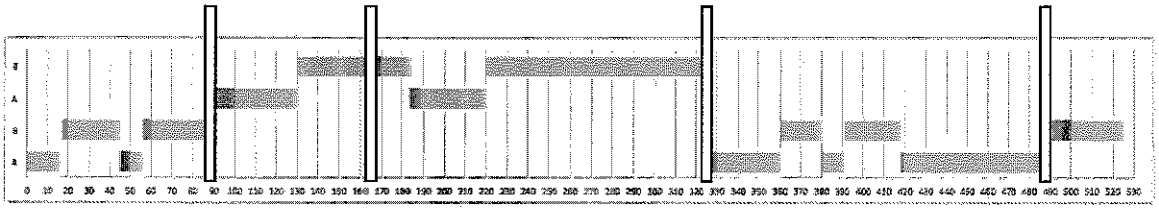

Figure 2: Schubert, *Vier Impromptus, op. 142 no 4.* Overview of themes and sections outlined by boundary silences.

Silence: For Orchestra uses boundary silence to bookend five large sections, which can be broken down further when looking at smaller breaks and the contrast in styles (Fig. 3). *Silence* utilizes the use of moment form, where silence helps define these moments and keeps the listener mindful of each importance. Stockhausen first described moment form in relation to his piece *Kontakte*. He writes, "a given moment is not merely regarded as the consequence of the previous one and the prelude to the coming one, but as something individual, independent and centered on itself, capable of existing on its own."[17] The use of boundary silence helps enforce this idea that each moment exists

[17] Karlheinz Stockhausen, as quoted in Jonathan Kramer, "Moment Form in Twentieth Century Music," *The Musical Quarterly* 64, 2 (1978): 179.

within itself without the necessary aid of other sections. Each section can be determined by the differences in texture and motive that is the focus of each section. Boundary silences also occur within four of the larger sections. Stockhausen's definition of moment form is reliant on music remaining static, as there is no clear goal that the whole piece is building to, just individual moments. *Silence* does not follow this rule, as it consistently builds in intensity, but the constant return to silence acts as a *tabula rasa* to begin again with no relation to the previous build.

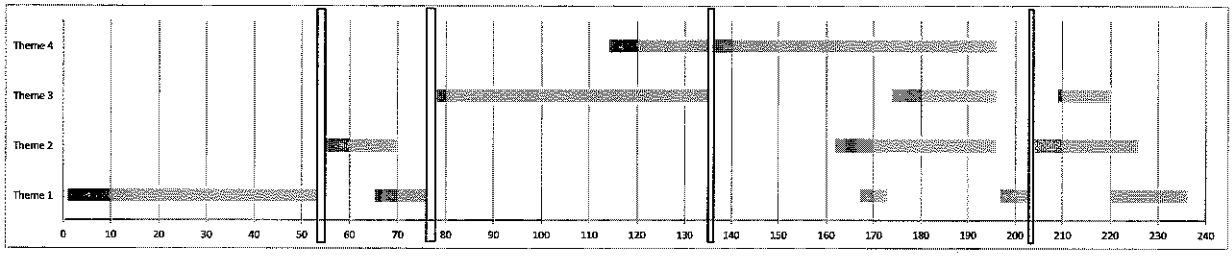

Figure 3: *Silence*. Overview of themes and sections outlined by boundary silences.

Hearing silences after these phrases in sections is a natural occurrence. However, it does not mean those silences are brought to our attention. In *Moment Musical*, the listener is holding on the decay of the chord until the music resumes. In *Impromptu 4* the listener is using the silence to prepare for a change in musical context. In both examples, silence is a secondary function, and the listener is too preoccupied by musical material to listen to the silence. The boundary silences in *Silence* would have the same effect without conditioning the listener to accept silence as an equal part of the music.

Conditional probabilities state the "probability of an event is dependent on some preexisting state."[18] For example, the probability of hearing a tonic note is increased after the occurrence of the leading tone. The probability of hearing silence is increased near

[18] Huron, *Sweet Anticipation*, 55.

the end of phrases. We are able to evaluate the probability of an event given the current context. These probabilities are based on current knowledge and can form from learned events, such as conditioning.

Conditioning requires repetition and associations. The most well known example of classical conditioning is Pavlov's dogs.[19] Ivan Pavlov noticed his dogs had a natural salivary response when presented with food. Pavlov discovered that an innate response could be transferred to a conditioned stimulus by ringing a bell immediately before feeding his dogs. Eventually, the sound of the bell caused the dogs to salivate without the presentation of food. The dogs learned to associate the sound of the bell with food and would therefore respond to the bell as they would with food.

In music, we do not use classical conditioning to elicit a reflex, but we can learn associations between two events in the same way. By presenting a stimulus and immediately following it with a second stimulus, we will quickly learn that the two stimuli are linked. When we hear the first stimulus, we can expect to hear the second soon after. Since we do not have an unconditioned reflex to musical stimuli, we must find other ways to test whether listeners have created the associations between two stimuli.

One way to measure musical expectations is through the head-turning paradigm. When we hear an unexpected sound, we often have an orienting response in which we turn our head towards the sound.[20] This paradigm does not measure the pleasantness of a sound, but rather the unusualness. Since this response occurs when a sound is abnormal, the listener may experience confusion and be unable to categorize the sound as pleasant

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[19] Roger R. Hock, *Forty Studies that Changed Psychology: Explorations into the History of Psychological Research,* 7th ed. (Boston: Pearson Education Inc, 2013), 66.
[20] Huron, *Sweet Anticipation*, 49.

or unpleasant due to the unexpected nature of the sound. This paradigm can be combated with repeated exposure. Research in this field has shown that repeated exposure to the stimulus no longer evokes this response, as the listener becomes habituated to the stimulus.[21] This allows listeners to evaluate the stimulus on a higher level of thinking.

There are many head-turning moments in Franz Schubert's impromptus. *Impromptu No. 4* in F minor creates these moments with contrasting themes. As the music approaches the recapitulation, the listener is intrigued by the run into a iio7 chord followed by a measure of silence. The tonality of the chord along with the halt in momentum breaks our expectations, but also makes the listener aware that something new is approaching. Schubert repeats this motive five times, shortening the run and the sustained chord each time, enforcing the listener's predictions that the return is coming (Fig. 4). Although the first occurrence of this motive comes as a surprise, the listener becomes habituated to the pattern. After the initial reaction response, the listener is able to appraise the motive as it is repeated in order to accurately predict what will happen next.

Silence also uses repetition and conditioning to allow listeners to appraise the current musical situation quickly and be able to appreciate silence without the distortion of surprise from every occurrence.

The use of silence as boundary is what introduces the role of silence within the piece. Silence is used to frame the cluster chord that is a prevalent feature throughout the work. With each repetition, the progression back to the cluster chord lengthens, but always starts and ends with silence (Fig. 5). This creates two conditions for the listener.

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[21] Ibid.

First, the listener is introduced to silence immediately, making it an integrated part of the piece. Second, the cluster chord never resolves to an audible consonance. Thus, silence becomes the resolution; the sound listeners yearn to hear to end the phrase after the dissonances. The listener becomes primed to expect to hear silence and experience the same expectation/denial responses that one associates with consonant/dissonant resolutions.

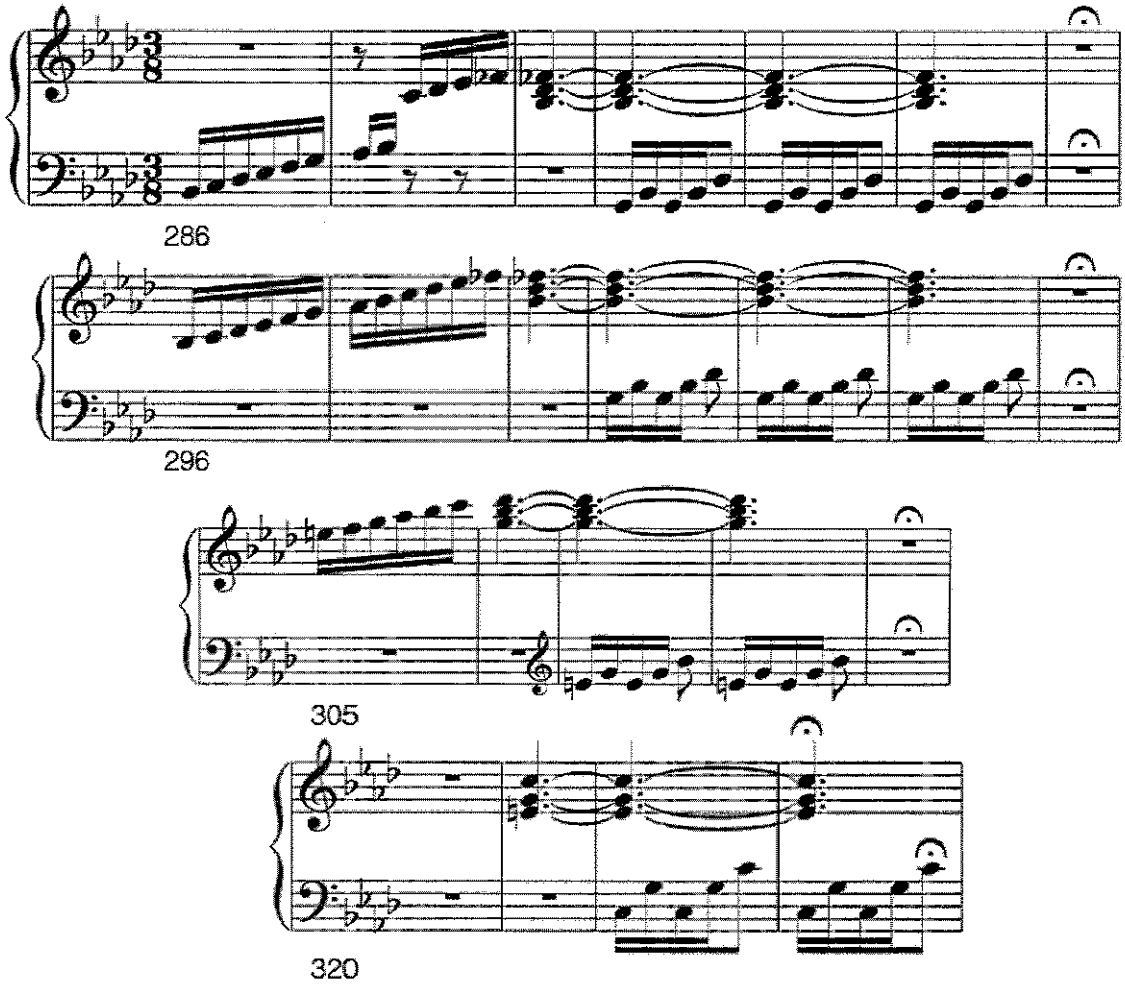

Figure 4: Schubert, *Vier Impromptus, op 142 no 4,* mm 286-323. Schubert reduces the amount of material surrounding the chord with each repetition.

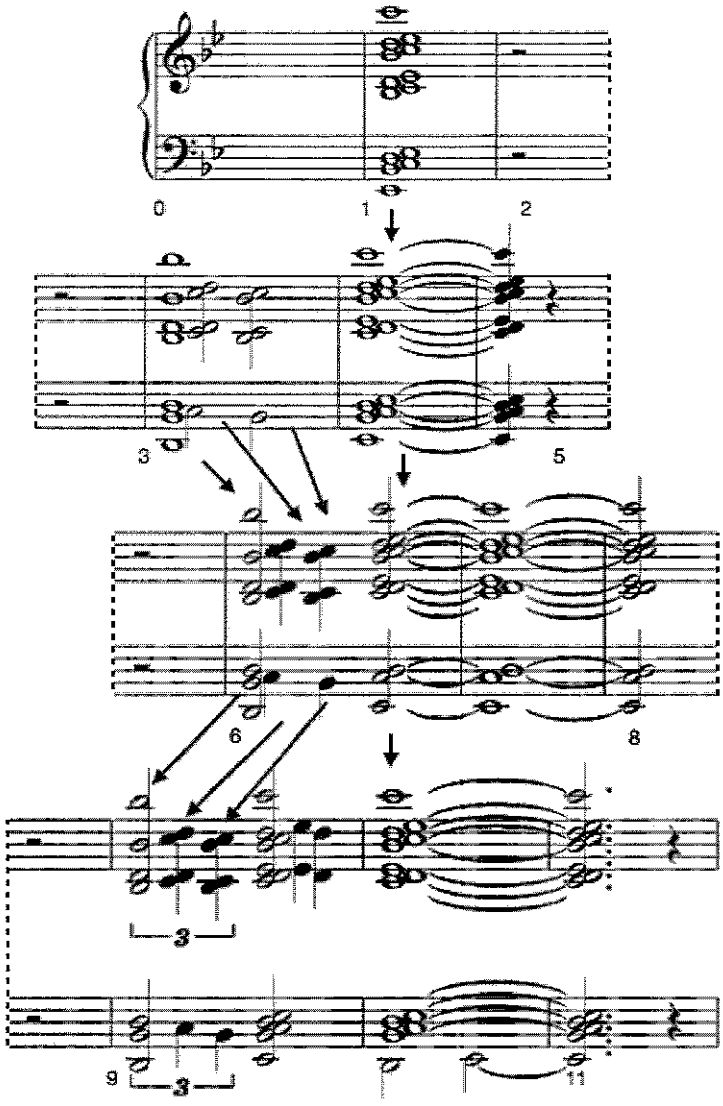

Figure 5: *Silence*, mm 1-11. Progression developed around the original cluster chord.

Chapter 2. Interruptive Silences: Forming and Disrupting Schema

Schemas are preconceived structures of events or concepts. These are built upon our own experiences as we grow to learn what to expect during certain scenarios.[22] Schemas also work with intangible ideas, such as music. Not only can we identify what is music and what is not (although this is subjective), we can also identify certain genres of music. Environmental markers are learned associations with certain schemas.[23] These markers help our brain ensure we are in the correct schema. For instance, the sounds of an electric guitar might confirm that we are listening to rock music based on our schema of rock music. If you hear strings you might assume you are listening to classical music. In music, some environmental markers have become so strongly associated with certain events that we only expect to hear them in certain scenarios. We are so used to hearing Wagner's *Bridal Chorus* as a bride walks down the aisle, that we may be confused if we hear the song in a concert setting. Similarly, plays and movies use Chopin's *Funeral March* as a universal signal that someone has died.

Schemas in music can help the listener stay on track. The use of Sonata Allegro form is so common that informed listeners know to expect it in the first movement of a symphony. This gives them a framework to follow along with the music. Ludwig van Beethoven's symphonies are some of the most popular works in classical music. Beethoven is praised for his innovativeness, but he is also popular due to the engaging nature of his music. We may view Beethoven's music as complex, but his use of

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[22] Ibid, 204.
[23] Ibid, 207.

environmental markers can help listeners follow the basic framework of his music. Beethoven's fifth symphony is one of the most identifiable with the four-note rhythmic motive. The complexity of the development in the fifth symphony might cause listeners to become lost. Beethoven uses the four-note motive to signify the beginning of each section. During the development, both themes are elaborately transformed until they are difficult to recognize. Upon hearing the motive at the beginning of the recapitulation, the listener expects to hear both themes from the exposition. However, Beethoven thwarts this expectation and both themes are altered. Beethoven takes unexpected liberties during the recapitulation, including the oboe cadenza and new voicing of the themes. The coda contributes further development and integration of the two themes. Beethoven's full voicing of the four-note motive at the end of the coda ensures that listeners are able to identify that the piece is reaching its conclusion.

Schemas also work with smaller concepts, such as phrases. Schemas tell us that phrases have a beginning, middle and end. We can expect the phrase to grow and decay, which fits our expectation of silence at the end of a phrase or section. Schemas are developed based on past experiences. Due to a wide range of music, these schemas are not always correct. Our brains use environmental markers not only to ensure we are in the correct schema, but also to help us switch from one schema to another or create new schemas.[24]

When a stimulus interrupts a schema, it is immediately brought to our attention. Interruptive silences bring silence to the foreground, but can also cause a slower reaction

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[24] Ibid, 211.

time.[25] As listeners are adapted to silences near the end of phrases, they are quicker to react to these silences as opposed to silence preceded by implicative material.[26] Despite the slower reaction, silences are useful as an interruptive device because they permit a "raw impression of interruption."[27] Interruption with different material requires the same processing time as interruptive silences and can distract from the awareness of an interruption and a correct appraisal of the new material.

Schubert uses silences in *Moment Musical 4* as both interruption and boundary to adapt to preconceived schemas (Fig. 6). The listener is able to experience the silence as an interruption, but is also given time to process the schema of silence at the end of a section. Therefore, the listener is expecting new material at the end of the silence and is able to process this information fully without the interference of the original interruption.

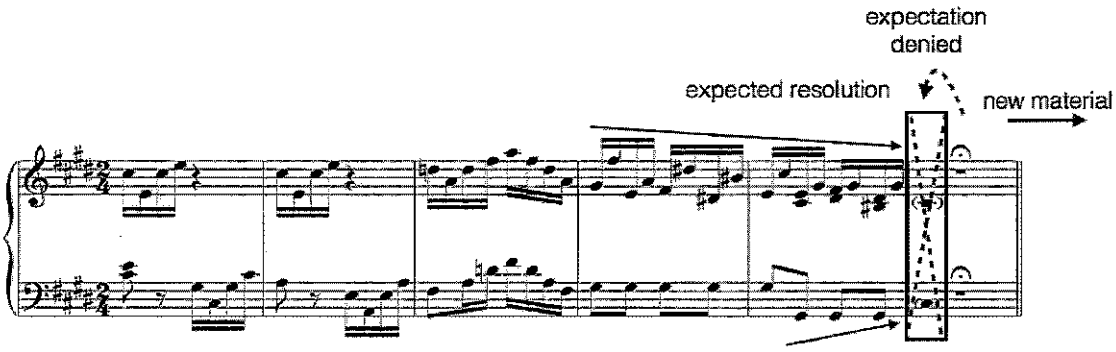

Figure 6: Schubert, *Moments Musicaux, op. 94 no 4*, mm 56-61. Expected resolution is interrupted by silence.

In the case of *Silence*, the brain's task is to appreciate both music and silence. In a normal musical setting, listeners are accustomed to appreciating the music more than silence. The beginning of *Silence* draws listeners' attention to silence, but as the music

[25] Margulis, "Moved by Nothing," 254
[26] Margulis, "Silences in Music are Musical Not Silent: An Exploratory Study of Context Effects on Experience of Musical Pauses," *Music Perception: An Interdisciplinary Journal* 24, no. 5 (2007): 498.
[27] Margulis, "Moved by Nothing," 255.

continues, it is natural to switch schemas. The beginning progression acts as an environmental marker through the rest of the piece, as it often comes back in preparation of silence. This alerts the listener that a new schema is present so the silence comes as a positive prediction.

The silence in measure 71 is short, and therefore might not give the listeners enough time to react to the change before the return of sound (Fig. 7). However, the use of the beginning material hints at the upcoming silence, making it easier to recognize the silence even though it registers as an interruption.

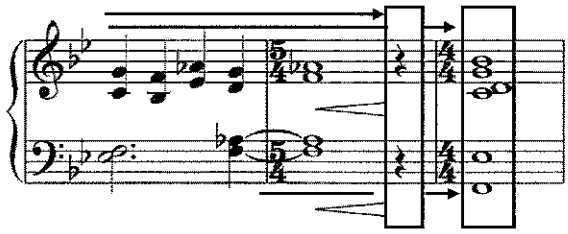

Figure 7: *Silence*, mm 70-72. Cluster chord progression leads to silence while chord in measure 71 leads to chord in 72.

Because of the level of integration between silence and music, sound can also interrupt the silence. This first occurs in measure 32 (Fig. 8). The listener expects to hear silence after this chord as has happened in every previous progression. There is a brief moment of notated silence, but it is immediately followed by the next progression, denying the listener the reflective space of noiselessness he or she is used to hearing. This denial continues as the music builds. The music becomes more hectic with the use of hemiolas in rhythmic runs and is no longer focused on the chord progression. Despite waiting for a return to silence, the moment it occurs (measure 48) acts as an interruption. Because the chord progression that usually leads to silence is lost in the chaotic materials, the listener cannot predict when the silence is going to occur. Unlike the cluster chord,

which has no resolution, the listener is expecting the chaotic material to resolve. Once again, the listener has little time to register the silence as it is quickly interrupted by the resolution to the chaos that the listener was expecting before the first interruption of the silence.

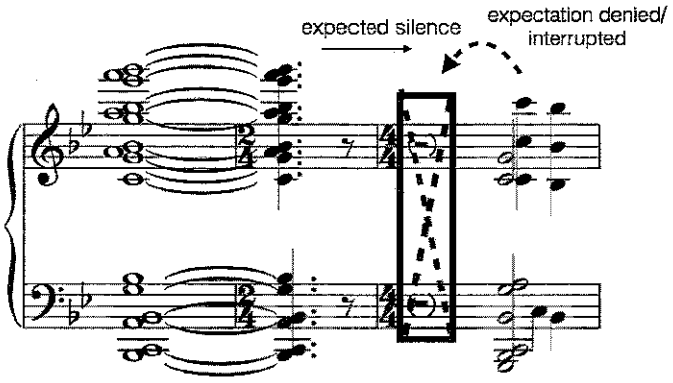

Figure 8: *Silence*, mm 31-33. Silence is interrupted by music.

This quick interplay between silence and sound interrupting each other continues as the chord descends into dissonance. The music returns to silence in the manner that the listener has grown accustomed to, but this is continuously interrupted by short bursts of the previous chord (Fig. 9). This helps strengthen the link between music and silence. Since either stimulus is able to interrupt the other, it means that the listener is interpreting both stimuli on an equal level.

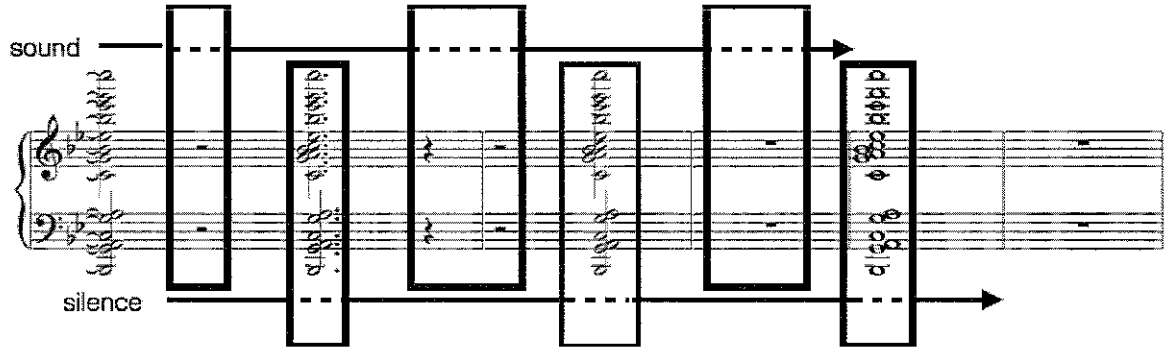

Figure 9: *Silence*, mm 48-53. Sound and silence are appreciated equally and can be viewed as sound interrupting silence or silence interrupting sound.

Chapter 3. Silence and the Inner Ear: Conforming to and Creating Expectations

Besides creating new schemas and conditioning, *Silence* also uses common expectations to introduce silence. Comprehensive studies of music show frequent patterns. Listeners of Western music are used to hearing patterns found in this type of music and therefore accept them as normal. This acclimation explains why music from other cultures can sound strange. Because we are not used to the sounds and rules of this music, it is difficult for listeners to understand this music in the beginning. Conforming to the expectations Western listeners have from Western music allows listeners to have some relatable knowledge of the piece to hold on to when encountering new concepts.

In a comprehensive study of over 6,000 folksongs, Huron discovered that 40% of these melodies were in arch form, first ascending then descending in pitch.[28] Studies on listeners' expectations of this pattern showed that although listeners could not predict the ascension of the first half of the phrase, they were quick to deduce that the phrase would descend during the second half.[29] In accordance with phrases such as "what comes up must come down," it could be that humans have inherently developed the expectation that an object can only build to a limited amount of potential before it must be released. As a melody builds it is natural to assume that it should regress, much like our schemas for phrases.

The frequency of past events allows us to create predictions about future musical events. Silence can be used to highlight these predictions. Margulis states, "When

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[28] Huron, *Sweet Anticipation*, 86-87.
[29] Ibid, 88.

external stimuli are withdrawn, internal projections, imaginings, constructions, and assumptions emerge more recognizable."[30] In these cases, the listener must rely on his preconceptions to develop his own theory of what is to happen next.

Frederic Chopin plays with this expectation in his *Prelude in E minor.* The melodic line reaches its peak in measures 16 and 17 before regressing (Fig. 10). This is presented both melodically and with the notated dynamics. As the melody descends, the listener expects the melody to resolve to an e minor chord. The melody follows this expectation, but the bass delays the arrival of the tonic chord. The silence Chopin uses in this prelude is linked back to the inner ear. The listener is already prepared for the final cadence; this expectation is delayed, first by the wrong chord, then by silence. This silence gives the listener a chance to hear the final progression before it happens.

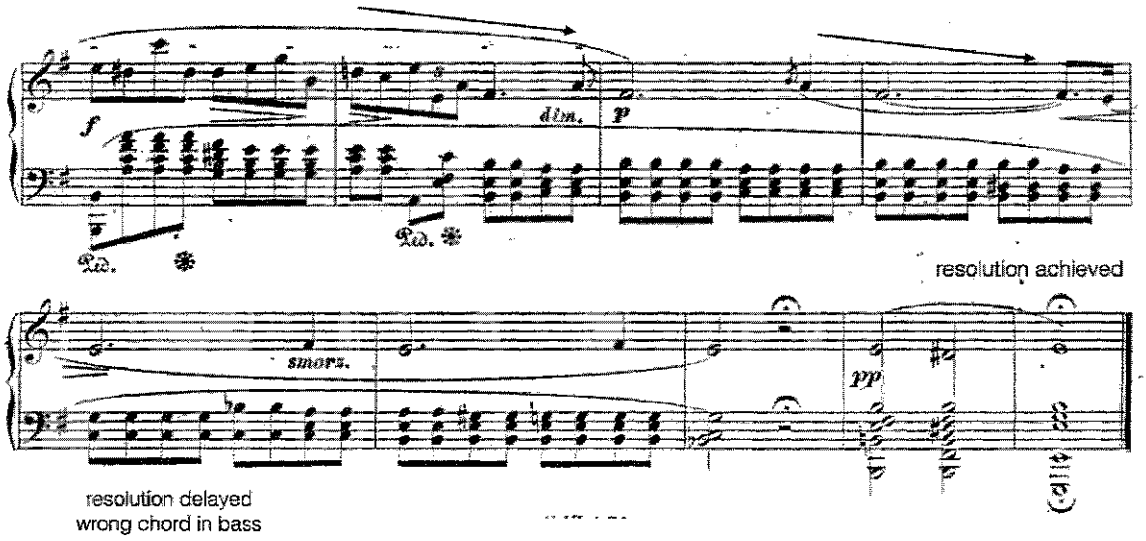

Figure 10: Chopin, *Prelude, op. 28 no 4,* mm 17-25. Melody reaches the top of the melodic arch and descends.

Silence does not focus on ascension in pitch, but rather dynamics. Just as the loudest point of Chopin's *Prelude* was also the peak of the work, the peaks in *Silence* can

[30] Margulis, "Moved by Nothing," 255.

be found by mapping out the intensity of sound throughout the work (Fig. 11). Although there are several interruptive silences, the overall sound map shows that *Silence* follows a model of development and regression that listeners commonly hear.

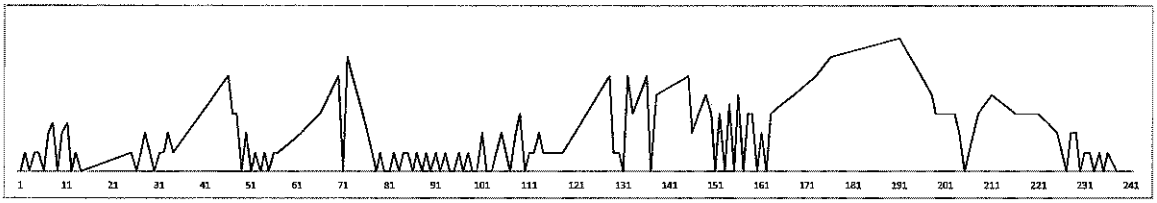

Figure 11: *Silence*. Graph overview of dynamics.

Chopin uses silence to help introduce the key in his *Nocturne in B Major*. Chopin starts the piece with a ii7 to a V7 and lets this decay to silence. The decay of the dominant seventh gives the listener time to prepare for the tonic note before it occurs in measure 3 as well as the tonic chord that the melody leads to in measure 4 (Fig. 12). The strong relation of ii7-V7-I makes the listener believe that the tonic chord will arrive after the dominant. Instead, Chopin lets it decay to silence. This defies the listener's expectations, but the dominant chord leads strongly enough to the tonic, that the listener is able to use their inner ear to hear it instead.[31]

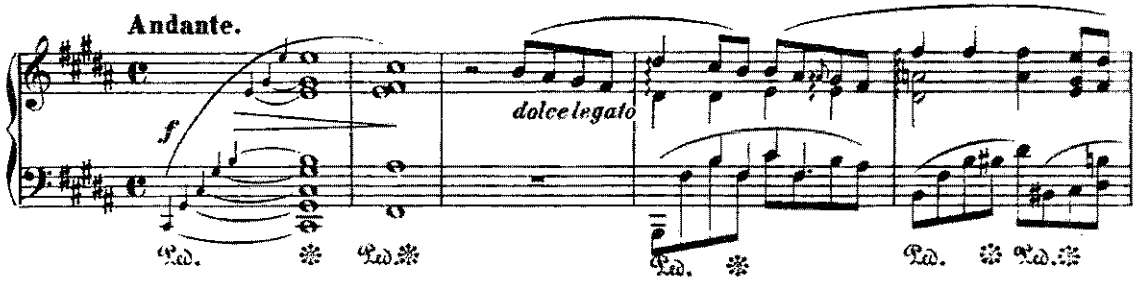

Figure 12: Chopin, *Nocturnes, op. 62 no 1,* mm 1-5. Silence after V7 chord allows listeners to use inner ear to anticipate the tonic chord in measure 4.

Silence also uses the inner ear to introduce a new theme (Fig. 13). The theme is introduced one note at a time by solo instruments followed by an indeterminate amount

[31] Ibid, 257.

of silence. The listener is faced with high levels of unpredictability in this moment. Timing, pitch, duration or instrumentation of the next note remains unknown. The amount of silence in between each pitch gives the listener time to reflect. The unmetered feel of this section lets listeners disregard their expectations for when the next pitch occurs. As the meter wanders, the listener no longer has a sense of where a downbeat and the most likely entrance will occur. Given the limited instrumentation, the next note breaks the silence without surprising the listener. This allows the listener to use the inner ear to focus on determining the next pitch of the melody. The listener is able to rely on frequent patterns in melodies to predict the next pitch. The leap down in the first two notes indicates that the next note will ascend by a step, causing the listener to hear the next pitch before it is produced by the orchestra. The return of the Bb may suggest a pattern is developing, and so the listener can predict the leap down to the F as a repeat of the beginning. Although not able to predict every note, the listener becomes more accurate as time goes on. By forcing the listener to use the inner ear, there is a sense of familiarity about this theme despite the fact that this is the first presentation because he has already heard the progression of the theme in his head.

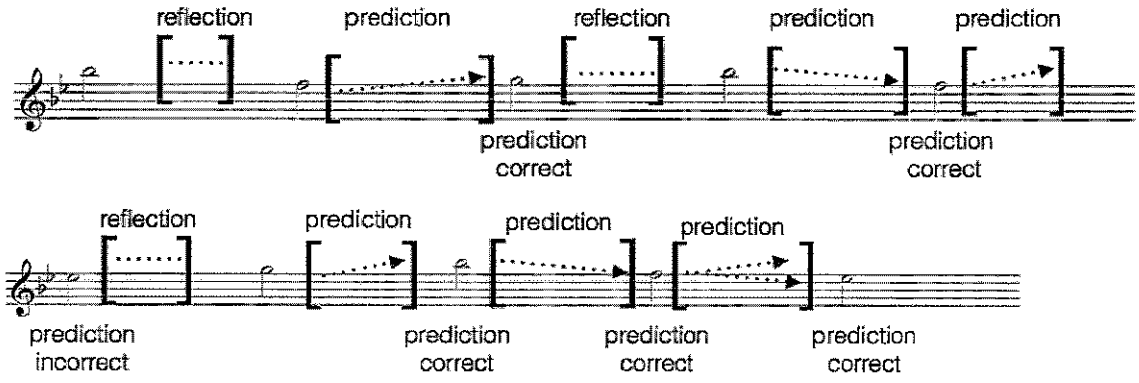

Figure 13: *Silence*, mm 78-99. Listener uses inner ear to reflect and predict the next pitch during silences.

Although Margulis's focus on the inner ear uses silence to hear music, I argue that listeners can also use the inner ear to hear silence. Since silence has become part of the listening experience, the listener has a heightened awareness of silence and notices even the briefest moments of silence. In measures 55-59, the cascade theme in the woodwinds leads to a boundary silence, but the bassoon and cello have a delayed cascade pattern that carries into the silence. Using the inner ear, the listener is able to hear the silence that should occur at the end of the phrase, and is therefore prepared for the brief moments in between the triplet pattern.

Dynamic expectations are formed from exposure to a stimulus with the help of short-term memory. Studies show that listeners can adapt rapidly to musical stimuli. This applies to forming expectations associated with musical genres and with individual pieces. As a work unfolds, the listener is constantly reflecting on the stimuli and forming expectations for what is to come. Listeners also learn to recognize patterns, which help them form expectations. The easiest way to retain a pattern is through repetition.[32] Due to our ability to adapt quickly, it's possible for an individual work to evoke specific expectations. Common techniques include thematic or motivic repetitions, ostinatos and sequences. Repeated material can range from small figurations that are only a few seconds in length, recurring motives, or even larger sections in a work.[33]

The smallest forms of repeated materials are figures. They are short in duration and often only use a few notes. Figurations quickly form templates that a listener can rely on as a source of cognizance. Figurations create their own mini schema, so listeners are aware of how the pattern unfolds. Beethoven's *Piano Sonata No. 14* uses an ascending

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[32] Huron, *Sweet Anticipation,* 227.
[33] Ibid, 255.

triplet ostinato that perpetuates throughout the piece (Fig. 14). It only takes a couple repetitions for the listener to identify the pattern and follow the schema through the rest of the piece.[34]

Figure 14: Beethoven, *Piano Sonata No. 14, op. 27,* mm 1-4. Triplet Figuration.

Silence uses a similar arpeggiated figure in the second section of the piece (Fig. 15). The figure first appears in the woodwinds, transferring voices as the figure descends, but is later taken over by the strings. This transfer helps listeners hold on the schema of this figure while the woodwinds are able to develop the figure into a melody.

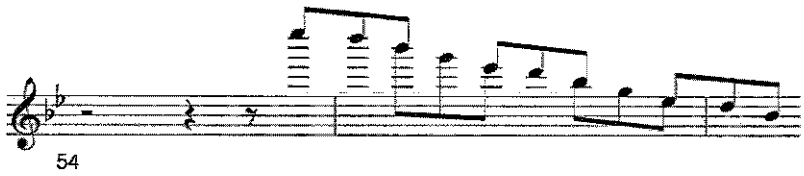

Figure 15: *Silence,* mm 54-56. "Cascade" figuration.

Recurring motives are a larger source of information and are processed differently than figures. Since motives do not necessarily follow a pattern, they require a deeper level of internalization. When a motive reappears, we are able to recognize it as a familiar sequence and use this knowledge to anticipate the next idea.[35]

Schubert's *Moment Musical I* develops around the opening motive (Fig. 16). As the motive develops, Schubert isolates the last two notes. The larger motive familiarizes the listener with the fall to the last note followed by a moment of silence. When the

[34] Ibid, 255.
[35] Ibid, 262.

falling pattern is isolated, the listener still expects to hear a lift after each note. The bar of silence in measure 17 gives the listener time to reflect on the build up and development of the motive so that the continuation in measure 18 results in recognition of the new pattern (Fig. 17).

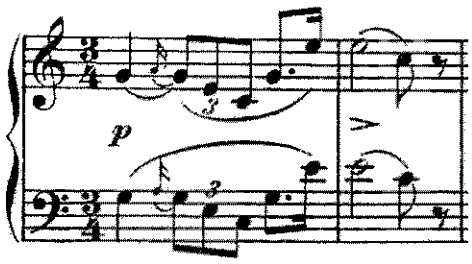

Figure 16: Schubert, *Moments Musicaux, op. 92 no 1,* mm 1-2. Opening motive that recurs throughout the piece.

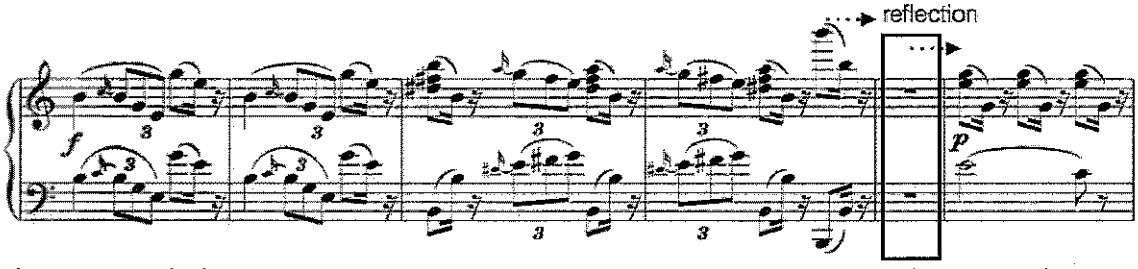

Figure 17: Schubert, *Moments Musicaux, op. 92 no 1,* mm 13-18. Development of opening motive.

In *Silence,* the cluster chord progression that develops in the beginning recurs in some variation in all but one section (Fig. 3). Repetitions of this motive appear as a brass chorale in measures 65-70 as a way to build into silence (Fig. 7). This motive is also used to help build to the climax of the piece in measures 167-172 and to return to silence after the climax in measures 197-202. Not only are listeners able to identify the motive and anticipate how the motive will play out, but also they are able to recognize that the motive signals an upcoming arrival point.

The piece ends using this same cluster chord motive. The audience has been trained to use these moments to heighten their awareness. In the last repetition, the

progression ends before reaching the final cluster chord that listeners are used to associating with the resolution into silence. Since listeners are already accustomed to listening to silence while waiting for the next musical stimulus, the denial of the final chord promotes further listening to silence after the piece ends.

Huron states that it is easiest to predict events through repetition when they happen immediately after one another.[36] The longer ago the repetition occurred, the more likely it is that we cannot keep the information in our short-term memory. Schubert's *Impromptu 3* is in a theme and variation form. The repetition of the original theme gives the listener an idea of what to expect melodically in the variations. The variations also repeat, and the phrases are small enough that the listener can remember most of the information. Also, the nature of the variations allows the listener to understand how Schubert is modifying the theme in order to accurately predict the musical ideas during the first repetition of the variation.

Despite the fact that proximity allows for the easiest predictions, music often follows different forms. The fourth impromptu follows a larger form of ABB'A' (Fig. 2). Each of these sections has two main themes. The longest time between iterations of themes occurs in the first and second themes of the A section. However, Schubert compensates for this break by reacquainting the listener with both themes before repeating them again for the conclusion.

Silence's form can be classified as ABCDC'B'A', although many of the themes are integrated throughout these sections (Fig. 3). As time passes, it may be harder to remember what occurred in each theme and therefore difficult to predict what will

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[36] Ibid, 255.

happen. However, the cluster chord theme that presents itself in the beginning is prevalent in every theme that follows, making it easier to predict despite the length of time between themes.

Stockhausen argues that moments should be equal in length. The overview in figure 3 shows three proportional sections and two shorter ones, but within the five larger sections or moments, the listener is able to hear smaller moments associated with each motive. When viewing the proportion of time spent on each of the four motives, the lengths become more uniform (Fig. 18).

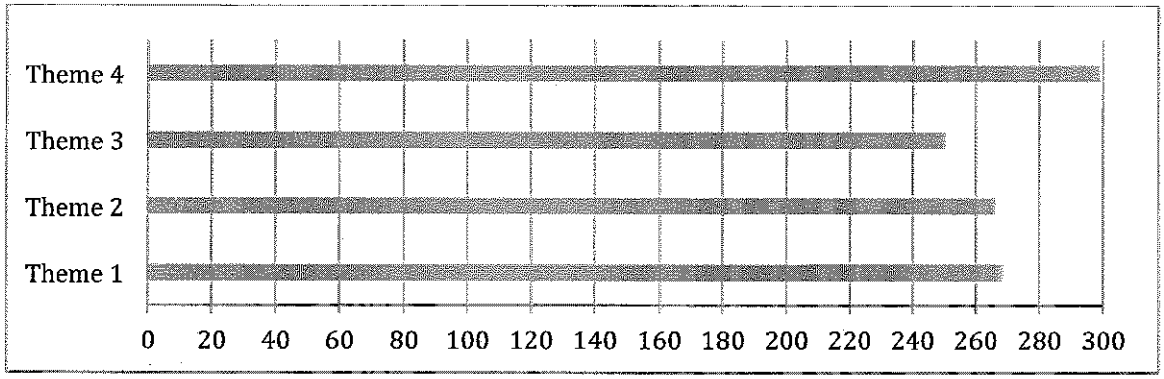

Figure 18: Cumulative time spent on each theme in *Silence* measured in seconds.

In his discussion of moment form, Stockhausen argues that the moments should appear arbitrary, but it is likely that moments should return.[37] The symmetry of the form of *Silence* is too explicit to seem arbitrary, but by negotiating the length of these moments, *Silence* is able to acquire a more arbitrary feel. The integration of multiple themes within a moment also helps the form feel less standardized.

[37] Kramer, "Moment Form in Twentieth Century Music," 180-181.

Chapter 4. Silence as Communication: Qualia

Qualia are intuitive feelings that accompany a sensory experience.[38] Huron shows that individual tones can possess certain qualia. Huron presented a survey to musicians asking them to describe the quality of each scale degree in a major key. He compiled the data into a table displaying common descriptors (Fig. 19). More descriptive responses led Huron to seven categories over which the qualia of tones seem to span: certainty or uncertainty, tendency, completion, mobility, stability, power, and emotion. Further study showed the three most common qualia are tendency, completion, and emotion.[39]

It is often understood that the leading tone has a tendency to go to the tonic. Yet, universally Huron has shown that because the tonic happens more often than the leading tone, there are actually more instances of the tonic going to the leading tone than the other way around. However, we rarely predict that the tonic will go to the leading tone and almost always predict the tonic will follow the leading tone.[40] This is due to the fact that the tonic has multiple notes that are likely to follow while the leading tone has a more limited possibility of notes that tend to appear. Statistically, there is a higher probability that the leading tone will lead to the tonic than any other note, while the tonic has a more varied probability between many notes. Tendency tones are not heard as such because of the frequency in which we hear these passages, but the probability of each note to lead to another note. This means that individual notes have the ability to create their own context.[41]

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[38] Huron, *Sweet Anticipation,* 144.
[39] Ibid, 144.
[40] Ibid, 160.
[41] Ibid, 162.

Scale tone	Common descriptors	Sample responses
tonic	stable, pleasure, home, contentment	stable, extremely satisfying, centered, foundational, solid, resolved
raised tonic	strong, upward, bold	edgy, unstable, uncertain, upwardly mobile, mildly precarious
lowered supertonic	surprise, abruptness, pause	somewhat dark, a sense of almost inevitable further descent, murky, unexpected richness, mild surprise
supertonic	solid, movement, resolve	hanging, dangling, transitory, moderate expectancy of more to come, part of a flow
raised supertonic	longing, unstable	needling, moderately harsh, jarring, unstable, off-balance
mediant	bright, love, warmth, beauty	light, lifted, bright, point of many possible departures, yet also strongly restful, peaceful and calm
subdominant	descending	awkward, tentative, strong sense of being unfinished, "Now what?" no clear expectation of future, hanging feeling, would be happy to fall by half step
raised subdominant	intentional, motivated	moderately anxious, interrupted flow to dominant, somewhat curious about possibilities, fluidity, transitory
dominant	strong, muscular, balance, possibility, pleasant	strong, towering, height, sense of looking down from a tall building and being comfortable, but knowing you'll eventually take the elevator back to the street level
raised dominant	leading, aspiring	leading to something, sense of implication, unfinished, leaning, mildly uncomfortable
submediant	balance, open, lightness	airy and open, temporary suspendedness, neutral, evokes mild curiosity in regard to direction
subtonic	falling, lightness drifting downward, shifting	heavy, like walking with a limp, unexpected, open new possibilities, sheds a new light on things
leading tone	unstable, pointing, restless	sense of inevitability, highly unstable, uncomfortable, squirmy, itching, restless

Figure 19: Common qualia of scale degrees. Reprinted from: David Huron, *Sweet Anticipation: Music and the Psychology of Expectation* (Cambridge: MIT Press, 2006), 145.

Silence uses tendency tones to lead to both sound and silence. The melody developed in measures 78-99 uses the inner ear to deduce what pitch will happen next. The long intervals of silence let the listener develop the melody with the inner ear, but still feel as though individual pitches are leading the melody a certain direction. In the case of *Silence*, silence has an equal probability of occurring as notated noise. This probability becomes more likely in certain scenarios, such as silence after the cluster chord or silence at the end of phrase or longer sections. This probability leads the listener not only to expect silence, but also feel as if the cluster chord is directing the music to silence.

The qualia and tendencies of music lead to non-musical descriptions of how music feels. This makes us feel that music is able to express. Just as music is often said to communicate what words cannot, silence can be used to communicate when music is not enough.[42] Our expectations suggest that music can only build to a certain point. When music has reached its climax, the listener eventually expects the music to regress. Silence can be used as communication, to help signify that the music is reaching its peak.

Franz Liszt uses many boundary silences within the first *Mephisto Waltz*, but silence in measure 196 seems to interrupt the increase in intensity (Fig. 20). Upon further study, the listener will find that the piece had already reached its maximum potential. Liszt uses silence as a way to extend the tumult created in the falling lines. This idea is supported when the music resumes in measure 199, exploiting the full range of the piano.

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[42] Margulis, "Moved by Nothing," 269.

The silence is used to communicate an intense turbulence that is beyond the dialogue of music.[43]

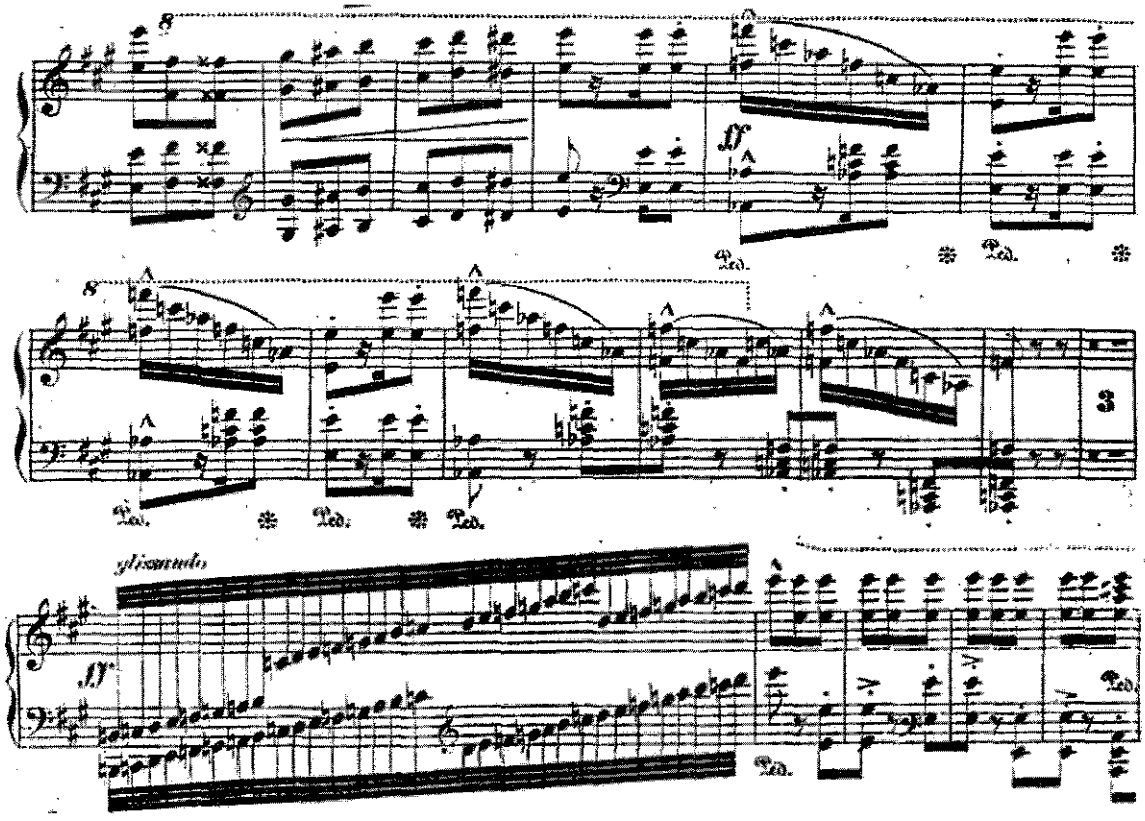

Figure 20: Liszt, *Mephisto Waltz No. 1*, mm 186-203. Liszt uses silence to continue the chaos beyond the realm of sound.

Silence reaches it's peak in measure 148, when it cannot surpass the Eb+ chord (Fig. 21). Silence helps communicate this as the music keeps approaching this chord in different settings. The inner ear may try to take over to find a way to surpass the augmented chord. As the progression has only ascended to this point, the listener may want to continue this ascent, but this would only provide an increase in tension and not a resolution. Silence communicates to the listener that the progression has reached the peak of the ascension and must find another way to resolve. During the silences, the listener feels the strain in tension through the search for a resolution. The silence after the G

[43] Ibid, 269.

major chord acts as a moment of reprieve after surpassing the augmented chord. As the progression descends, silence helps communicate the regression.

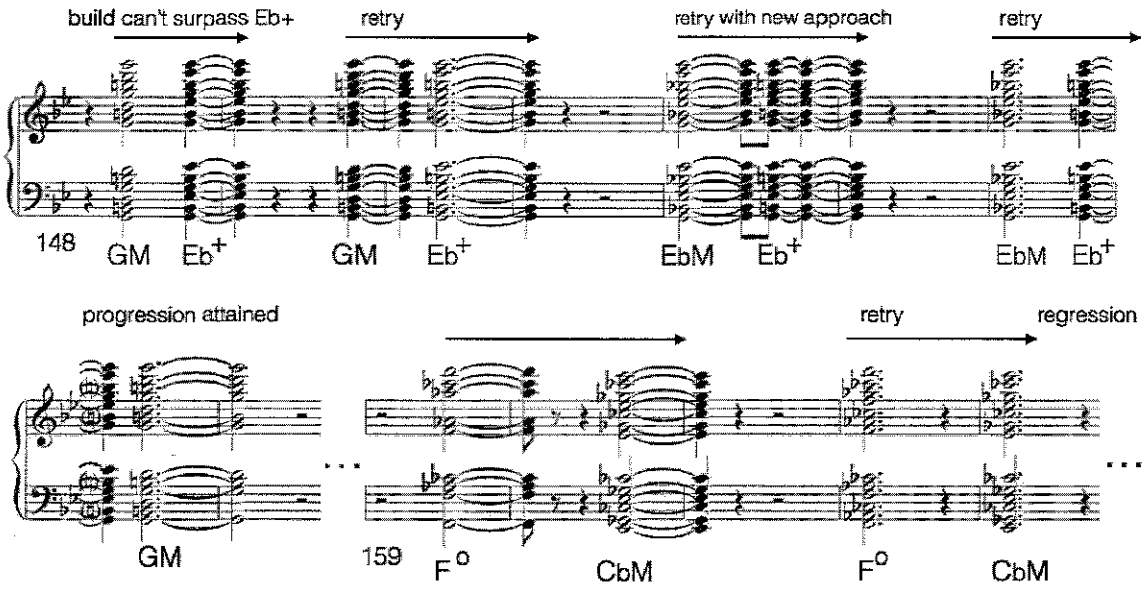

Figure 21: *Silence*, mm 148-161. Silence communicates the struggle the music is facing to surpass the Eb+ chord.

Qualia also allow us to perceive an upcoming closure. Huron found that in approaching a cadence, a listener's certainty about what was going to happen increased, then immediately decreased after the cadence.[44] The closure effects are often regarded as sounding pleasant.[45] The use of the I-V-I cadence is such a strong progression, the listener hears where the progression is going and knows what is going to happen next. Composers use the qualia of this progression as a source of familiarity with continuous sound or allow the inner ear to take over by incorporating silences in between the progression. Chopin often leaves a silence between the final cadences in his piano preludes (Fig. 10), while other composers leave silences in between each individual chord. In the tonal system, both approaches are easy for the listener to predict.

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[44] Huron, *Sweet Anticipation*, 156.
[45] Ibid, 155.

Silence does not follow conventional tonality, as the cluster chord to silence is the primary source of closure. The closure effect of the cluster chord is not as strong as a cadence in tonal music, but the conditioning effects of the first section help strengthen the listener's certainty. When a cluster chord with no predictable resolution is presented, the listener can predict that this chord will end in silence. The use of dynamics and orchestration help give the cluster chord a sense of finality (Fig. 22).

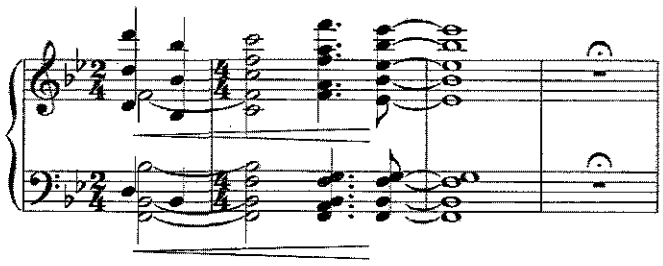

Figure 22: *Silence*, mm 133-136. Unison rhythm in orchestra aids in producing closure.

Since the brain is able to evaluate a stimulus as it is presented, the listener is able to use the information to create qualia. Although frequency is not as valuable information as context, conditioning through repetition can help us create new contexts. To achieve the pleasant senses of qualia from tendency and closure, the listener must evaluate how often a tone completes a phrase and the probability of a tone following another tone.[46] This is another way the completion of the cluster chord can feel resolved by silence.

[46] Ibid, 173.

Chapter 5. Surprise

Evolutionarily, it is beneficial for an individual to correctly predict when and what stimuli are going to occur. This is why we are rewarded when we correctly predict an outcome. However, there are also studies that show some surprises can create a more positive experience than a predicted outcome. This is due to contrastive valence; an experience can feel even more pleasurable if it is preceded by an unpleasant event. Despite our desire to correctly predict events, we can also enjoy surprises in a safe environment. Music poses no danger to the listener, which makes it possible to experience physiological symptoms without appraising them as negative. Music can create surprise by contradicting expectations. Just as listeners can form dynamic expectations within an individual musical work, music is able to create dynamic surprise by avoiding these expectations. Simple ways to disrupt these expectations are to use rhythmic or harmonic materials. Huron uses the term periodicity to define the timing of events in music. One can create surprise by delaying or anticipating this timing, such as using syncopation. Contrast in sound can also create a reaction known as frission, which we commonly refer to as "chills."

In Chopin's fourth piano prelude, Chopin denies the listener the resolution to the final note in the falling melody (Fig. 10). The denial may cause an initial dissatisfaction, but this delay makes the final resolution more pleasing. In this case, the surprise is unpleasant, which leads to greater appreciation of the expected resolution. However, Chopin also uses surprise to provide a pleasant relief to disagreeable chords. In the second prelude, the continuous drone of eighth notes in the bass suddenly stops, but the build up in dissonance in the chords makes the surprise a pleasant relief (Fig. 23).

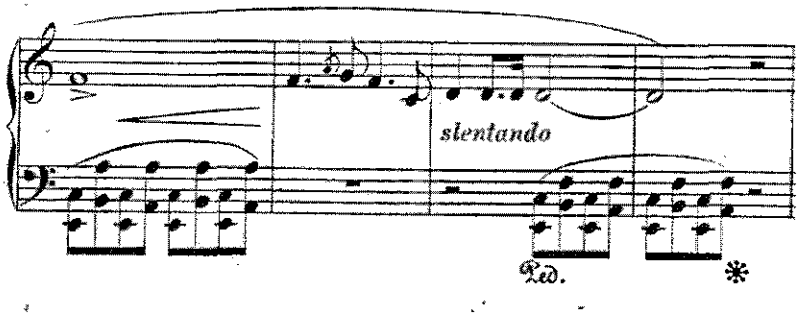

Figure 23: Chopin, *Prelude, op. 28 no 2,* mm 16-19. Absence of eight notes creates surprise and gratification.

In my work, contrastive valence is the reasoning behind the juxtaposition of the cluster chord and silence. This allows for the interplay of silence and resolution between the dissonant cluster chord and the consonant silence (Fig. 5). By being able to hear silence as a pleasant experience, the listener is able to accept this as a resolution to the cluster chord instead of feeling as if it is never resolved. This also primes the listener to experience silence as a pleasurable experience throughout the rest of the work despite whether it is preceded by an unpleasant sound.

Despite the pleasantness of predictability, we are also trained to have a preference for novelty. Surprise can be a pleasant experience even if an unpleasant stimulus does not precede it. Dynamic surprises are created when music violates the expectations that it has already set up. A common example is Haydn's symphony no. 94, commonly known as the *Surprise Symphony*. Haydn sets up a quiet theme typical of a second movement in a symphony but disrupts the peaceful impression with a fortissimo chord on the last beat of the theme. This alone could cause a surprise to the listener based on his schema of how a symphony works, but Haydn amplifies the surprise by playing the theme through without the interruption first. This gives the listener a false sense of security in predicting what will happen when the theme is repeated and creates a more dramatic surprise when the

event occurs. It can be expected that this incorrect prediction may cause alarm for some listeners, but Huron found contrary evidence showing that many listeners also find the surprise amusing.[47]

Periodicity in music easily creates a dynamic expectation of when events are going to occur, which allows composers to create dynamic surprises by averting these expectations. Listeners are able to predict perfectly periodic events easiest when they occur at a tempo between 80-100 beats per minute.[48] *Silence*, with a tempo of 88 bpm, fits a comfortable range in which listeners should be able to predict the timing of events, but plays with periodicity to make it difficult for listeners to naturally predict when the next event will occur. Constant changes in meter mean that the pattern of strong and weak beats that a listener would normally be able to predict become lost. *Silence* takes advantage of uncertain periodicity in measures 71-99 (Fig. 13). In this section, there is an indeterminate amount of silence between each note. In performance, the conductor determines the length of silence while each performer chooses the length of the sound based on the note values given. With this model, all sense of a beat is lost. Given the absence of a steady tempo, the listener is unable to attempt to predict when the next event will occur. Thus, even though each tone appears as a surprise, the listener is not negatively affected by a false prediction. Instead, the listener remains at a heightened state of awareness throughout the whole section. This forces the audience to listen to silence as intently as they listen to the music.

Syncopation also takes advantage of periodicity without fully disregarding meter and tempo. Beethoven's Ninth Symphony creates surprise in the fourth movement within

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[47] Ibid, 279.
[48] Ibid, 176.

the "Ode to Joy" theme in measures 96-107 (Fig. 24). As the theme reaches the last line, it starts a beat early, causing a dynamic syncopation.[49] This anticipation of the first note surprises the listener, but by extending the value of this note, Beethoven does not interrupt the listener's internal pulse and he can listen to the rest of the theme without losing time reorienting meters.

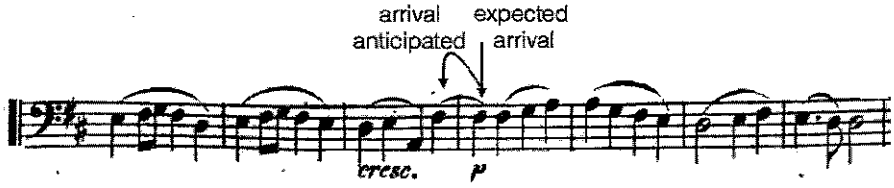

Figure 24: Beethoven, *Symphony No. 9, op. 125,* mm 101-107. Anticipated event occurs on a metrically weak beat earlier than expected.

Silence sets up a dynamic expectation in measures 137-146 (Fig. 25). The listener first perceives a continuous wave of sound, where individual voices change on the strong beats of each measure. The reintroduction to silence breaks up the continuous sound, but does not hinder the harmonic changes from occurring on the first and third beat. As the chord keeps ascending, the listener becomes used to the duration of the sound and silence. In measure 146, the chord is held an additional eighth note, this small duration is just enough for listeners to feel the delay. When events occur on a weak beat, they are often followed by an event on the next strongest beat. The extension of duration of the chord in measure 146 moves silence to a strong beat, creating a feeling of syncopation and increased tension.

[49] Ibid, 278.

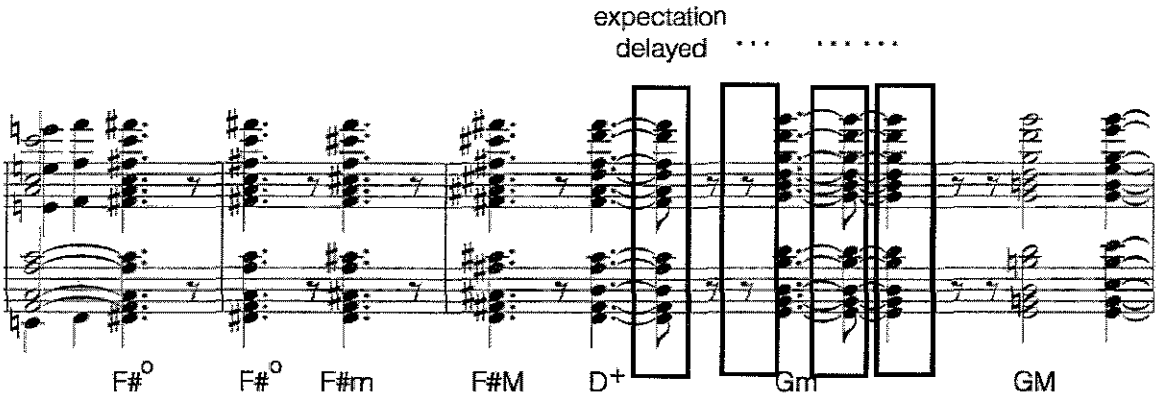

Figure 25: *Silence*, mm 144-148. Elongation of chord and silence creates delay in anticipated onset of events.

Frission is usually an experience related to fear. When our fight-or-flight response occurs there are several physiological reactions, including hair rising.[50] These reactions occur in moments of increased psychological arousal. Arousal can be peaked when two opposite events directly follow one another. In music, this can occur during sudden changes in dynamic or an unexpected onset of sound. In the case of music this is often experienced by a sudden dynamic change. Most commonly, this occurs when jumping to a loud dynamic, but it can also happen juxtaposing a loud sound with a quiet one. Although some musical surprises may become less effective upon repetition, the effects of frission last through several listenings. In fact, frission may be more likely to occur once a work has become familiar.[51]

Although a change in dynamic is the most common way to create frission, intensely loud noises can be enough to create frission without an extreme contrast in dynamic.[52] Beethoven is able to evoke frission with both techniques. Beethoven scores the orchestra in a chordal texture (Fig. 26). Despite the *sforzandi*, Beethoven is able to

[50] Ibid 33.
[51] Ibid, 283.
[52] Ibid, 34.

create frission with the increase in dynamic along with the change in rhythmic pattern. The new pattern automatically heightens the awareness of the listener. When combined with the change in dynamic and harmony, the listener is likely to experience frission.

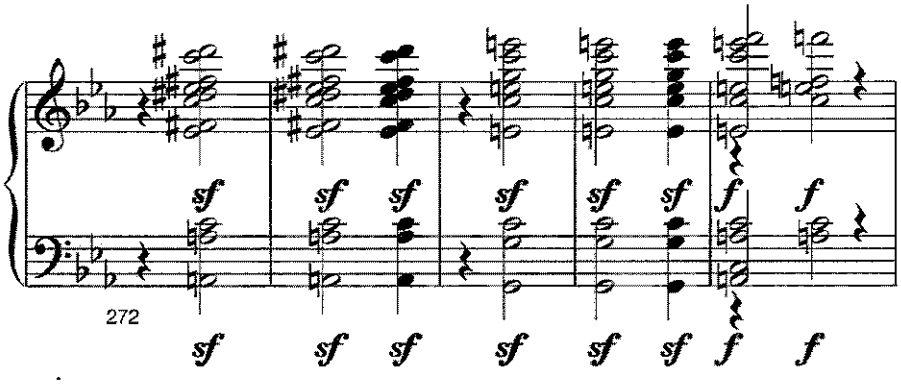

Figure 26: Beethoven, *Symphony No. 3, op. 55*, mm 272-276. Increase in dynamic and change harmonic pattern create frission.

Beethoven also uses the voicing of the ensemble to create a change in dynamics (Fig. 27). In this case, the listener feels frission in response to the change in both dynamics and timbre. In measure 377, Beethoven removes the brass and strings to create a sudden change in timbre. Despite the forte marking, there is an audible change in volume due to the limited voicing. Beethoven extends the feeling of frission by creating another dynamic change as the dynamics in the woodwinds drop to a piano.

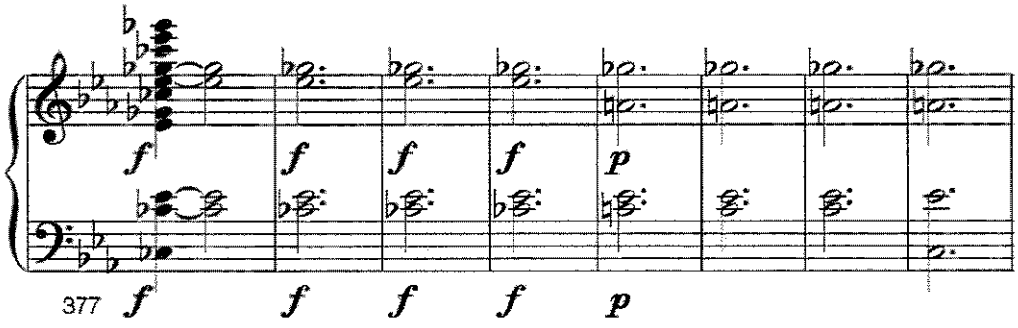

Figure 27: Beethoven, *Symphony No. 3, op. 55*, mm 377-384. Change in dynamic and orchestration creates frission.

Silence mimics Beethoven's ability to create frission with loudness in measures 167-174 (Fig. 28). As the music builds, the low brass introduce the cluster chord theme heard at the beginning. Despite the increase in intensity, the listener is used to associating this theme with silence. The listener is aware the music is building and expects it to continue to do so, but because of the context of the cluster chord, the increase in dynamic at 174 can create frission. This is also the culmination of the three themes (Fig. 28); the brass and strings both have a change in material, heightening the effects of frission.

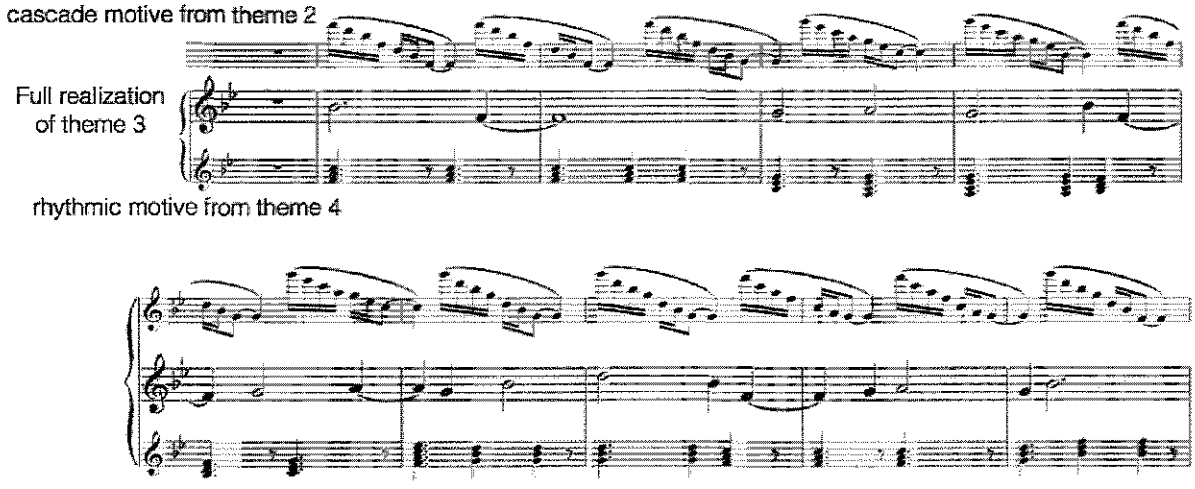

Figure 28: *Silence*, mm 174-182. Increased dynamic and the integration of multiple themes create frission.

Silence also experiments with changes in dynamics. Although most phrases try to enter and exit silence as elegantly as possible, there are also moments that exemplify the contrast in dynamics. In measure 125, the full ensemble crescendos, but this loud dynamic is contrasted by a pianissimo in the woodwinds in measure 128 before returning to silence. This again is contrasted by the full orchestra entering in measure 131.

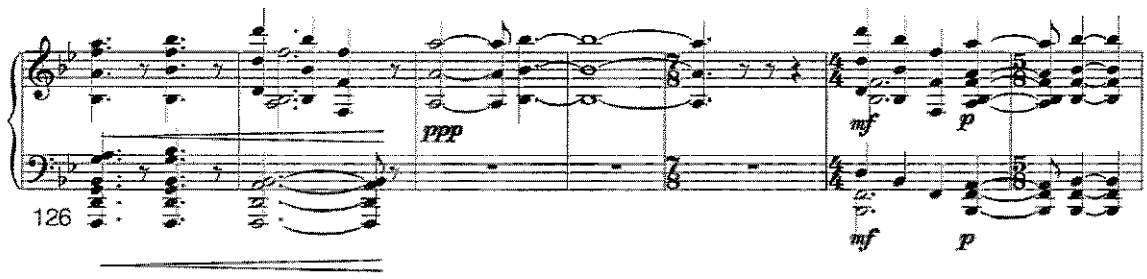

Figure 29: *Silence*, mm 126-132. Change in dynamic and orchestration creates frission.

Silence is able to take the contrast of volume further by using silence as the softest sound. The build through measure 136 is scored for the full orchestra and represents the loudest moment to this point (Fig. 22). This is immediately followed by a full bar of silence, which allows for the reverberation of the chord to decay completely before the music resumes. This moment extends the range of dynamic contrast, strengthening the possibility of experiencing frission.

Conclusion: Emotional Effects

The goal of *Silence* is to create an experience in which listeners appreciate silence as equally as musical sound. This is an atypical approach to music and requires certain care in production. In contemplating the uniqueness of individual works, Huron surmises that novelty requires "identity markers" that distinguish a piece from any other work.[53] The focus on silence distinguishes my piece from most musical literature, but this distinction would become lost without the identity marker of the silence. A problem often faced with novelty is if the markers are not integrated properly; the work may seem unoriginal with isolated moments of innovativeness. To combat this, the markers should appear frequently and fit within the context of the piece as a way to promote dynamic expectations.[54] In *Silence*, this is already resolved with the repetition of the cluster chord and silence used for conditioning.

Although I have spoken of silence through a singular function, further listening and appraisal will show that individual silences can serve multiple functions. Boundary and interruptive silences, which at first seem less involved, can also act as ways of communication and use the inner ear. *Silence* has moments of both conforming and denying the listener's expectations of music. Through both objectives, the goal is to make silence a pleasurable listening experience, but it is possible for listeners to experience a range of emotions.

The tension response is able to evoke many emotions from the listener. Tension builds as an anticipated event approaches. Although tension tends to rise at the latest possible moment to reserve energy, there are moments that tension may rise early. Strong

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[53] Ibid, 265.
[54] Ibid.

feelings of prediction can lead to higher level of anticipation. Huron also discovered that listeners might feel moments of "premonition" when a listener's tension response may be peaked by a vague sense of what is to come.[55] The tension response can also be prolonged if music delays the onset of an expected event. High levels of tension can cause stress, but can also make the final outcome more pleasurable due to contrastive valence.

Our emotions can rely on our ability to correctly predict an event. Our first reaction to music may be based on the emotions we feel when we make correct or false predictions. The beginning of *Silence* acts as a learning curve. Listeners are able to use the beginning as a model to make correct predictions in the future. Some listeners may be able to evaluate the beginning without making judgments while others might be immediately thrown off by the use of silence. This may mean that some listeners find the beginning odd, but the appraisal reaction can help the beginning sound as beautiful as the rest of the piece.

The long breaks of silence offer a reflective quality to the piece. As listeners appraise *Silence*, they are able to explore their reactions further. Reflection allows for listeners to reevaluate moments that they may have found odd or discomforting and find that they now find them enjoyable within the context of the larger work.

Silence tries to promote further listening by denying the listener the final cluster chord. The listener has learned this cluster chord progression and expects to hear the tension resolution of the final chord. Instead, the progression ends two notes earlier. This first creates tension, as the listener is expecting the final chord, but as the listener is

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[55] Ibid, 318.

already accustomed to silence, they are able to appraise the original tension and reevaluate it as a resolution.

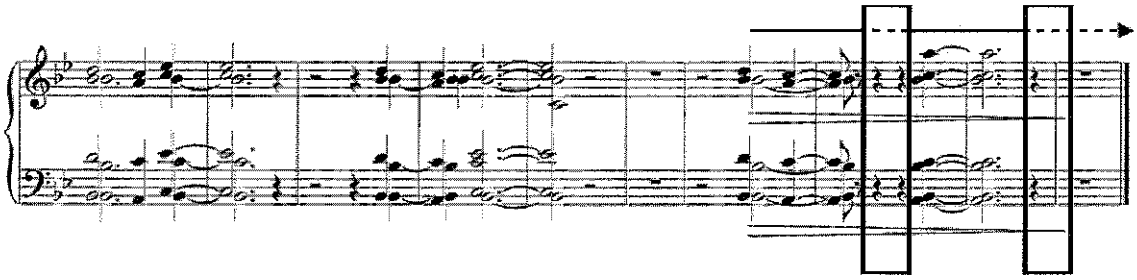


Figure 30: *Silence*, mm 228-237. Final cluster chord progression is suspended in silence.

The denial of the final cluster chord promotes further listening from the audience. Even after the final note, listeners are encouraged to listen to the silence beyond the concert hall, or rather, the lack thereof. Continued listening will confirm that there is never truly silence, but the listener can find relative silence in the noise that surrounds them. In both silence and noise, the listener can find beauty.

Appendix

silence

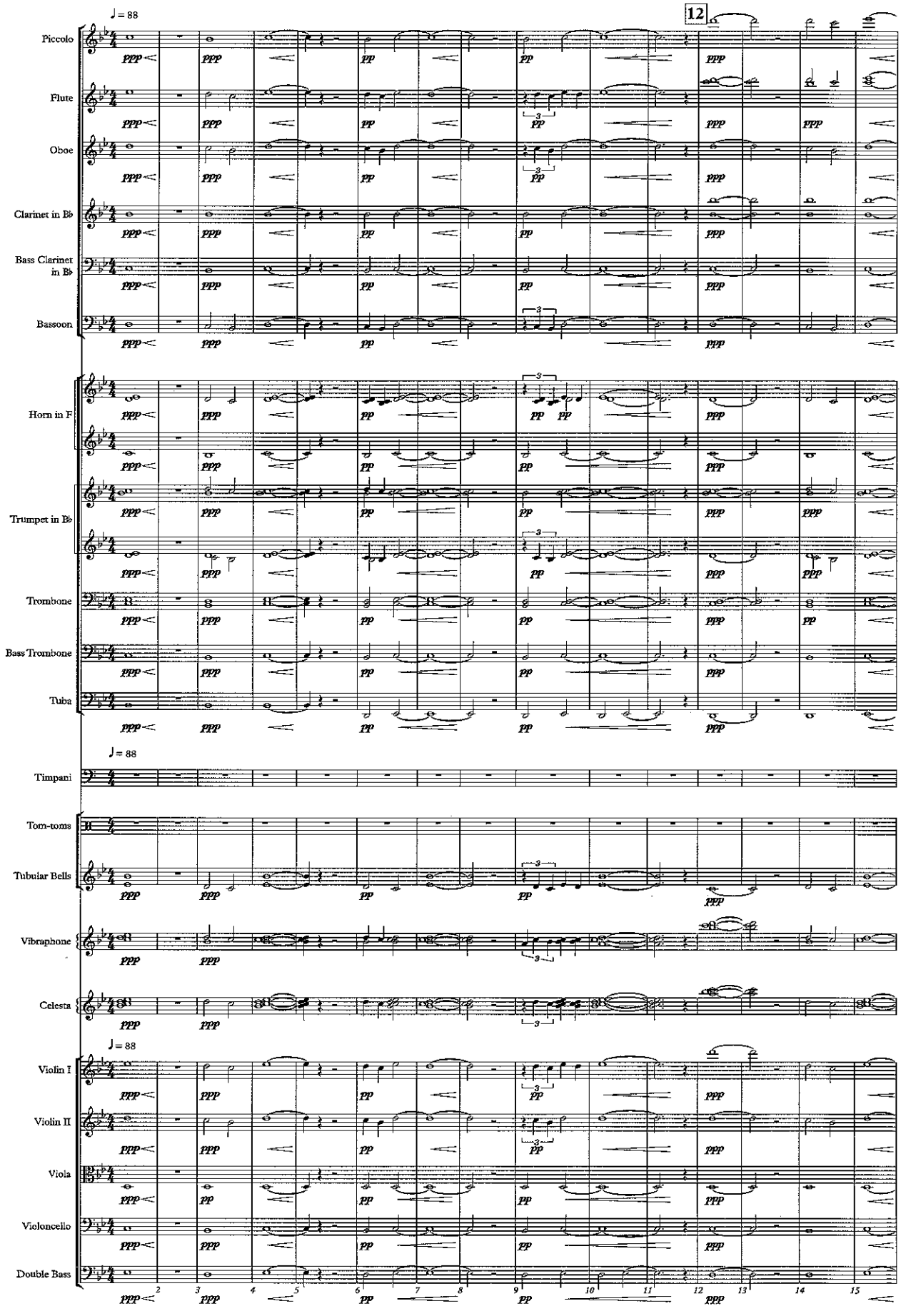
for orchestra

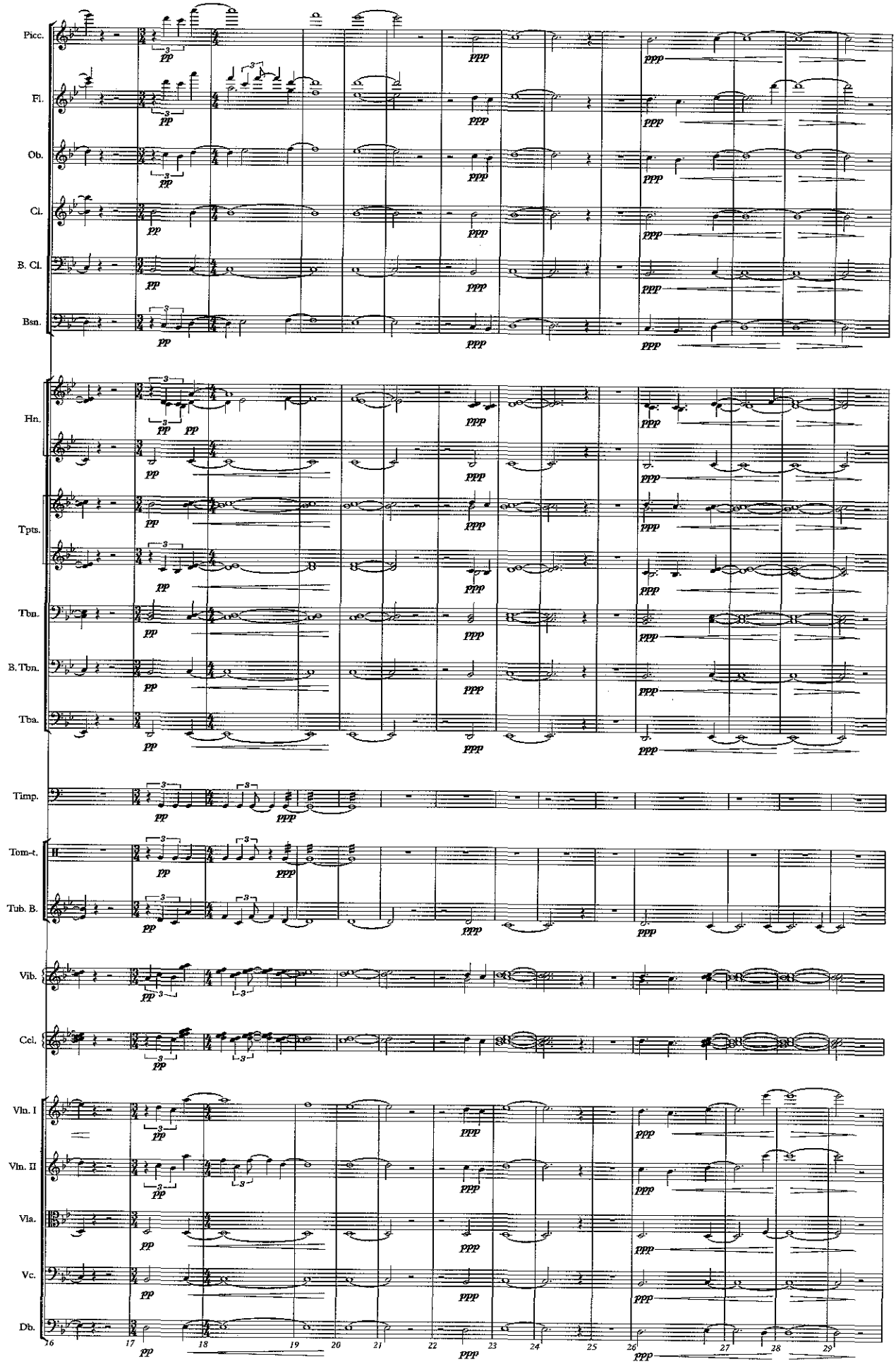
Full Score

silence

for orchestra

Kari Darby

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B. Tbn.
Tba.
Timp.
Tom-t.
Tub. B.
Vib.
Ccl.
Vln. I
Vln. II
Vla.
Vc.
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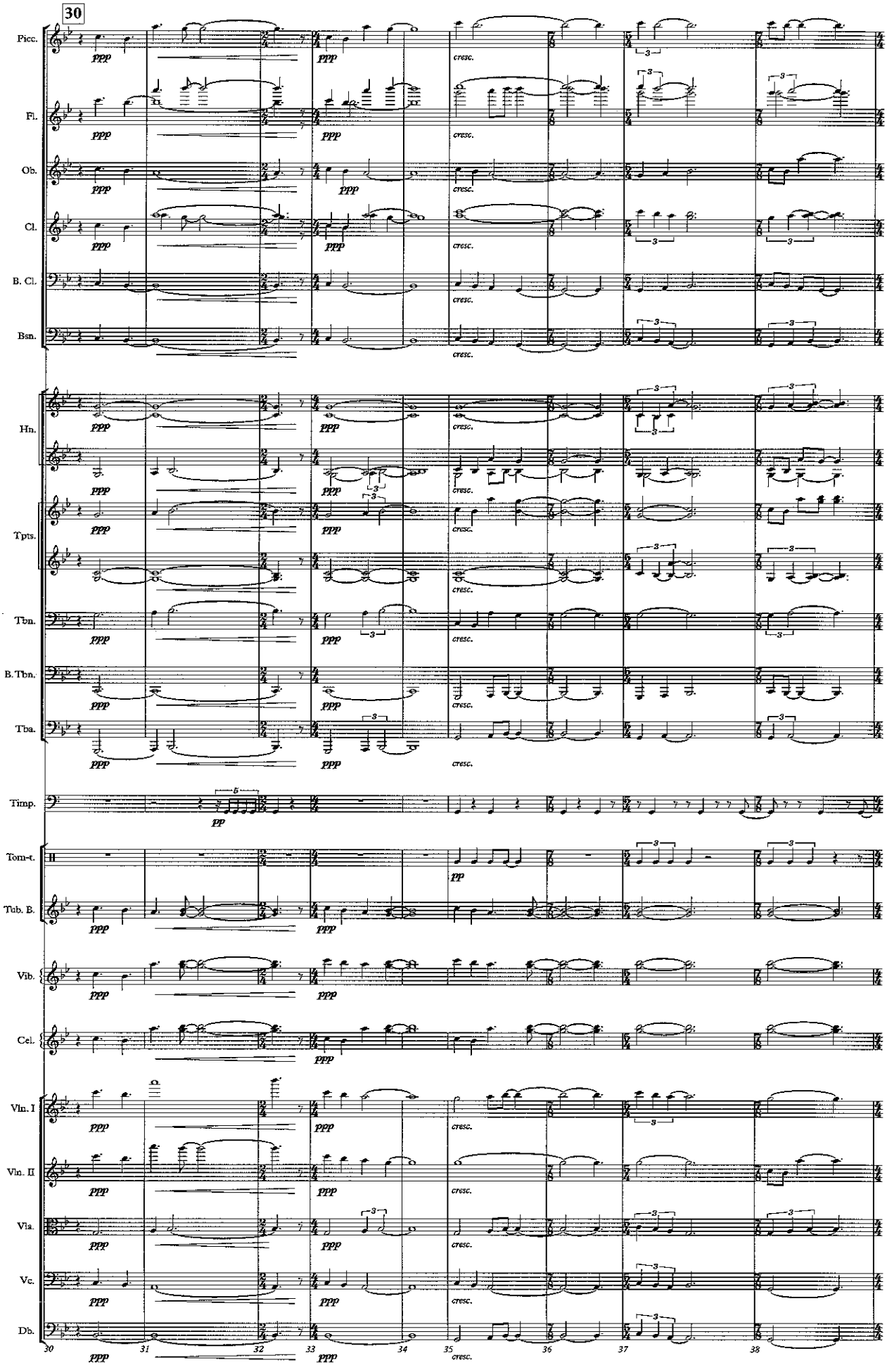
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Tom-t.
Tub. B.
Vib.
Cel.
Vln. I
Vln. II
Vla.
Vc.
Db.
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pp
cresc.
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31
32
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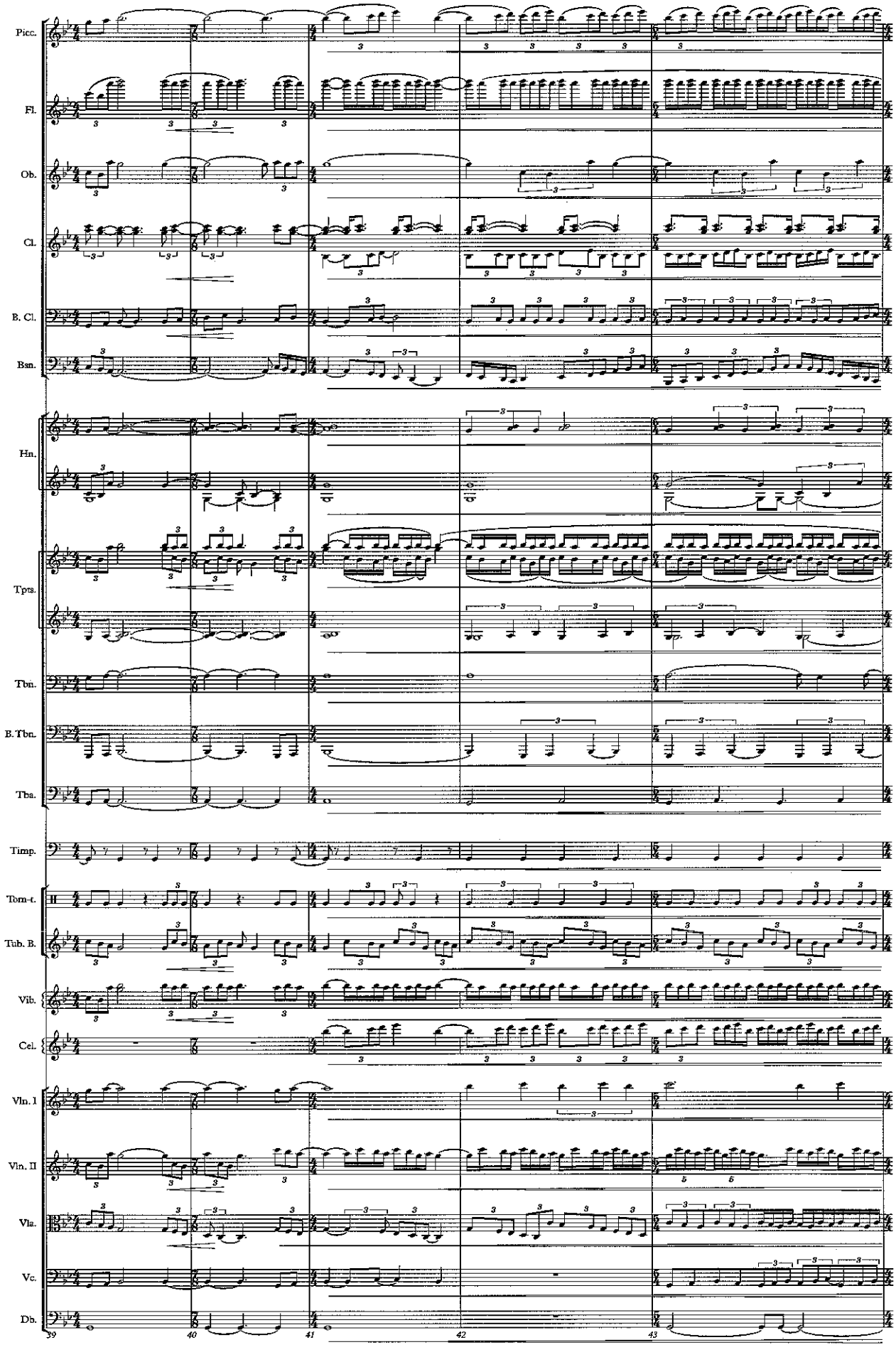
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Vla.
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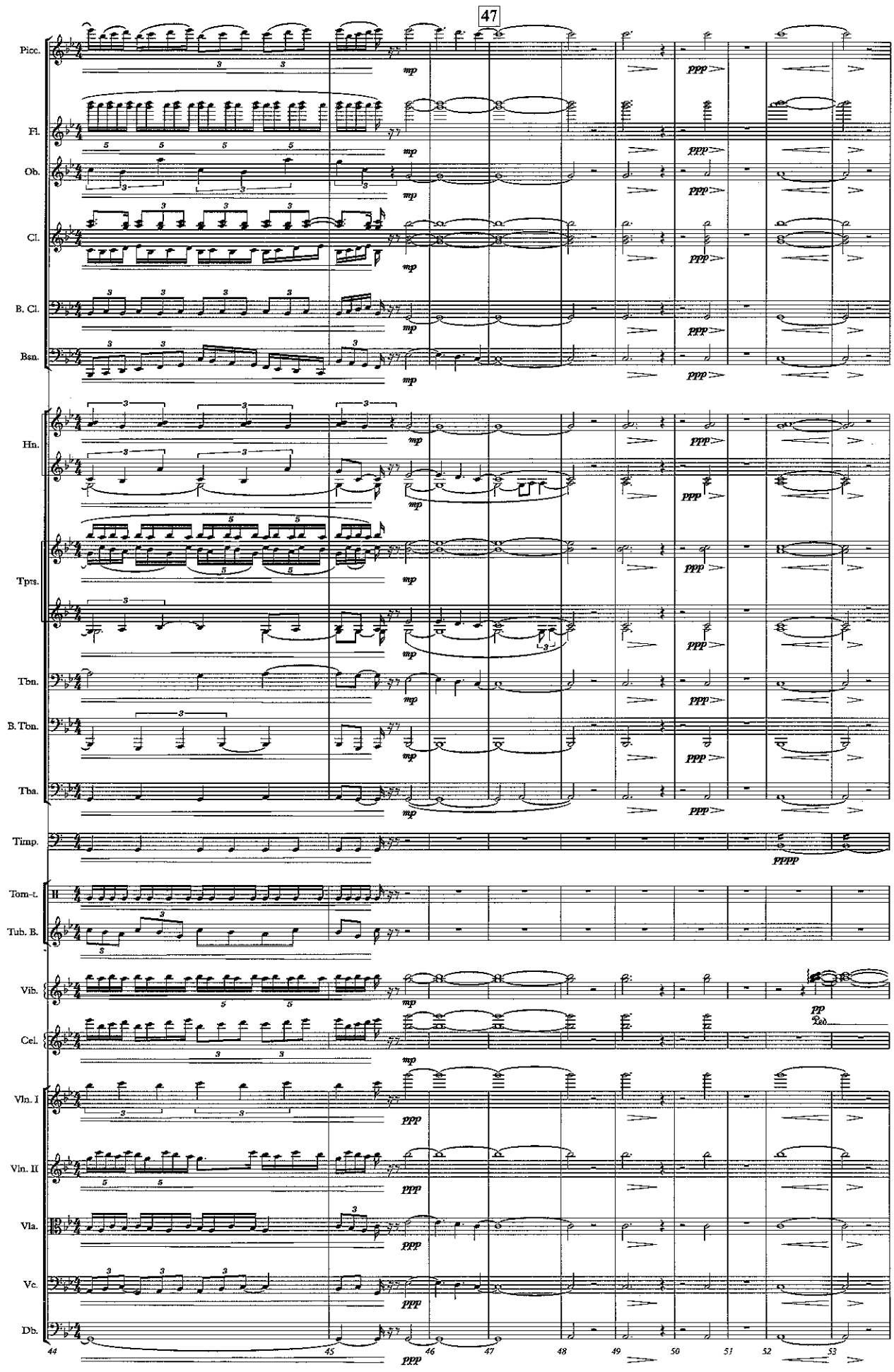
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Tom-t.
Tub. B.
Vib.
Cel.
Vln. I
Vln. II
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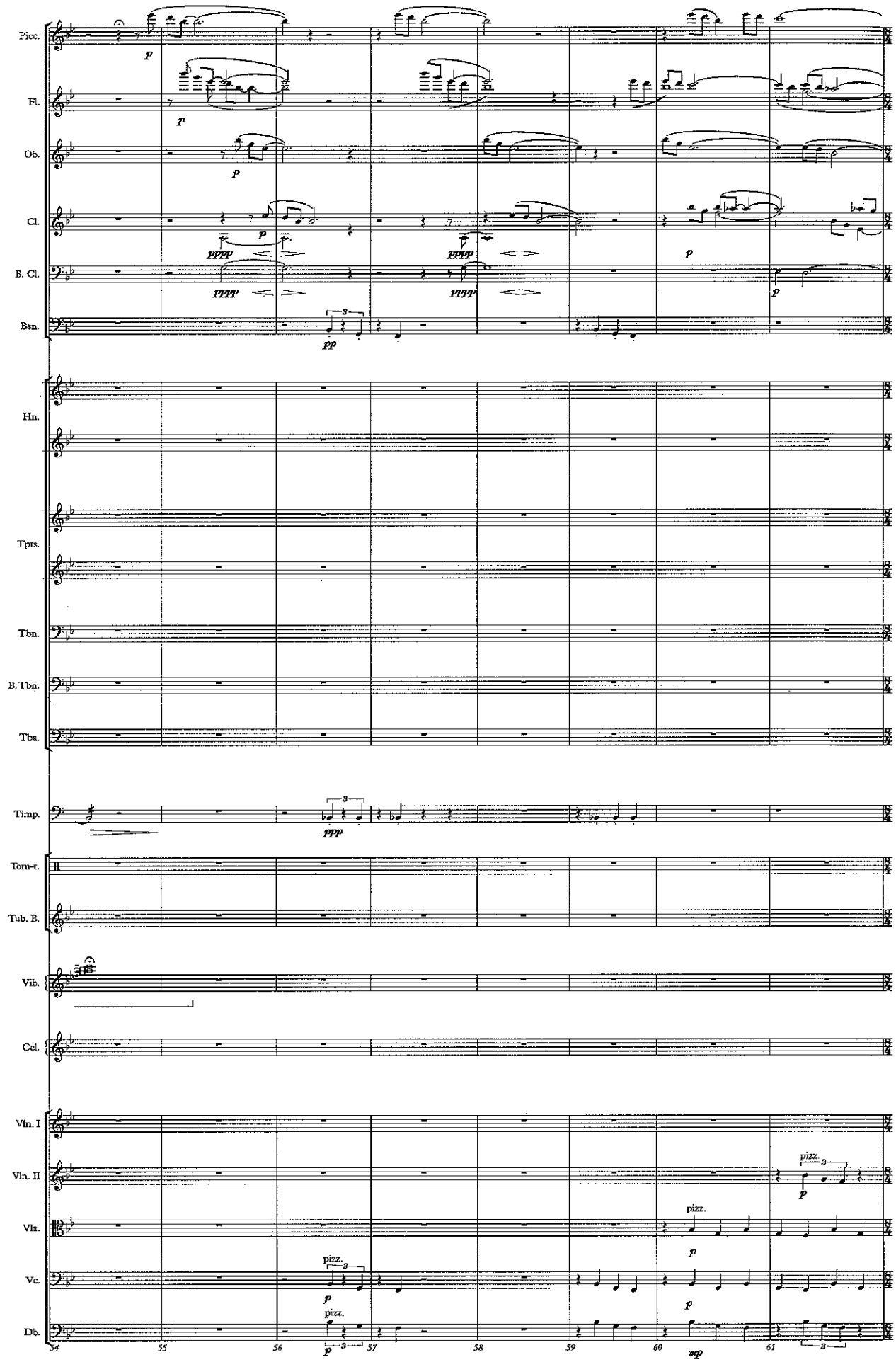
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Tba.
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Tom-t.
Tub. B.
Vib.
Cel.
Vln. I
Vln. II
Vla.
Vc.
Db.
pizz.
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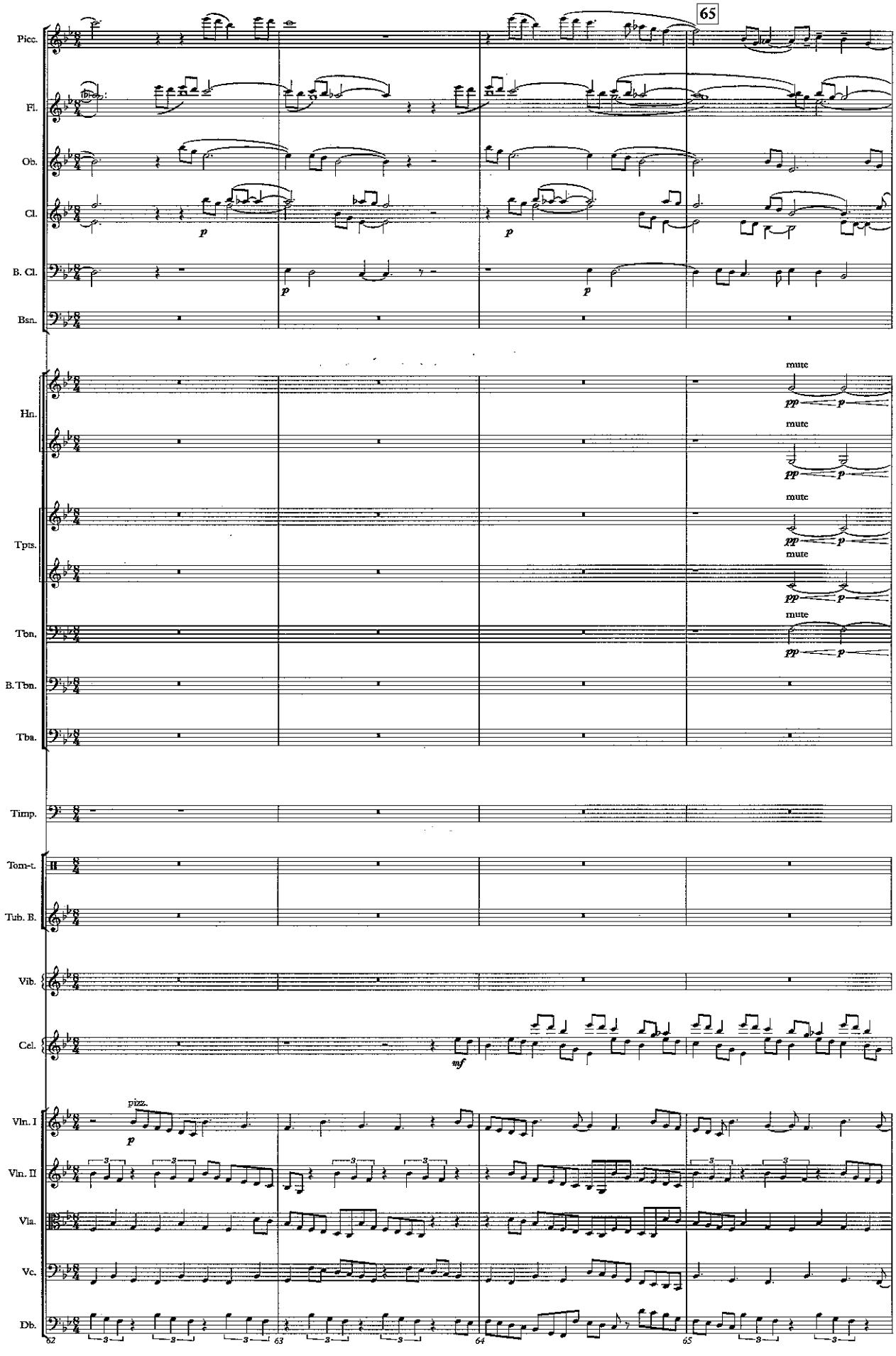
55
56
57
58
59
60
61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Tom-t.
Tub. B.
Vib.
Cel.
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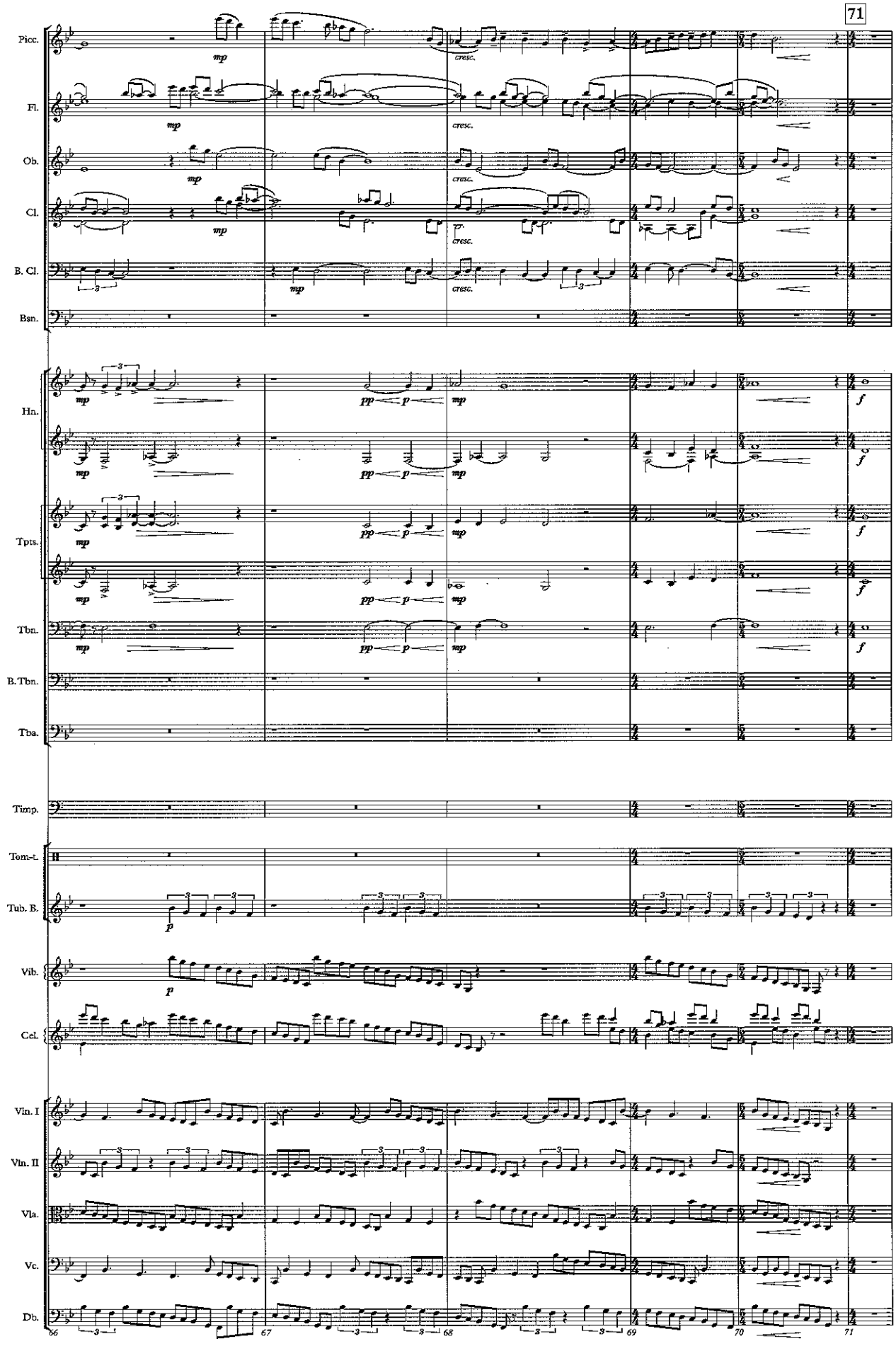
Vc.
Db.
mute
pizz.
62
63
64
65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Tom-t.
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Vib.
Cel.
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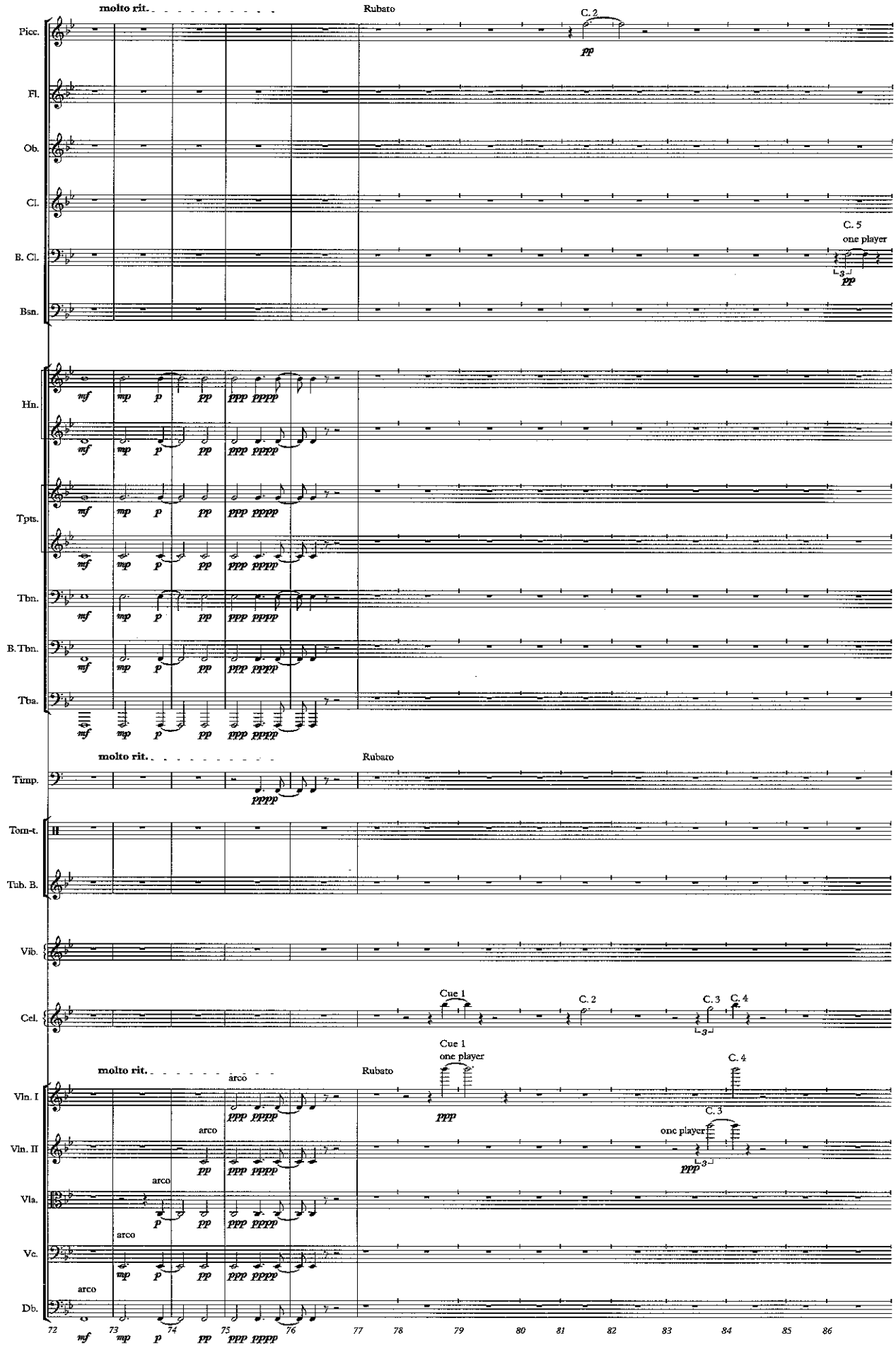
molto rit.
Rubato
C. 2
C. 5
one player
Picc.
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Ob.
Cl.
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Tbn.
B. Tbn.
Tba.
Timp.
Tom-t.
Tub. B.
Vib.
Cel.
Cue 1
C. 3
C. 4
Vln. I
Vln. II
Vla.
Vc.
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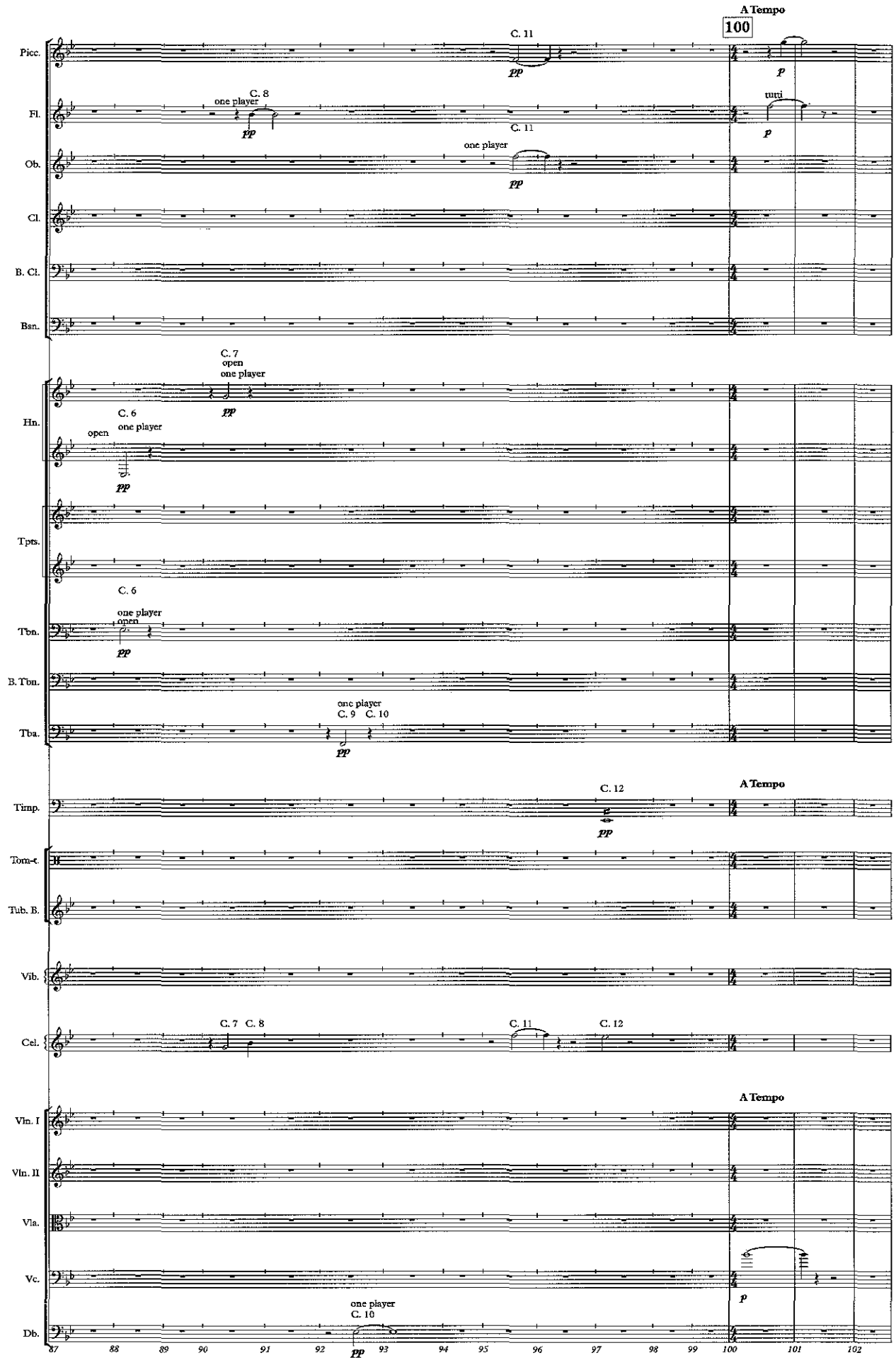
A Tempo
100
Picc.
C. 11
pp
p
Fl.
one player
C. 8
pp
C. 11
tutti
p
Ob.
one player
pp
Cl.
B. Cl.
Bsn.
C. 7
open
one player
pp
Hn.
C. 6
one player
open
pp
Tpts.
C. 6
one player
open
Tbn.
pp
B. Tbn.
one player
C. 9 C. 10
Tba.
pp
C. 12
A Tempo
Timp.
pp
Tom-t.
Tub. B.
Vib.
C. 7 C. 8
C. 11
C. 12
Cel.
A Tempo
Vln. I
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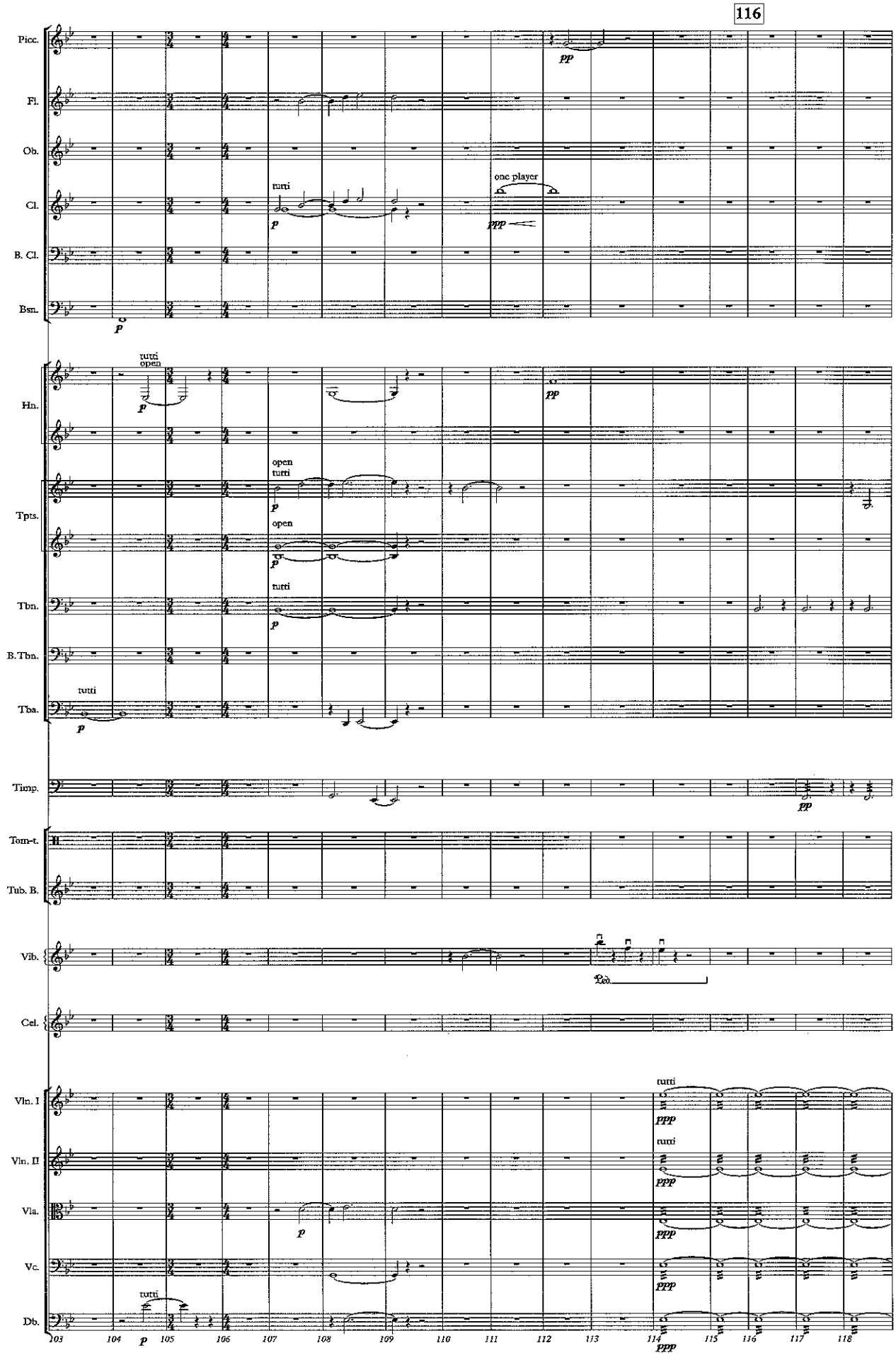
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Tom-t.
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Vib.
Cel.
Vln. I
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Vla.
Vc.
Db.
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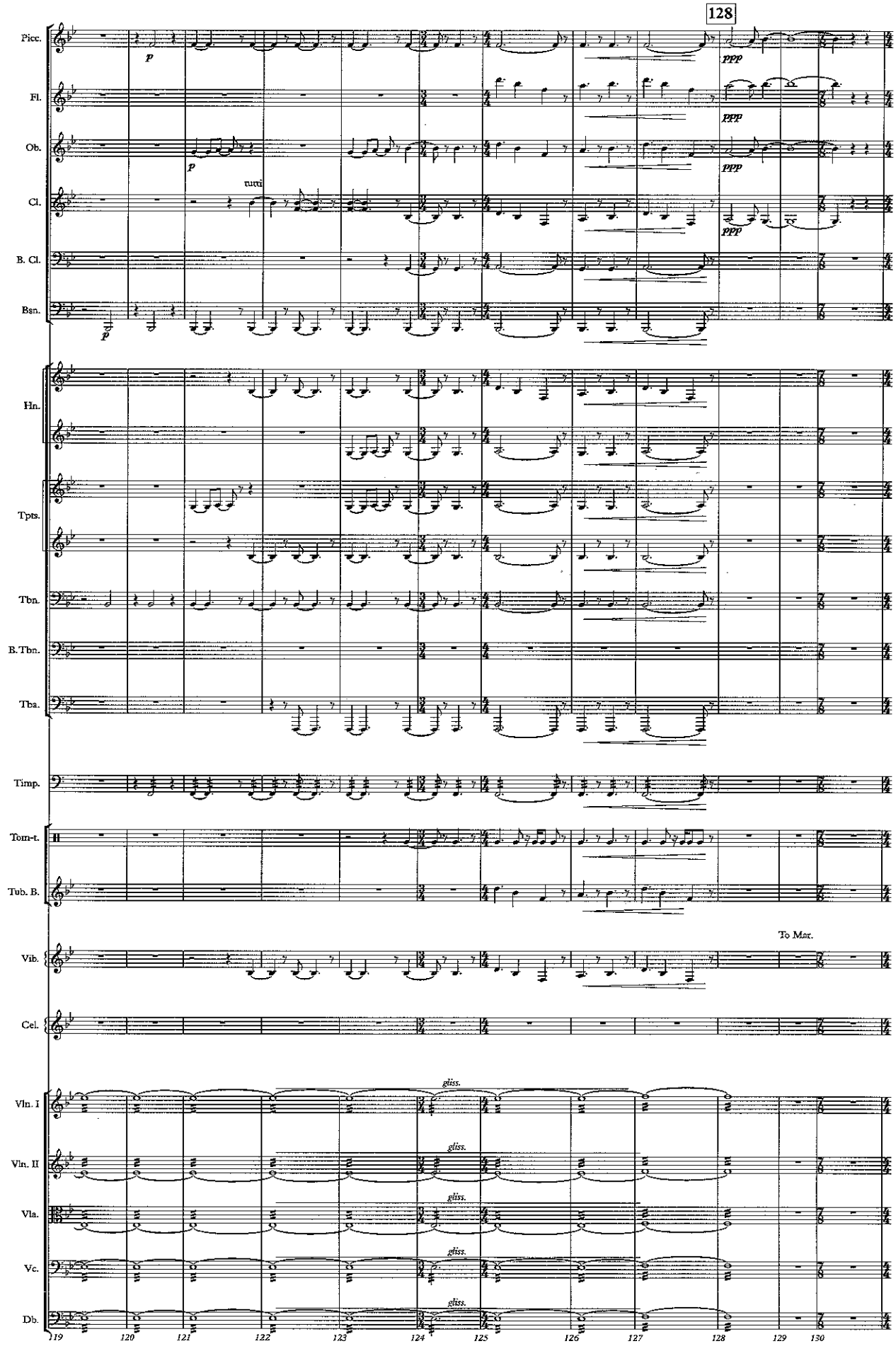
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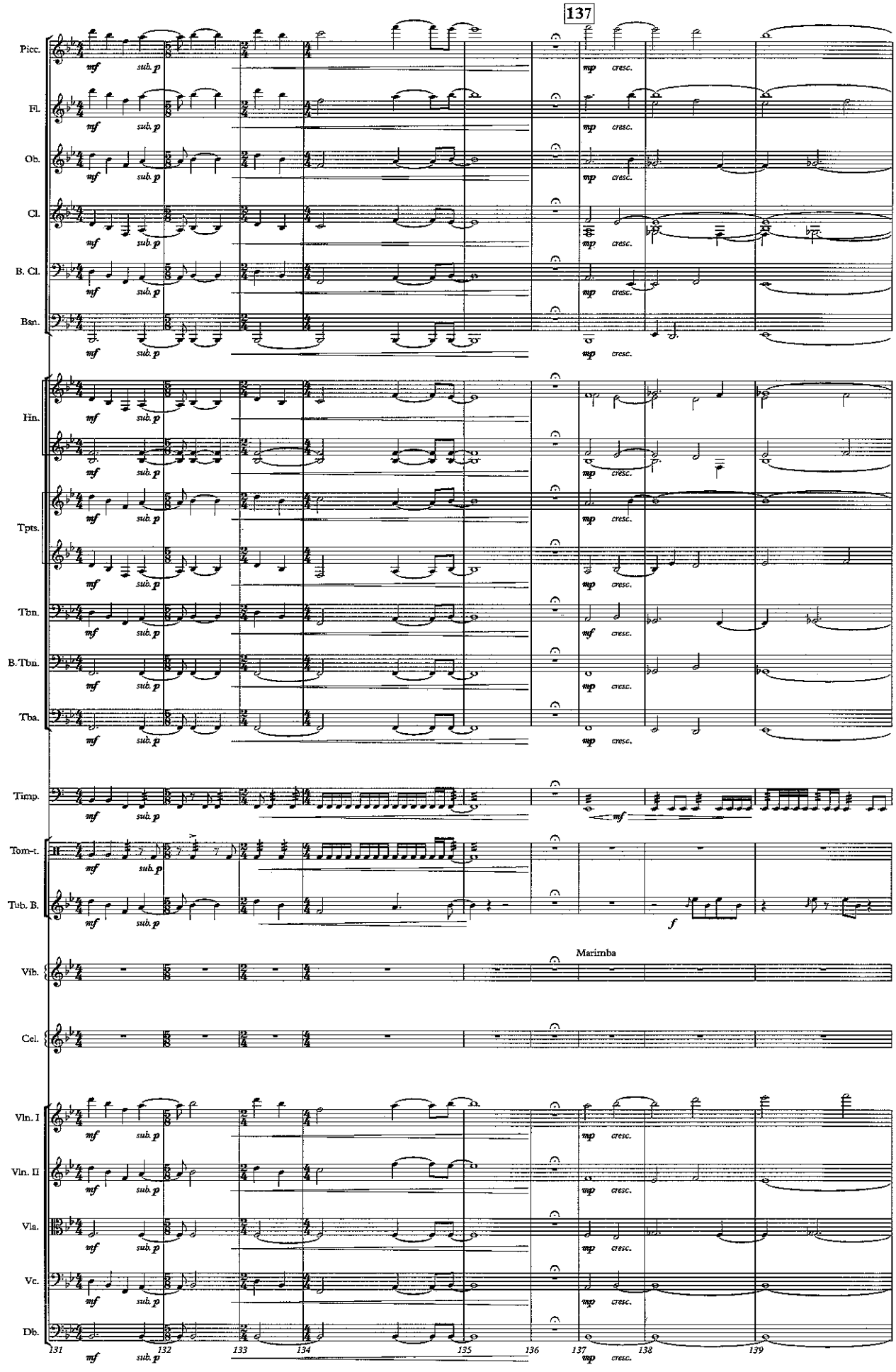
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Timp.
Tom-t.
Tub. B.
Vib.
Marimba
Cel.
Vln. I
Vln. II
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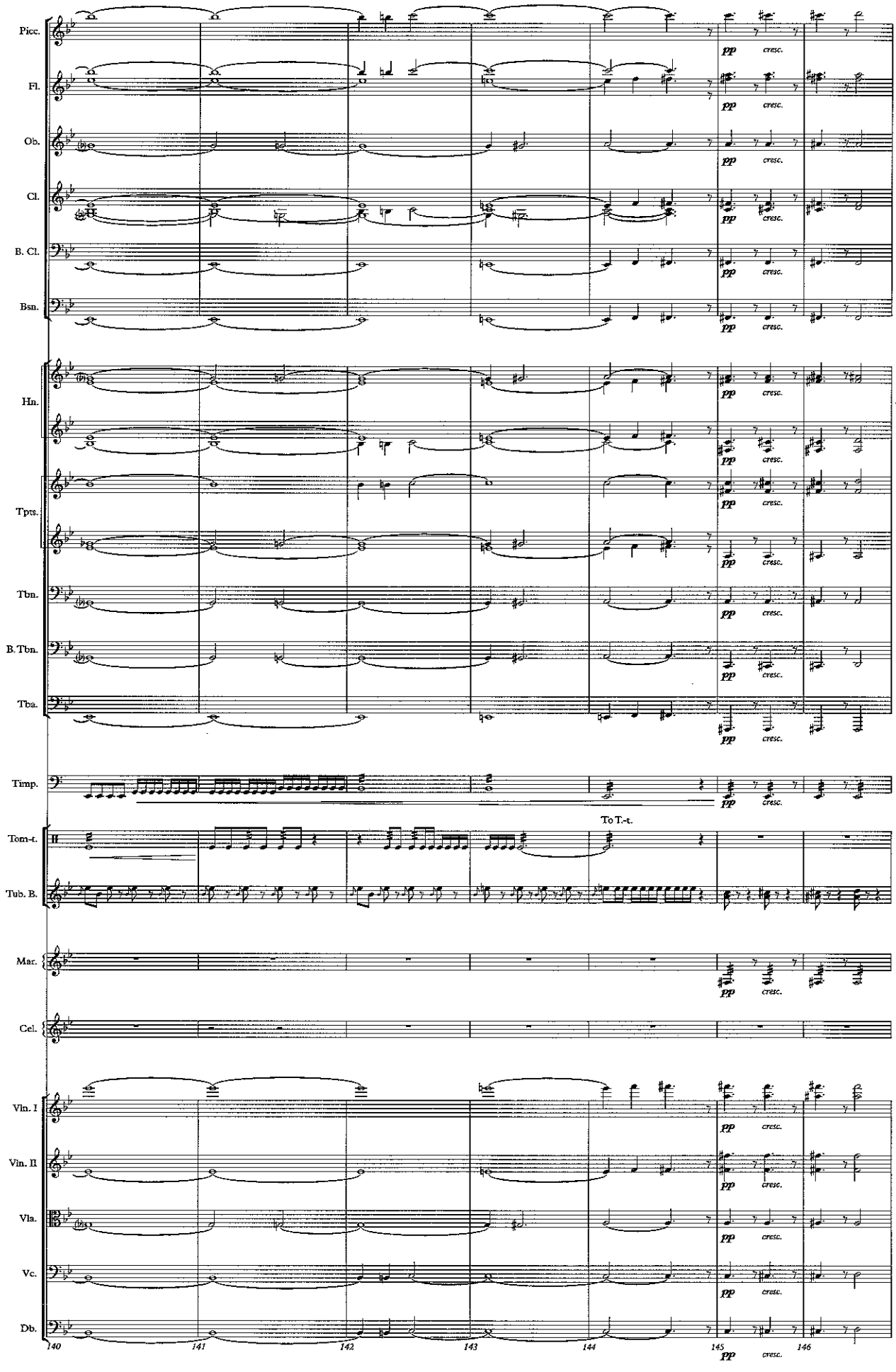
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To T.-t.
Tom-t.
Tub. B.
Mar.
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pp
cresc.
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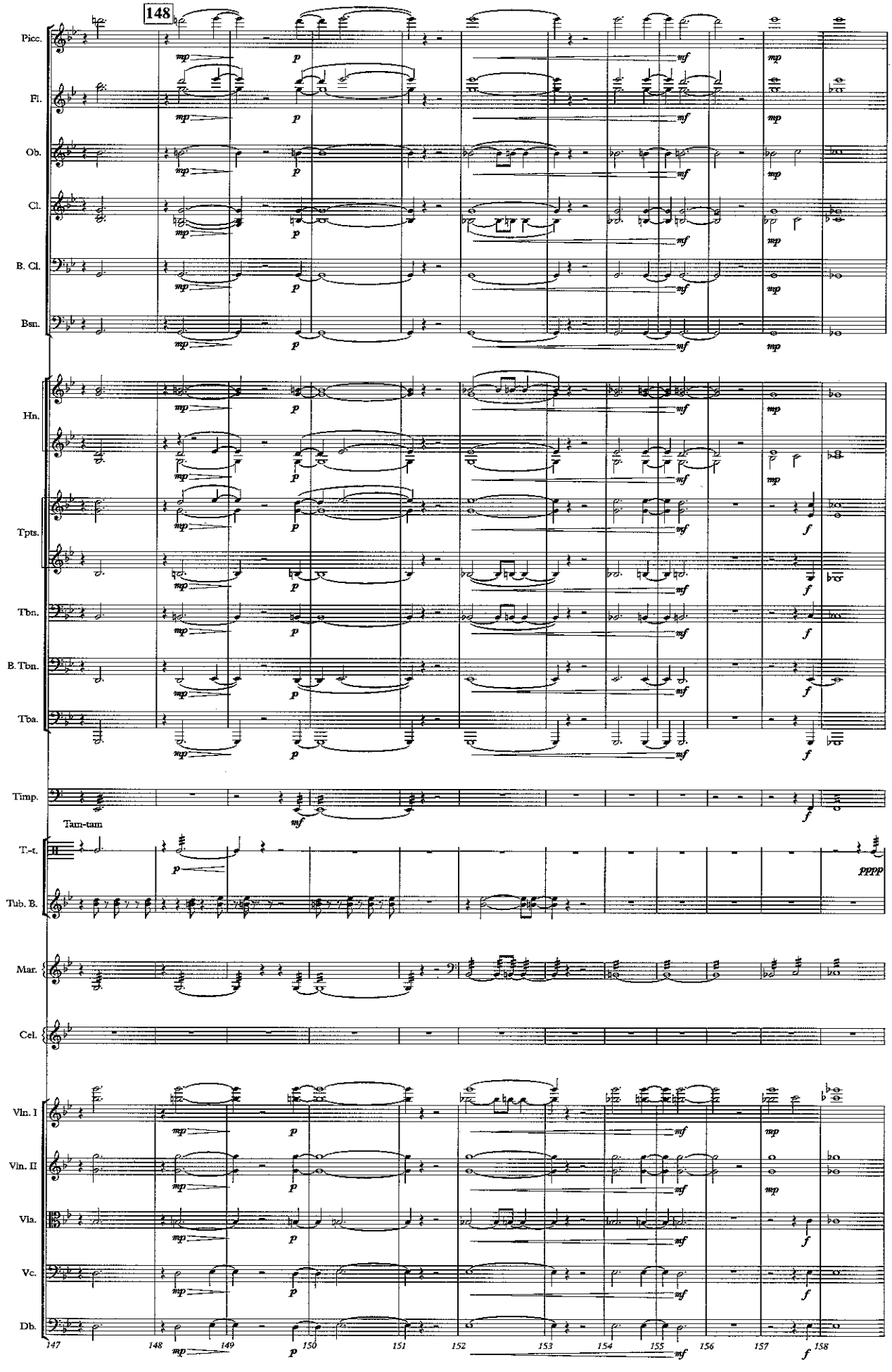
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Fl.
Ob.
Cl.
B. Cl.
Bsn.
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B. Tbn.
Tba.
Timp.
Tam-tam
T.-t.
Tub. B.
Mar.
Cel.
Vln. I
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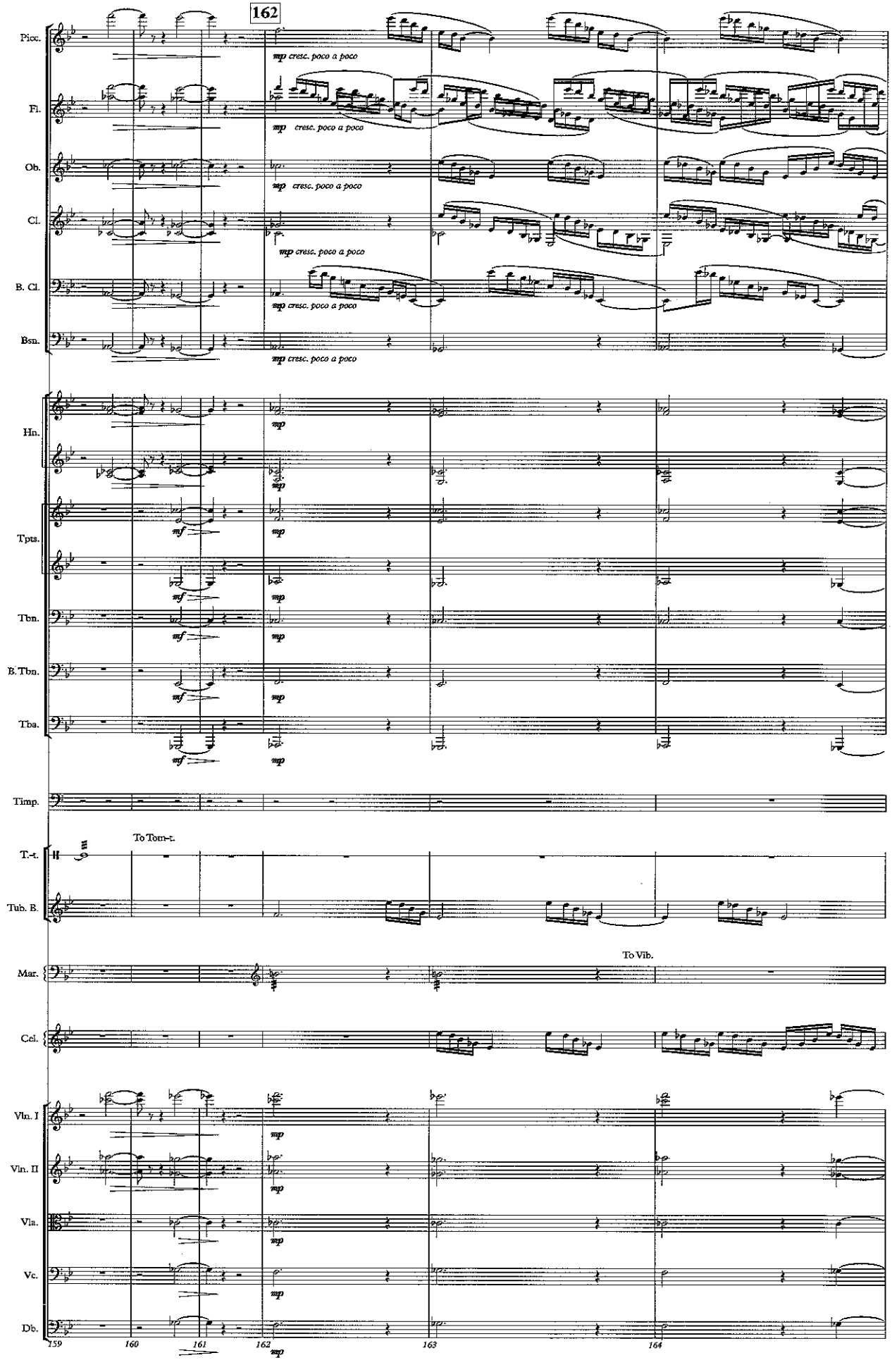
162
Picc.
Fl.
Ob.
Cl.
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Bsn.
mp cresc. poco a poco
Hn.
Tpts.
Tbn.
B. Tbn.
Tba.
mf
mp
Timp.
T.-t.
To Tom-t.
Tub. B.
Mar.
To Vib.
Cel.
Vln. I
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Vla.
Vc.
Db.
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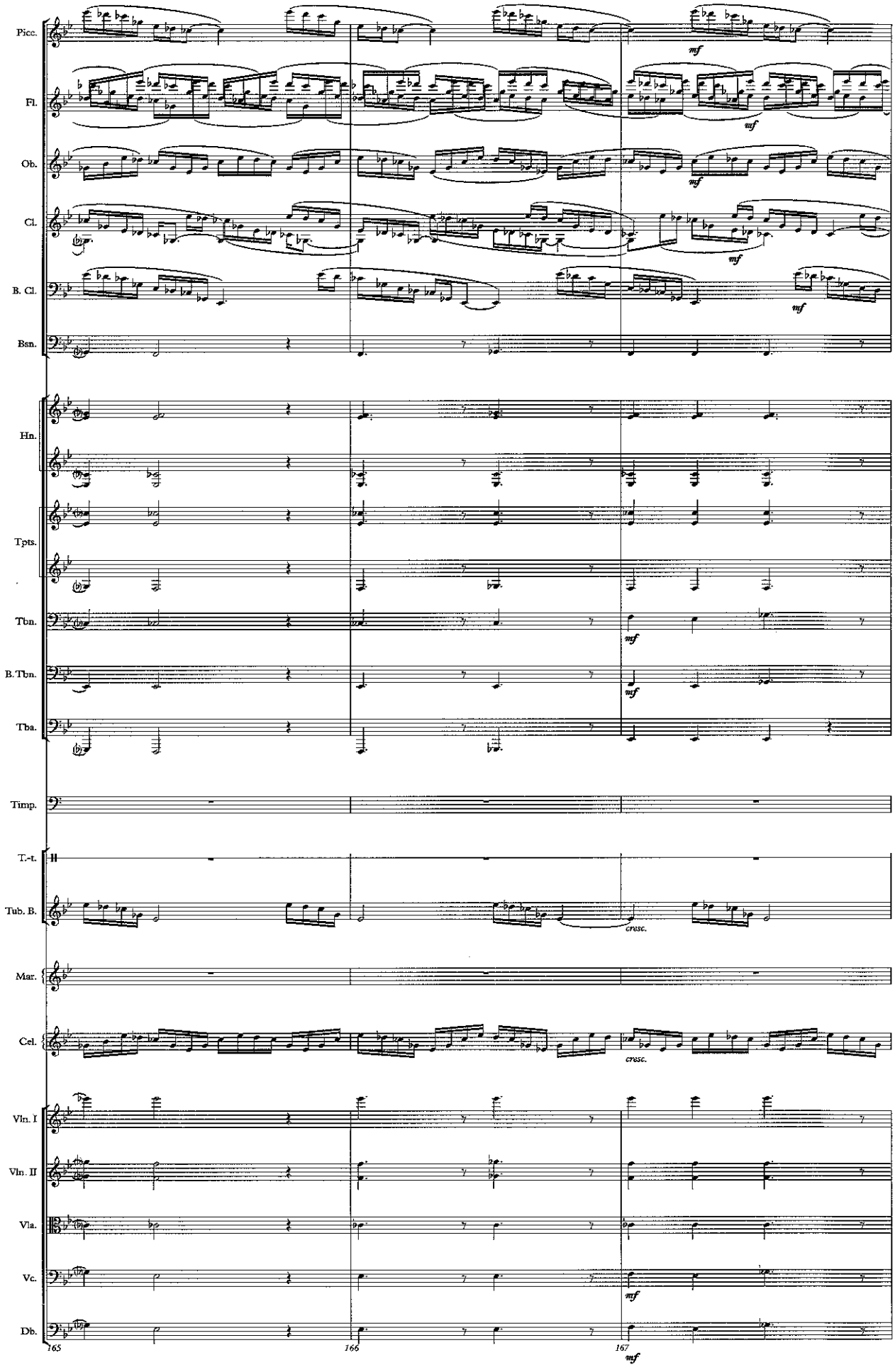
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T.-t.
Tub. B.
Mar.
Cel.
Vln. I
Vln. II
Vla.
Vc.
Db.
mf
cresc.
165
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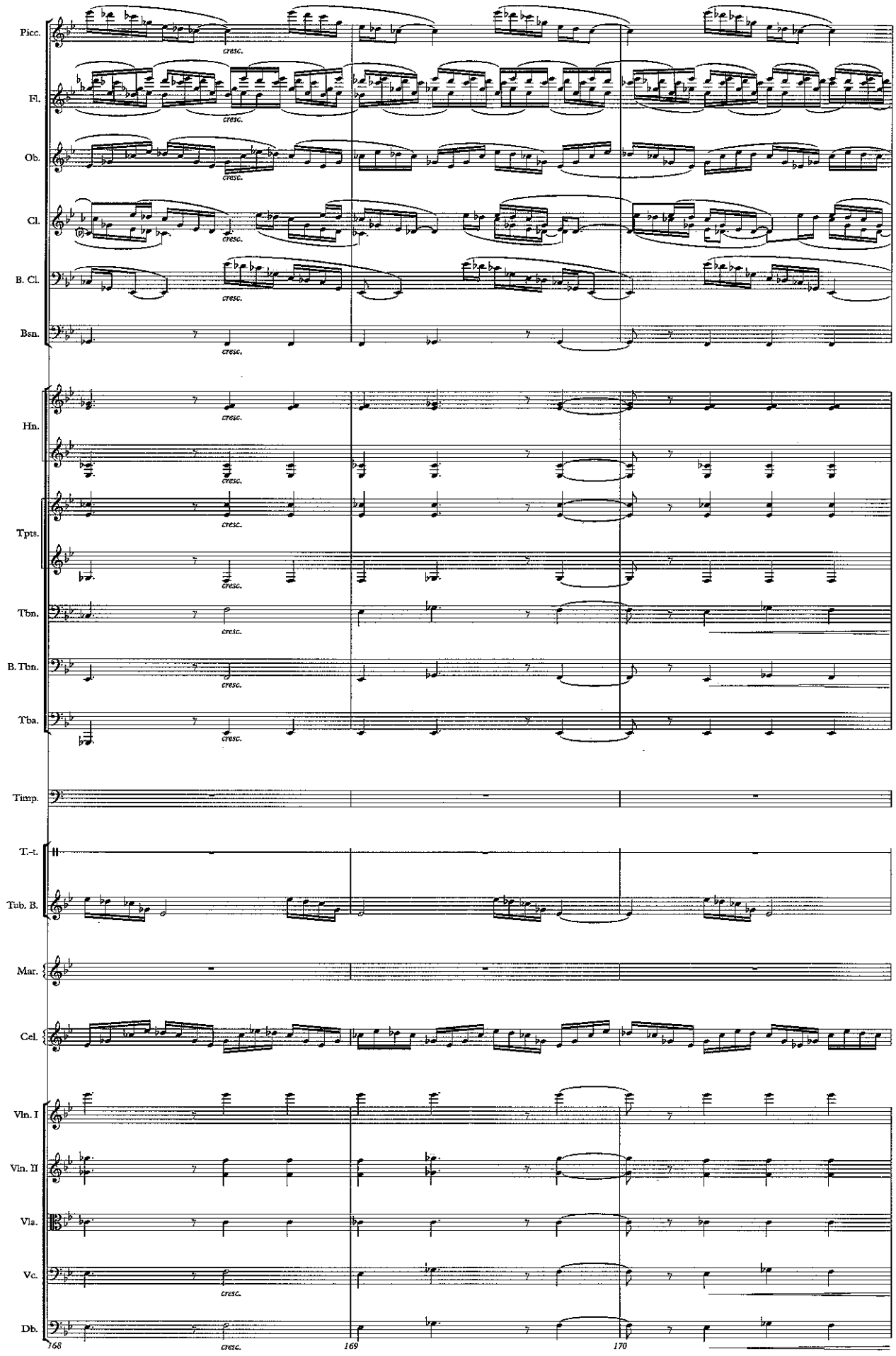
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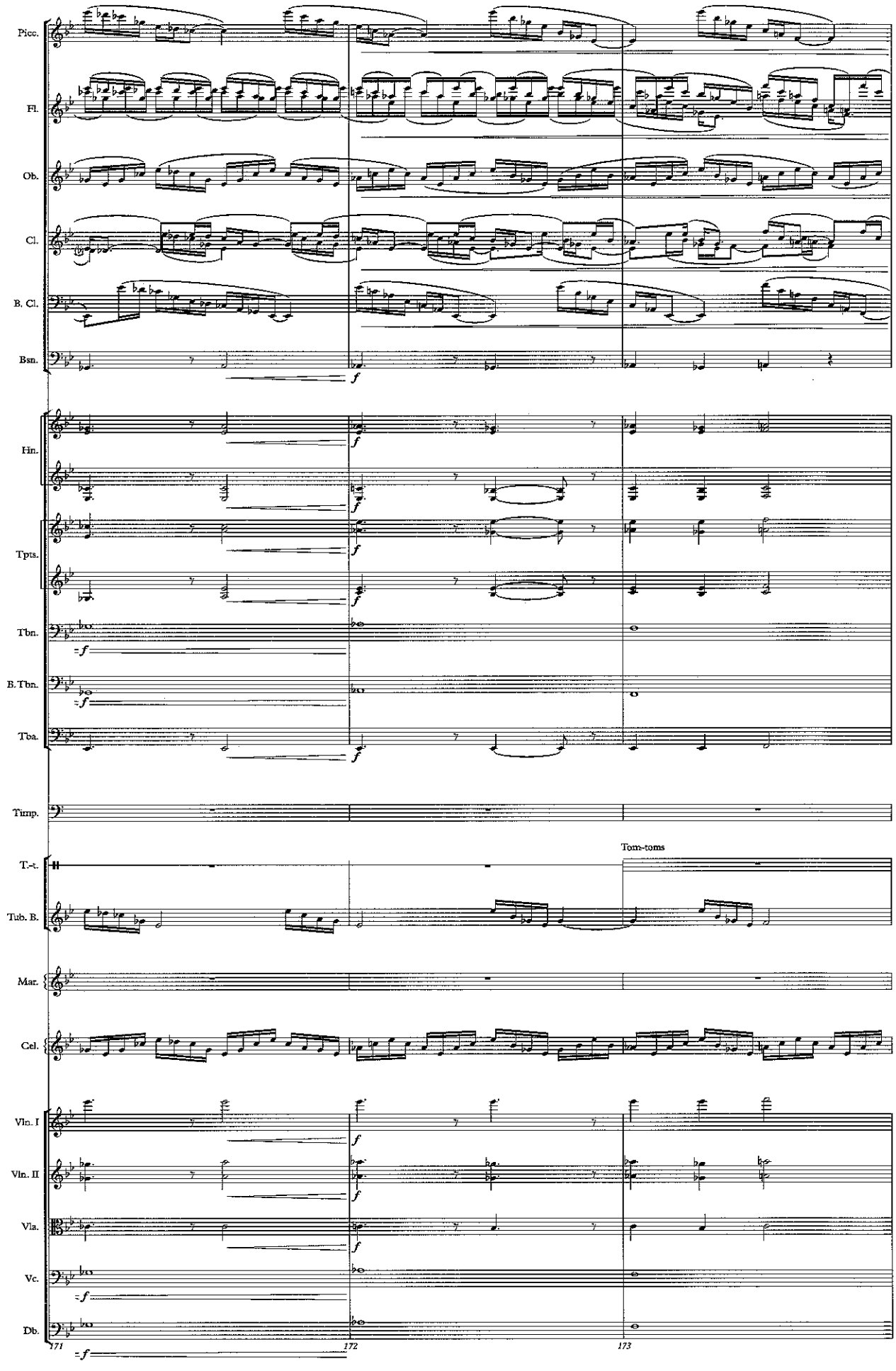
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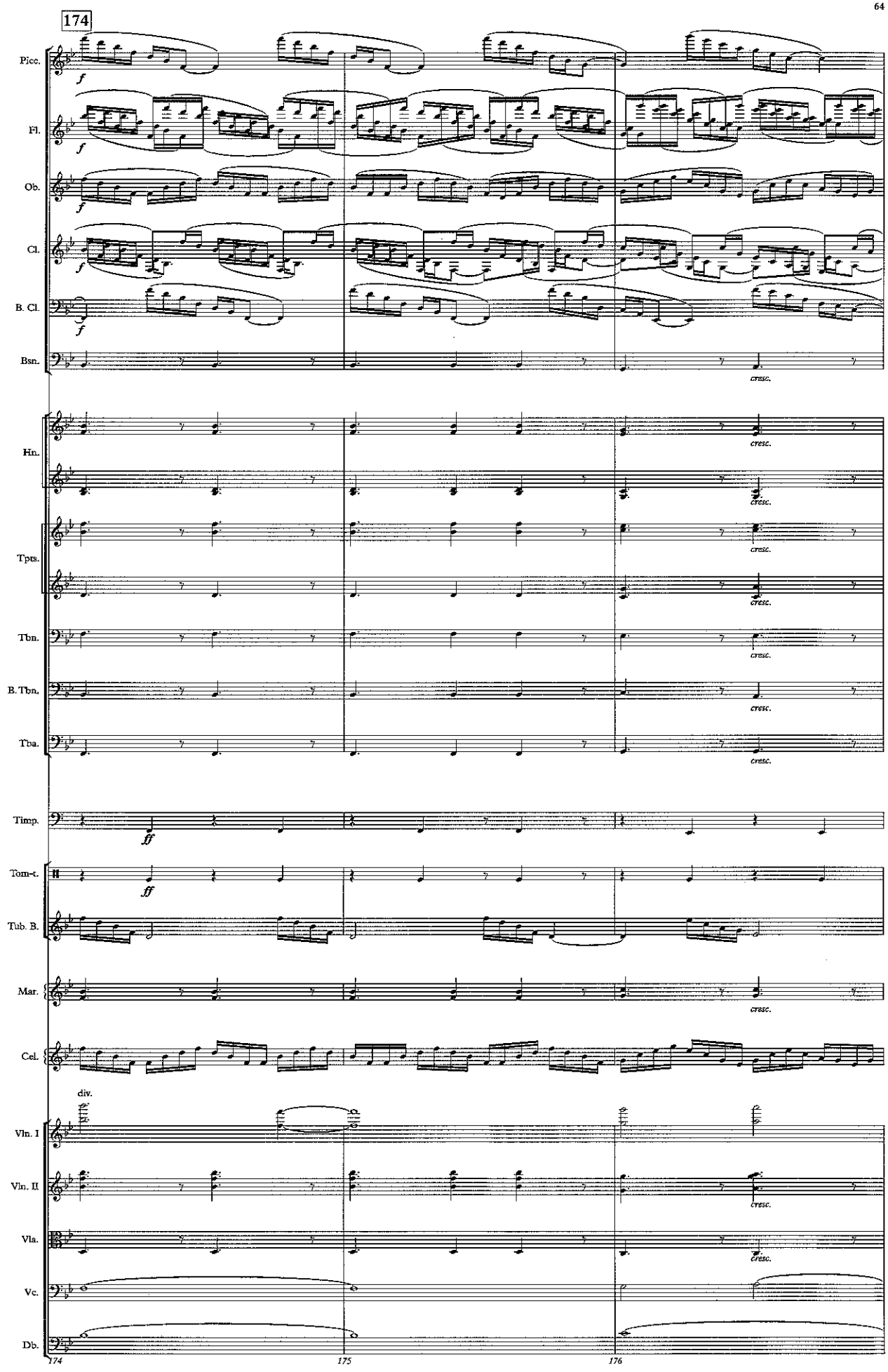
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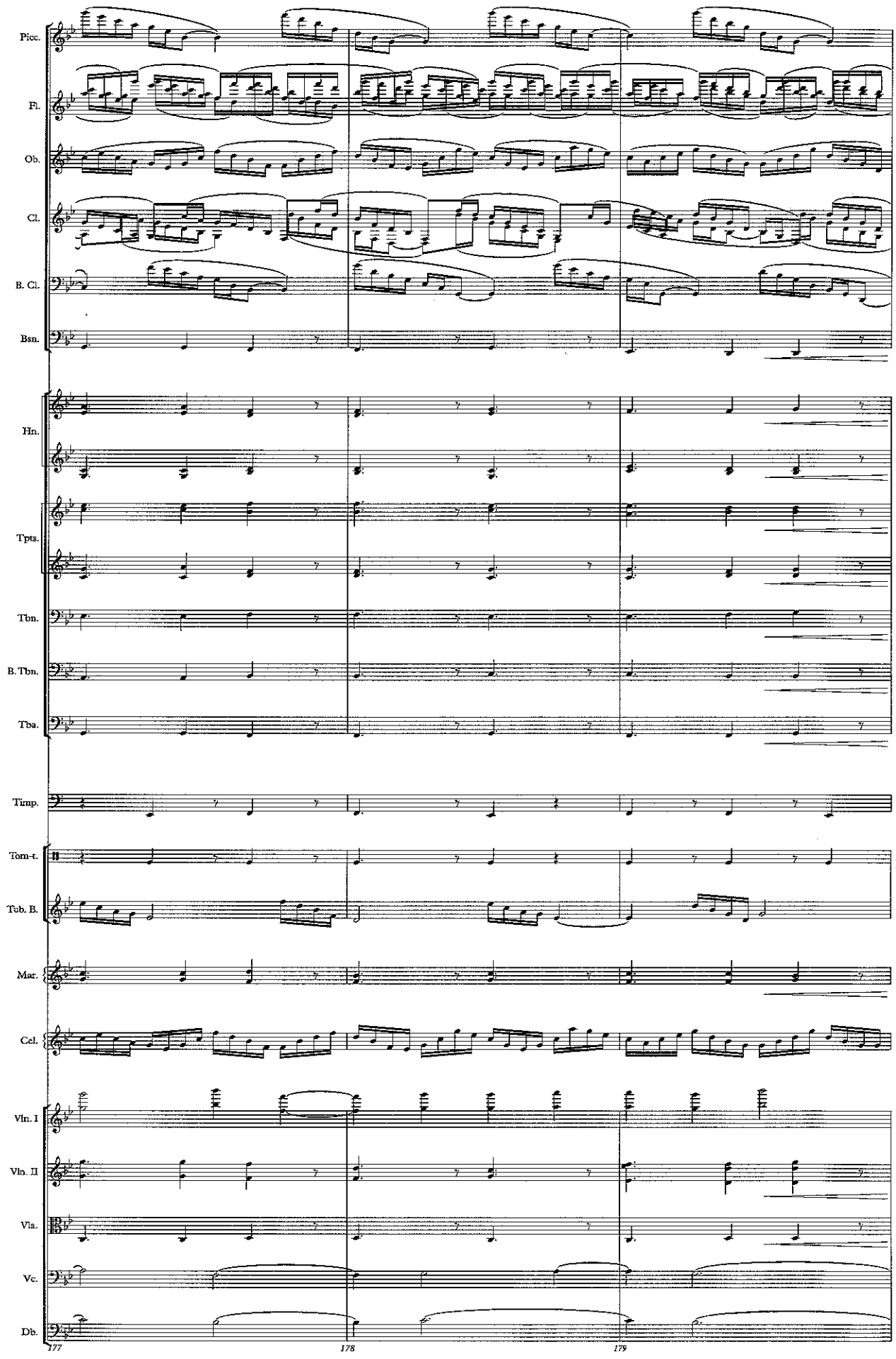
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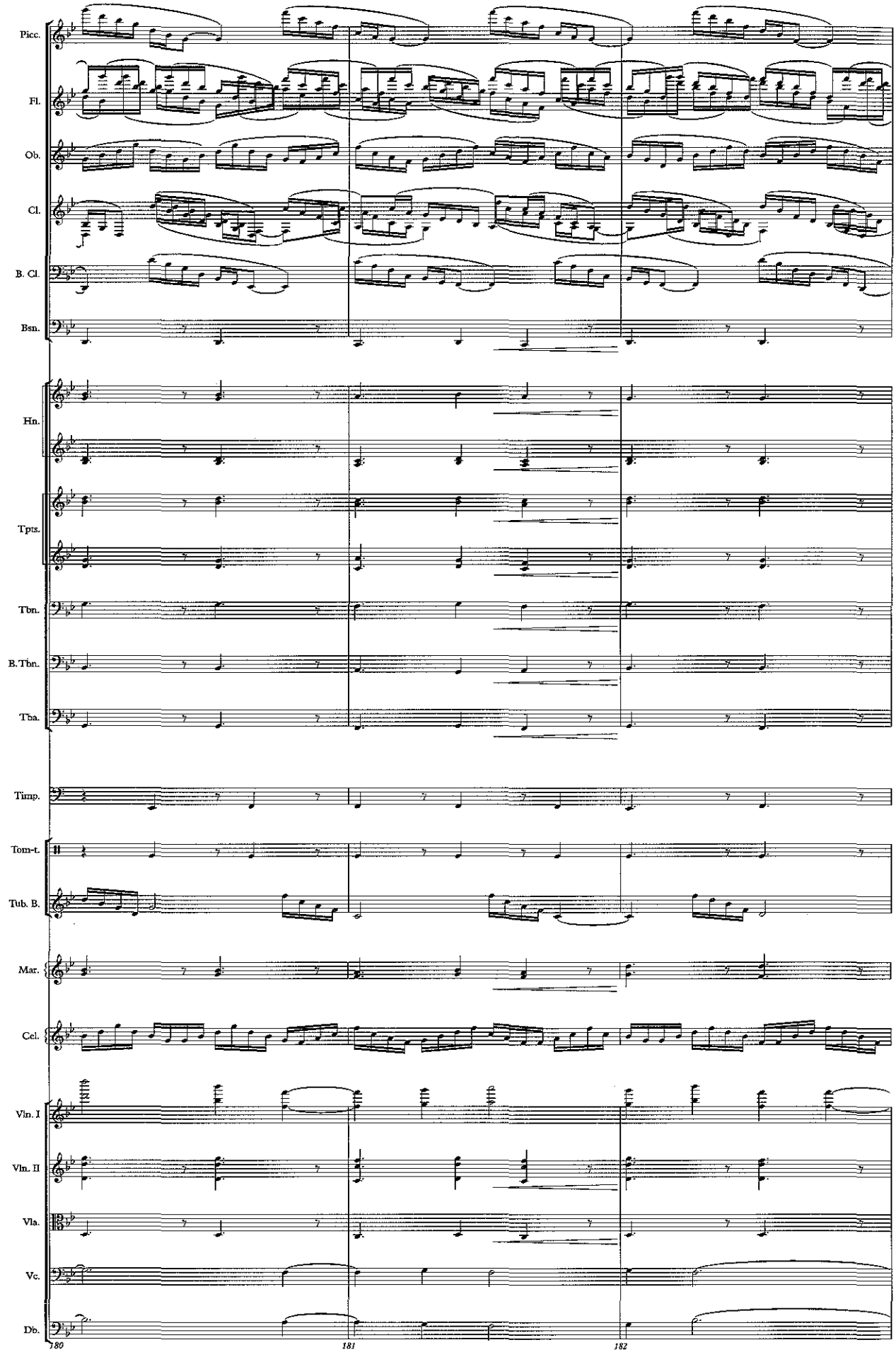
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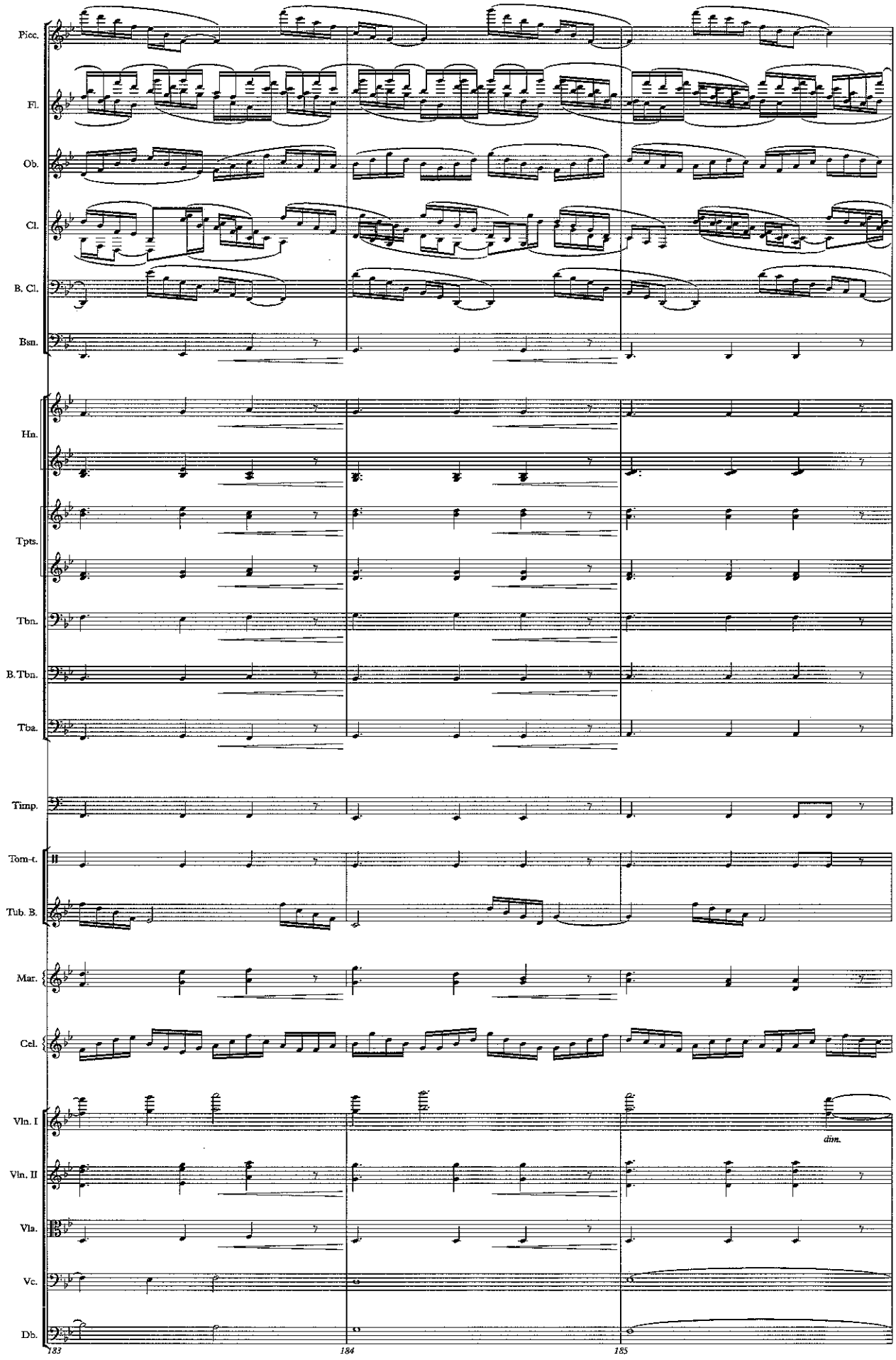
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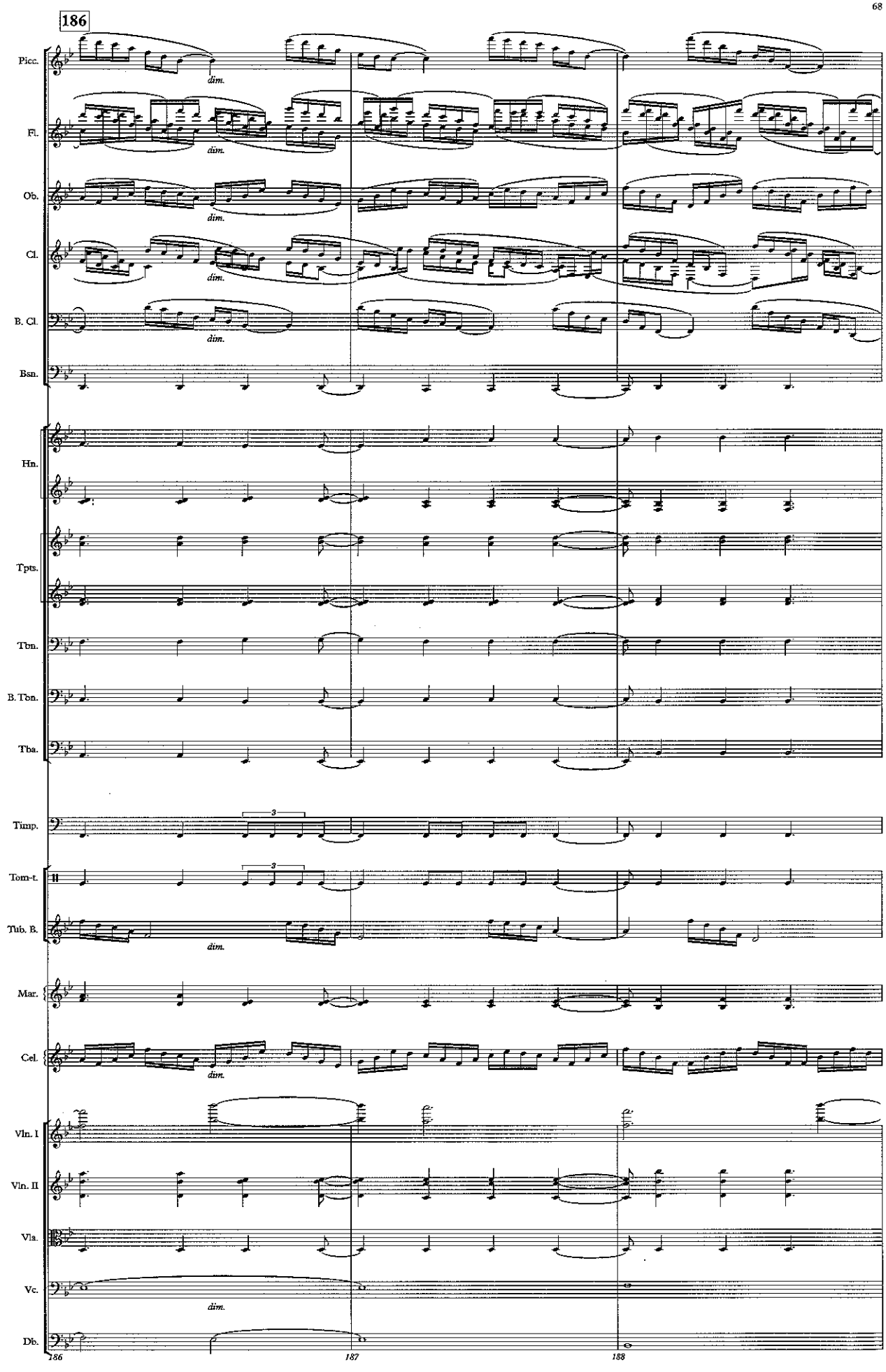
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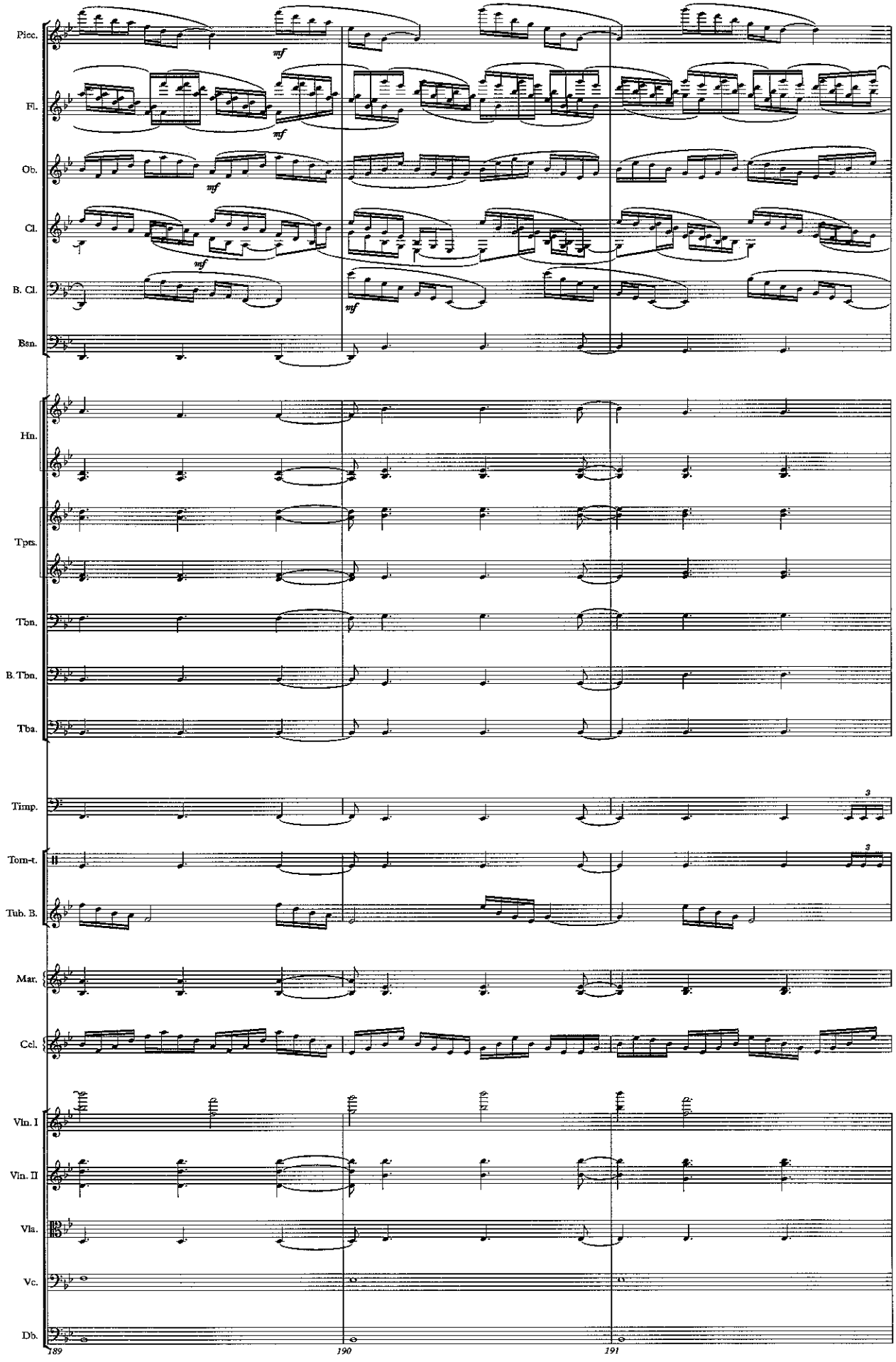
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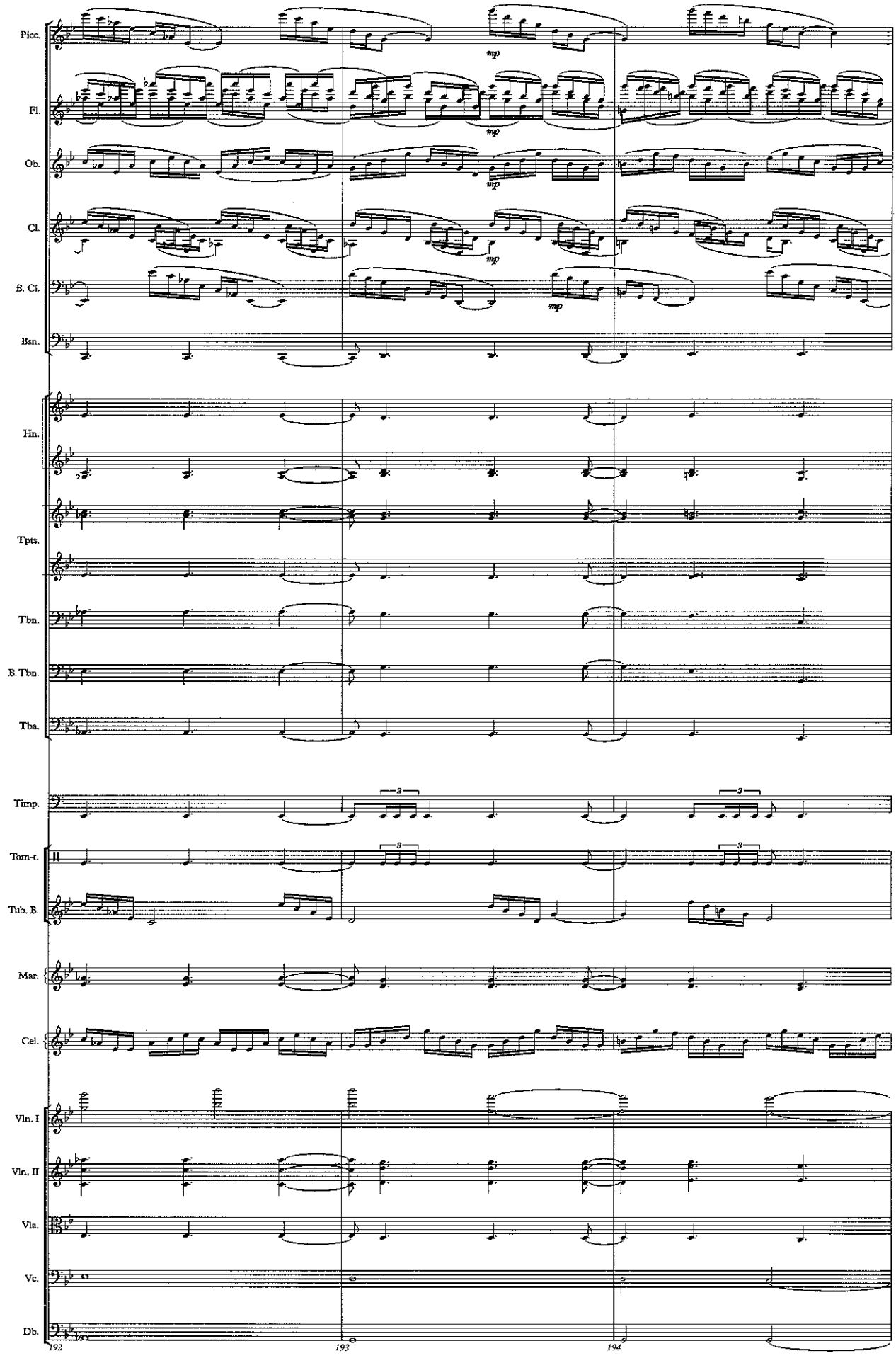
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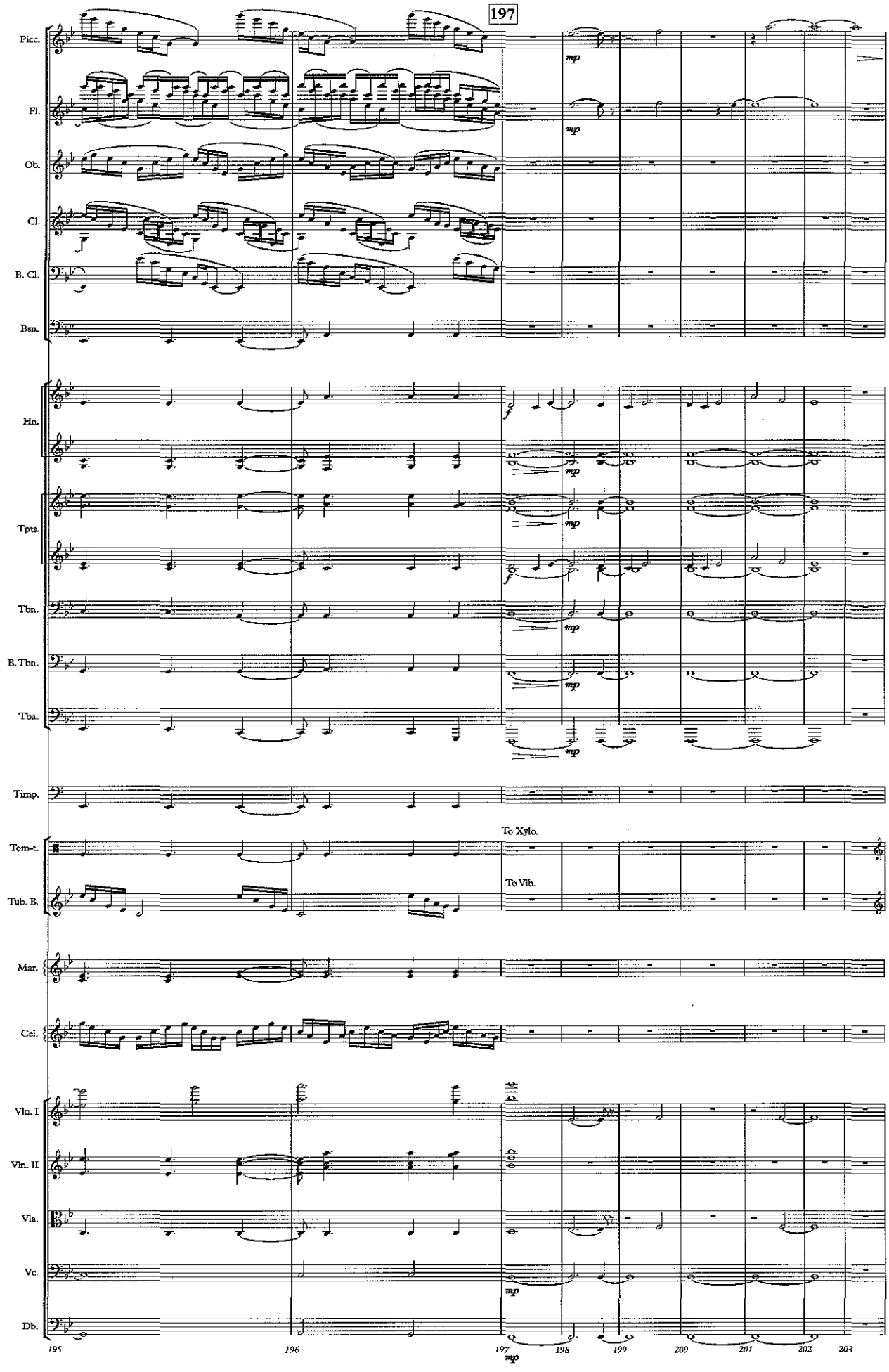
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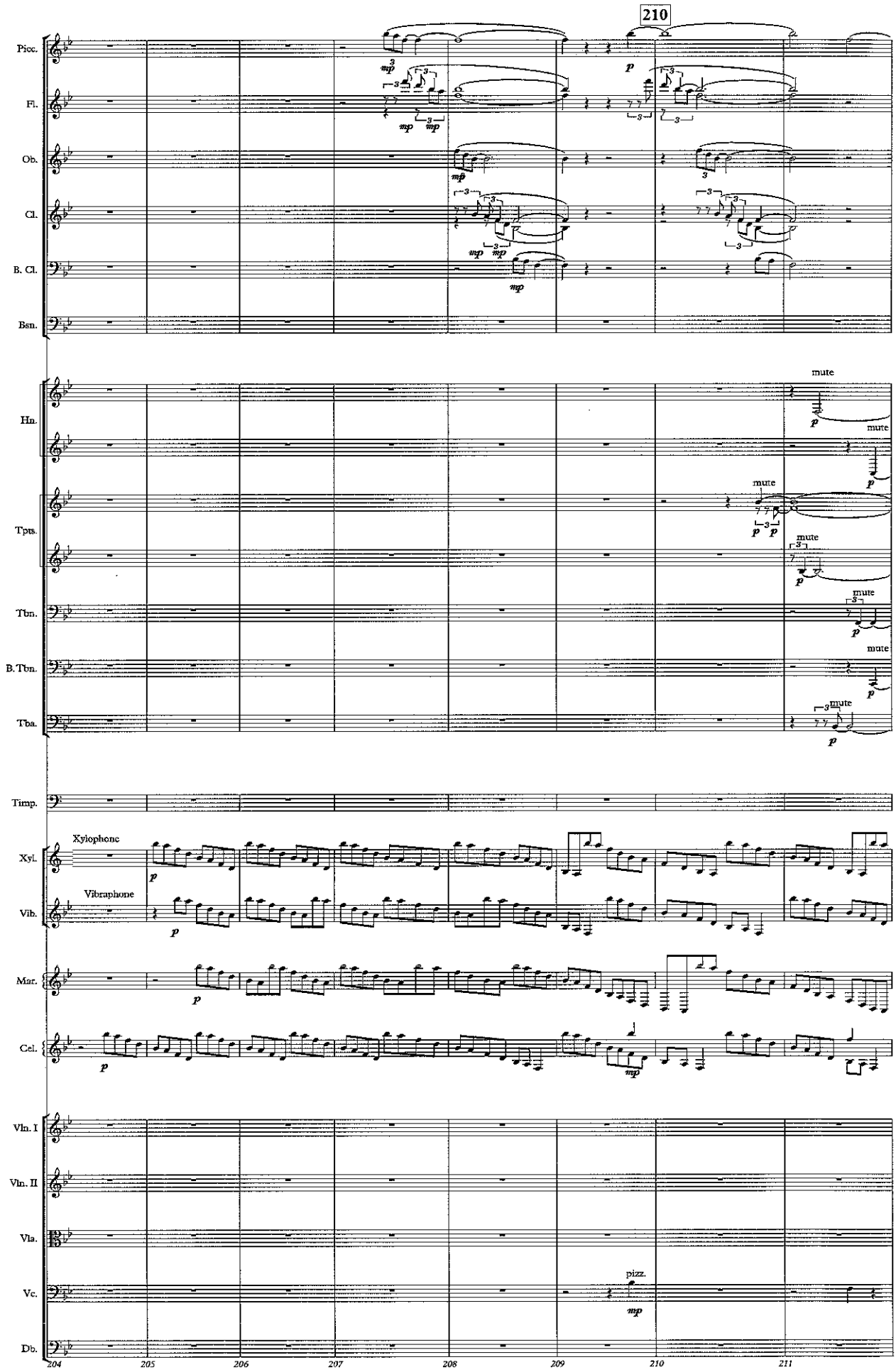
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Timp.
Xyl.
Xylophone
Vib.
Vibraphone
Mar.
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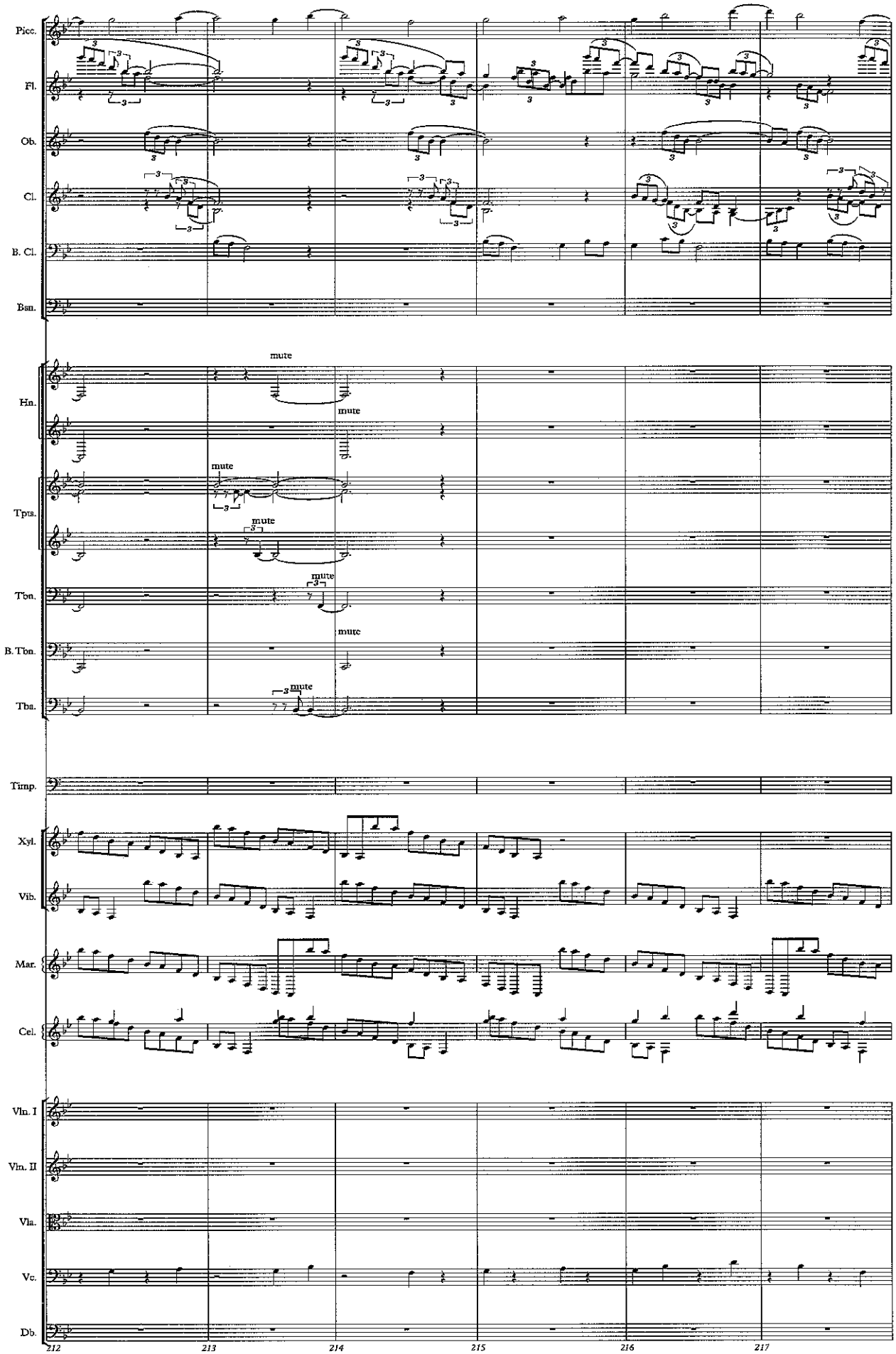
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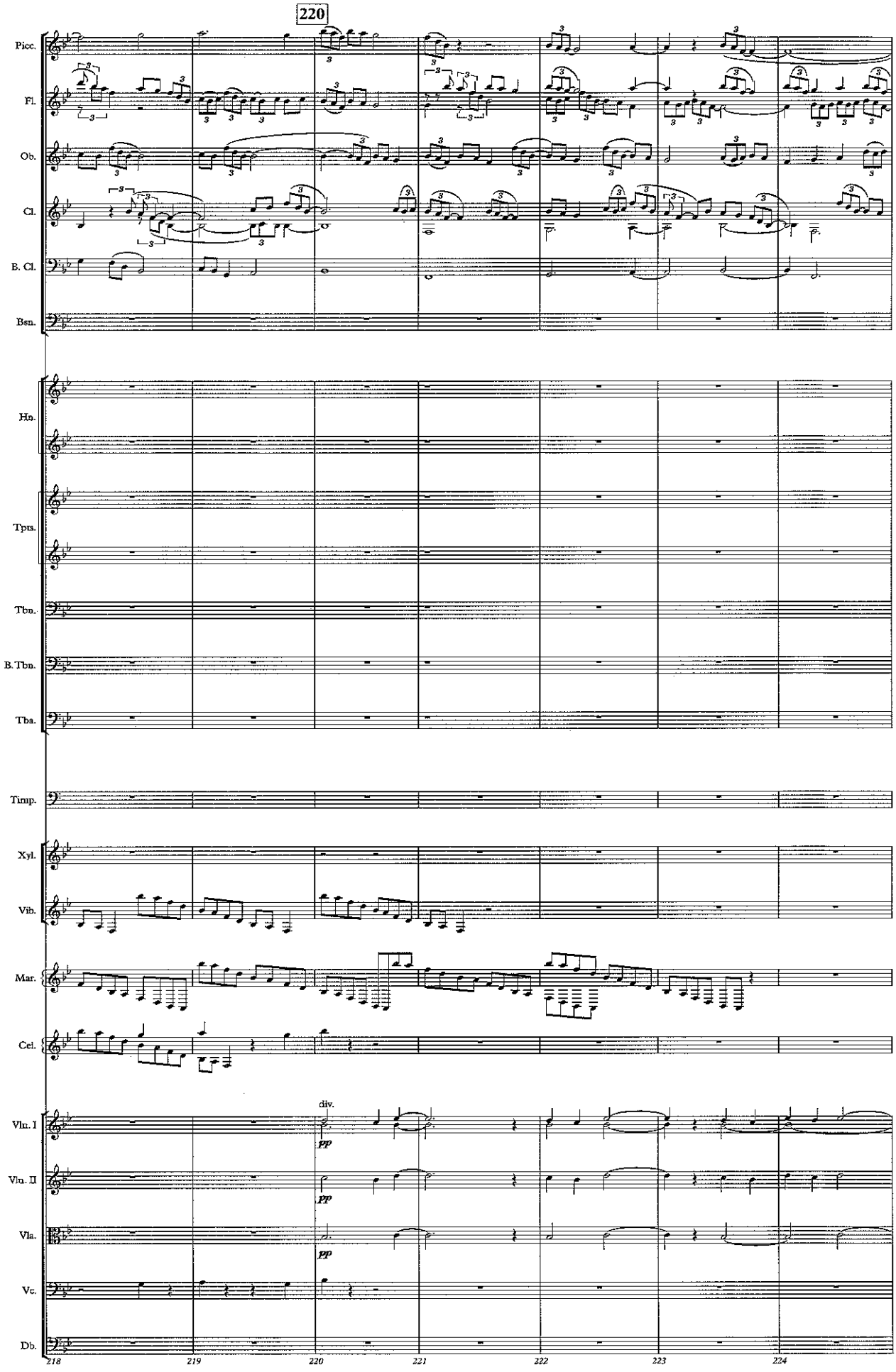
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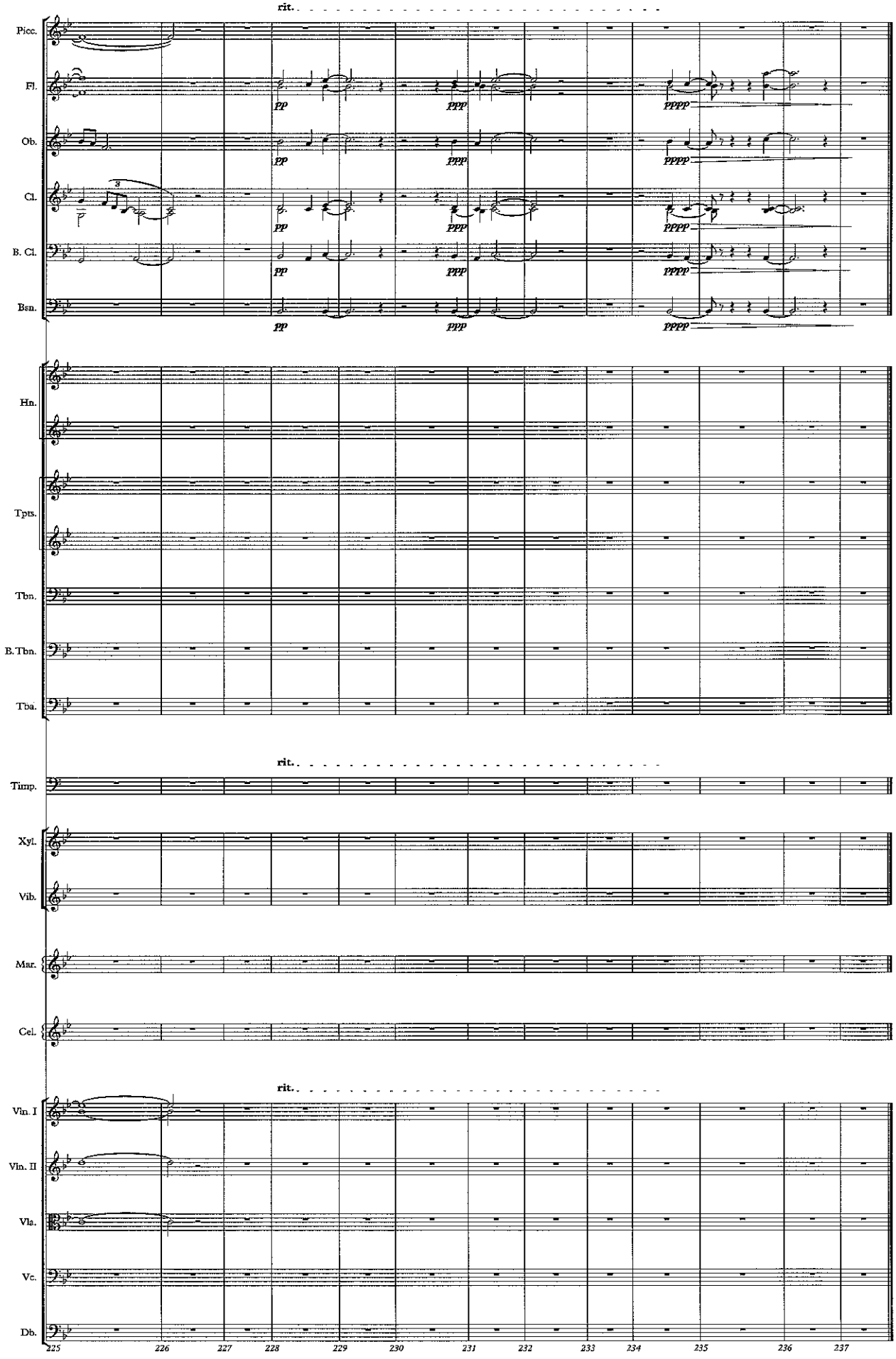
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