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Sounding the Lost Body Electric: Transducing the Silences of Unreconciled Pasts

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Sounding the Lost Body Electric:
Transducing the Silences of Unreconciled Pasts

A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of Philosophy

in

Music

by

Christina Tallon

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2020

The Dissertation of Christina Tallon is approved, and it is acceptable in quality and form for publication on microfilm and electronically:

Chair

University of California San Diego

2020

DEDICATION

To all who are forced to keep their lives in their throats.

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Tallon_excision2.wav	Audio documentation of *excision no. 2,* recorded at the San Francisco Conservatory by Kurt Rohde on Mar. 6, 2019. Tina Tallon, recording engineer and post-production.
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Tallon, Tina. "A Century of "Shrill": How Bias in Technology Has Hurt Women's Voices." *The New Yorker.* Conde Nast Digital, 3 Sept. 2019. Web. https://www.newyorker.com/culture/cultural-comment/a-century-of-shrill-how-bias-in-technology-has-hurt-womens-voices

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ABSTRACT OF THE DISSERTATION

Sounding the Lost Body Electric: Transducing the Silences of Unreconciled Pasts

by

Christina Tallon

Doctor of Philosophy in Music

University of California San Diego, 2020

Professor Lei Liang, Chair

My creative practice for the past eight years can be characterized as an exploration of poorly-understood trauma responses through the means and materials of electronic music. One of the more common adaptive responses to trauma is the dissociative subtype of post-traumatic stress disorder, characterized by episodes of depersonalization/derealization in which a profound disconnect between one's body and reality is experienced. Through alliances with various articulations of the affective turn, information theory, and digital signal processing, I theorize depersonalization/derealization as a stalled state of incomplete transduction that creates lost bodies devoid of potentiality, incapable of sensing or making sense.

Researchers in psychology and neurobiology often look to failures in information processing, encoding, storage, and retrieval as paradigms to inform research on memory loss and/or suppression and altered cognitive states associated with adaptive trauma responses. Given the importance of these same paradigms to the production of electronic music, it seems a natural medium for artistically interrogating the similarities between cognition and musicking, and hence a satisfying modality for reifying the virtual, locating the bodies lost in depersonalization/derealization, and completing processes of transduction through sound.

In my work, I have developed a personal taxonomy of these electronically-mediated transduction paradigms involved in sounding, defined by the configurations of bodies, modes of interaction, and temporal dynamics that animate them. In this dissertation, I exemplify my engagement with three of these paradigms, *acoustic transduction*, *simple electroacoustic transduction*, and *complex electroacoustic transduction*, through the use of three compositions: *sear*, *luscinia*, and *excision no.2: they didn't know we were seeds.*.

By developing a framework for exploring trauma responses through the means and materials of electronic music, my praxis reifies and validates my experiences of depersonalization/derealization, creating space for evaluation, understanding, acceptance, and healing.

INTRODUCTION

In 1687, Isaac Newton codified his observations about the natural world in his *Philosophiæ Naturalis Principia Mathematica*, a document which shed new light on the laws that govern the universe and provided a framework for a deeper understanding of the physical world. One of Newton's most notable sets of observations are distilled into three laws that govern the motion of bodies in space and time in response to the application of forces.[1] Human bodies, however, when subjected to extreme forces, be they physical or emotional, do not always behave according to these laws, often rendering the body and its relationship to the natural world unrecognizable. In this dissertation, I articulate a framework for artistically interrogating dissociative responses to trauma through the means and materials of electronic music in an attempt to find understanding, validation, and healing.

Trauma, PTSD, and DPDR

When a body is subjected to deeply distressing event, a response known as trauma often occurs. While the disruption that results in trauma may be physical or emotional in nature, its effects are often inscribed both in the mind and in the

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[1] Newton, Sir Isaac. *Philosophiae Naturalis Principia Mathematica.* Translated by Benjamin Motte, 1687.

body.[2] These adaptations may be experienced in many different ways, often resulting in a constellation of responses including re-experiencing, avoidance, negative alterations in cognition and mood, and alterations of arousal and reactivity.[3] When these responses persist and negatively interfere with one's life, they are diagnosed as post-traumatic stress disorder (PTSD). While there are currently attempts to create a taxonomy of PTSD subtypes according to presentation to allow for more granular segmentation in standards of care,[4] there is still disagreement on the best criteria for categorization. What *is* agreed upon amongst mental health professionals, however, is that there is a grouping of dissociative symptoms associated with PTSD distinct enough to comprise a separate subtype characterized by depersonalization/derealization (DPDR).

DPDR is experienced as a profound sense of detachment from one's mental processes, body, or the reality of their surroundings. While there is significant overlap between depersonalization and derealization, symptoms associated with depersonalization often influence a patient's relationship to their body, actions, or mental processes, while those associated with derealization often affect a patient's relationship to their surroundings, reality, or epistemology itself. One of the most illustrative descriptions I have found is that of repeating one's name over and

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[2] van der Kolk, Bessel A. "The Body Keeps the Score: Memory and the Evolving Psychobiology of Posttraumatic Stress." *Harvard Review of Psychiatry*, vol. 1, no. 5, 1994, pp. 253–65.

[3] American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, 5th ed.* American Psychiatric Publishing, 2013.

[4] Campbell, Sarah B., et al. "Identifying PTSD Symptom Typologies: A Latent Class Analysis." *Psychiatry Research*, vol. 285, 2020.

over until it ceases to hold any meaning beyond interest in its status as a sonic object. The feeling of identifying with the word slowly melts away, and all that is left is a dull, numb appreciation of the gestures of the sounds themselves, absent any meaning or connection to one's being (this, of course, we know is mediated by the speech-to-song illusion,[5] but sadly, no analogy as beautiful as language sublimating into song holds in this instance).

Other common experiences include sensations of distortions of the passage of time or the proportions of one's body. Language used to describe episodes often includes filmic analogies, as if one is watching their life on film from a distance, with the script written and interpreted by unknown storytellers. This is very apropos; scholar Akira Mizuta Lippit refers to film as a medium that generates "lost bodies:" "Despite the simultaneous presence of two bodies in cinema—one in the physical world, the other on film— the body in film is also a lost body, in some fundamental way there only as a trace, as the remnant of a body no longer there, its *revenant*."[6] DPDR seemingly generates *only* lost bodies, however, leaving only these traces of a seemingly unknown and irrecoverable inscriber. It is not that two bodies are perceived; rather, the sole body that is perceived seems untrue, artificial, or unfamiliar.

[5] Deutsch, Diana, et al. "Illusory Transformation from Speech to Song." *Journal of the Acoustical Society of America*, vol. 129, no. 4, 2011, pp. 2245–52.

[6] Lippit, Akira Mizuta. *Ex-Cinema: From a Theory of Experimental Film and Video.* University of California Press, 2012. pg. 121.

One of the most frustrating aspects of DPDR is the cognitive understanding of what comprises reality, but the inability to feel or identify with it through affective means. People experiencing an episode of DPDR are usually fully aware of what is occurring; it is not a delusion. It is intensely disconcerting to cognitively appreciate that panic is being felt (or should be felt), but to be incapable of actually feeling it - again the appreciation of a trace, but inability to identify who or what produced it or how. Notions of agency are inherently destabilized, and one may feel as if they are not the sole arbiter of their thoughts or actions. In *Feeling Unreal*, Daphne Simeon writes that

> On one hand, selfhood, and with it the individual's relation to the outer world, seems to deteriorate, leaving the sensation of "no-self." Conversely, a heightened awareness of the thoughts running through one's head can result in a distant heightened consciousness of the self, a self that no longer feels familiar or grounded. Strongly held beliefs, vivid memories, strong emotions that were naturally sparked by the senses now all seem like illusions, unfamiliar, without meaning, somehow false. Familiar mental images are reduced to movie-screen pictures devoid of the smells, sounds, and sensations that accompanied them earlier. Ideas or memories that once had emotional meaning are now experienced with distorted awareness and little feeling, while the sufferer remains intellectually very aware that this altered perspective is anything but normal.[7]

Very little is understood about the biological nature of consciousness, which makes objective, mechanistic understandings, and therefore treatment, of DPDR nearly impossible. While many of the conditions that can cause or

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[7] Simeon, Daphne, and Jeffrey Abugel. *Feeling Unreal: Depersonalization Disorder and the Loss of the Self.* Oxford University Press, 2006. p. 9.

exacerbate episodes of DPDR, such as anxiety, panic disorder, and depression, can be moderated with pharmacological interventions, there are no such interventions for DPDR itself.[8] Perhaps the most comforting intervention is merely to acknowledge that it is occurring and is a common, valid response to trauma, and understand that it will eventually subside.

What's most useful and strange about depersonalization as a response to trauma is that, even if for just a moment, it renders the experience of the trauma distant and unrecognizable. The intensity is lost, the color is drained. The experience is a hollow husk made of spider silk, slowly deforming as the breeze catches it, a curious object to be turned in one's hand and studied. It becomes possible to replay the details, to analyze actions and reactions, and yet feel nothing. It is safe. In my work, I have found that modes of transduction required to create music using electronic means share an uncanny resemblance to many of the processes involved in depersonalization, a reification of some semblance of self in another form which, if not true, is at the very least interesting.

Composer and scholar Jenny Olivia Johnson has spent significant time considering and studying the multifaceted ways in which other composers process trauma responses in their music. She writes

> That music and sound appear to have had the power to store and restore these devastating memories of human pain that for

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[8] Stein, Dan J., and Daphne Simeon. "Cognitive-Affective Neuroscience of Depersonalization." *CNS Spectrums*, vol. 14, no. 9, 2009, pp. 467–71.

> many years remained, in Freud's terms, "inadmissible to consciousness" has forced me to confront some important slippages in my own thinking about music and its status as literally and figuratively powerful — literally powerful in its physiological impacts on the body...and figuratively powerful in its emotional intensity...[9]

Music can be a powerful framework for processing trauma, and I argue that electronic music in particular can be a powerful means for conceptualizing depersonalization, its languages and processes at once a shelter, an escape, and a playground.

Philosophy

Locating Lost Bodies

Any discussion of the ablation of identification with a body or the generation of bodies that are lost must necessarily undertake the task of first defining and locating the concept of "body." The affective turn is particularly instructive, although it both illuminates and leads to more confusion within the context of DPDR. Theorist Brian Massumi begins by defining *affect* as a field of potentiality associated with intensity, and *bodies* as entities that are defined and animated by changes in and movements through this field. Massumi writes that

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[9] Johnson, Jenny Olivia. "The Touch of the Violin, the Coldness of the Bell: Synaesthesia, Mimesis, and the Unlocking of Traumatic Memory in Bunita Marcus's 'The Rugmaker' and Andra McCartney's 'Learning to Walk.'" *Women and Music: A Journal of Gender and Culture*, vol. 15, no. 1, 2011, pp. 18–37.

> The *autonomy* of affect is its participation in the virtual. *Its autonomy is its openness*. Affect is autonomous to the degree to which it escapes confinement in the particular body whose vitality, or potential for interaction, it is. Formed, qualified, situated perceptions and cognitions fulfilling functions of actual connection or blockage are the *capture* and closure of affect.[10]

DPDR could be seen as an inability of the body to capture and enclose affect, or to present enough resistance to be compressed into form by affective flux, thus occupying a state characterized by a lack of potentiality. For Massumi, the state of being is actually a process of becoming, of changing form, no matter how slight. To cease to change or be changed is to become deconstructed.

Massumi's articulation of affect and the modes by which it gives rise to bodies and their functions is strangely reminiscent of quantum field theory. While the application of quantum field theory to bodies larger than subatomic particles may seem vulgar, it may prove an interesting analogue. Physicist David Tong notes that "what we think of as particles aren't really particles at all; they're waves of these fields, tied up into bundles of energy....There are no particles in the world; the basic fundamental building blocks of our universe are these fluid-like substances that we call fields."[11] Much like matter is the result of waves compressing fields into packets of matter and energy, affect is compressed into forms that resemble emotion and sensations of the boundaries of form that define

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[10] Massumi, Brian. "The Autonomy of Affect." *Cultural Critique*, no. 31, 1995. pg. 96.

[11] The Royal Institution. "Quantum Fields: The Real Building Blocks of the Universe - with David Tong." *YouTube*, uploaded by The Royal Institution, 15 Feb. 2017. https://www.youtube.com/watch?v=zNVQfWC_evg.

bodies. But what if the concept of form itself is rendered unfamiliar? What then does it mean to not identify with a specific form, or even the concept of form at all?

One perspective on the definition of the body is that it is merely a form that results from a specific configuration of component parts, a container for information. Claude Shannon is said to have defined information as "the resolution of uncertainty,"[12] a clever phrase that functions both to outline a system for determining granularity in measurements of uncertainty, and also to capture movement toward a state of knowing. If we look to digital signal processing as an example, we can theorize electronic bodies as being defined by their configuration of 1s and 0s, or, more poetically, patterns of presences and absences. The fewer possible values that exist for each of these bits, and the more homogeneous these configurations of bits, the lower the entropy of the system, indicating a state of higher certainty. If we think of the affective field as being a probability distribution, each bit is an articulation, a codification, of this affective field. Now imagine an electronic body comprised of bits that all have a value of zero; this body would also have an entropy of zero, and thus be characterized by absolute certainty. I would argue that the lost body in DPDR is one comprised mostly of 0s, and is thus trapped in a state defined by absence. Despite the low entropy and high certainty of this body, being in a state defined by absence leads

[12] I cannot find this exact quote in anything that he published, nor anything authoritative that has been published about him. Nevertheless, I really like it.

to uncertainty and chaos of a different sort, introducing a potential paradox when combining affective and information theories.

For this and many other reasons, locating the body and all its attendant feelings and sensations in DPDR admittedly becomes difficult. Its existence is made most notable through its absence. Perhaps it is more helpful to think of the "lost body" generated by DPDR as defined by a lack of connection to or engagement with the affective field. Like a shark which needs the constant flow of water past its gills in order to respire, a body must be in a constant state of change, a constant state of uncertainty, in order to be constituted. When affect ceases to flow, the bounds of the body are no longer recognizable, and the system of organization of the matter comprising it becomes specious. In somatic epistemologies such as those referenced in the affective turn, a lack of identification with the body (or even with the idea of corporeality) leads to a rejection of the notion of knowing altogether, which, despite theoretically occupying a state of low potential and thus high certainty, actually leads to a state of extremely high uncertainty. Epistemology becomes slippery - like a climber attempting to scale a large gravel pile, to apply force and lift oneself is to further displace the structure supporting their endeavor. It stands both in line with and against Massumi's assertions simultaneously; parallel in one dimension of understanding, and perpendicular in another. In DPDR, to attempt to know is to experience a constant state of slippage. But perhaps this is apropos; as

Massumi notes, "actually existing, structured things live in and through that which escapes them. Their autonomy is the autonomy of affect."[13]

Transduction

"Transduction" is, quite aptly, a malleable word with a multitude of definitions in fields ranging from psychology to microbiology. In a purely physical sense, transduction can refer to the process of turning vibrations in the air into electrical signals via magnets and coils of wire (or vice versa in the case of speakers). In biology, transduction is the process by which exogenous genetic material is introduced to and incorporated into a cell's genome via some sort of (usually viral) vector. At its core, transduction is a process of conversion or subsumption of form, which fits handily with Massumi's characterization of bodies as entities that are animated by constant processes of change and transformation, either on their own or in relation to other bodies. Alvin Lucier raises this to the level of epistemology, writing that

> ...if you make an analogy between two things, you're not only saying that one of them resembles the other, you're saying that the identity of one is concealed in the other. It's as if all things are the same, but have different outward appearances, and the transformation from one to another is an active process in which truth is determined, but you're at different values along the way.[14]

[13] Massumi, Brian. "The Autonomy of Affect." *Cultural Critique*, no. 31, 1995, pg. 102.

[14] Lucier, Alvin. *Reflections: Interviews, Scores, Writings*. Germany, MusikTexte, 1995.

The change in conformation or composition of various bodies involves some sort of essentialization and parametrization, in which the potential for revealing some form of truth is contained.

In sound studies, transduction has multiple meanings, some physical and some philosophical, which is in line with the affective turn's attempt to generate epistemologies that unite physical, psychological, and cultural dimensions. Stefan Helmreich writes that "transduction, a term of art within the science of sound itself, has also been an appealing concept because it narrows the distance between cultural analysis and technical description, offering a conceptual language partially shared between scholars in the humanities and in engineering and science circles."[15] While different disciplines understand transductive processes in different ways, it is evident that different forms of transduction occur at different hierarchical levels simultaneously, and on many different timescales, some continuously, some as singular events.

Given this adaptability, it should come as no surprise that there is precedent for using sound as a medium to explore the potentialities of transduction in response to trauma; Johnson writes of the process of composition as

> ...the journey through memories as translated into sensations and sounds, that remains an unusual and evocative mixture of trauma as metaphor and trauma as devastatingly, persistently

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[15] Helmreich, Stefan. "Transduction." *Keywords in Sound,* edited by Novak, David, and Matt Sakakeeny. Duke University Press, 2015. pg. 223.

> real, living in our bodies, echoing timelessly in our minds, and searching for an adequate, if not complete, structure for representation, a language open enough to withstand trauma's fluid textures and details, its wordless intensity, its ever-changing meaning.[16]

Electronic music is a medium that is uniquely defined by multiple layers of these fluid, flexible transductive processes, rendering it a powerful structure for representation in efforts to locate the bodies lost in DPDR.

The Uncanny Valley

In the 1970s, robotics researcher Masahiro Mori set out to provide a framework for explaining the repulsion that many people felt when interacting with humanoid robots.[17] Mori notes that as the human likeness of a body in question increases, so does human affinity with it - to a point. Somewhere beyond 50%, a vast gulf opens up in which affinity drastically decreases, before finally increasing again (Fig. 1). Humanoid robots often occupy a space in the red highlighted region, at the lowest point in the valley. There are many proposed reasons for the uncanny valley, ranging from evolutionary biological concerns such as appraisals of reproductive

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[16] Johnson, Jenny Olivia. "The Touch of the Violin, the Coldness of the Bell: Synaesthesia, Mimesis, and the Unlocking of Traumatic Memory in Bunita Marcus's 'The Rugmaker' and Andra McCartney's 'Learning to Walk.'" *Women and Music: A Journal of Gender and Culture*, vol. 15, no. 1, 2011, pp. 18–37.

[17] Mori, Masahiro. "The Uncanny Valley: The Original Essay by Masahiro Mori." *IEEE Spectrum*, 2012, Trans. Karl F. MacDorman and Norri Kageki. https://spectrum.ieee.org/automaton/robotics/humanoids/the-uncanny-valley.

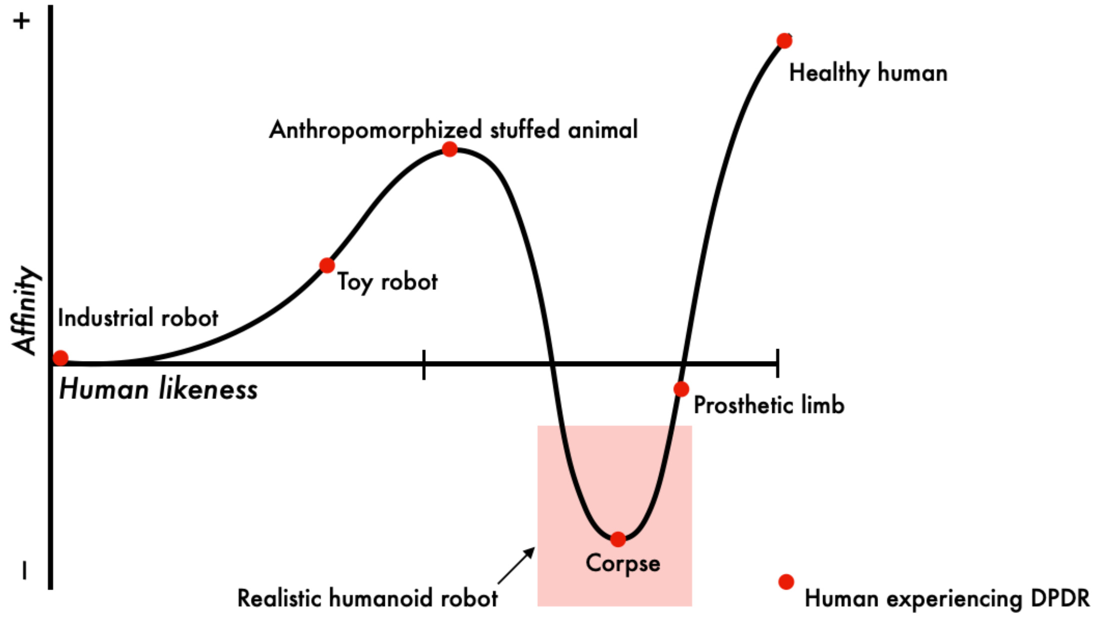

Figure 1. Modification of Mori's original graph of the uncanny valley, with the addition of DPDR.

fitness or pathogen avoidance, to more existential and cultural questions surrounding an increased awareness of one's mortality or of their eventual obsolescence in the face of increasing automation. While Mori's framework does not perfectly capture the nuances of DPDR, I locate the lost body outside of the context of Mori's curve; while the body looks and seems to function as if it were human, the patient experiencing DPDR experiences a profound lack of affinity for it.

However, it can be very useful to think about the uncanny valley in terms of identification with the various transduced states the body may take on in artistic pursuits, and why the process of transduction can be useful and interesting in the first place. Mori writes that "I predict it is possible to create a safe level of affinity by deliberately pursuing a nonhuman design. I ask designers to ponder this. To illustrate the principle, consider eyeglasses. Eyeglasses do not resemble real eyeballs, but one could say that their design has created a charming pair of new eyes."[18] While one could imagine more literal attempts to produce a new human-like body to inhabit, I posit that, much like Mori's prediction, it is possible to fashion a charming new one out of sound using the materials and means of electronic music.

Electronic Analogues

Metaphors evoking circuitry and information theory abound in neuroscience and psychology research; researchers often look to failures in information processing, encoding, storage, and retrieval as paradigms to inform research on trauma-related memory loss and suppression.[19] Data compression is another analogue currently being explored as a model to explain biases in the representation of certain types of perceptual details.[20] A common understanding of PTSD is that information retrieval processes regarding fear are rendered more

[18] Ibid.

[19] Hayes, J. P., et al. "Emotion and Cognition Interactions in PTSD: A Review of Neurocognitive and Neuroimaging Studies." *Frontiers in Integrative Neuroscience*, vol. 6, no. 9, 2012, pp. 1–14.

[20] Bates, Christopher J., and Robert A. Jacobs. "Efficient Data Compression Leads to Categorical Bias in Perception and Perceptual Memory." *Proceedings of the 41st Annual Meeting of the Cognitive Science Society*, 2019, pp. 1369–75.

efficient, thereby decreasing the likelihood that non-threat-related information will be retrieved, processed, and acted upon in response to specifics sets of stimuli.[21] In my praxis, I follow a similar path, and examine the ways in which understandings of states of dysfunction and modes of manipulation in electronic media can appropriated to model experiences of DPDR.

Sonic objects

The affective turn provides an easily applicable definition of "body" in electronic paradigms, as most bodies reliant on the movement of electrons through wires and other components are necessarily in a constant state of flux. Like many composers who engage with electronic materials and processes, the idea of *objets sonores,[22]* or sonic objects, and curating relationships between them is at the core of my compositional process. Pierre Schaeffer refers to these sonic objects as opportunities to engage in a process of "reduced listening," or a state in which the source of the sound, with all of its attendant histories and modes of interaction, is obscured. (Interestingly enough, Chion asserts that this sublimation necessitates the transduction, the "fixing" of the sonic object from an acoustic into an electronic form.)[23] While there has been much discourse

[21] Maddox, Stephanie A., et al. "Deconstructing the Gestalt: Mechanisms of Fear, Threat, and Trauma Memory Encoding." *Neuron*, vol. 102, no. 1, Cell Press, 3 Apr. 2019, pp. 60–74.

[22] Schaeffer, Pierre. *Traité des objets musicaux: essai interdisciplines*. France, Éditions du Seuil, 1966.

[23] Chion, Michel. *Audio-Vision: Sound on Screen*. Trans. Claudia Gorbman, Columbia University Press, 1994. pg. 30.

surrounding both the drawbacks and advantages of thinking about sound in this way, I do find that it can be a useful framework, though one that is itself replete with contradictions.

While one experiencing DPDR may in fact feel a resonance with the idea of engaging with a sonic object from the perspective of reduced listening, having entered into a similar positionality of estrangement to their own bodies and contexts, I find that maintaining an awareness of the origin and mode of production of these sonic objects is a necessary part of completing the incomplete transduction processes referenced in my work. While the act of liberating them from their original context is perhaps validating, it is by no means curative.
In a way, the sonic object can be viewed in much the same way as subatomic particles, compressions of various fields, be they physical or contextual, into a defined form, crucial for completing processes of transduction and thus reconnection.

My process of working with sonic objects often begins with spectral analysis in order to derive information about pitch, timbral, and temporal dynamics that are characteristic of the behaviors exhibited by the object. These parameters allow me to position sonic objects (be they acoustic or electronic) in relation to each other in ways that may not be suggested by their contexts or origins. The result is that each piece is defined by a complex multidimensional manifold of sonic objects, some proximal to each other in one dimension, but distant in others. This manifold provides a support system for navigating the compositional process, and I believe serves as the armature for connections and processes that I may initially appraise as intuitive, but which actually have a concrete basis in form.

Glitch

Another concept in electronic music that is frequently appropriated in cognition is that of the *glitch*. Interestingly enough, for a word with a relatively recent emergence, its etymology is not entirely straightforward. According to Google Books' Ngram viewer, its usage in written sources begins to grow sigmoidally beginning around 1960, leveling off around 2018. Some theorize that it is related to the Yiddish word *glitsh*, which means "slip," and was apparently used by radio announcers throughout the 40s and 50s to refer to their mistakes.[24] In a 1959 interview in the television broadcasting trade magazine *Sponsor*, producer Al Cantwell says that "'Glitch' is slang for the 'momentary jiggle' that occurs at the editing point if the sync pulses don't match exactly in the splice....Even if it occurs, it isn't bothersome to the viewer unless he knows it's there."[25] In the 1962 book *Into Orbit*, astronaut John Glenn writes that "a glitch is a spike or change in voltage in an electrical circuit which takes place when the

[24] Vespe, Jim. "It Was John Glenn Who Popularized the Word 'Glitch.'" *Air & Space Magazine*, October 2019, https://www.airspacemag.com/airspacemag/just-right-word-180973113/.

[25] "How to Cut TV Tape Costs." *Sponsor*, 11 April 1959, pp 42- 44.

circuit suddenly has a new load put on it."[26] Whatever the origin, and be it human, mechanical, or electronic, a glitch is usually characterized as a discontinuity, an interruption, a failure, and a violation of expectations.

In electronic music, glitches can manifest in any number of ways, including repetitions of tiny fragments of material, a decrease in the signal-to-noise ratio, degradation of materials, and eventual complete collapse. Glitches expose the workings of the electronic bodies being used to create the work, be they hardware or software, resulting in the anthropomorphization of these electronic bodies and driving creative practice up the eastern slope of the uncanny valley. David Zicarelli, quoted by Kim Cascone in his article aptly titled "The Aesthetics of Failure," noted that "I would only observe that in most high-profile gigs, failure tends to be far more interesting to the audience than success."[27] It's true - the 24-hour news cycle is seemingly constantly occupied by violence, heartbreak, and trauma. Our information economy is based on a currency of repeating cycles of traumatization and desensitization, all at seemingly higher and higher voltages.

Glitches, however, can be intensely humanizing. If "to err is human,"[28] then there is perhaps nothing more humanizing than witnessing failure. One particularly effective (and entertaining) example of this phenomenon occurs in

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[26] Glenn, John et al. *Into Orbit, by the Seven Astronauts of Project Mercury*. United Kingdom, Cassell, 1962.

[27] Cascone, Kim. "The Aesthetics of Failure: 'Post-Digital' Tendencies in Contemporary Computer Music." *Computer Music Journal*, vol. 24, no. 4, 2000, pp. 12–18.

[28] Pope, Alexander. *An Essay on Criticism*. 1711.

comedy as "breaking," when a performer fails to keep their composure, thus destroying the veneer of performativity that allows audiences to suspend disbelief.[29] Journalist Luke Winkie writes that performers are "not supposed to break. It devalues a sketch, alienates your co-stars, and negates the social contract between audience and performer."[30] However, a positive feedback loop often occurs when a live audience is involved, as they inevitably begin raucously laughing, clapping, and cheering at the first sign of a crack in a performer's stolid armor. Given that laughter is a social, mimetic behavior,[31] the audience's laughter at the performer's laughter at themselves creates a social resonance that further destabilizes the scene and makes it increasingly difficult for performers to wrest their composure back from the brink.

Throughout the 2010s, the break was notably elevated to material status in Bill Hader's recurring performance of the character Stefon Zolesky on *Saturday Night Live's* "Weekend Update" sketch. Comedian John Mulaney, the writer of Stefon's segment in the sketch, would purposefully craft situations that would cause Hader to break, most commonly by changing the cue cards between rehearsal and the show, and then whispering hints about what the changes might be into Hader's ear immediately before he walked out on stage. Mulaney notes

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[29] Rather fascinatingly, "breaking" is known as "corpsing" in British comedy circles, which further ties the idea of performative glitches to the notion of "lost bodies" and the uncanny valley.

[30] Winkie, Luke. "The Greatest Breaks in Comedy History." *Vulture*, 2020, https://www.vulture.com/2020/01/best-breaks-in-comedy-history.html.

[31] Provine, Robert R. "Contagious Laughter: Laughter Is a Sufficient Stimulus for Laughs and Smiles." *Bulletin of the Psychonomic Society*, vol. 30, no. 1, 1992, pp. 1–4.

Figure 2. Bill Hader as Stefon Zolesky in SNL's "Weekend Update" segment, covering his face while breaking.

that "The first time we did [the Stefon sketch] at dress, Bill started laughing. A lot. And then afterwards, he was apologizing to me, because he has a strong work ethic and stuff, and thinks that it's bad to mess up - and I think it's *very funny* to mess up."[32] Because Hader knew there was a possibility he might break, he was primed to do just that, and within the span of just two sketches, the break became a structural component of his performance of Stefon. Perhaps most interesting is the way in which Hader's embodiment of the character accommodates the potentiality of the break: because his initial on-camera break was marked by the act of covering his mouth with his hands to hide his laughter (Fig. 2), he subsequently began holding his hands very close to his face, often

[32] Saturday Night Live. "Behind the Sketch: Stefon with John Mulaney - SNL." *YouTube*, uploaded by Saturday Night Live, 14 April 2018. https://www.youtube.com/watch?v=_C14eXiZQWo

agitatedly smoothing his hair, biting his nails, and subtly voguing to make the act of covering his face natural so as not to illicit a response from the audience anytime he made a subtle shift toward it. Over time, as Mulaney upped the ante with more and more outlandish, nonsensical, and politically-incorrect modifications to the script (in many respects, the sketch has not aged well), Hader spent more and more time covering his face, which further added a longer-term engagement with the audience's expectation generation mechanisms. Hader's performances kept viewers suspended in a constant state of liminality and flux for over eight years on Weekend Update, resulting in Stefon's canonization as one of the most beloved and meme-able recurring characters on SNL in recent memory.

There is another layer to Stefon's character that ties the notion of glitch and embodiment to DPDR, however. The Stefon residency on Weekend Update began as a standalone sketch two years prior meant to satirize the gulf between 1990s club kids culture in New York and conservative midwestern family values. The sketch is comprised of a movie pitch in which Stefon and his brother approach two executives at Disney about producing a coming-of-age story, except the two brothers have extremely different ideas about what that coming-of-age story should entail. It is implied that Stefon's engagement with the rave scene is a way of processing deep-seated, prolonged trauma due to exposure to homophobia during his childhood and adolescence. The executive with whom they are speaking refers to Stefon's contributions to the pitch as "some kind of half-remembered gay nightmare" and tells him that "[they] can't make [his] movie," to which he catatonically responds "What movie?" as the camera slowly zooms in on his face.[33] While caricatured and satirized, this moment does in some small way exemplify and reinforce the blurring of present reality, memory, and virtuality that so often characterize episodes of DPDR.

Stefon's movements are also reminiscent of Massumi's theory about Ronald Reagan's affective success as an orator, although the term "glitch" is never expressly applied:

> Reagan was more famous for his polyps than his poise, and there was a collective fascination with his faltering health and regular shedding of bits and pieces of himself. The only conclusion is that Reagan was an effective leader not in spite of but because of his double dysfunction. He was able to produce ideological effects by non-ideological means, a global shift in the political direction of the United States by falling apart.[34]

Kim Cascone writes that "The medium is no longer the message in glitch; the tool has become the message."[35] Ronald Reagan, was, in more ways than one, a tool. Unfortunately, in some paradigms, the tools of message transmission and transduction can be damaged beyond repair. While the aesthetics of glitch are based in the empathy resultant from a shared identification with fallibility and

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[33] Saturday Night Live. "Every Stefon Ever (Part 1 of 5) - SNL." *YouTube*, uploaded by Saturday Night Live, 5 Nov 2019. https://www.youtube.com/watch?v=vwm_N2PCUz8

[34] Massumi, Brian. "The Autonomy of Affect." *Cultural Critique*, no. 31, 1995, pg. 102.

[35] Cascone, Kim. "The Aesthetics of Failure: 'Post-Digital' Tendencies in Contemporary Computer Music." *Computer Music Journal*, vol. 24, no. 4, 2000, pp. 12–18.

brokenness, when raised to political and structural levels, we see that paradoxically, the outcome is increased apathy and animus. The fact that glitch has become structural and normalized in systems designed to protect people (resulting in the needless deaths of hundreds of thousands of individuals, such as is the case with the United States' response to the coronavirus pandemic) desperately needs to be interrogated. While glitch frequently generates virtual lost bodies, to generate literal lost bodies is beyond horrifying. These accumulating failures have entered us into a positive feedback loop of collective traumatization, resulting in what has felt like a national episode of DPDR.

Silence

Perhaps the logical conclusion of any ill-fated process of accumulation of glitches is silence. Any electronic music practitioner who has attempted to troubleshoot a technical setup from which no sound is emanating is intimately acquainted with the disconcerting experience of being at war with silence. The truth of silence, however, is that it does not exist. In bodies, in architectural spaces, and in both analog and digital electronic systems, there is no such thing as silence. Silence may be perceived or experienced as a lack of expected outcome, but there are many layers of mediation that may be preventing the listener from perceiving the actual signal. As the old adage goes: "If a tree falls in a forest but no one is around to hear it, does it make a sound?" In the case of the tree, the silence is not for lack of signal; it is for lack of a receiver.

In her treatise on glitch, artist Rosa Menkman writes that “the dominant, continuing search for a noiseless channel has been, and will always be no more than a regrettable, ill-fated dogma.”[36] Within electronic systems, even the lack of an intentionally-produced signal does not amount to silence. Stray electrons, potentially guided by some inductive force beyond the confines of the housing of the apparatus such as electromagnetic radiation from a proximal phone or distant solar flare, course their way through wires in ways that are always detectable. Even within well-shielded systems disconnected from a power source, capacitors and memristors mediate a process of hysteresis, of electronic memory, which in itself contains information, a signal. Electrical engineers go to great lengths to ensure that no unintended output is able to emanate from a system, but the system is required to be very active to maintain that surface appearance of stasis. In line with Massumi’s effort to define the body through change, silence is almost never passive. It is a process of active suppression, and one that can, in itself, define a body.

One of the most common responses to trauma is, unfortunately, silence. Though it is extremely difficult to get accurate statistics, it is estimated that approximately 75% of sexual assaults go unreported.[37] While survivors’ reasons

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[36] Menkman, Rosa. ✎ *Glitch Studies Manifesto* - █ ▄█ ▜█ // *beyond Resolution*. https://beyondresolution.info/Glitch-Studies-Manifesto.

[37] *The Criminal Justice System: Statistics | RAINN*. https://www.rainn.org/statistics/criminal-justice-system. Accessed 23 Nov. 2020.

for choosing not to report are varied, we have seen incredibly high-profile cases of reports of sexual violence that have resulted in no consequences for the perpetrator and severe harassment of the survivor. Consequently, the most common reason for not reporting is fear of retaliation.[38]

This is further complicated by societal messaging in which silence becomes an object of desire. Especially in our currently intensely-mediated way of life, we long for the quiet of the woods, an escape from the din of the city, a chance to unplug and disconnect. Too often, we incentivize and almost fetishize silence, often complicating the relationship of those who would like to speak out with the process of doing so. One of the clearest articulations of this complicated relationship lies in Nora Cooper's spoken word poem, "On Silence," which was premiered at the Rustbelt slam poetry competition in 2018 (I highly recommend watching the video, as slam is a necessarily performance-based medium and the excerpt that I've transcribed below does not do justice to the performance):

> ...Sometimes my heart is breaking
> and other times, I am just tired.
> I have spent so much time at war with my silence,
> I have forgotten everything she has done for me.
> ....
> When my stomach was nothing but a mass of fear and obligation,
> my silence took my hand, squeezed it gently as if to say,
> "You owe them nothing. I am here if you need me.
> Speak only if you want to."
> So to you, quiet child, who have kept everything
> just inside your mouth for whatever reason,
> I see you.

[38] Ibid.

Even when you say nothing, I believe you.
....
My silence hears this poem, looks at me, teary-eyed, and says
“

.”
I say “I'm sorry I hated you.
I always thought you were the weakest part of me,
The part that needed the most forgiveness.
But no,
You are the first one who never asked me to prove anything,
the only one who believed me before I spoke,
and after.”
And now when my silence takes my hand, I squeeze back.
I say “I know.”
I say “Thank you.”
And I mean it.[39]

Synthesis

Perhaps one of the most interesting and instructive recent depictions of DPDR in popular culture occurs in Netflix's 2018 interactive film *Black Mirror: Bandersnatch*. *Black Mirror* is a series known for inviting viewers to explore the myriad ways in which technological advances can lead to dystopian nightmares, but *Bandersnatch* explicitly breaks the fourth wall by inviting the viewer to interact with the narrative in a digital “choose your own adventure” modality, forcing the viewer to become complicit in the decisions made by the protagonist, a troubled video game designer named Stefan Butler. At varying points in the film, viewers are presented with choices, and, using their remotes, are asked to

[39] Button Poetry. “Nora Cooper - ‘On Silence’” *Youtube*, uploaded by Button Poetry, 30 May 2019. https://www.youtube.com/watch?v=yuE-D9wx-jU.

choose between different options. The choices presented to the viewer are initially seemingly banal, such as what type of cereal to eat for breakfast or which cassette to listen to on the bus. However, choices soon become more and more intrusive, and viewers are faced with questions of agency and their own complicity in manipulating situations that influence the health and safety of the characters in the film, all while watching the protagonist slowly become more and more detached from the reality that has been constructed for him. Eventually, the agency of the viewer is even manipulated by the software governing their ability to make decisions in that certain options are removed upon different iterations of pathways through the narrative. Occasionally, in an almost farcical commentary on notions of compromised agency, only one option is ever presented, and yet the viewer is still forced to physical press the button on their remote to choose it.

Given the role of video game design and technological advancement in the film's narrative, discussions of memory, glitches, and routines further reinforce parallels between disordered technological and mental states. Dejavu and gaslighting become a frequent themes, and repeating certain paths result in slight modifications to the scripting and editing of scenes as both viewers and characters question their memories ("Have we met before?" "How did you know that?"). While never overtly glitching (unfortunately, the polished corporate surface upon which Netflix's profits are conditioned would likely render such a design a bridge too far), glitch is the currency in which *Bandersnatch* trades. In one ending, the notion that DPDR is often described as "watching one's life as if it is a movie" is made material, in that suddenly an out-of-frame voice yells "CUT!" and the camera zooms out to reveal a film set on which the confused protagonist is an actor who has unfortunately fallen too far down the rabbit hole of his method acting.

While the reception of *Bandersnatch* in the DPDR community has been varied, many people have strong reactions, reporting feeling validated, comforted, or even triggered by viewing and interacting with the film.[40] One thing that is agreed upon, however, is that the multitude of ways in which it questions notions of complicity and agency is extremely effective. Given the branching nature of the narrative and the way in which the modes of interaction offered to the viewer change, it is a paradigm replete with potentiality and characterized by constant transduction.

In my work, I divide the process of transducing different types of information between bodies involved in musicking into three paradigms based upon the bodies and patterns of interaction that define them (Fig. 3): acoustic, simple electroacoustic, and complex electroacoustic. In the *acoustic* paradigm, electronic and acoustic sources of information inform the decisions that a human (in this dissertation, me, acting as the composer) organizes into a score, which is

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[40] NathoBear. "To Those on Here Who Are Particularly Sensitive to Existential Thoughts, Don't Watch Bandersnatch on Netflix." *Reddit*, 2018, https://www.reddit.com/r/dpdr/comments/aa9ak5/to_those_on_here_who_are_particularly_sensitive/.

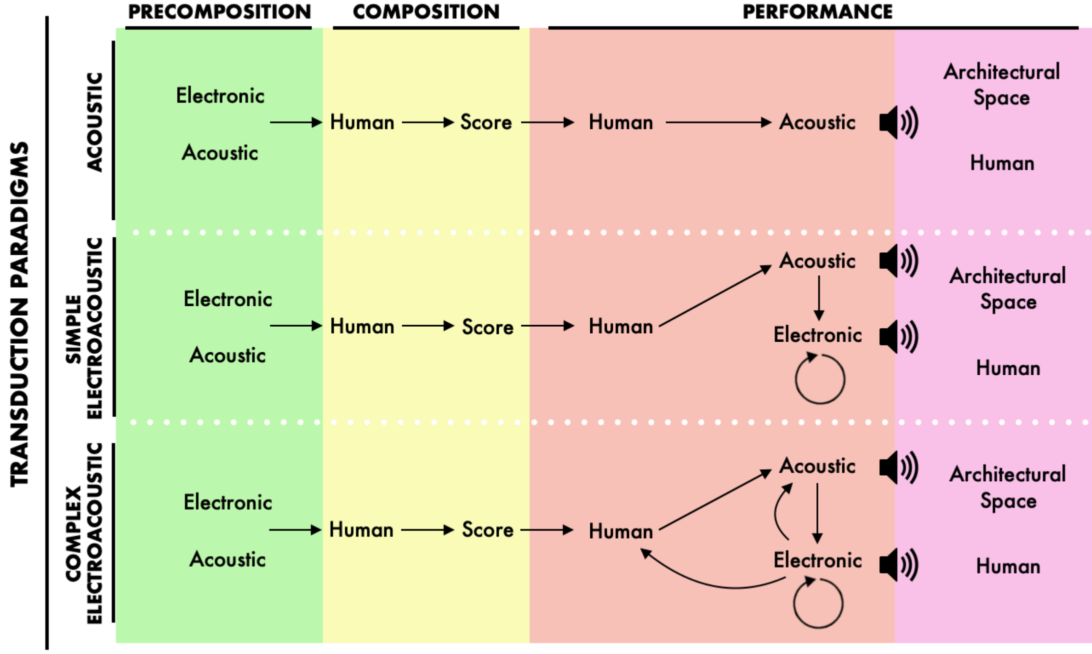

Figure 3. Three transduction paradigms that describe how information is transduced in my musicking process.

then transferred to other humans who engage with acoustic bodies to transduce that information into vibrations in the air that listeners' bodies transduce into electrical impulses that their brains perceive as sound. In the *simple electroacoustic* paradigm, an electronic body is added to the act of sounding in performance, and is influenced by an information stream emanating from human bodies' engagements with acoustic bodies. There may exist feedback loops within the electronic bodies that influences their output, but none of that output influences either the human or acoustic bodies involved in performance. In the final paradigm, which I have termed *complex electroacoustic* transduction, there are multiple feedback loops entangling the electronic bodies, acoustic bodies, and human bodies involved, including modification of both the human and acoustic bodies' behaviors in response to the electronic bodies' output.

As Michel Chion writes of Pierre Schaeffer's system of organization of sonic objects, "this system is certainly neither complete nor immune to criticism, but it has the great merit of existing."[41] While there certainly exist other configurations of bodies and information streams in the transduction processes involved in musicking, and this taxonomy is by no means exhaustive (for instance, one could imagine a paradigm in which the human body influences the electronic body directly without the mediation of an acoustic body, or a paradigm in which the information streams feed all the way backward into the compositional phase of musicking and a score is generated in real time in response to output from the electronic bodies), these are the three most relevant paradigms to the works being discussed in this dissertation, and which have most influenced my praxis.

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In DPDR, the body, which is lost, does not sense and does not make sense. We must find another pathway for sensing. Varying sources of trauma, both physical and emotional, have played an outsize role in influencing my compositional choices throughout graduate school. By theorizing DPDR as a process of incomplete transduction, a change frozen in process in a liminal space

[41] Chion, Michel. *Audio-Vision: Sound on Screen.* Trans. Claudia Gorbman, Columbia University Press, 1994. pg. 30.

of zero potentiality, I engage in completing that transduction through the means and materials of electronic music. Again, I find some resonance with poet Nora Cooper's work; her poem "I Won't Write Your Obituary" references these processes of electronic transduction: "I will write you a body whose veins are electricity / Because outlets are easier to find than good shrinks."[42] When one's body seems stuck in a lost space, it occasionally helps to find a new one.

Electronic music serves as a liminal space of infinite potentiality, and one that can be thought of as a perpendicularly-oriented field to the drained, frozen, or disconnected affective field, the waves of which animate and force the incompletely-transduced body into some semblance of recognizable form. By exploring an albeit brief and non-exhaustive taxonomy of electronically-mediated transduction processes in my work, I attempt to locate and sound the lost body electric. Necessarily, these attempts will result in more slippage - more glitches - and the production of new paradoxes (as Princess Leia told General Tarkin in *Star Wars: A New Hop*e, evoking the etymology of glitch: "The more you tighten your grip, Tarkin, the more star systems will slip through your fingers."[43]), but, as Massumi says: "The trick is to get comfortable with productive paradox."[44]

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[42] Button Poetry. "Nora Cooper - 'I Won't Write Your Obituary' (CUPSI 2015)." *YouTube*, uploaded by Button Poetry, 8 June 2015. https://youtu.be/vBvnuGIMRos

[43] Fisher, Carrie, perf. *Star Wars Episode IV: A New Hope*. Dir. George Lucas. Twentieth Century Fox, 1977. Film.

[44] Massumi, Brian. "The Autonomy of Affect." *Cultural Critique*, no. 31, 1995, pp. 83–109.

CHAPTER 1: ACOUSTIC TRANSDUCTION IN *SEAR*

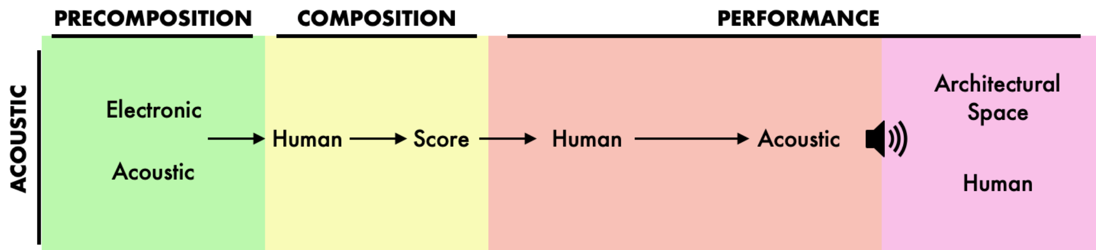

Figure 4. Bodies and modes of interaction involved in acoustic transduction paradigm.

In my work, I define electronically-mediated acoustic transduction as a paradigm of musicking in which the process of sounding involves only acoustic bodies activated by human bodies, but for which compositional materials are derived from electronic bodies via computational means, including spectral analysis, synthesis, and algorithmic processes (Fig. 4). Here, the electronically-mediated transduction step is farthest removed from the act of sounding, in that the traces of electronic sounds are only extant as parametrized/mimetic musical materials arranged in the score. In this chapter, I explore this mode of transduction in the composition of *sear*, a piece for chamber ensemble composed for and premiered by the LA-based chamber ensemble wild Up in 2016, during the LA Philharmonic's National Composer Intensive.

1.1 Sonic Objects

Paul Virilio notes that "when you invent the ship, you also invent the shipwreck; when you invent the plane you also invent the plane crash; and when you invent electricity, you invent electrocution....Every technology carries its own negativity, which is invented at the same time as technical progress."[45] In the same fashion, the invention of audio recording and reproduction technology also allowed for the increased mobilization and weaponization of sound.[46] While the electronically-mediated potential of sonic technologies has vastly increased access and opened new pathways for innovation and artistic exploration, it has also opened new pathways for harm.

On January 1st, 2015, I ruptured my left eardrum in a rather unfortunate audio programming accident. I was left with permanent hearing damage, which, as a composer, computer musician, and audio engineer, put the future of my career in question. I spent the next year and a half wondering whether my hearing would improve at all, and trying to figure out what I was going to do with my life if it didn't. Having already abandoned a promising career in biological engineering for one in music, the thought of having to again abandon my career and begin the search for another was unthinkable. However, I wasn't sure what option remained; listening to music felt intensely dissatisfying, as it

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[45] Virilio, Paul., et al. *Politics of the Very Worst: an Interview by Philippe Petit.* Semiotext(e), 1999.

[46] Cusick, Suzanne G. "You Are in a Place That Is out of the World.: Music in the Detention Camps of the Global War on Terror." *Journal of the Society for American Music*, vol. 2, no. 1, 2008, pp. 1–26.

always seemed a grotesque bastardization compared to my memories of what sound used to be. Composition was a terrifying prospect, and as someone whose primary musical materials focused on subtle nuances in timbre and gesture, I wondered how any performer would trust a composer who couldn't accurately hear the fine-grain details of the sounds they were producing. While my distrust of my hearing apparatus forced me to rely more heavily on electronic tools to generate visual stimuli such as spectrograms to inform my compositional process, the thought of actually producing any sort of electronic music was made much more terrifying. The critical ear that I had spent the past 5 years honing was now obliterated, and I lost all confidence in my ability to communicate my intentions through sound.

One of the other lingering effects of the injury was tinnitus. I was left with a permanent, grating, high-frequency drone in my auditory cortex that became my constant sonic companion.[47] An estimated 10% of Americans have experienced tinnitus at some point in their lives, either as a temporary annoyance in response to a loud concert or accident, or as a chronic condition.[48] Whereas one can shut their eyes to visual stimuli and cover their ears to auditory ones, one

[47] It is interesting to note that the very first scene in *Black Mirror: Bandersnatch* is accompanied by a granular, high-frequency drone, which is one of the most quite accurate depictions of tinnitus in sound design for film that I've ever heard. This element of the sound design occurs repeatedly throughout the film, and even intensifies in various storylines.

[48] Bhatt, Jay M., et al. "Prevalence, Severity, Exposures, and Treatment Patterns of Tinnitus in the United States." *JAMA Otolaryngol Head Neck Surg*, vol. 142, no. 10, 2016, pp. 959–65, doi:10.1001/jamaoto.2016.1700.

cannot turn off the firing of neurons in the brain. To logically appreciate that the sound does not exist as a physical stimulus and yet to be constantly be in the presence of one is frustrating at best and infuriating at worst. While many describe it as ringing, I experience it as a constant stream of granular articulations of high-frequency stimuli, almost like the sound of a chain running across rough concrete which has then been pitch-shifted up a number of octaves. Perhaps what is so frustrating about describing tinnitus is that the physical idea of "ringing" is grounded in expectation generation mechanisms conditioned on resonance, and thus decay. While we expect resonance from a singular impulse to fade, tinnitus is a resonance that constantly shifts, expands, and distorts, keeping the experiencer engaged in a constant guessing game, grasping for the traces, the lost bodies of decays that have already been interrupted. This constant string of discontinuities leads to a perception of roughness and texture, which suggests a sort of virtual tactility. The inability to physically engage with this tactility, however, is highly frustrating, and reminiscent of the disassociation from the body that occurs in DPDR.

Researchers have attempted to model how the brain processes the tactility inherent in sonic textures, and one possible explanation is the concept of roughness that results from fine-grained systems of organization replicated at multiple hierarchical levels: "Sound textures are produced by a superposition of many similar acoustic events, such as arise from rain, fire, or a swamp full of insects, and are analogous to the visual textures that have been studied for decades."[49] Because textures are often identified as composites of component parts, one cannot help but attempt to interrogate them, to dream of uncovering some higher-order principle governing this complexity. However, the patterns themselves are likely distributed in a complex way, leading to an ever-expanding rabbit hole of Mandelbrotian roughness:

> Roughness is part of human life forever and forever, and ancient authors have written about it. It was very much uncontrollable, and in a certain sense, it seemed to be the extreme of complexity, just a mess, a mess, and a mess. There are many different kinds of mess....I prefer the word 'roughness' to the word 'irregularity,' because irregularity — to someone who had Latin in my long-past youth — means the contrary of regularity. But it is not so. Regularity is the contrary of roughness because the basic aspect of the world is very rough.[50]

The notion that there must be some rule, some buoy of structure to lift me from the undertow of seeming chaos was alluring. In an effort to preserve my sanity, I began to study my tinnitus, keeping both written and electronic diaries of the ways in which it changed on a daily basis (Fig. 5). Silence had been stolen from me, but perhaps if I could parametrize what took its place, I could make sense of it, and make it sense.

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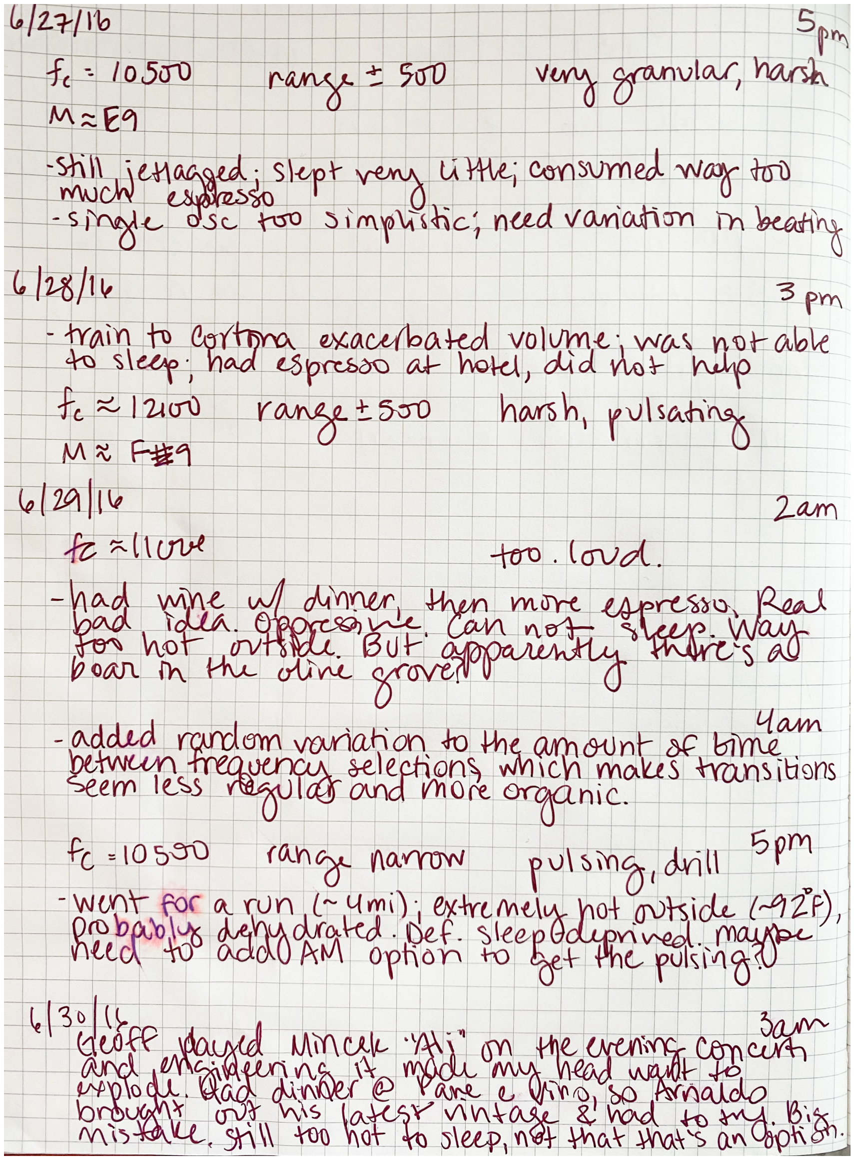
[49] McDermott, Josh H., and Eero P. Simoncelli. "Sound Texture Perception via Statistics of the Auditory Periphery: Evidence from Sound Synthesis." *Neuron*, vol. 71, no. 5, 2011, pp. 926–40.

[50] Mandelbrot, Benoit. "Fractals and the Art of Roughness." *TED: Ideas Worth Spreading*, Feb. 2010, https://www.ted.com/talks/benoit_mandelbrot_fractals_and_the_art_of_roughness.



6/27/16 5pm
f_c = 10500 range ± 500 very granular, harsh
M ≈ E9
-still jetlagged; slept very little; consumed way too much espresso
-single osc too simplistic; need variation in beating

6/28/16 3pm
- train to Cortona exacerbated volume; was not able to sleep; had espresso at hotel, did not help
f_c ≈ 12100 range ± 500 harsh, pulsating
M ≈ F#9

6/29/16 2am
fc ≈ 11000 too. loud.
- had wine w/ dinner, then more espresso. Real bad idea. Oppressive. Can not sleep. Way too hot outside. BUT apparently there's a boar in the olive grove!!

4am
- added random variation to the amount of time between frequency selections which makes transitions seem less regular and more organic.

5pm
fc = 10500 range narrow pulsing, drill
- went for a run (~4mi); extremely hot outside (~92°F), probably dehydrated. Def. sleep deprived. maybe need to add AM option to get the pulsing?

6/30/16 3am
Geoff played Mincek "Ali" on the evening concert and engineering it made my head want to explode. Had dinner @ Pane e Vino, so Arnaldo brought out his latest vintage & had to try. Big mistake. Still too hot to sleep, not that that's an option.

Figure 5. An excerpt of my written tinnitus diary, outlining a few measurements and the beginning of the evolution of my electronic model.

1.2 Electronic Modeling

In order to objectively keep track of the changes in my hearing, I constructed auditory tests for myself so that I could objectively understand how the changes to my hearing apparatus were influencing the appraisals of the sounds I was experiencing. Eventually, I also began creating electronic models of

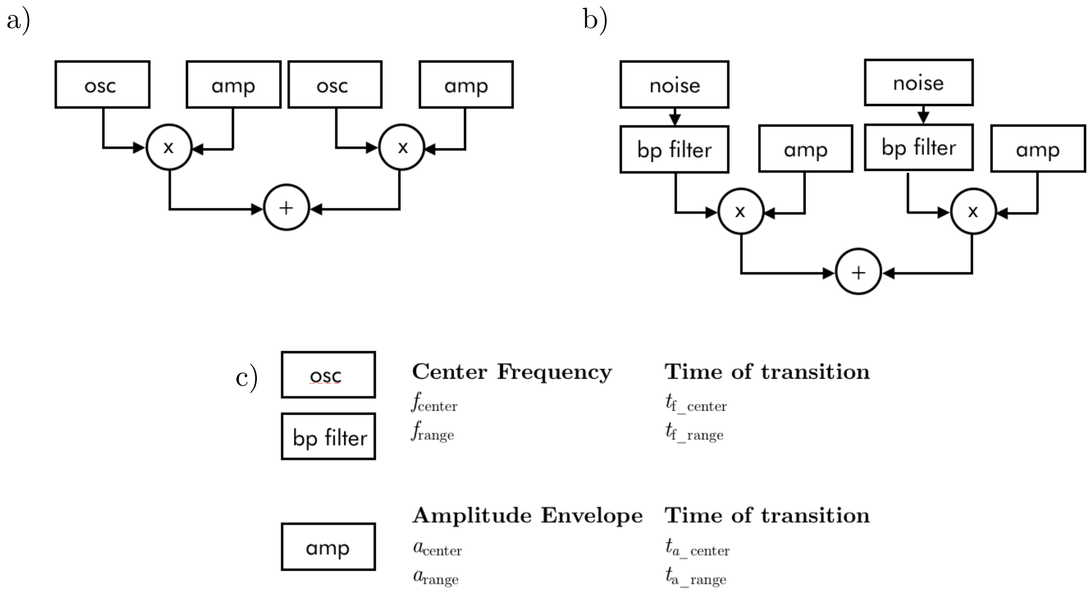


Figure 6. Schematics of two tinnitus models a) using sinusoids and b) using filtered noise. c) lists the variables involved in defining uniform probability distributions that govern the behavior of its components.

my tinnitus, creating a sonic diary of sorts that attempted to capture the pitch, timbre, and temporal dynamics of its behaviors.

Modeling it was highly therapeutic; the reification of those sounds as externally-produced auditory stimuli, mediated by electronic bodies and air validated the experiences I had been having. In order to capture the variety of organic, granular, pulsating, ever-changing qualities of these sounds, I first employed two pairs of oscillators (Fig. 6a), and later, two pairs of noise generators and resonant bandpass filters (Fig. 6b). Parameters that I kept track of (Fig. 6c) included the center frequency, which was allowed to randomly vary within a specified range, amplitude, which was also allowed to vary within a specified range, and temporal dynamics of the changes, which were also allowed

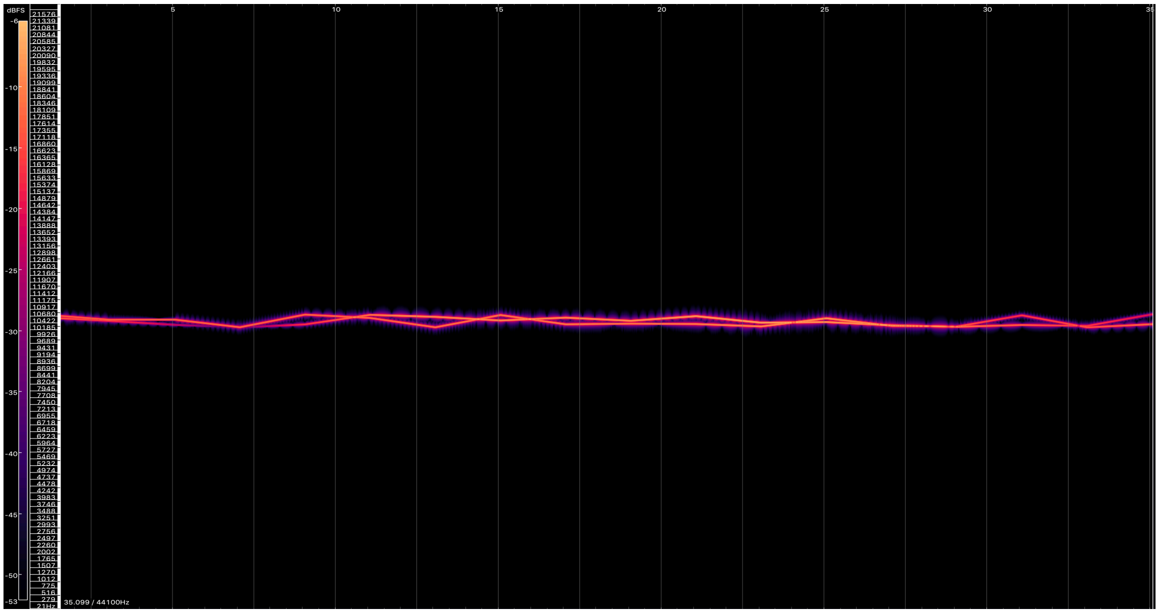


Figure 7. Spectrogram of the left channel of output from one day's tinnitus entry using sinusoids.

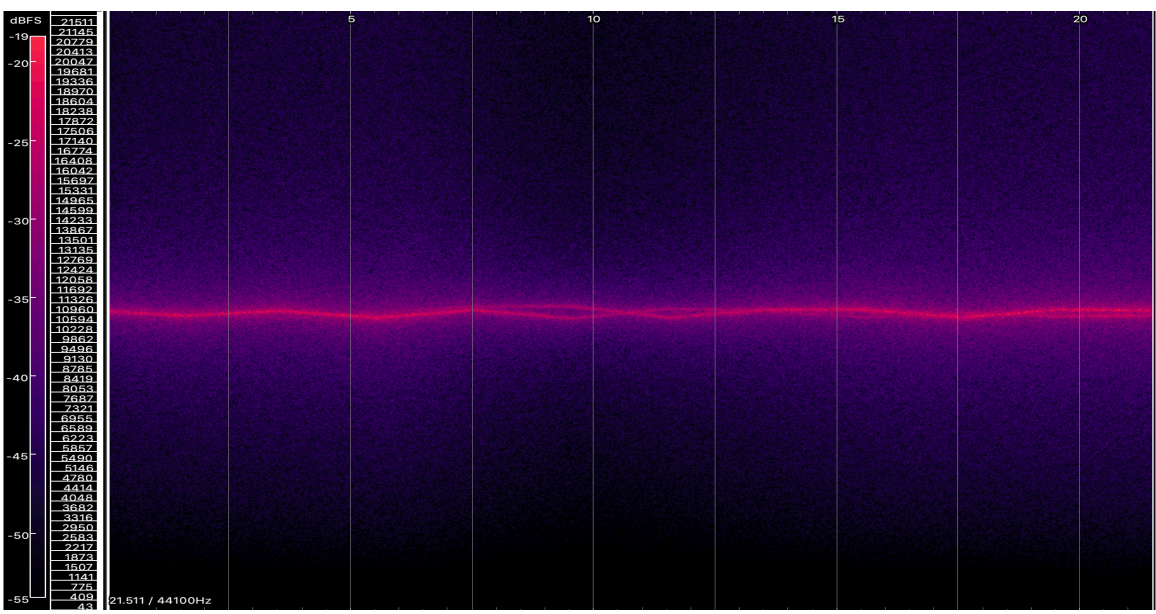


Figure 8. Spectrogram of the left channel of output from one day's tinnitus entry using filtered noise.

to randomly vary.[51] Different instances of this existed in both the left and right channels to reflect the independence of the stimuli that I experienced in my left and right hear (Fig. 7). In order to capture more turbulent, textured experiences of my tinnitus, I also employed very narrow bandwidth resonant bandpass filters to noise (Fig. 8). (However, given that I had partially deafened myself with unstable resonant filters before, I didn't spend much time listening to these, even though they ended up being more representative of the sounds produced by acoustic instruments in the final version of the piece.)

1.3 Acoustic Transduction

Unfortunately, when I received the commission to write *sear* in the summer of 2016, the use of electronics was prohibited, so I was forced to find acoustic ways of emulating the sonic objects with which I was working. Because most of the frequencies involved in these modeling efforts were too high for traditional acoustic instruments to produce, I had to turn to non-traditional instruments. I went through countless iterations of objects, including various types of small metal chains, ceramic bowls, and small glass marbles, attempting to find combinations that produced frequencies high enough and with the appropriate time-varying timbral profiles. I finally managed to find a brand of 6mm metal jingle bells that, when placed in a ceramic bowl covered in foam,

[51] Uniform probability distributions were used for simplicity's sake, though it would be interesting to use other distributions.

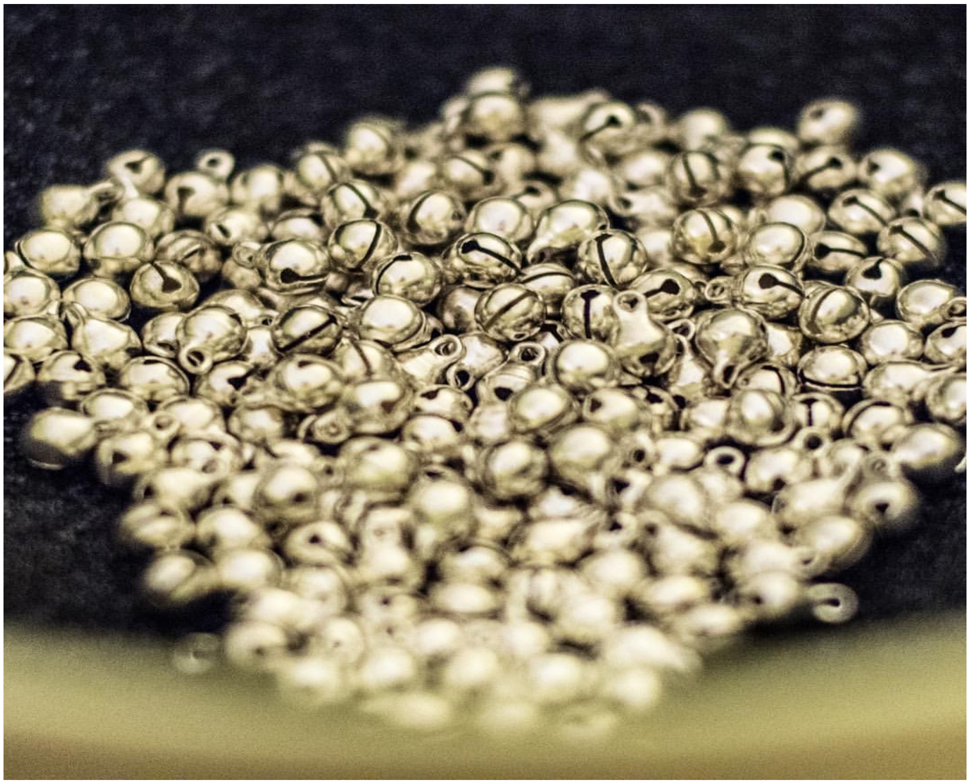


Figure 9. 6mm jingle bells in foam-covered ceramic bowl that allowed for the reproduction of time-varying pitch and timbral profiles as exhibited by electronic tinnitus models.

resulted in sounds that had both the frequency, range, texture, and timbre for which I was searching (Fig. 9). Much of the spectral energy of the bells is situated between 10,000 and 11,500 Hz, a range that my tinnitus also frequently occupies. To be able to haptically engage with the production of a sound that is usually virtual, to somehow locate its lost body and complete its transduction back into the physical world, was incredibly cathartic.

In order to provide for more orchestrational possibilities, I also found other sound production modalities that would either produce sounds in that frequency range or that had a spectral profile whose overtones existed in that range, thus

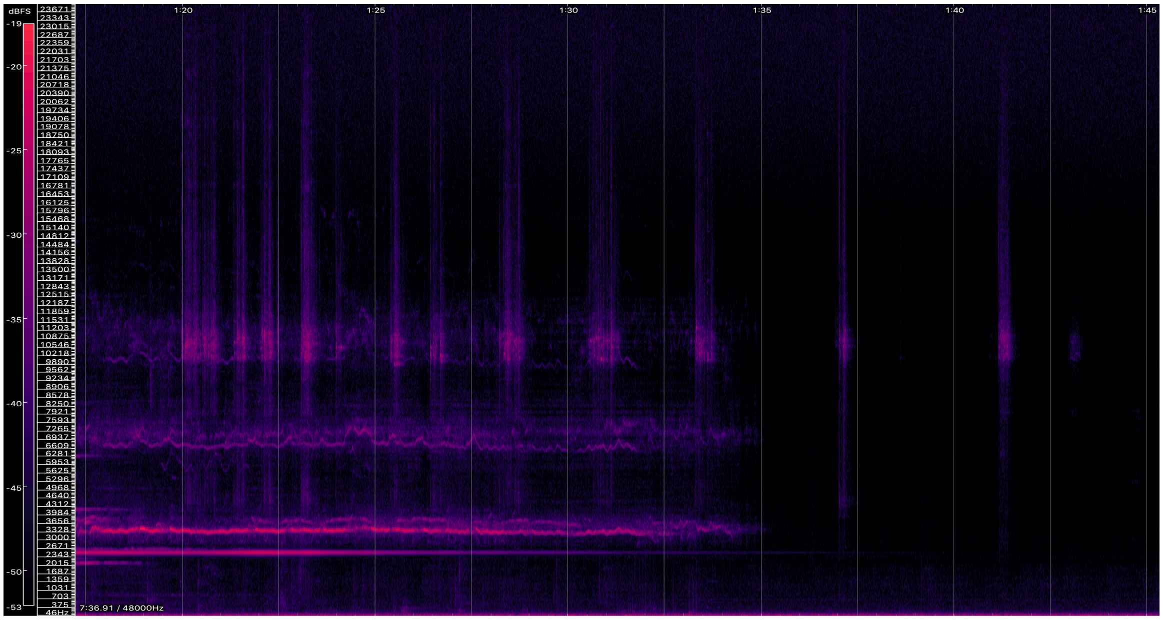


Figure 10. Spectrogram of mm. 22-34. The bells, which occupy the highest band, result in frequencies centered in the 10,000-11,500 Hz range. The pen caps result in bands of harmonics that also exist in that range, resulting in further granularity.

reinforcing the fundamental of the bells (Fig. 10). I was immediately reminded of the sound of someone trying to learn how to whistle, and discovered that blowing through pen caps provided an extremely turbulent, brittle sonic texture given their diminutive size and the players' innate unfamiliarity with their use as instruments. This further produced a very satisfying organic nature to the variability in the sonic texture. Styrofoam was also used as an instrument, though its spectral profile is more unpredictable (and bowing it results in its degradation, which makes quite a mess). The use of these sounds creates many different kinds of messes, but they are messes that are true.

1.4 Glitches

Glitch informs the process of musicking in this piece on a number of levels, both in very physical and metaphorical senses. The use of the aforementioned non-traditional instruments such as pen caps, styrofoam, bowls full of varying sizes of tiny jingle bells, and power drills were employed to capture the pitch material and timbral properties of the electronic models, which seemingly relied on the fact that players' inherent unfamiliarity with using them as instruments would produce states of dysfunction. Additionally, the inside of the piano was played with a variety of implements, including sheets of paper, mallets, and wooden sticks, and wind players are asked to disassemble their instruments and play in ways that necessarily introduce nonlinearities into the vibrating air columns. I was allowed to use *one* electronic element in the piece - an electric guitar (though it is analog, rather than digital), which is always played through an overdrive pedal. Feedback and distortion in the guitar pushes the electronic elements to the brink of failure, and that feedback process becomes form-bearing in m. 92.

Regardless of whether the instruments were traditional or comprised of found objects, players are also frequently asked to push their ability to play their instruments to extremes, either in terms of register, dynamics, or idiomatic gestures. In one instance, the cellist is given material labeled "aspirational," recognizing how impossible it was to perform (this was later re-written in a subsequent revised version of the piece, which is reflected in the score in

Appendix A). While I knew that the sonic outcome would not be what I had notated, I was more interested in the sonic trace of someone trying and failing.[52]

Glitch also serves a structural role in *sear*, inspiring the use of processes of accumulation, degradation, and rupture as organizing principles over larger timescales. While glitches often produce sonic events that unfold on very short timescales, the accumulation of glitches is an ongoing process through which labor, and ultimately society, is inscribed. Musicologist Gavin Steingo writes about how unstable power grids in Soweto in the 2000s resulted in the frequent corruption of files stored on hard drives. Because of the lack of internet connectivity, these hard drives and all of the files on them were the main means of transferring files from person to person, allowing for glitch genealogies to be constructed, tracing the paths of files as they are shared throughout communities. Steingo writes that "[he has] many MP3s from friends in Soweto that contain glitches, pops, abrupt silences and crackling sounds....there are several ways that file corruption can happen: the most common way it happens is when something goes wrong while a file is being saved. .... Computers [in Soweto] — which are often many years old and have gone through several rounds of repairs — crash frequently and hard."[53]

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[52] It is also worth noting that I only felt comfortable writing material that entreated performers to try their hardest and inevitably fail because I was writing this piece for people that I had already worked with for many years and with whom I shared a high degree of trust. When the piece was performed again by the Phoenix Symphony in 2017, I revised the score to be more tractable.

[53] Steingo, Gavin. "Sound and Circulation: Immobility and Obduracy in South African Electronic Music." *Ethnomusicology Forum*, vol. 24, no. 1, 2015, pp. 102–23.

The structure of *sear* is also informed by processes of accumulation and dissolution in varying frequency ranges, reminiscent of the way in which artifacts from data compression algorithms accumulate over the course of multiple rounds of varying types of compression processes. Ruptures are often preceded by some sort of oscillation or instability, resulting in collapse (Fig. 11).

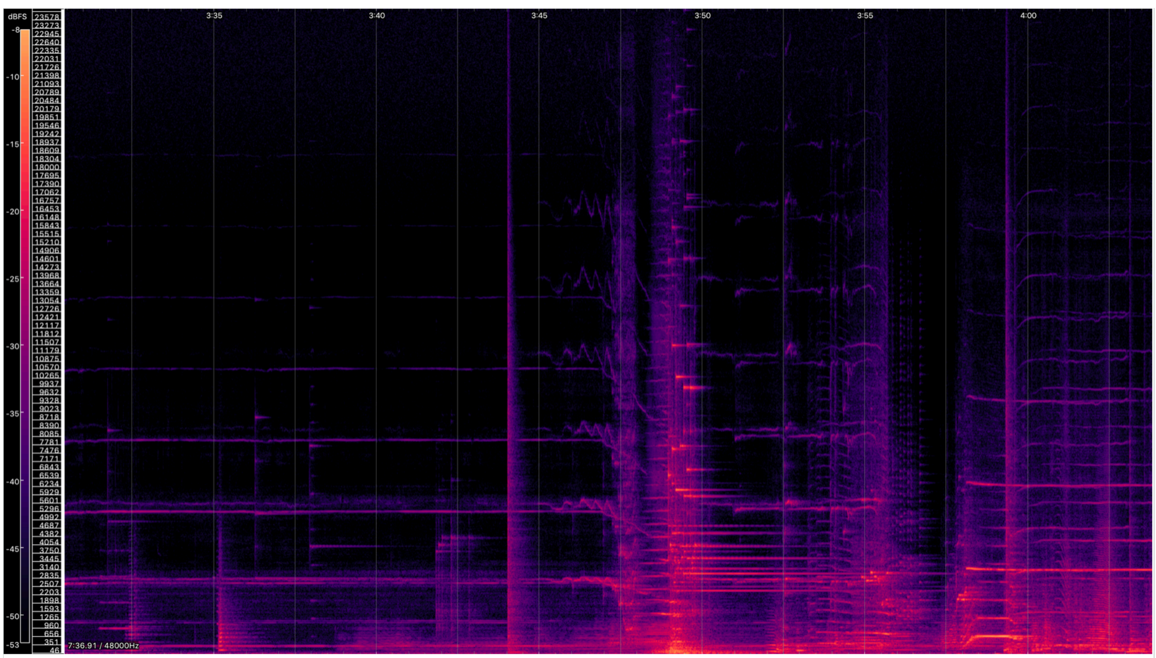

Fig. 11. Spectrogram of mm. 62-73 (3:30) showing the increasing spectral density and transposition of pitches after rupture-like events.

Glitch aesthetics also influence the organization and treatment of certain smaller-scale gestures as they recur and evolve throughout the piece. Each repetition of the "horn rip" gesture shared by the cello, bassoon, and horn in mm. 69-70 (approx. 3:54 in the audio recording) ushers in further instabilities, collecting sonic detritus and increasing chaos with each iteration. This continues at mm. 79-83 (4:28), again ushered in by the horn rip, but in the context of a texture dominated by high frequency components articulated by the crotales and piano. This 4-measure section itself then repeats in similar fashion at mm. 86 (4:53), although in somewhat nearly unrecognizable fashion due to the amount of chaos occurring in all frequency ranges for the additional instruments who have joined the fray for that iteration.

1.5 Perceptual sonic articulations of visual stimuli

One of the results of losing portions of my hearing was a drastic change in my relationship to the visual elements associated with sound production, whether manifested in spectrograms in or the physical cues that accompany the process by which performers interact with their instruments to make sound. As someone with multiple types of synesthesia, I have always perceived sound as having a very visual component, albeit a virtual one. However, I began relying more on visual cues associated with the physicality of performance to help me make sense of the sounds I was hearing (and, perhaps more importantly, the ones that I wasn't). One of the outcomes of my loss of hearing and subsequent replacement of silence with persistent tinnitus was an awareness of the way in which visual information articulated the tinnitus. Much has been written about the primacy of visual in the sensorium from both cognitive and philosophical perspectives, but recent studies have shown that visual stimuli do actually produce the perception of auditory stimuli in approximately 22% of the population.[54]

To reflect this, *sear* incorporates choreographic elements which produce unexpected sonic outcomes compared to the size of the movements involved. During m. 92, players surreptitiously don small hand-sewn bell bracelets comprised of the same bells used in the bowls at the beginning of the piece. They then mime large, vigorous motions reflective of actions that they would have undertaken earlier in the piece when it was at its most chaotic, except now they only produce minor articulations of the constant, tinnitus-like texture (this begins at 7:30 in the video documentation). These traces also represent an exercise in futility, and in signals sent but not received; no matter how much effort is inscribed in the gesture, the sonic outcome is limited by the diminutive jingling of the bell bracelets.

The act of transducing, of *reifying*, the sounds of tinnitus into actual auditory stimuli through the use of electronic modeling, and then again into interactions with acoustic bodies to be performed by other humans, was an act of validation and ultimately, an act of reclamation of agency. While these stimuli still haunt the space in-between my ears, the act of transducing them into actual results of physical actions which can be shared with other humans has proved comforting and healing.

[54] Fassnidge, Christopher, et al. "A Deafening Flash! Visual Interference of Auditory Signal Detection." *Consciousness and Cognition*, vol. 49, Academic Press Inc., Mar. 2017, pp. 15–24.

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After the premiere of the *sear* during the LA Phil's inaugural Noon To Midnight festival on Oct. 1st, 2016, a man came up to me, introduced himself as Juan, and said he'd never been to a concert of classical music before. He said that he paints houses and office buildings, and that a few years ago, he fell from a ladder and ended up with a concussion, which has left him with an awful ringing in his ears. Then he said something to me that I'll never forget: "I don't know what that was, and I'm not going to lie to you, I never want to hear it ever again. But I get it. Thank you."

In that moment, transduction felt complete.

CHAPTER 2: SIMPLE ELECTROACOUSTIC TRANSDUCTION IN *LUSCINIA*

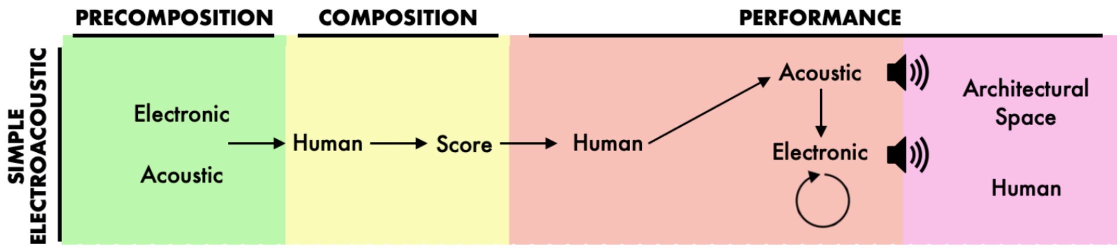

Figure 12. Bodies and modes of interaction involved in musicking in the simple electroacoustic transduction paradigm.

In my work, I define simple electroacoustic transduction in performance as that which takes place through electronic bodies in parallel with the acoustic bodies involved in performance (Fig. 12). While electronically-mediated transduction may occur further back in the precompositional process as in acoustic transduction, there is now an electronic body involved in sounding as well. The inputs to the electronic bodies can be various data streams derived in real time from either live microphone inputs which capture the sounding of acoustic bodies, or material being generated through synthesis and digital signal processing, but all are ultimately converted into signals which are processed in a computer and outputted to the speaker system without further passing through human, acoustic, or electronic agents.[55] While humans may interact with other

[55] Here the speaker system and the architectural space in which the speaker system is housed, while crucial components of the process of sounding, are admittedly disregarded for simplicity's sake (and also because in many cases, neither composers or performers have any agency with which to make modifications to them).

acoustic bodies in order to produce an acoustic component of the sonic output, they do not change their behavior as a result of the sonic output of the electronic bodies.

In this chapter, I explore the simple electroacoustic transduction paradigm through the composition and performance of *luscinia,* scored for orchestra and live electronics. The electronic component of the piece involves eight live audio input streams from microphones on stage, in addition to a corpus of samples within the software which all conspire to generate a stereo audio signal that accompanies the acoustic material performed by the orchestra. Notably, there is no feedback between the orchestra and the electronics, in that the orchestra does not modify its behavior in response to the electronic component. In many cases, the electronic output is not even audible to the orchestra because of the infeasibility of providing all players (or even groups of players) with monitors. Their only interactions are with the score, the conductor, and their fellow human performers. The only human agent responding to the electronic output is that of the computer musician, who (in ideal cirucmstances) exercises very little agency, save for the occasional space-bar press or gentle nudge of sliders on the mixing board.

2.1 Program Notes

"luscinia" is the genus portion of the scientific name for the common nightingale, *Luscinia megarhynchos*. Nightingales are small birds found primarily throughout Europe and Asia, and are known for their highly varied song, which is often sung at night. They have been referenced throughout literature, music, and visual art for centuries, though perhaps one of the nightingale's most well-known appearances is in the tale of Philomel, found in Ovid's *Metamorphoses*.[56] Ovid writes of a young woman who is raped by her brother-in-law, Tereus, who then cuts out her tongue to prevent her from identifying him as the perpetrator. Unable to speak, she weaves a tapestry depicting her assault and sends it to her sister Procne, who hatches a plan to exact revenge. After discovering this plan, Tereus chases Procne and Philomel into the forest, where they escape by being transformed into birds - Procne into a swallow, and Philomel, a nightingale. For many artists, the nightingale's song has often had melancholy connotations, presumably due in some part to Ovid's story; however, in a somewhat cruelly ironic twist, modern ornithologists have found that it is usually only the male nightingale that actually sings, as is the case with many species of birds. *luscinia* is ultimately a meditation on both the destructive and redemptive powers of different articulations of silence, and a meditation on the process of transduction and disembodiment in response to trauma.

[56] Ovid, , and Charles Martin. *Metamorphoses*. New York, W.W. Norton & Co, 2004.

While this piece was an attempt for me to process and come to terms with my own experiences with sexual assault and the battles with PTSD that resulted, the composition of this piece was entirely completed before the details of the decades of Harvey Weinstein's sexual misconduct were chronicled in the *New York Times* on October 5, 2017,[57] which sparked an intensification of the international conversation known as the #MeToo movement (which actually first began in 2006, initiated by activist Tarana Burke[58]). While the constant exposure to these narratives in the media was in itself retraumatizing, I did appreciate the newfound sense of ease with which I was able to talk about the piece to the players and the audience, given the societal conversations that were already occurring.

2.2 Sonic Objects

Similar to *sear,* the composition of *luscinia* also began with the analysis of recorded and synthesized sonic objects from which both means and musical materials were derived. The three primary sonic objects are birdsong (particularly a nightingale song), tinnitus, and the human voice.

[57] Kator, Jodi and Megan Twohey. "Harvey Weinstein Paid Off Sexual Harassment Accusers for Decades." *The New York Times*, 2017, https://www.nytimes.com/2017/10/05/us/harvey-weinstein-harassment-allegations.html.

[58] *Get To Know Us | Tarana Burke, Founder.* 2020, https://metoomvmt.org/get-to-know-us/tarana-burke-founder/.

2.2.1 Birdsong

Many of the musical materials that interact in *luscinia*, whether in terms of pitch classes, intervals, gestures, or timbres, are either extracted from or inspired by a nightingale's song. Interestingly enough, the nightingale's complex and varied song contains many elements reminiscent of glitches in electronic media: short fragments repeated in quick succession, unexpected noise bursts, buzzes, and clicks, and quick juxtapositions of materials with characterized by different pitch spaces and and tempos.

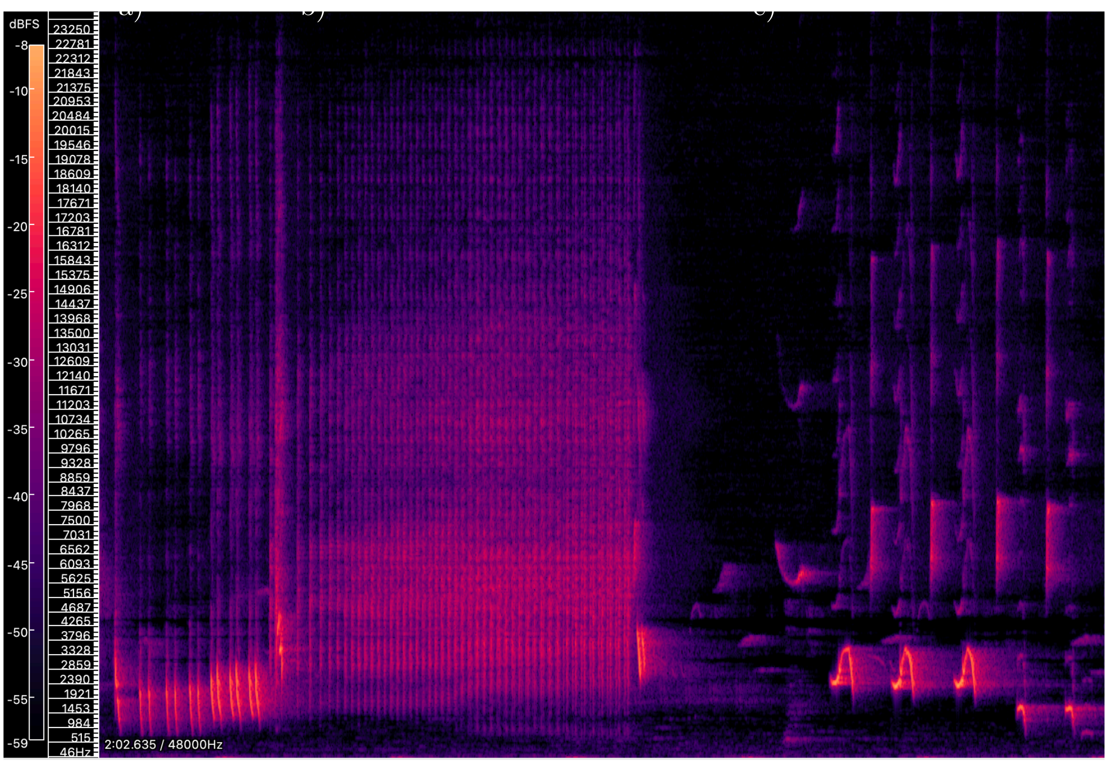

Figure 13. Spectrogram of a nightingale call exhibiting examples of three behaviors: a) chirrups, b) elongated rising trill, c) swoops.

Figure 14. Technique involved in bass solo at the beginning of the piece.

Figure 13 shows three examples of characteristic behaviors from which I generated musical materials: a) chirrups (which I define as two rhythmic impulses which are then repeated), b) an elongated rising trill, and c) swoops (which involve U-shaped smooth changes in pitch).

Perhaps the most blatant articulation of all three of these is the bass solo at the beginning of the piece. The bassist begins by firmly pressing a loosened bow against the portion of the fingerboard above the body of the instrument and rolling the stick over the hair, creating a series of pops, reminiscent of the rhythmic profile of many of the chirrup-like portions of the nightingale's song (Fig. 14). Quickly dragging the bow vertically along the fingerboard creates sounds evocative of vocal creaks, moans, and wails, and slowly vertically moving the bow creates a scraping sound characterized by a slowly-changing spectral profile, reminiscent of the rising trill.[59]

Intervallic relationships were also derived from the nightingale's call; many swoops encompass intervals of a seventh (both major and minor), which informed the melodic and harmonic language used in the piece. The harp frequently outlines sevenths in a melodic fashion (rehearsal letters C and L), and the seventh's inverse, the second, is frequently used to create harmonic materials with acoustic beating to result in a destabilizing effect. This is perhaps most evident in the vibraphone for extended periods of time (such as at rehearsals F and G, and again from rehearsal K to the end), although seconds prominently feature in a harmonic context throughout the piece.

2.2.2 Tinnitus

Elements of tinnitus, as experimented with in *sear*, finally make their debut in my work as electronically-transduced sounds in *luscinia*. While no one would every characterize my music as having a tonal center, much of the harmonic material of the piece is centered around the pitch E, which is pitch that often aligns most closely with my tinnitus (though many octaves higher than is

[59] Given frequent depictions of string instruments in relation to female bodies throughout history, the position of the bow being drawn across the uppermost portion of the fingerboard takes on a multiplicity of meanings relating to gendered silence and violence. While it is convenient that the spectral characteristics of the sound of the bow on the strings combines handily with those of choked, nonlinear vocal sounds emanating from the throat, these sonic materials were combined because of the resonance of the physicality of the techniques required to make them sound.

usually heard in the piece). High-frequency sounds in general are privileged throughout the piece, both acoustically and electronically, and are frequently articulated by slowly-transforming harmonics in the strings and flutes. The same bells used in *sear* also make an appearance, that toy bird calls, while programmatically relevant, also contribute to articulations of high-frequency materials.

2.2.3 The Voice

Given the importance of the voice (or lack thereof) in Ovid's story, *luscinia* necessarily represents a turn toward a preoccupation with the technological mediation and transduction of the voice in my praxis. The voice ties sounds to bodies in ways that acoustic instruments never could, which makes it a powerful tool for exploring virtuality and lost bodies through sound. Mladen Dolar writes that

> Indeed, the voice appears as the link which ties the signifier to the body. It indicates that the signifier, however purely logical and differential, must have a point of origin and emission in the body. There must be a body to support it and assume it, its disembodied network must be pinned to a material source, the bodily emission must provide the material to embody the signifier, the disembodied signifying mechanics must be attached to bodily mechanics, if only in it most intangible and 'sublimated' form, the mere oscillation of air which keeps vanishing the moment it is produced, materiality at its most intangible and hence in its most tenacious form.[60]

[60] Dolar, Mladen. *A Voice and Nothing More.* MIT Press, 2006. p. 59.

Because of the voice's inherent suggestion of a lost (or, in Dolar's terms, "sublimated") body, it is a framework and inspiration that itself is reminiscent of DPDR. While the electronically-mediated disembodied voice is of course inscribed with traces of the technology involved in its mediation, its sublimation, the process of liberating it from the body allows for expression that the body would have otherwise not allowed, either because of physical constraints or cultural notions about what it means for certain arrangements of sounds to emanate from which bodies.

While I was grappling with my own relationship to sexual assault and the PTSD that I have experienced as a result, it became clear to me that I could not write a piece of this magnitude if I were only inscribing my voice in the materials of the piece. Having spoken with numerous other people who had had similar experiences, they suggested that I invite others to participate. I posted a call for submissions on social media, and received 37 submissions, including whispered or spoken texts, vocalizations, and performances on other instruments. As someone who understands the varying forces influencing one's decision about whether or not to come forward and speak out, I wanted to ensure that the anonymity of any contributors would be protected at all costs, and provided a field on the submission form that they could select if they wanted their materials processed beyond recognizability or only used for feature extraction.

Perhaps not surprisingly, not a single submitter wanted to be identified through their materials. I still do not know the names of the majority of people who submitted (though I can certainly identify some of the voices).

Because I wanted to manipulate the boundaries of intelligibility and did not feel as if I could safely do so while honoring the wishes of the people who contributed recordings, I recorded material of my own in my own voice and pilfered materials from the public domain such as news broadcasts and government hearings.

Materials were treated in a variety of different ways; those that were not designated to be used only for feature extraction were sorted into a corpus for use in convolutional synthesis, and those that were designated to be kept anonymous were used for feature extraction and/or templates for other types of synthesis.

One such mode of transduction was the generation of slowly-evolving sinusoidal washes that underly, reinforce, and support the acoustic sounds through very limited vocoding and resynthesis engines. Because relatively few sinusoids were used in both of these process, articulative elements of speech are smoothed over, and only the vague pitch contours of the materials are left, as if one's tongue was cut out.

One criticism is that the process of obscuring or manipulating intelligibility does nothing to support or advocate for the voices of people who have historically been silenced. However, this treatment of the voice is meant more to hold a mirror up to society and represent the degree to which the

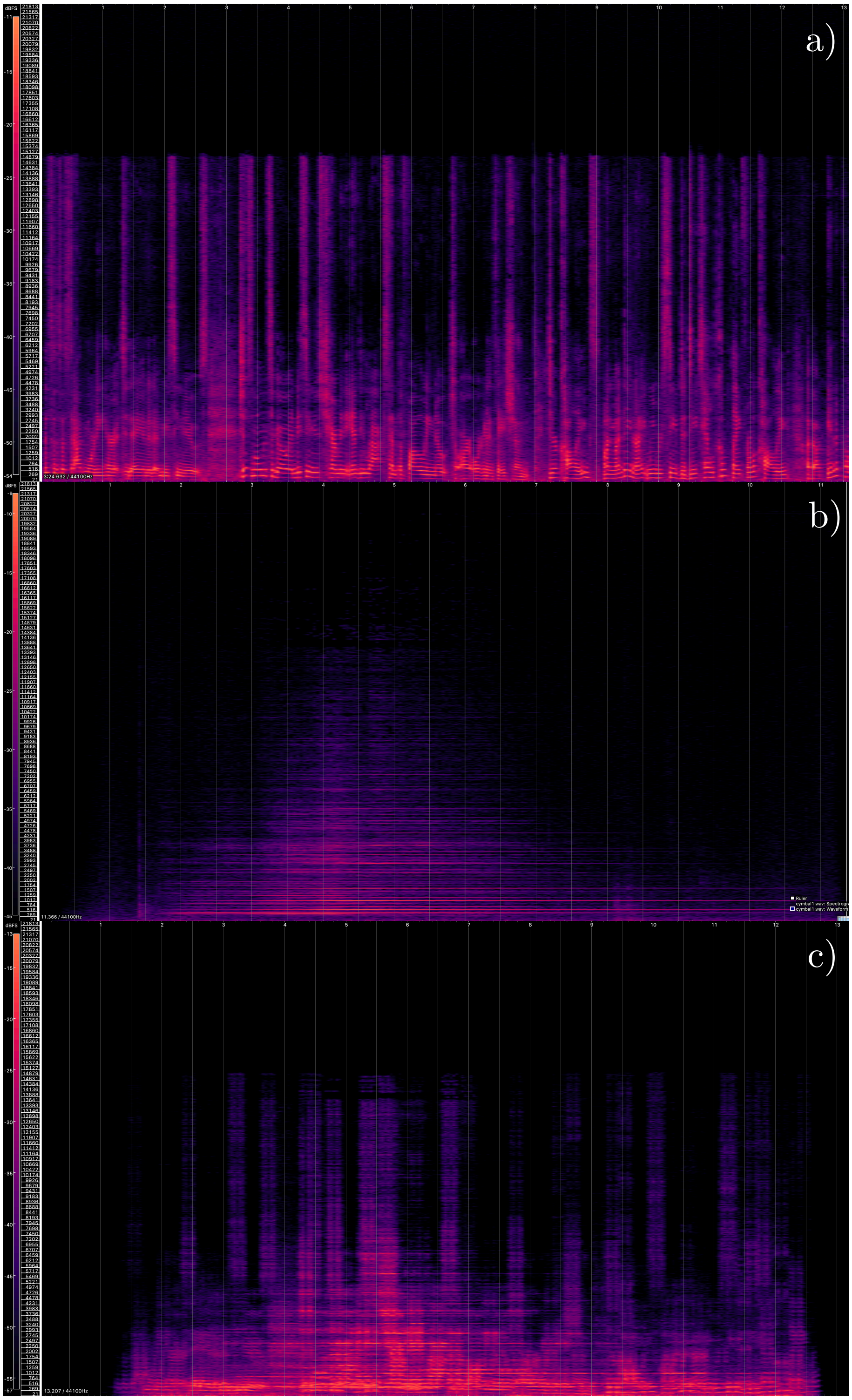

Figure 15. Three spectrograms illustrating how convolution allows for the creation of spectral amalgams. a) spectrogram of speech, b) spectrogram of bowed cymbal c) spectrogram of the convolution of the voice with the bowed cymbal. (Of particular note is how the bandlimiting on the vocal sample is reproduced in the convolved signal.)

contributions of certain voices (and bodies) are still disregarded. In some ways, it is validating to hear a lack of communication, to reify the virtuality of screaming into a void but being heard by no one. Wishart notes that "in the virtual acoustic space of loudspeakers, we can play with the ambiguity between indicator and signal."[61] It is merely the act of sounding separate from one's body in a safe space that is cathartic. There is a trace of identity inscribed, but also protected.

2.3 Composing with Convolution

At the heart of the patch for *luscinia* is a synthesis engine built on convolution.[62] In electronic music, convolution is commonly used in applications related to reverb to allow for an impulse response to be applied to an incoming time-varying signal. This contextual relationship to space and physicality makes convolution a great candidate to serve as a transductive process which allows sonic objects to occupy new bodies (Fig. 15).

One notable divergence between traditional applications of convolution and the use of convolution in this patch is that it allows for two time-varying signals to be convolved, thereby generating timbral amalgamations of two distinct sound sources in real time. In simple terms, convolution is essentially a process by which the spectra of two signals are multiplied, generating a new signal that has

[61] Wishart, Trevor. *On Sonic Art.* Routledge, 1996. p. 15.

[62] Infinite thanks to Tom Erbe and Miller Puckette for their help in refining my initial convolution engine into something that was significantly less likely to deafen the audience.

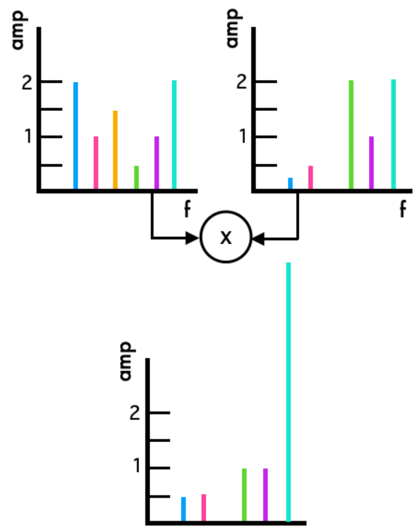

Figure 16. Extremely simplified representation of the multiplication of spectra in one computational block of convolution.

characteristics of both of the original signals (Fig. 16). This creates liminal, ambiguous spaces that engage with a listener's sonic expectation generation mechanisms about the behaviors of different sounds sources in interesting ways.

Because of the multiplicative nature of convolution in the frequency domain, it is somewhat unpredictable and can result in volatility in the amplitude of the resultant signal. This proved to be extremely problematic at the first tech rehearsal, particularly with eight hot microphones on stage, two of which unfortunately had to be pointed directly at stacks of speakers at ground level because of the lack of flown speakers in Mandeville Auditorium.

In order to gain more control over the dynamic range, compression is applied bin by bin in the frequency domain of the convolution operation, limited by the square of a squelch parameter. Because of the high resolution of this frequency-dependent dynamic range compression, the squelch parameter also became a useful tool for controlling the intelligibility of the final result (particularly when vocal signals were used). Higher squelch values resulted in a flattening of the spectral profile of the sounds (leading to a "noisier" quality in the sounds), whereas low squelch values capture more the dynamic range.

Composing for large ensemble and completely live electronics (and particularly live electronics that incorporate potentially volatile elements) is like dancing with a ghost. While one may have a vague notion of the form and structure of the orchestration of the piece, it is impossible to fully audiate the precise, expected outcome and orchestrate accordingly. It is certainly possible to create small-scale tests during the compositional process to run through the software in order to experience what sounds may result, but it is impossible to capture the sound of the entire orchestra until the first rehearsal, by which point the compositional process would have long been completed.

Additionally, because of the completely live nature of the sounds, it is often impossible to notate the outcomes in the score, and thus is impossible for a conductor to imagine when approaching the piece for the first time. The first rehearsals of pieces in this paradigm often take place without electronics, and admittedly, to hear the piece without the electronics is terrifying and empty. The immediate impulse is to somehow counteract this by over-orchestrating, but in order for the electronics to feel integral, space must be carved out just as one would do for any other instrument. *luscinia* is notably extremely sparsely orchestrated so that the more subtle components of the electronics are fully audible, which required a great deal of trust from all parties during the early rehearsal process. This speaks to the strength of community, and I am grateful to Prof. Schick and the La Jolla Symphony for trusting me during the process of bringing the piece off the page.

The most important aspect of the use of convolution in an orchestral context such as in *luscinia* is that on a practical and philosophical level, it is a process that requires the participation of a community in order to activate, support, or uncover sounds, *voices*, that have been silenced. Convolution is a process that most accurately reproduces original signals when all frequencies are present in some way. This may seem like noise to an outside observer, but in reality, it can be a mark of a community that delights in diversity and direct action. Convolution is, in this context, a metaphor for personal responsibility, advocacy, and community engagement.

2.4 Glitches

Glitch aesthetics again inform the compositional process in *luscinia*, which is appropriate given the structural importance of brokenness and trauma to the story. Perhaps relying too heavily on filmic sound design tropes, the piece begins with swells of static and tinnitus-like high frequency traces, signifying the entrance into a space defined by both technological and psychological states of dysfunction.

In a similar manner to *sear*, performers are asked to bring forth sounds from their instruments in unusual, non-idiomatic ways - or to use instruments that aren't typically used in an orchestral context. While the palette of extended techniques and found objects is much reduced in *luscinia* as compared to *sear*, the first acoustic sounds that listeners are treated to in the bass solo are of potentially unidentifiable origin given the unusual mode by which they are produced.

Sonic textures are replete with interrupted, stuttered fragments of inhalations and whispered text, belying nonlinearity and the ablation of narrative - a state of nonsense. I also contributed extended vocal components evocative of glitches and nonlinear modes of vocal production such as vocal fry and throat singing, all of which are produced without the aid of articulative elements such as the tongue and teeth, inspired by Ovid's original tale.

While these are all intended behaviors that were chosen to be reminiscent or suggestive of glitch aesthetics, there was one very notable *actual* glitch that resulted from digital signal processing. One of the more interesting and unexpected artifacts of the convolution engine is stuttering. Because I chose a larger computational block size to allow for greater frequency resolution, there is higher latency and the overlap-add process becomes more apparent, particularly with short-duration sonic events such as the pops and clicks that result from the bass solos and the chirps from the squeaking of the toy bird calls. Initially, I was concerned about the regularity that this imposed on some of the less pulse-oriented elements of the piece, but in terms of balancing frequency resolution with these artifacts, I chose to view it as a feature rather than a bug, and one that was actually reminiscent of the chirrups exhibited by the nightingale's song.

2.5 Randomness and agency

A key component of this piece involves the abdication of agency, facilitated by randomness.[63] Certain compositional "decisions" were reserved for the patch to make in real time. Because I received more submissions than I anticipated from the call for materials and did not feel as if I could choose whose materials to include, I allowed the software to do so for me. I divided the materials up by spectral characteristics to ensure that the output of the patch would be in line with orchestrational ideas that had guided my compositional process, but within those broad categories, I allowed the patch to choose randomly. (This decision

[63] Or, I suppose if we're being technical, pseudorandomness.

does also represent an element of DPDR in terms of feelings of compromised agency, and also the larger randomness associated with the onset of symptoms.)

In the final section of the piece, the software recalls vocal samples that it randomly chose earlier and convolves them with random choices of recordings of instrumental materials from earlier in the piece. This plays on the listener's memory, but also exemplifies how fragments of memories or sensations can surface unexpectedly in trauma responses.

Because of these elements of randomness, no two performances will ever be the same (in fact, the electronic output of the only two performances that have occurred have been drastically different), and a space of possibility is created. The piece itself becomes a body, animated by this uncertainty and infinite potentiality.

CHAPTER 3: COMPLEX ELECTROACOUSTIC TRANSDUCTION IN *EXCISION NO. 2*

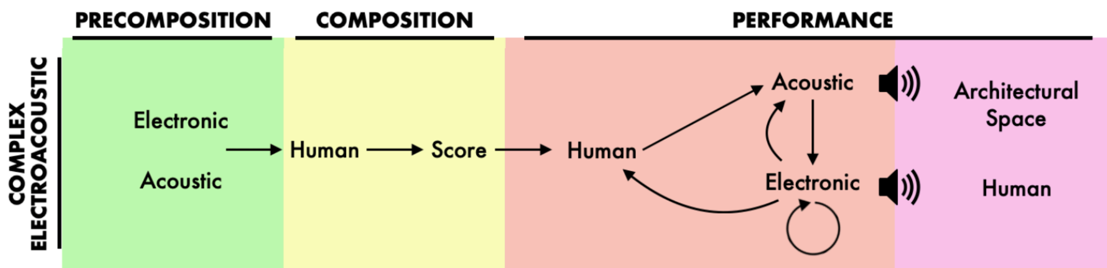

Figure 17. Bodies and modes of interaction involved in musicking in the complex electroacoustic transduction paradigm.

I define a complex electroacoustic transduction paradigm as one which involves human, acoustic, and electronic bodies with feedback pathways embedded not just within the interaction of the electronic elements, but also in direct conversation with the performer's ability to carry out the actions prescribed in the score in relation to acoustic bodies involved in the performance (Fig. 17). The human performer's agency engages in conversation with that of the electronic performer, and the electronic performer, through literal transduction, is able to interfere with the human performer's physical actions. Because of this physical interference, the human performer makes adjustments in response to the sonic output generated by the electronics, and the electronics are of course influenced by the sonic information being generated by the performer's interaction with the acoustic body.

Figure 18. Transducer affixed to the back of the viola.

excision no. 2: they didn't know we were seeds is a piece scored for viola and live electronics, although in addition to the software, the electronics also include a transducer fitted to the viola (Fig. 18). The electronics are able to directly influence the sonic information that the performer creates by way of this transducer, which imparts vibrations to the body of the instrument and thus interferes with the performer's ability to carry out the subtle, fragile actions prescribed in the score. In addition, the electronic bodies (the microphone, the software, and the transducer) are in conversation with each other, constantly modifying themselves in a feedback paradigm and also physically interacting with the sound production capabilities of the human performer and the viola.

This type of multi-layered transduction paradigm necessarily questions agency on many different levels, physically reifying disconnects experienced in DPDR in addition to societal resistance that people may feel when speaking truth to power. Additionally, the feedback pathway between the microphone and the transducer results in an inherent instability, which causes the performer to further modify their behavior to avoid collapse. *excision no. 2* forces the performer to walk a sonic tightrope, with complete failure never more than a stiff breeze away.

3.1 Program Notes

Building on much of the technological and conceptual work at play in *luscinia*, *excision no. 2: they didn't know we were seeds* expands the tools and feedback loops involved to further explore issues of silence, agency, and complicity in response to trauma from sexual assault. It is the second in a series of pieces for solo instrument and live electronics, all based on examinations of trauma responses.

The phrase "they didn't know we were seeds" comes from the sentence "They tried to bury us, but they didn't know we were seeds," which has experienced varying levels of usage over the 50 years, most recently in protests responding to the Trump administration's policy of forced separation of families at the southern border of the United States. The origin of the phrase is unclear, but according to media scholar Alexandra Boutopoulou, it appears to have been written in 1978 by Dinos Christianopoulos and included in a collection of poetry entitled *The Body and The Wormwood (1960-1993)*.[64] The English translation, published in 1995 by Nicholas Kostis, reads "what didn't you do to bury me / but you forgot that I was a seed." This couplet has since been translated into many other languages and been used as rallying cry or protest chant by people silenced by oppressive regimes or structural inequality. It was perhaps most ubiquitous in the wake of the kidnapping and murder of 43 students in Iguala, Mexico in 2014 as the phrase "Quisieron enterrarnos, pero se les olvido que somos semillas."

The notion of a seed takes on an interesting significance in the context of a framework for theorizing DPDR which defines the lack of identification with a body as the result of drained affective potential in a stalled state of incomplete transduction. A seed, while full of potential, is also trapped in a state of dormancy, frozen in a liminal state of incomplete transduction, unable to effect change on its own. It contains promise, but requires action.

3.2 Sonic Objects

There are two primary categories of sonic objects that inform the compositional process in *excision no. 2,* again, in both material and process:

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[64] Xiao, An. "On the Origins of 'They Tried to Bury Us, They Didn't Know We Were Seeds.'" *Hyperallergic*, 2018, https://hyperallergic.com/449930/on-the-origins-of-they-tried-to-bury-us-they-didnt-know-we-were-seeds/.

seeds and vocal sounds.

3.2.1 Seeds

While the types of actual vibrations that might result from the growing of seeds would typically take place over timescales that are too long and at amplitudes that are too small to meaningfully record, the idea of something textured, granular, and subterranean resultant from the image of the roots of a seed pushing through soil greatly influenced the sonic materials I used as starting point for the piece. I was also inspired by the soundscape of David Dunn's *The Sound of Light In Trees*, which records the signals from tiny microphones embedded in pinyon pines in order to capture the muffled pops, clicks, and chewing noises of bark beetles gnawing on the wood.[65] The creaks and scrapes involved in *excision no. 2* have a similar granular quality to them, and indeed, at m. 22 (1:55 in the video) granular synthesis is used in order to recombine tiny portions of them to create materials with new sonic textures, some bearing an uncanny resemblance to bodily sounds such as cracking knuckles or chattering teeth.

However, rather than just suggesting possible timbral materials and temporal dynamics of those materials, the notion of the seed takes on structural importance in that a majority of the electronic materials in the piece are derived

[65] Dunn, David. "The Sound of Light in Trees." The Sound of Light in Trees. CD Baby, 2007.

from a recording of the first 12 seconds of acoustic portion of the piece, through pitchshifting, filtering, playback speed manipulations, granular synthesis, and other modes of feature extraction-driven synthesis. This material is produced by placing the bow perpendicular to the strings as one normally would, but instead of drawing the bow across the strings, the performer slowly moves the bow along the strings toward the scroll - a vastly slowed-down version of one of the behaviors involved in the bass solo at the beginning of *luscinia*. This results in a textured, turbulent scraping sound, the spectral profile of which slowly transforms as the vibrating length of the string is changed. When fed into a convolution engine, this spectral transformation changes which portions of the vocal samples are reinforced, which necessarily manipulates the intelligibility and affect of the sounds. This subtle pitch and timbral shift also evokes a material being stretched or changing in length, much like radicules or shoots emerging from a seed underground and pressing through the soil.

Beginning at m. 60 (4:35 in the video), these scraping sounds return, except in multiple pitchshifted copies, with the parameters controlling the degree of pitchshifteing derived from contours of the vocal sample underlying the noisy surface of the piece. It is as if roots are growing around the voice, weaving a tapestry and feeding off the lost body that it suggests. The viola's material becomes more and more strident and defiant, attempting to break free, but is eventually subsumed by the increasingly-noise-based component of the electronics.

3.2.2 The Voice

Much like *luscinia,* the other main category of sonic object used in the piece is comprised of vocal sounds. The two primary samples used include a recording of Chanel Miller's 2016 victim impact statement at the trial of Brock Turner,[66] and Christine Blasey Ford's testimony before the Senate Judiciary Committee in 2018.[67] After undergoing the processes that result in glitches and other interventions in the software, these materials are never fully comprehensible or identifiable in any way during the piece without the prior knowledge that they have been incorporated, but still inscribe their histories and contexts into the sonic landscape. Again, vocal techniques based on nonlinearities also enter into conversation with instrumental sounds through the process of convolution, imparting the sonic landscape with uncanny creaks, groans, and wails resultant from amalgamating the spectra of states of strained sonic production. While many of the sonic objects taken at face value may seem saturated and overly-similar, they rely on the uncanny valley in order to evoke, draw in, and repulse a

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[66] Baker, Katie J. M. "Here's The Powerful Letter The Stanford Victim Read To Her Attacker." *Buzzfeed News*, 2016, https://www.buzzfeednews.com/article/katiejmbaker/heres-the-powerful-letter-the-stanford-victim-read-to-her-ra

[67] "Supreme Court Nominee Brett Kavanaugh Sexual Assault Hearing, Professor Blasey Ford Testimony." *C-SPAN*, 27 September 2018, https://www.c-span.org/video/?451895-1/professor-blasey-ford-testifies-sexual-assault-allegations-part-1.

listener through their resonance with the concept of bodies, human or otherwise.

3.3 Glitches

Whereas glitch aesthetics are appealed to in the previous chapters, *excision no. 2* expands the ways in which the software is pushed to its limits to produce unexpected behaviors.

A granular synthesis engine was designed to randomly select points in a sound file at which to begin playback, and then repeat tiny portions a randomly-selected number of times before continuing with the playback of the selected portion of the file. This results in stutters, clicks, and skips, ultimately ablating any sense of continuity and intelligibility of the original sound file. This technique is most apparent at m. 47 (approximately 3:30 in the recording), where the musical material in the viola is at its most sparse and most narrowly-defined in terms of frequency range, which should allow for the clearest comprehension of the whispered text. Unfortunately, only 12 measures later, the recordings from the beginning of the piece come back with a vengeance, weaving a noisy rhizomatic structure that enmeshes and overwhelms both the stuttered whispers and the pitched material in the viola.

Because of the many feedback loops involved both within the hardware and software and between the different bodies involved in performance, the possibility of failure is not insignificant. In fact, the piece is conditioned on the failure of the performer to exert complete control over the process of acoustic sound production; in the final portion of the piece (beginning in m. 123, or 8:10 in the video), the transducer imparts vibrations to the viola. Because of the delicacy and fragility of the physical gestures involved in the human's participation in the performance, such as the production of very unstable harmonics or the scraping sounds from before, these vibrations can significantly interfere with the ability of the performer to carry out the actions prescribed in the score. Rather than focusing on traditional principles that guide orchestrational choices, I have chosen to orchestrate failure.

Feedback between the transducer and the microphone further introduces potential nonlinearities into the system, creating the possibility of the creation of very uncomfortable situations for the performer and the audience. In order to moderate these potentialities and safeguard the ears of everyone in the hall, a pitch shifter[68] is employed, activating when the rate of change of the volume exceeds a certain value. This shift in pitch undercuts the unstable growth of the amplitude of the signal, allowing the system to regulate itself. Additionally, a limiter is applied to the sound so that the volume can never actually get to a point that is injurious, but the audience does not know this. The audience and the performers alike are conditioned to swiftly protect themselves from even the

[68] Interestingly enough, the pitch-shifting modality being used involves the constant changing of delay times, which is actually an elegant illustration of Massumi's assertion that bodies (or states of being) are defined by constant underlying flux.

suggestion of feedback, particularly since we engage with it in very visceral ways. Artist Christine Sun Kim, in discussing the role of feedback in her performance process, notes that “Feedback can often be fierce and rough, which sends vibrations through my body. It becomes physical. It moves my body.”[69] Even working with the knowledge that a critical state is impossible given the ways in which the software is designed, feedback in this sense is still a force that in some ways, usurps agency from the performer and the listener.

However, a performance on the edge of failure is required to illuminate, essentialize, and sublimate the vocal material. The feedback loops between the vocal samples being played into the viola with the transducer will draw out the resonant frequencies of the system as the sound activates the viola and software in a manner similar to Alvin Lucier’s *I Am Sitting In a Room*, though on much shorter timescales. Consonants and other articulative elements of speech are erased, leaving only vowels and the resonant frequencies of the voila and electronic system. Through feedback, which could be seen as an extreme temporal compression of the act of repeating a phrase over and over, speech is sublimated to song, though one that is characterized by a steady state of brokenness.

<u>**3.4 Silences**</u>

[69] Selby, Todd. *Christine Sun Kim: A Selby Film.* The Selby, 2011. https://www.nowness.com/story/todd-selby-x-christine-sun-kim.

While the piece does take the voice as one of its departure points, the idea of silence is still an animating force. It is encouraging to see so many people willing to speak out against abuse, now three years after the increase in awareness brought about by the intensification of the #MeToo movement. However, the intentional incomprehensibility of the vocal elements of the piece reflects the reality that many, many survivors of sexual violence and abuse still have not been heard in the sense that they have not received any semblance of justice. Brett Kavanaugh was confirmed to the Supreme Court, and Brock Turner, while convicted of three counts of felony sexual assault, was released after serving a mere 3 months in a county prison. In a paradigm all too familiar for many of us, a signal was sent, but clearly not received.

One advantage to working with live electronic components in performance is that source materials can easily be switched out and manipulated, allowing for a long-term evolution, a long-term *transduction,* of the piece as it passes through the bodies of new performers. The piece is able to take on a life of its own, adaptable to changing conditions of performance and societal contexts. I have had numerous performers approach me and ask if they could record or collect their own materials for use in the patch (though all of these scheduled performances were unfortunately canceled due to the pandemic). Rather than a reified lost body, the piece itself becomes a seed, replete with all attendant potentialities.

3.5 Future Directions

While I have written more pieces that continue to use similar materials and methodologies as the three discussed in this dissertation, I do feel as if I have done what I have set out to do in terms of processing trauma through sound. In 2018, the LA Phil New Music Group premiered *…for we who keep our lives in our throats…,* a piece which uses many of the same techniques as the previous three to locate lost bodies (I sadly was not allowed access to a recording). In his 2018 year-end review for the *New Yorker*, music critic Alex Ross claims that

> [he] was shaken by Tina Tallon's *…for we who keep our lives in our throats…*, a response to sexual abuse. The electronic portion of the piece evokes, in Tallon's words, the 'muted whispers, tortured murmurings, and choked admissions of those who have been forced to remain silent far too long.' Agonizingly, those voices do not quite succeed in being heard: after hovering at the edge of comprehensibility, they lapse back into the fractured texture from which they emerged.[70]

While I have spent the better part of the decade processing my trauma through my creative practice, I am admittedly quite ready to stop hovering at the edge of comprehensibility. My compositional output has slowed to a trickle over the past three years, not only because of a demanding teaching and work schedule, but because the act of sitting down to write every day has required overcoming increasingly higher and higher amounts of activation energy. For me, writing music (and writing words about music) has become a process of continual re-

[70] Ross, Alex. "Notable Performances and Recordings of 2018." *The New Yorker*, 2018, https://www.newyorker.com/culture/2018-in-review/notable-performances-and-recordings-of-2018.

traumatization. It is unsustainable. While articulating this theory and framework has felt cathartic in some ways, it is by no means comforting. Additionally, while I have reclaimed some elements of agency through this process, I also feel as if my agency has been completely usurped by merit of the fact that I haven't been able to write about anything else. Even writing this document and articulating my process has been a far more laborious and injurious task than I would have liked, which has further demonstrated to me that perhaps the best way to culminate my doctoral work is to leave it behind. I must begin another process of transduction, of changing the focus and form of the work in which I engage.

While people should absolutely be given time and space to process their trauma, if we are to move forward as a society, we will need to choose to traffic in an economic system defined not by trauma, but by hope and healing. We should be working to overhaul the systems of oppression that continue to create trauma. Society has reached an inflection point: our environment is on the brink of collapse, and natural disasters and pandemics are causing mass casualty events that might have been thought impossible in the twenty-first century. The rise of right-wing authoritarian regimes based in hatred and fear around the world have shown that passivity is not an option. Much like a celestial object nearing the event horizon of a black hole, we are on the brink of singularity, a catastrophic glitch, from which there is no escape. Unless drastic, collective action is taken, it is possible that we will soon sign our own death warrants.

One of the beautiful artifacts of chronic DPDR is empathy and the understanding that it is possible to exist outside of oneself, and that a multiplicity of viewpoints are valid and can be true simultaneously. That sometimes, when the self is difficult to locate, it is better to live for others.

The force currently animating both my creative practice and my research is a preoccupation with the technological mediation of the voice, and particularly how structural biases in the development of those pieces of technology have influenced whose stories are told and how throughout history. While many of them are path-dependent at this point, there is much to be learned from the past so that we don't make the same mistakes in the future. I draw inspiration from the work of incredible researchers and activists such as Joy Buolamwini, Timnit Gebru, Safiya Noble, Cathy O'Neil, Mar Hicks, Sasha Costanza-Chock and so many others who are uncovering technological biases and working toward creating a more equitable future. I hope to be able to join them in contributing to a better understanding of the technological underpinnings of systems of structural inequality, and in advocating for the responsible development and application of technology moving forward. Rather than focusing on ways to locate and reconnect lost bodies, through the work of technological and algorithmic justice, I hope to find new ways to prevent the generation of lost bodies in the first place, electric or otherwise.

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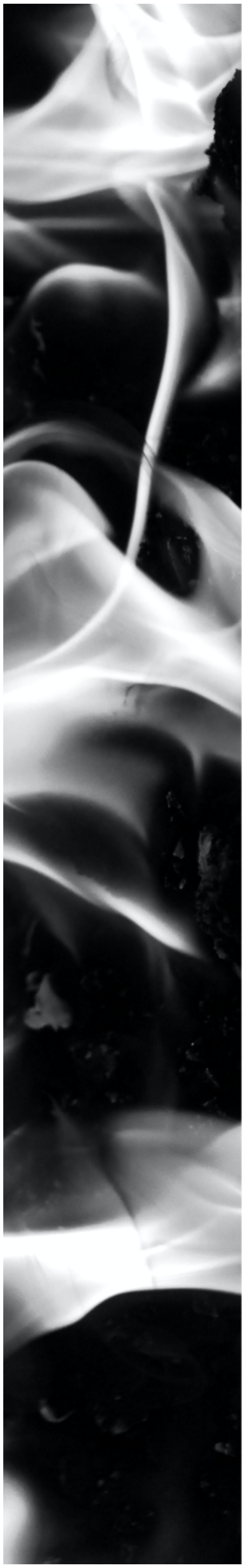
APPENDIX A

Musical Scores



sear

for chamber orchestra

tina tallon
2016, rev. 2017

sear

approx. duration: 7.5'

INSTRUMENTATION:

Alto flute (+ piccolo)
Oboe (+ high pen cap*)
Clarinet in B♭ (+ med. pen cap*)
Bassoon (+ lower pen cap* & power drill***)

Horn in F (+ bowl of 8mm tiny bells**)
Trumpet in B♭
Trombone

Piano (+harmonica in D)

Electric Guitar (+harmonica in C)

Violin I
Violin II (+ styrofoam)
Viola (+ styrofoam)
Cello
Contrabass

2 Percussion
    Percussion 1: Cymbals (high, med., low), Crotales (high octave)
    Percussion 2: Bowl of 6mm tiny bells**, Bass Drum, Vibraphone

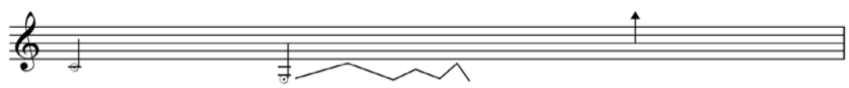
* Caps which give a very high-pitched variety of relatively centered tones are preferably to those with only a turbulent sound; for instance, blowing into them should sound similar to a whistle tone on a piccolo (though the partials will probably not be harmonic and they will be much more unstable). Pick three different pen caps with slightly varying pitches.

** I have had the most success with tiny jingle bells of 6mm and 8mm in diameter (high and low, respectively). Between 400-600 of these should be placed inside a relatively resonant ceramic bowl of about 12" in diameter, covered in thin foam (this minimizes the sound of the bells hitting the ceramic - we want to isolate the very high-pitched metallic sound of the bells jingling and hitting each other). In general, one should just continuously circulate their fingers in the bowl (unless specific rhythmic articulations are called for).

*** A drill with continuously variable speed (as opposed to one with fixed speed modes) works best.

NOTATION KEY

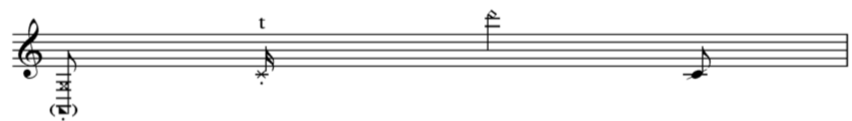
General woodwind/brass:



Blow air through instrument with as little pitch as possible; rather than identifiable pitches, different fingerings should lead to different colorations of noise.

Zig-zags indicate approximate contours of noise coloration, the generating technique and/ or fingerings by which this is accomplished to be determined by the performer.

Triangle noteheads indicate to play the highest possible clear, centered pitch (with as minimal a noise component to the sound as possible) allowable by the instrument at the marked dynamic.



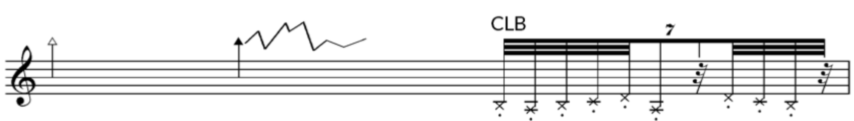
Tongue ram (approx. pitch notated below cross notehead in parentheses)

Tongue pizz with specific consonant

Whistle tone

Noise-laced pitched tone (halfway between pure colored noise and a pure pitched tone, this sound should have an identifiable pitch, but be breathy and turbulent)

Strings:

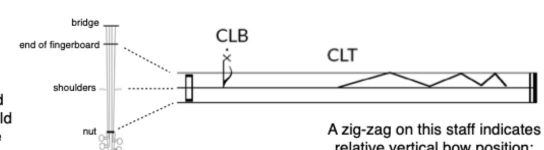


Triangle noteheads indicate to play the highest possible clear, centered pitch (with as minimal a noise component to the sound as possible) allowable by the instrument at the marked dynamic.

Zig-zags indicate approximate contours of pitch variance (some noise component may be allowed into the sound to accommodate pitch variance)

CLB indicated "col legno battuto," while notated pitches on a staff should be taken as the approximate pitches of the sound.

A staff with three lines delineates relative position of the CLB bow strikes along the fingerboard (oriented with the end of the fingerboard corresponding to the top line, and the nut to the lowest line). The left hand should mute all strings as close as possible to where the bow is striking the strings to limit resonance (sound should be very dry).



A zig-zag on this staff indicates relative vertical bow position; movements should occur only along the axis of the fingerboard, as opposed to across it (the way an instrument would normally be bowed).

PROGRAM NOTE

In 2015, I ruptured my left eardrum in a rather unfortunate audio programming accident. This accident left me with permanent hearing damage, which, as a composer, computer musician, and professional audio engineer, was a rather traumatic experience. My career depends on my ears (or so I thought at the time), and the thought of having to give it up was heartbreaking. I spent the next year and a half wondering whether my hearing would improve at all, and trying to figure out what I was going to do with my life if it didn't. One of the other lingering effects was tinnitus - I was left with a permanent ringing in my ears that became my constant sonic companion. At first, it was maddening. Some nights it was so overwhelming that I couldn't sleep.

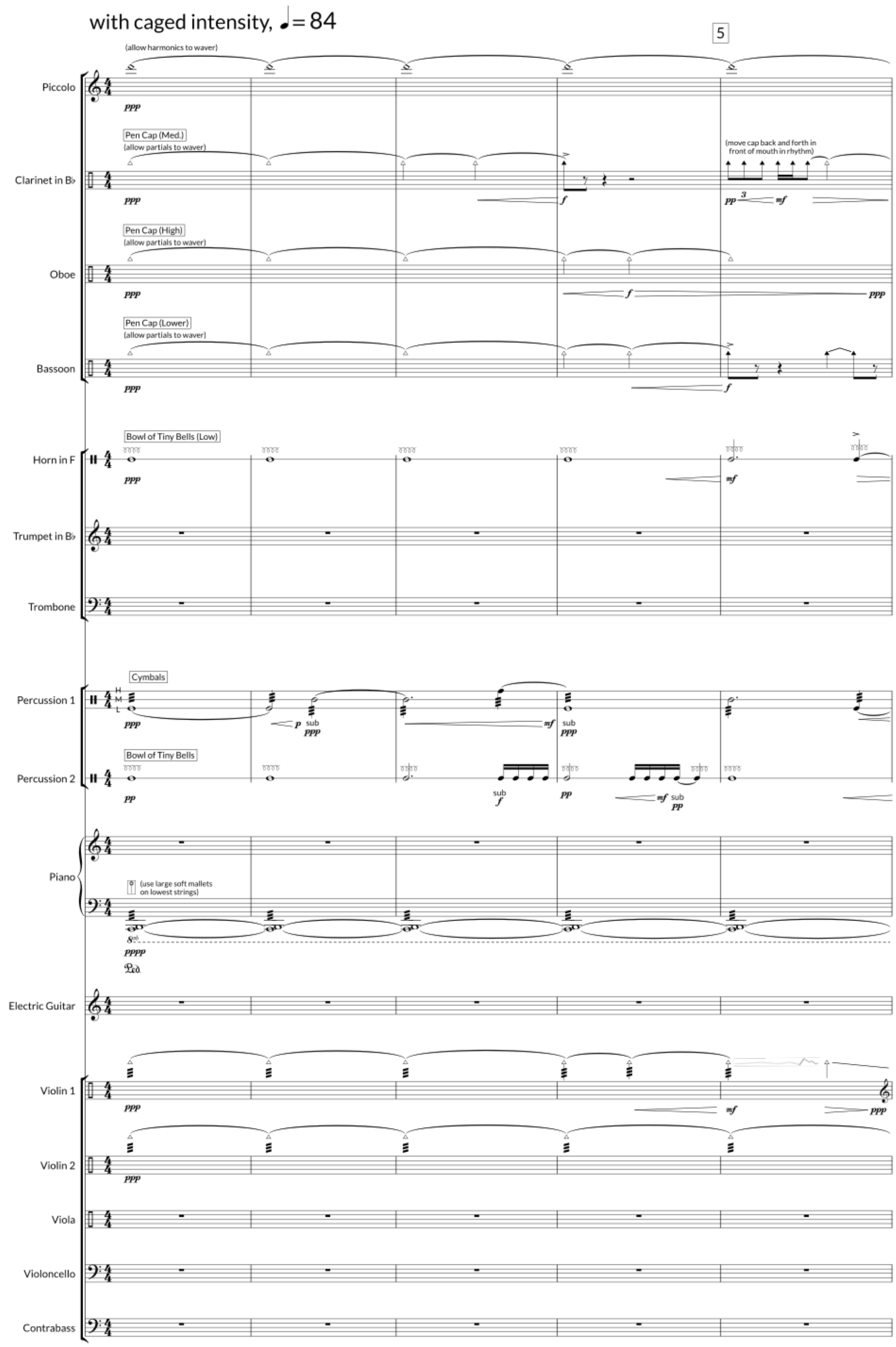
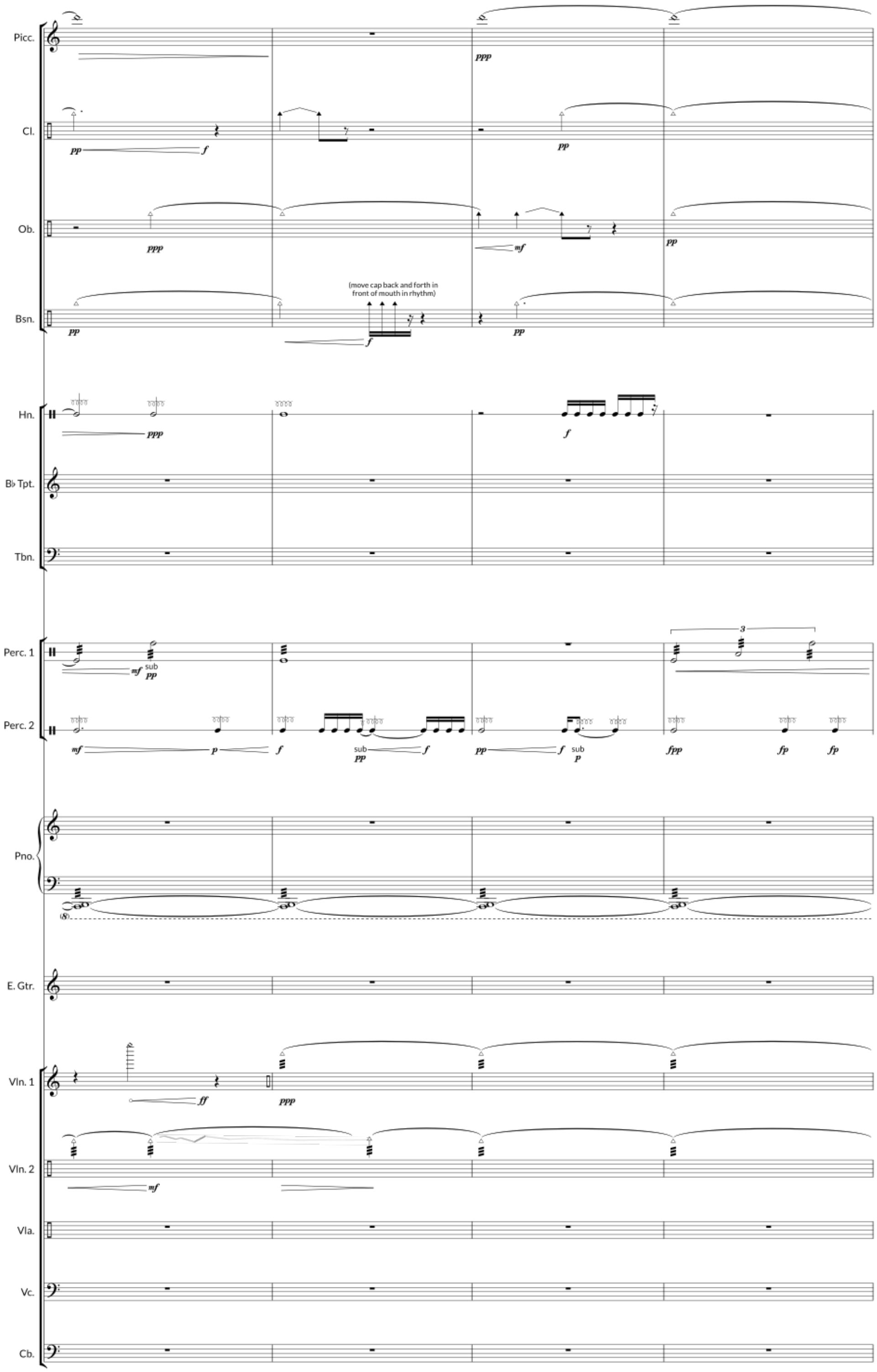
When I was given the opportunity to write a piece for the tour-de-force that is wild Up through the LA Philharmonic's National Composers Intensive, it was on an extremely accelerated timeline, which forced me to write what I knew - and sonically, there was nothing I knew better than my tinnitus. I began studying it in detail - how it changed, what alleviated it (spoiler alert: nothing), what exacerbated it, and ultimately, how it effected my life. I even used audio software to model what I was hearing each day and kept a digital sonic diary from which I could draw materials. This compositional process gave me a way of recontextualizing and reclaiming the sonic space between my ears, and allowed me to write a piece that finally let me reify the virtual sounds that had been tormenting me for the past few years.

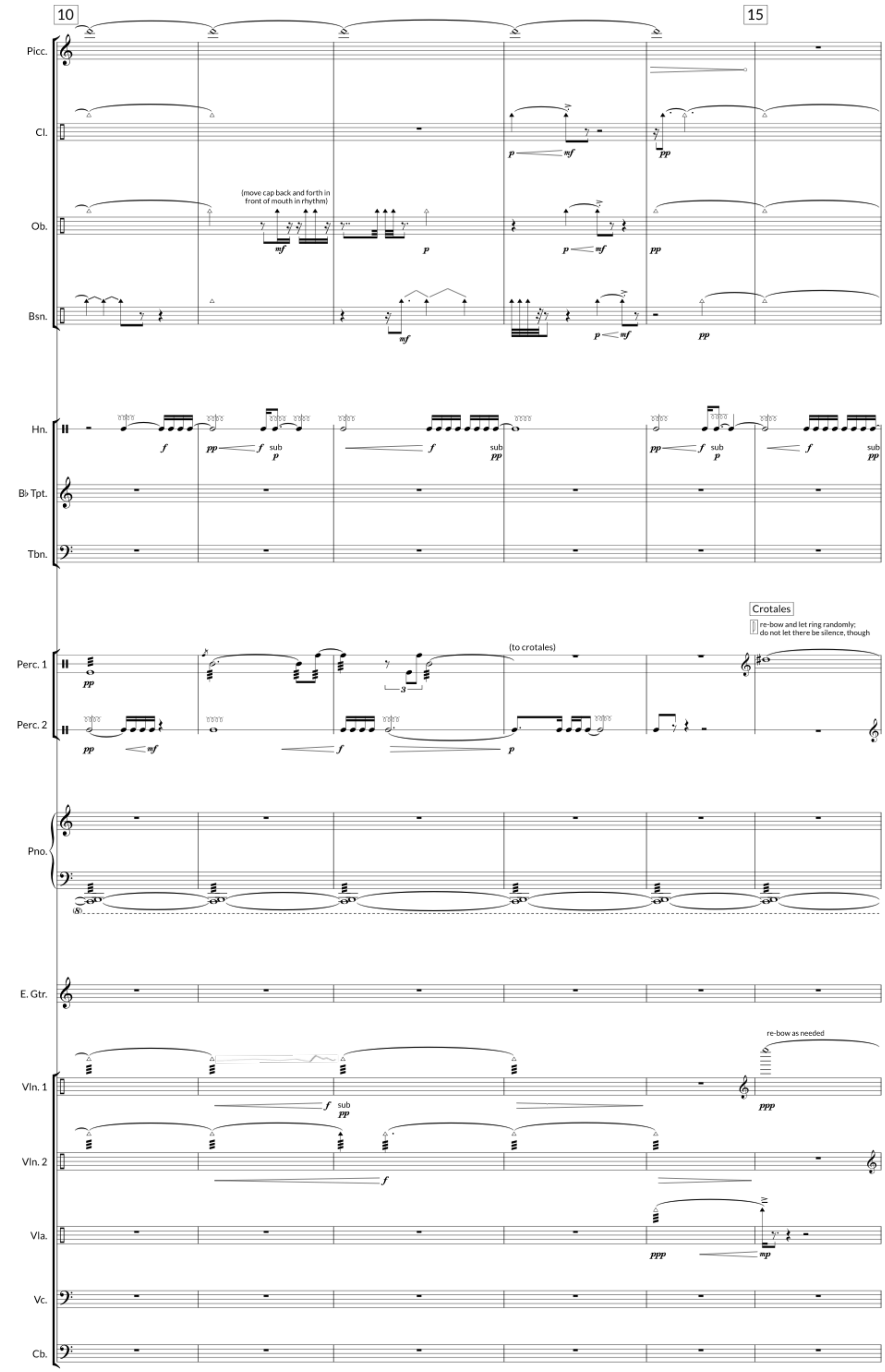
Visual/choreographic components are also important to the piece; one of the side effects of losing my hearing was becoming more attuned to the way that physical cues influence the way that we process sonic stimuli, and so there are sections in the piece during which musicians perform physical gestures that result in unexpected sounds (or a complete lack thereof). The piece is also deeply inspired by my engagement with electronic music, and makes use of objects (such as bowls of tiny jingle bells, styrofoam, a power drill, and pen caps) that aren't usually used in traditional orchestral repertoire in order to achieve a timbral palette that is unavailable to a traditional orchestra.

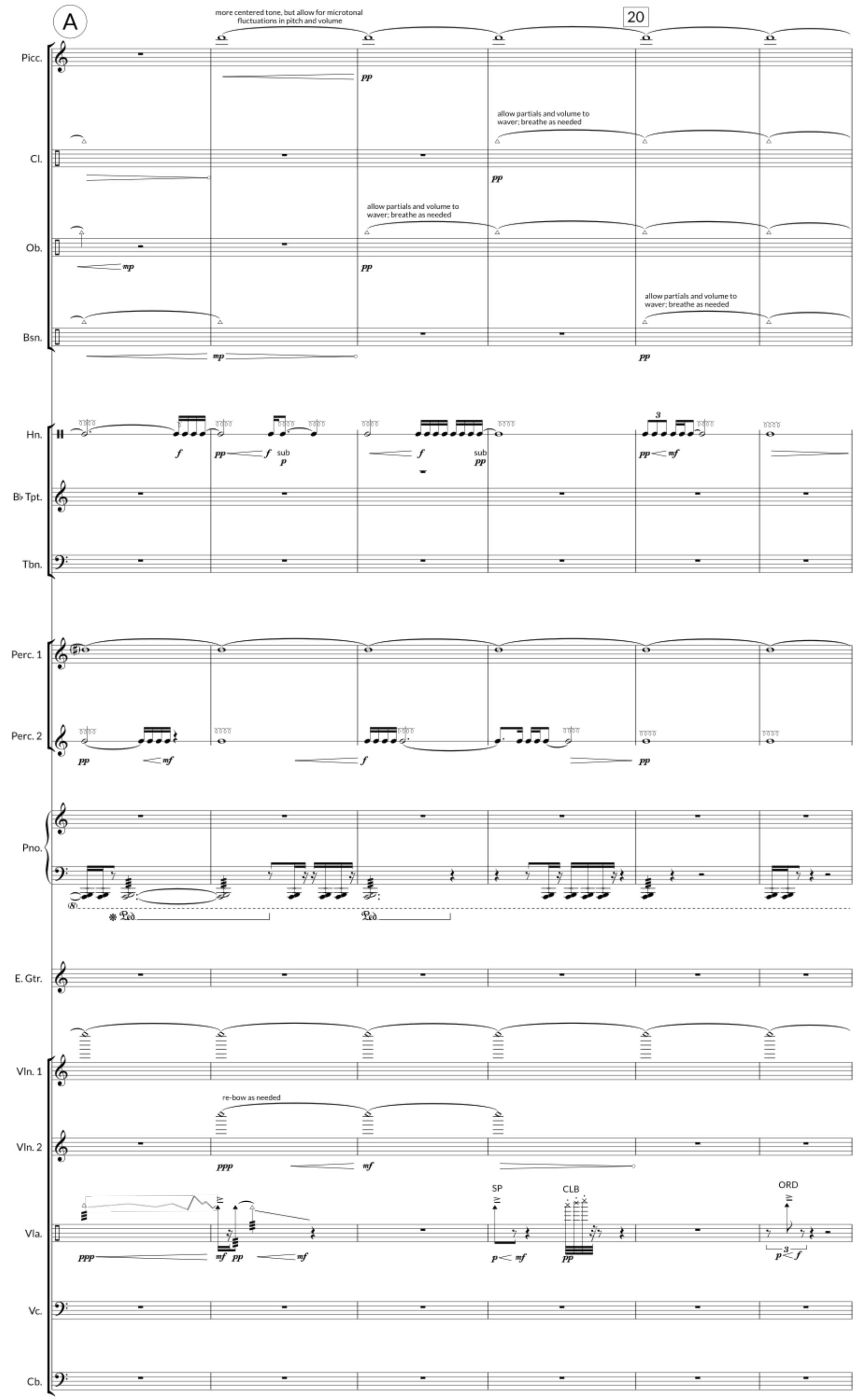
-Tina Tallon

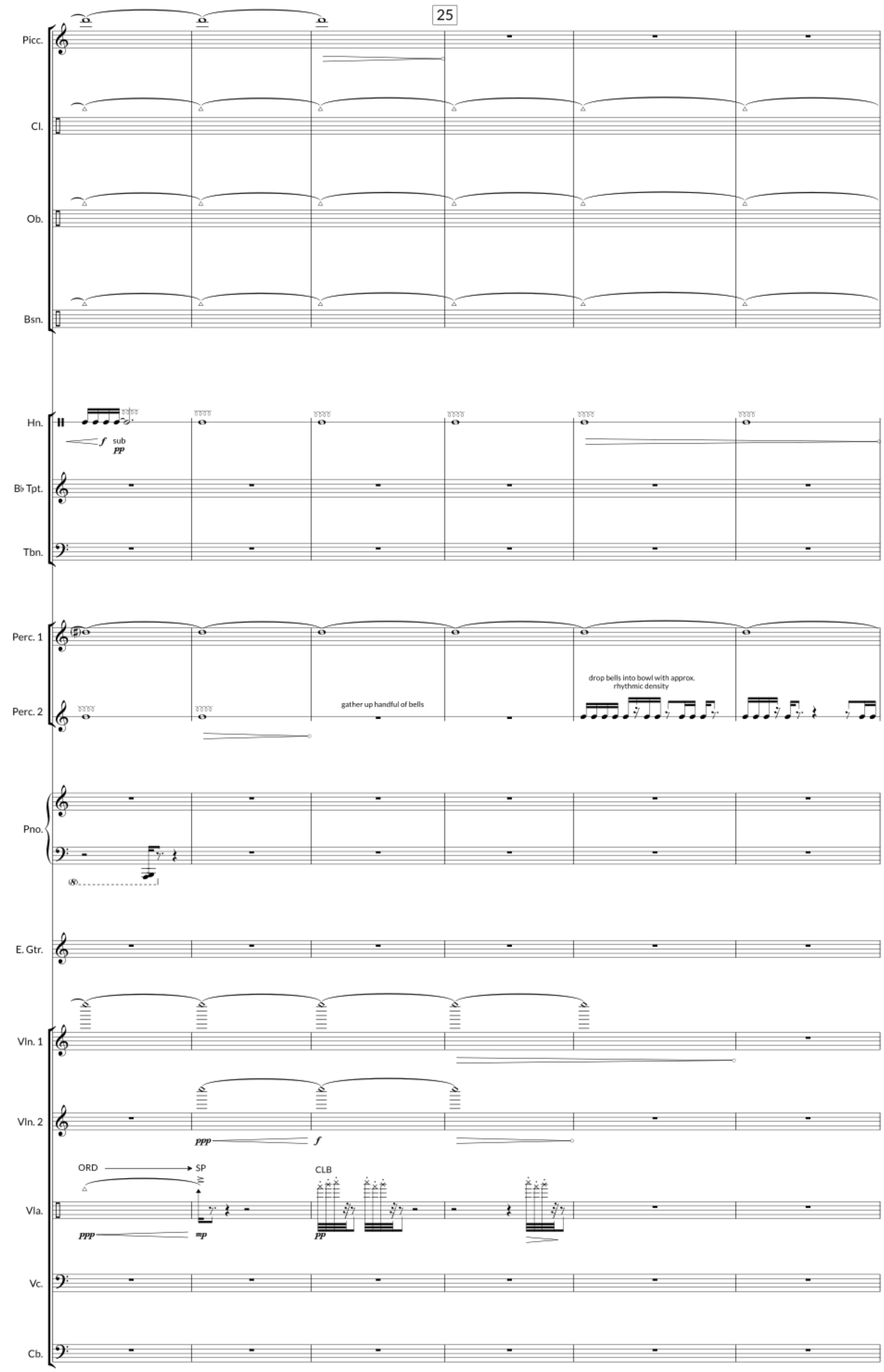
Transposed Score

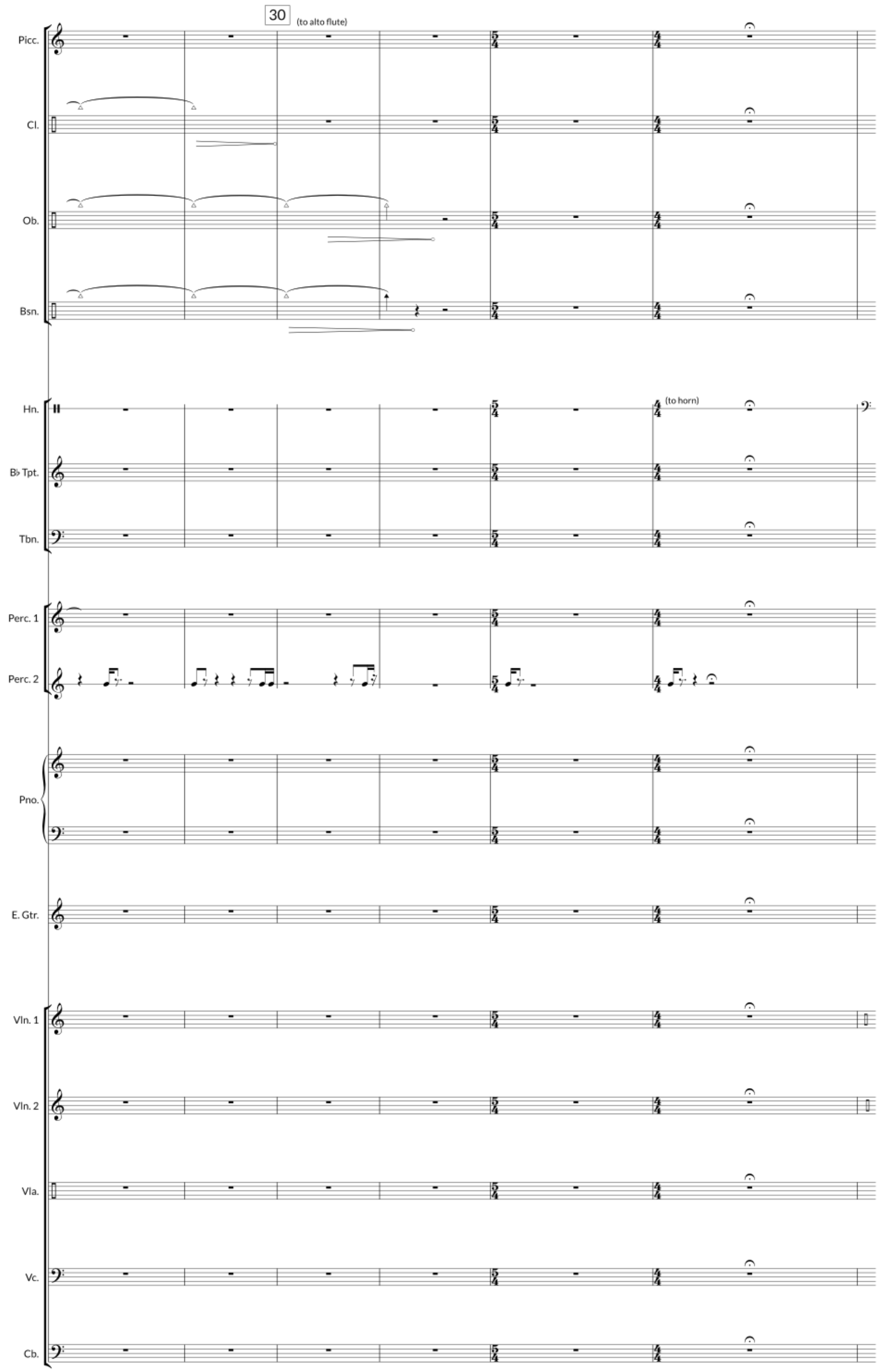
sear

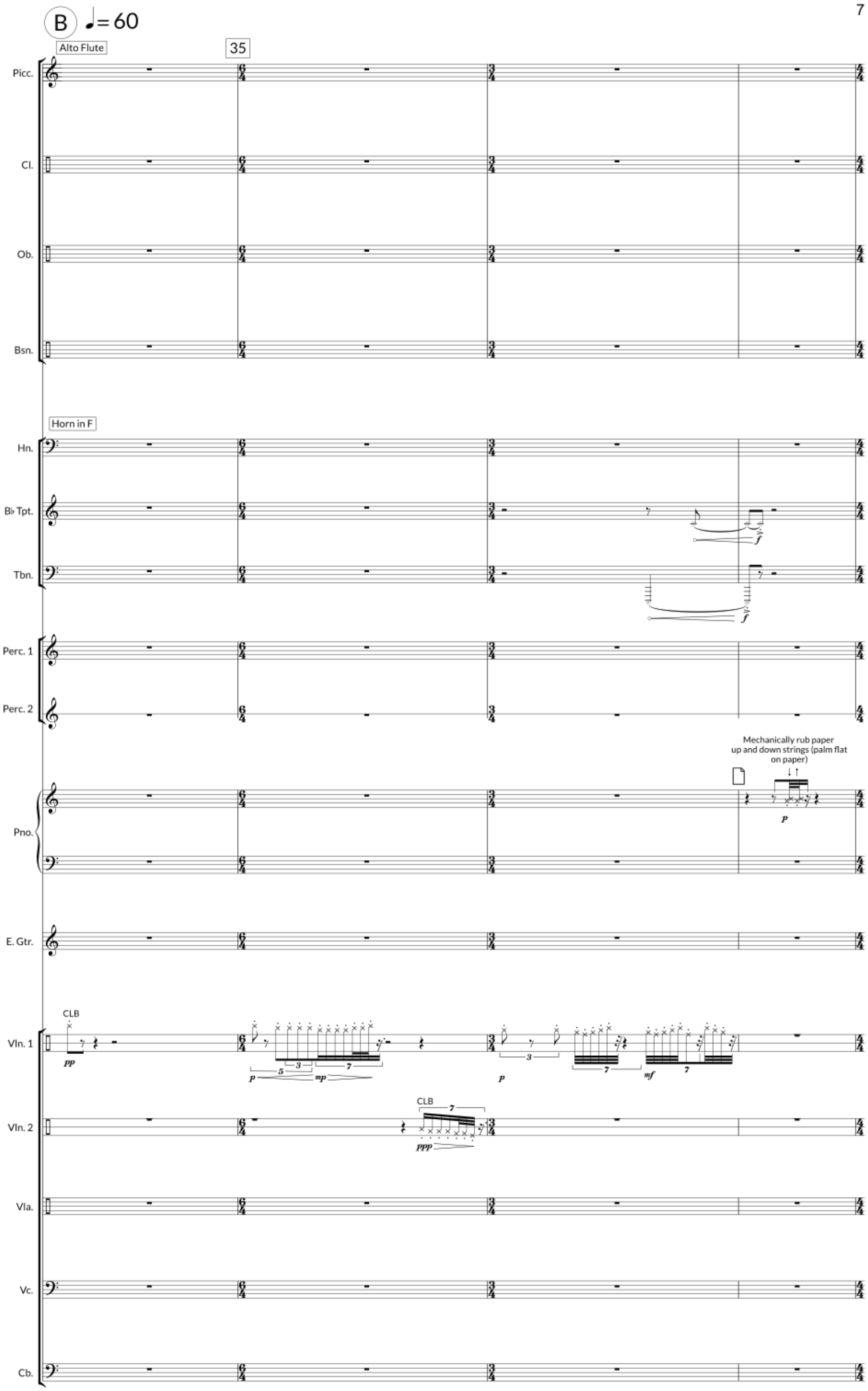
tina tallon (2016)


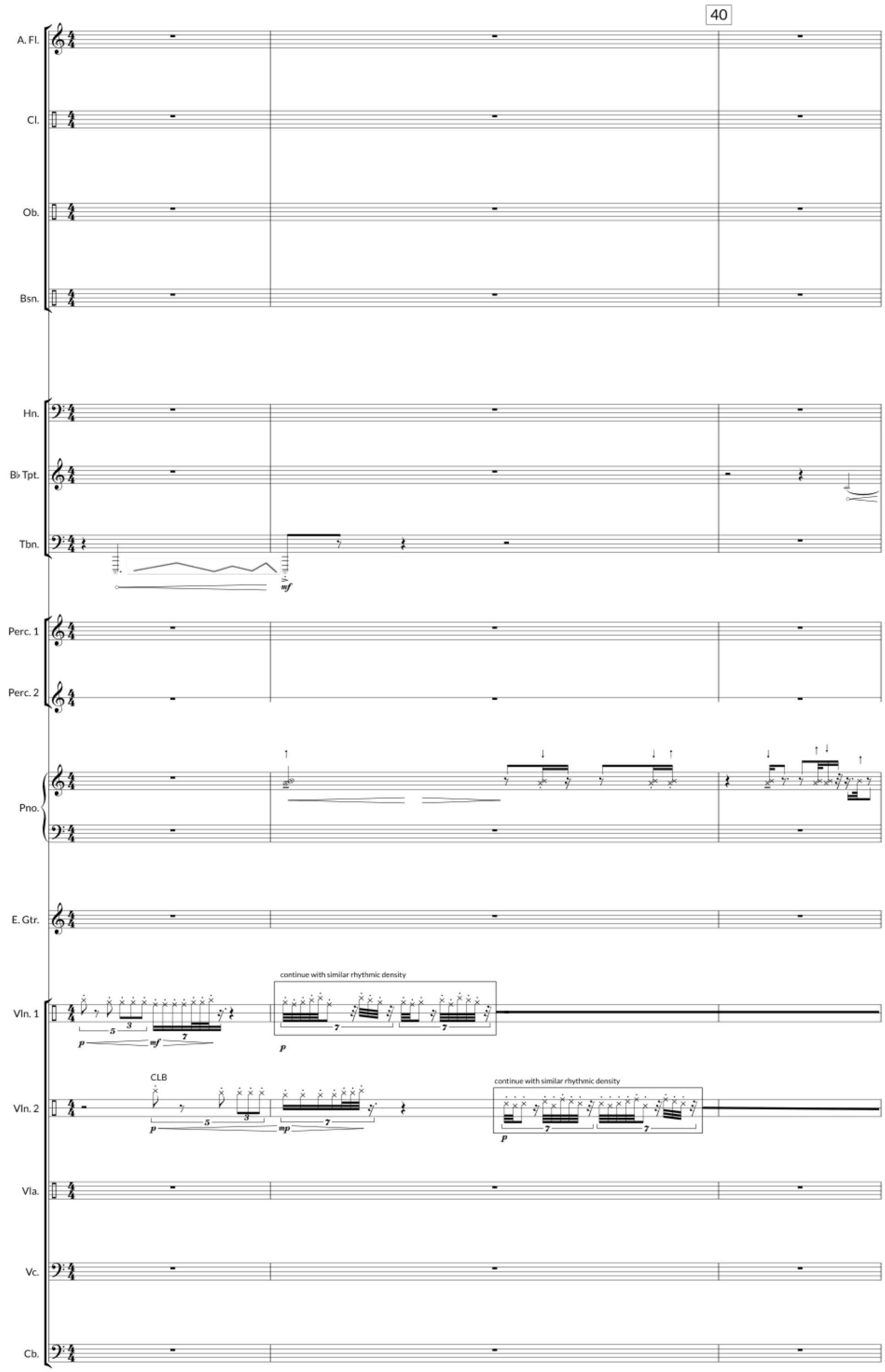
Picc.
Cl.
Ob.
Bsn.
(move cap back and forth in front of mouth in rhythm)
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.


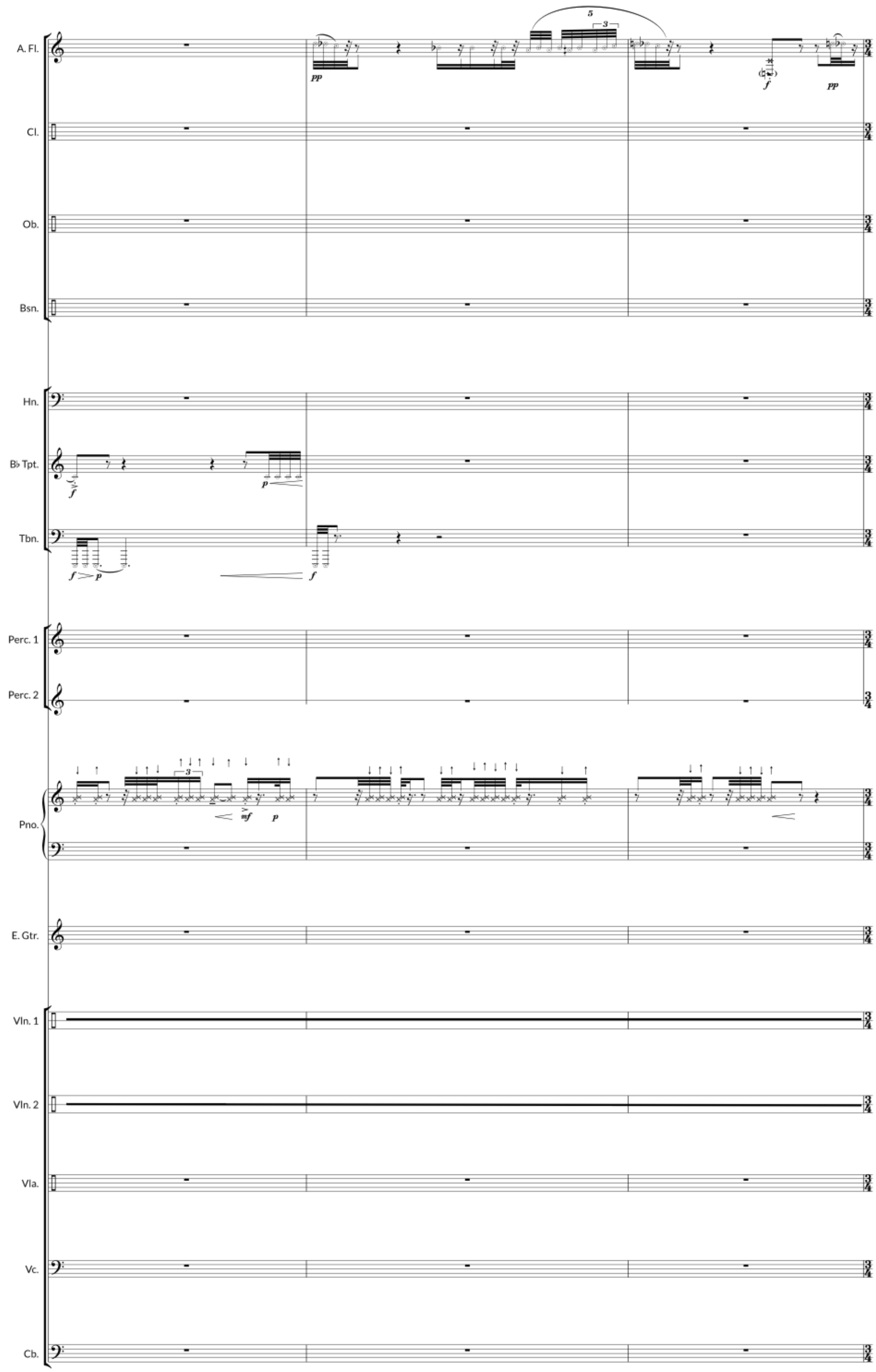
10
15
Picc.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
(move cap back and forth in front of mouth in rhythm)
(to crotales)
Crotales
re-bow and let ring randomly; do not let there be silence, though
re-bow as needed
sub


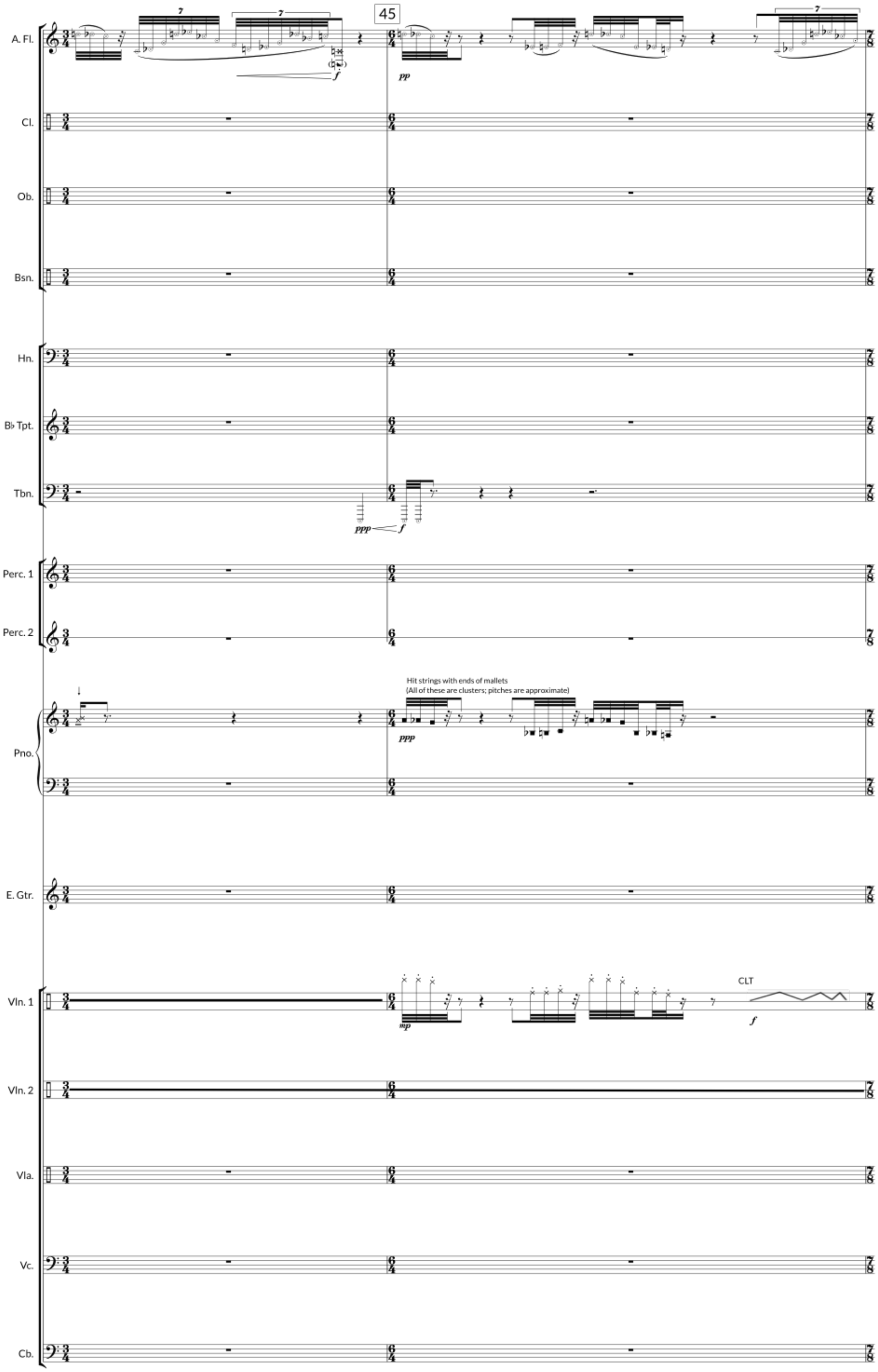
A
20
more centered tone, but allow for microtonal fluctuations in pitch and volume
Picc.
allow partials and volume to waver; breathe as needed
Cl.
allow partials and volume to waver; breathe as needed
Ob.
allow partials and volume to waver; breathe as needed
Bsn.
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
E. Gtr.
Vln. 1
re-bow as needed
Vln. 2
SP
CLB
ORD
Vla.
Vc.
Cb.


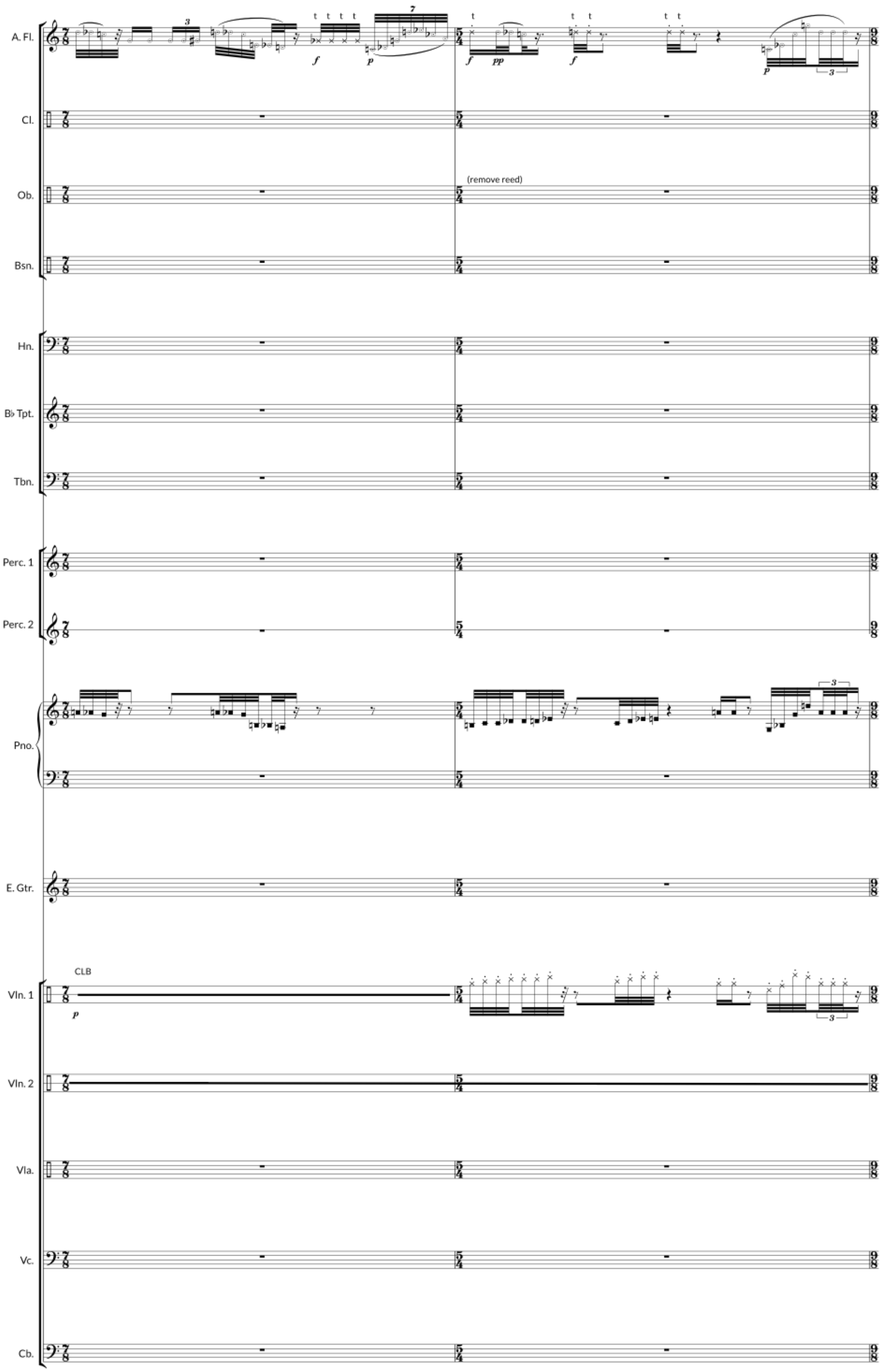
25
Picc.
Cl.
Ob.
Bsn.
Hn.
f sub pp
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
gather up handful of bells
drop bells into bowl with approx. rhythmic density
Pno.
E. Gtr.
Vln. 1
Vln. 2
ppp
f
ORD
SP
CLB
Vla.
ppp
mp
pp
Vc.
Cb.


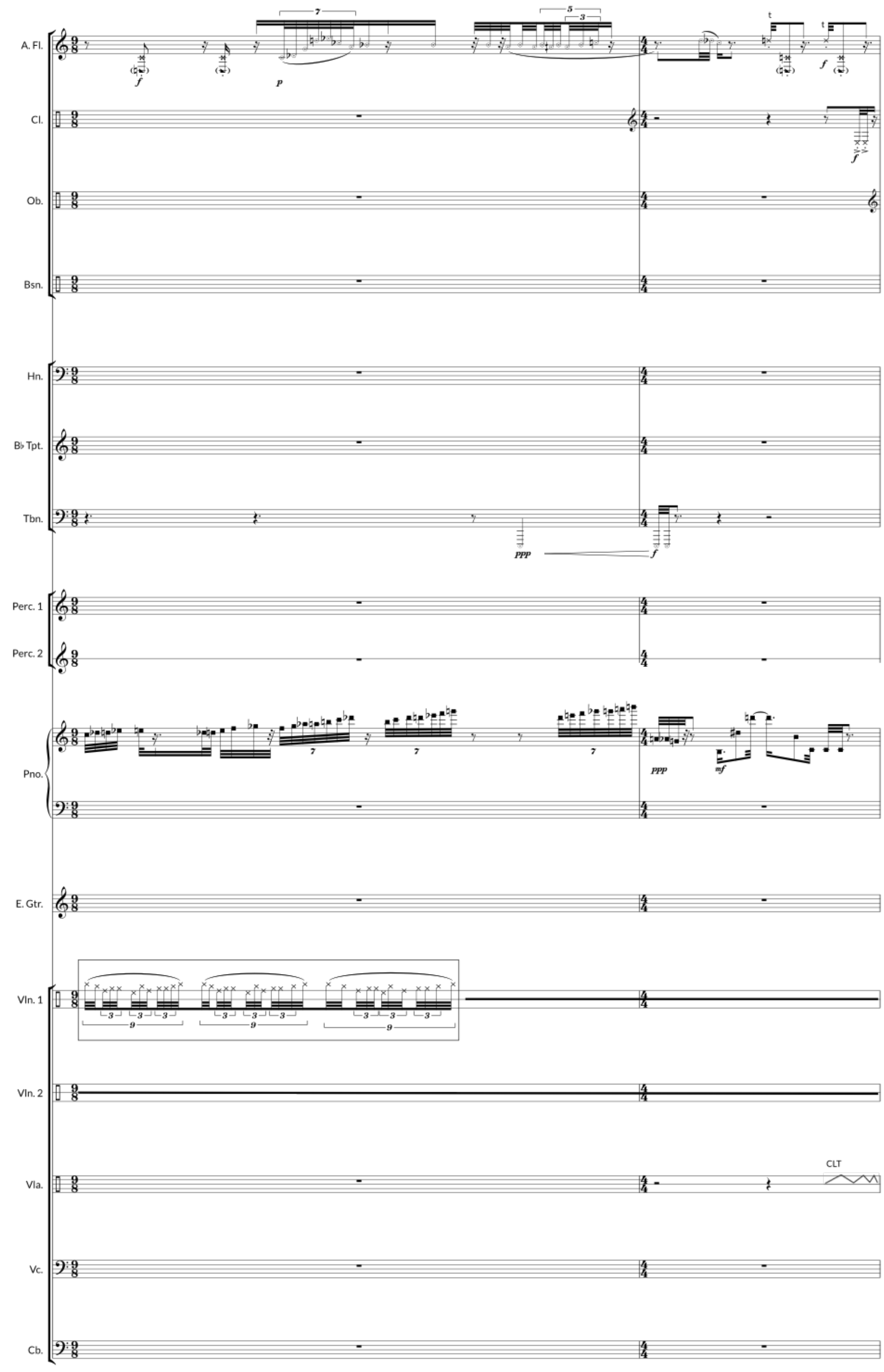
30
(to alto flute)
Picc.
Cl.
Ob.
Bsn.
Hn.
(to horn)
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.


B
♩= 60
Alto Flute
35
Picc.
Cl.
Ob.
Bsn.
Horn in F
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Mechanically rub paper
up and down strings (palm flat
on paper)
Pno.
E. Gtr.
CLB
Vln. 1
Vln. 2
Vla.
Vc.
Cb.


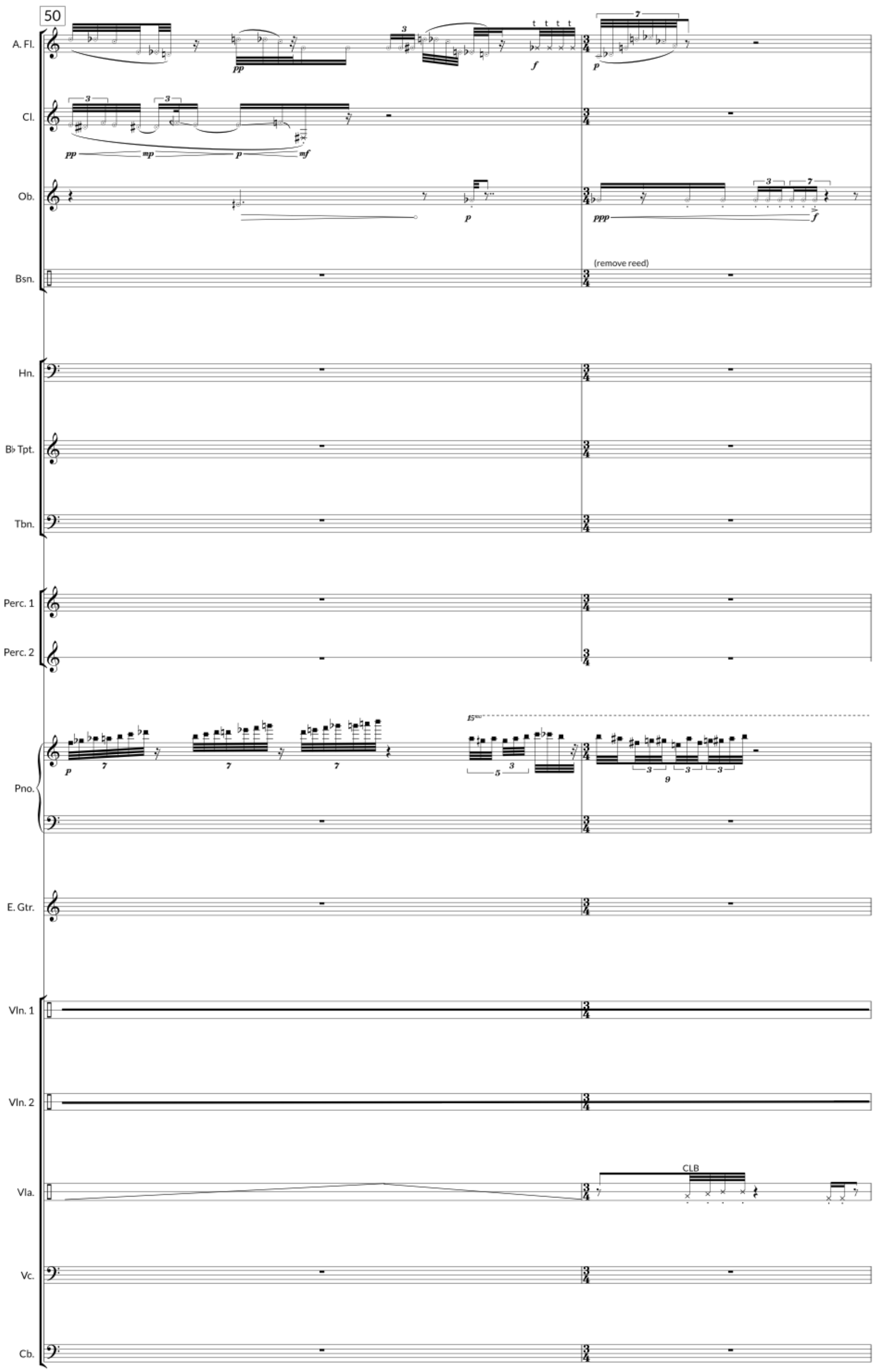
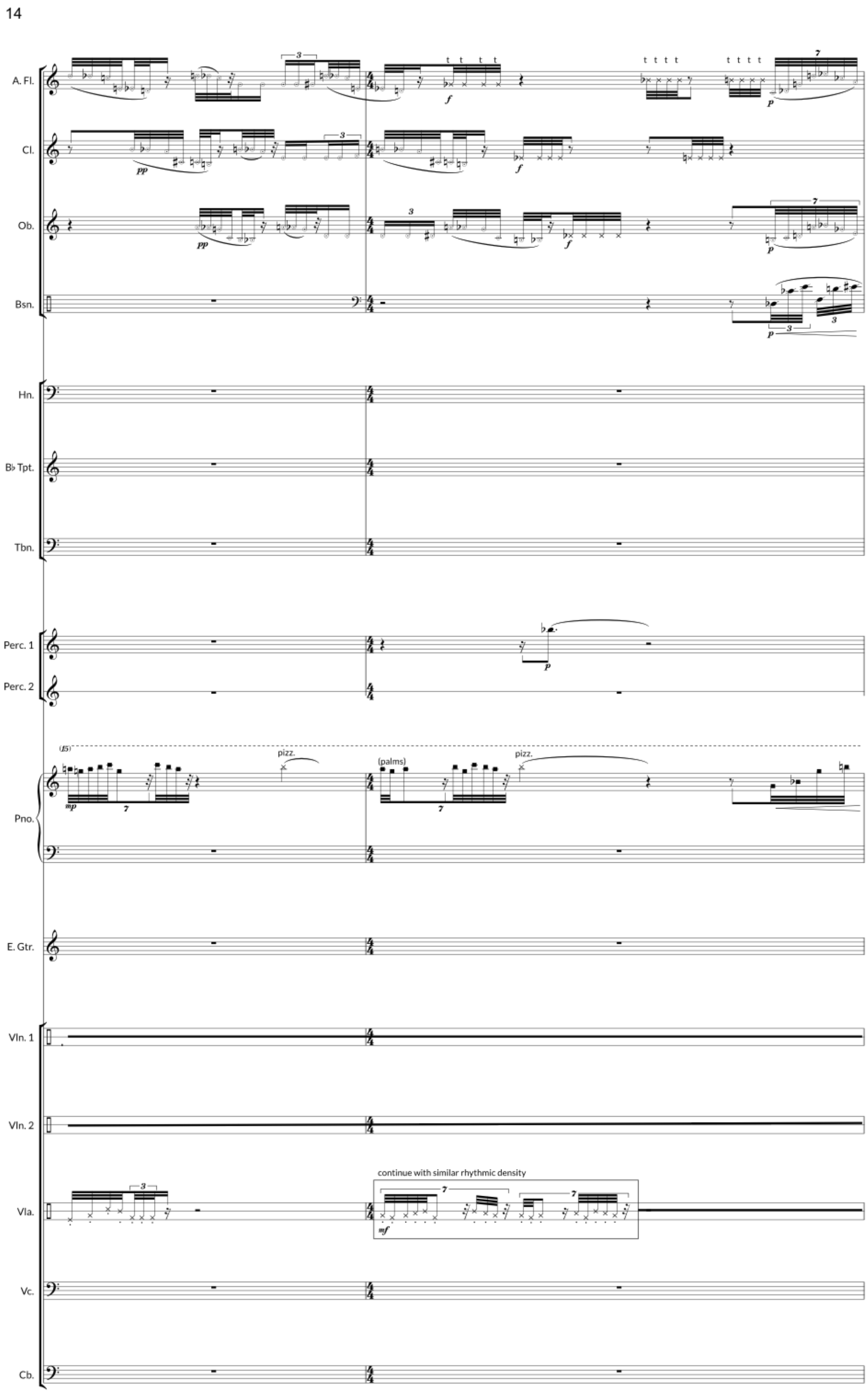
40
A. Fl.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
E. Gtr.
Vln. 1
continue with similar rhythmic density
CLB
Vln. 2
continue with similar rhythmic density
Vla.
Vc.
Cb.


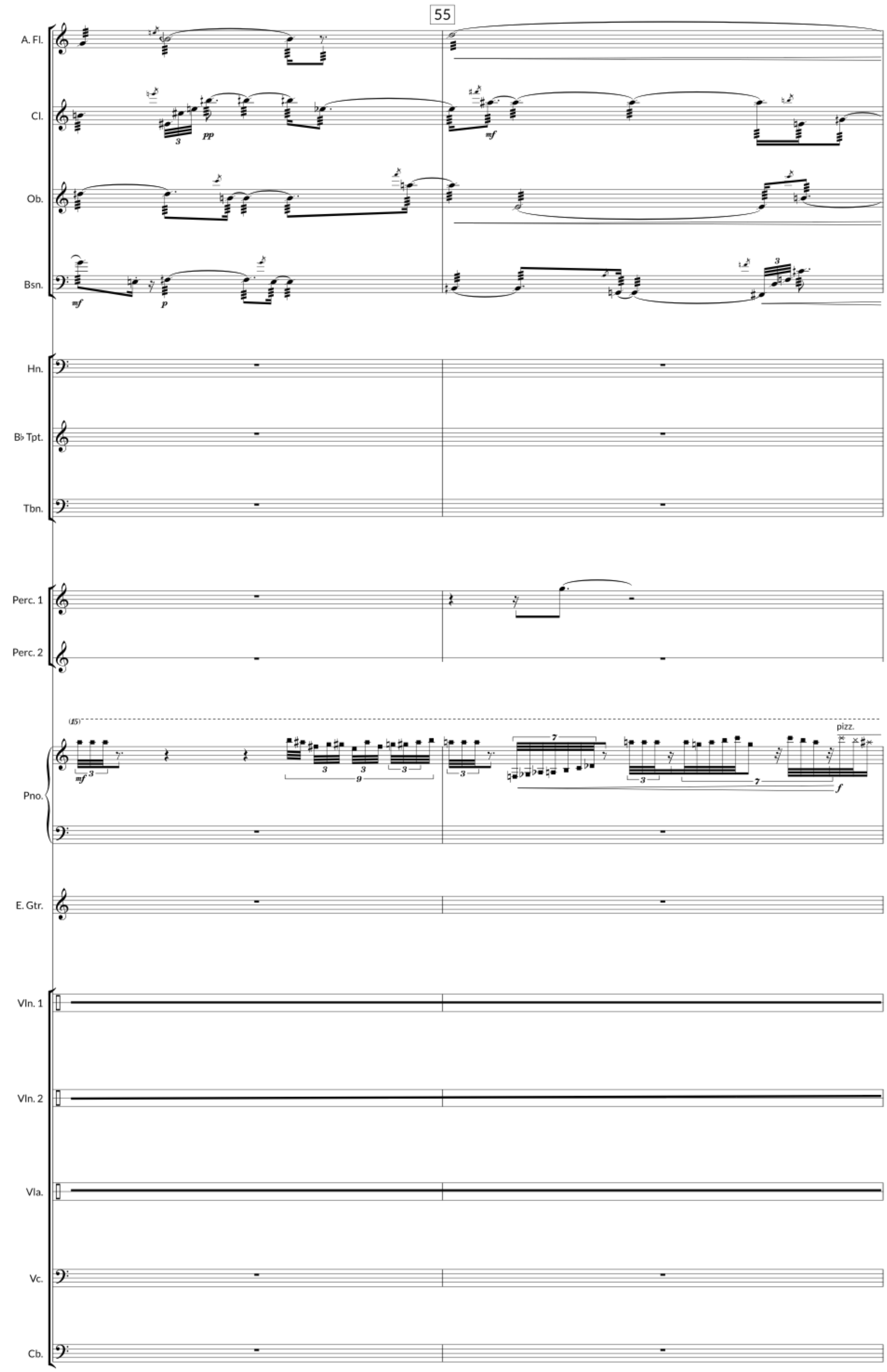
A. Fl.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.


A. Fl.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
45
Hit strings with ends of mallets
(All of these are clusters; pitches are approximate)
CLT


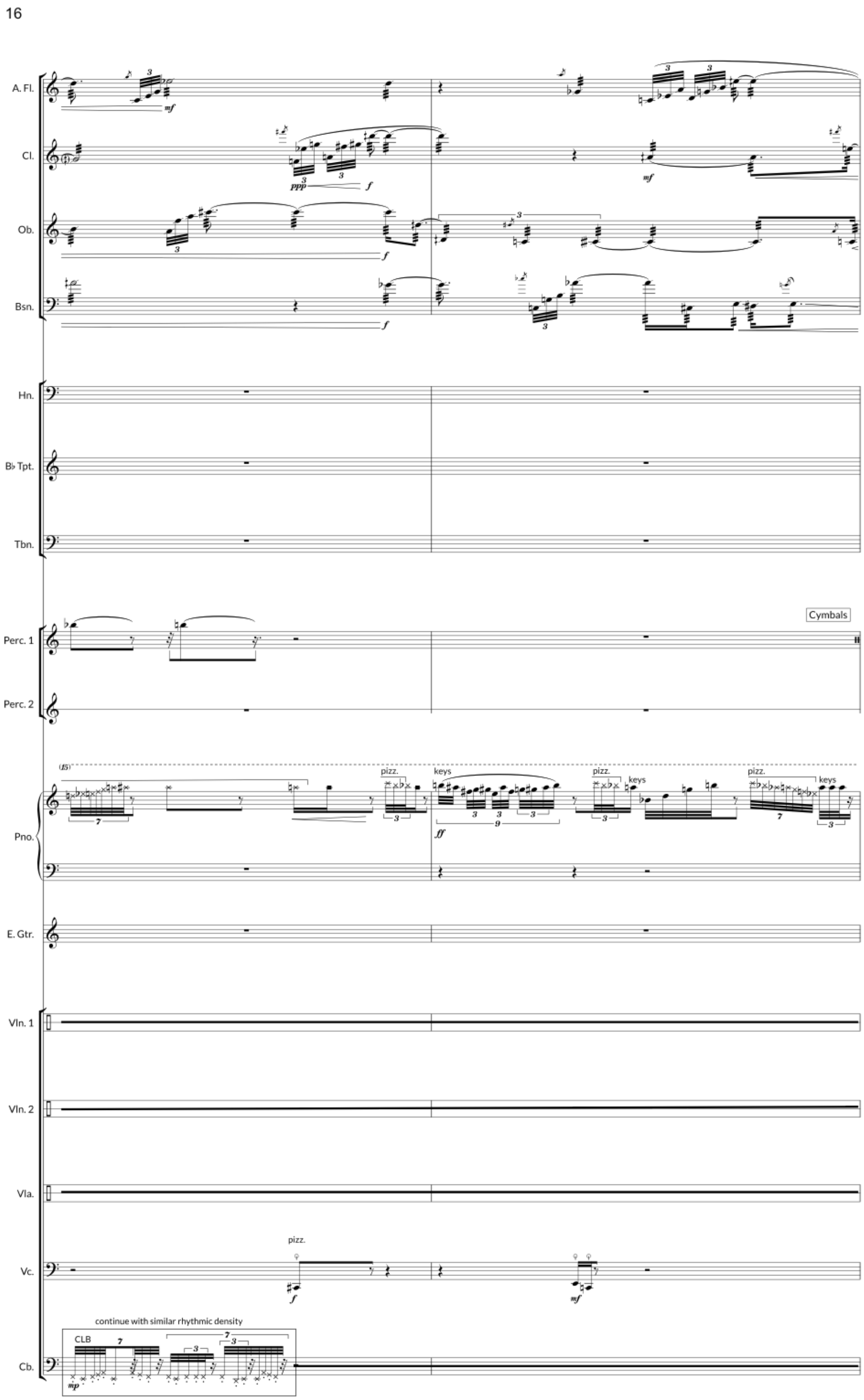
A. Fl.
Cl.
Ob.
(remove reed)
Bsn.
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
E. Gtr.
CLB
Vln. 1
Vln. 2
Vla.
Vc.
Cb.


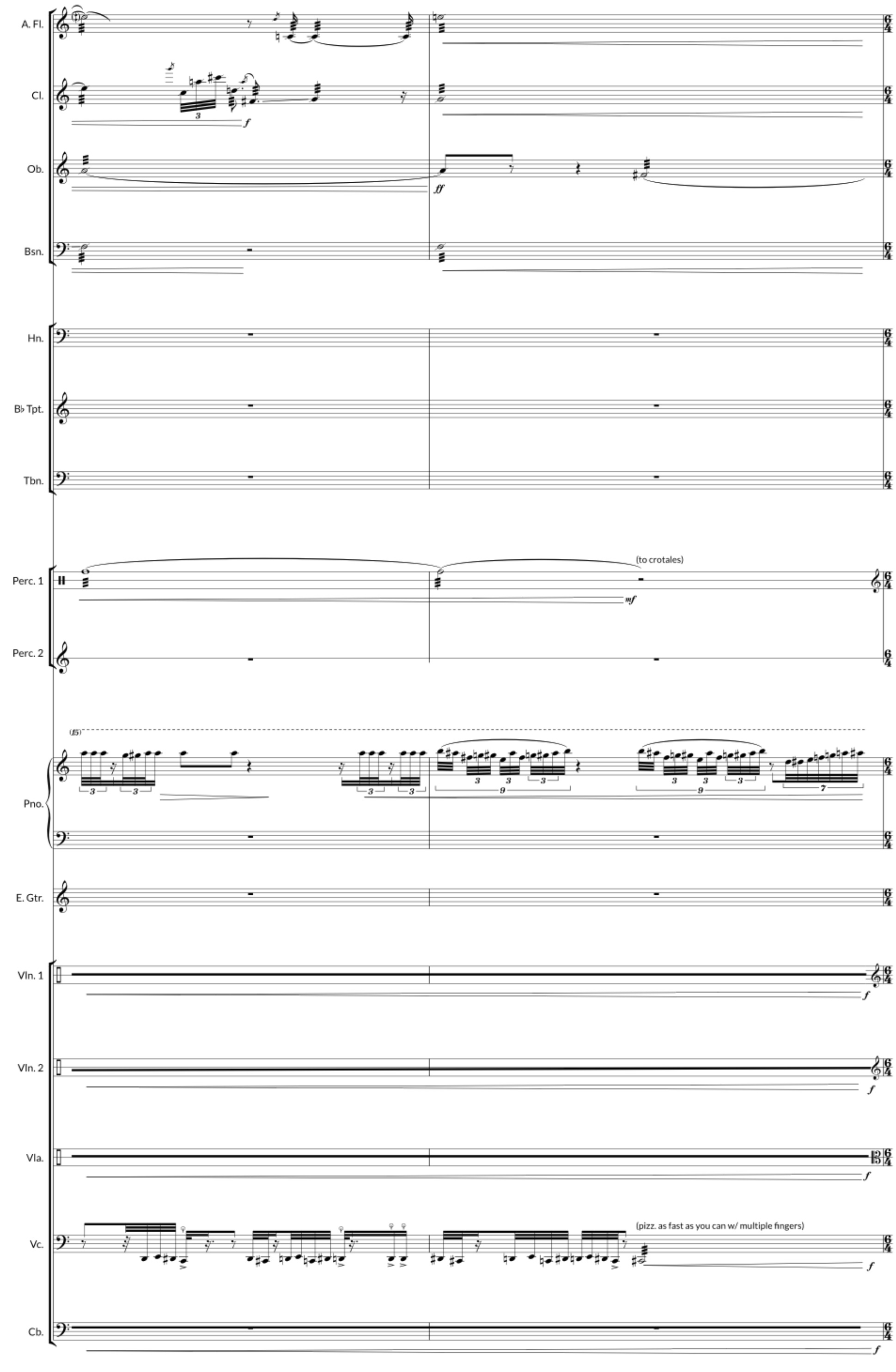
A. Fl.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
CLT

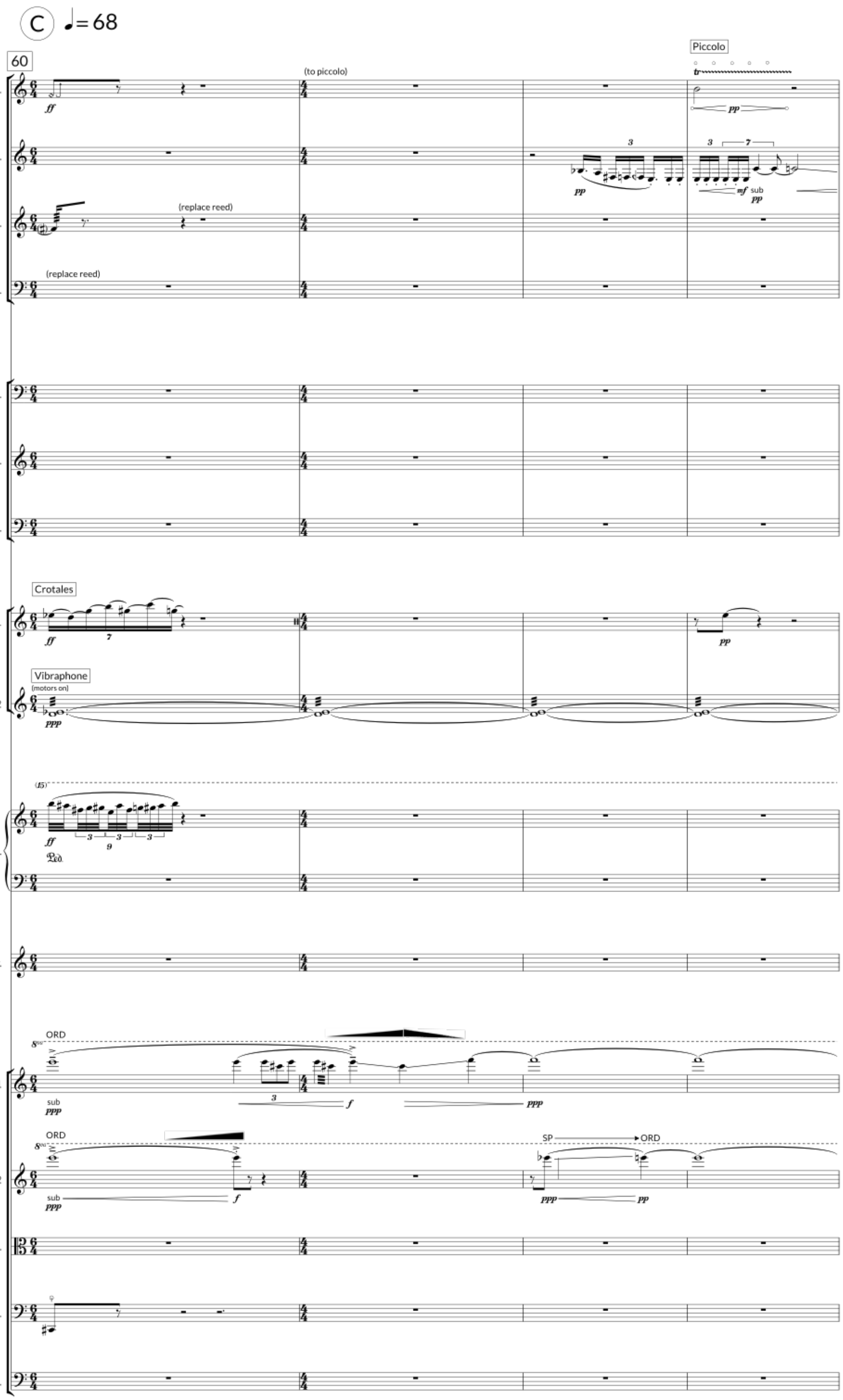
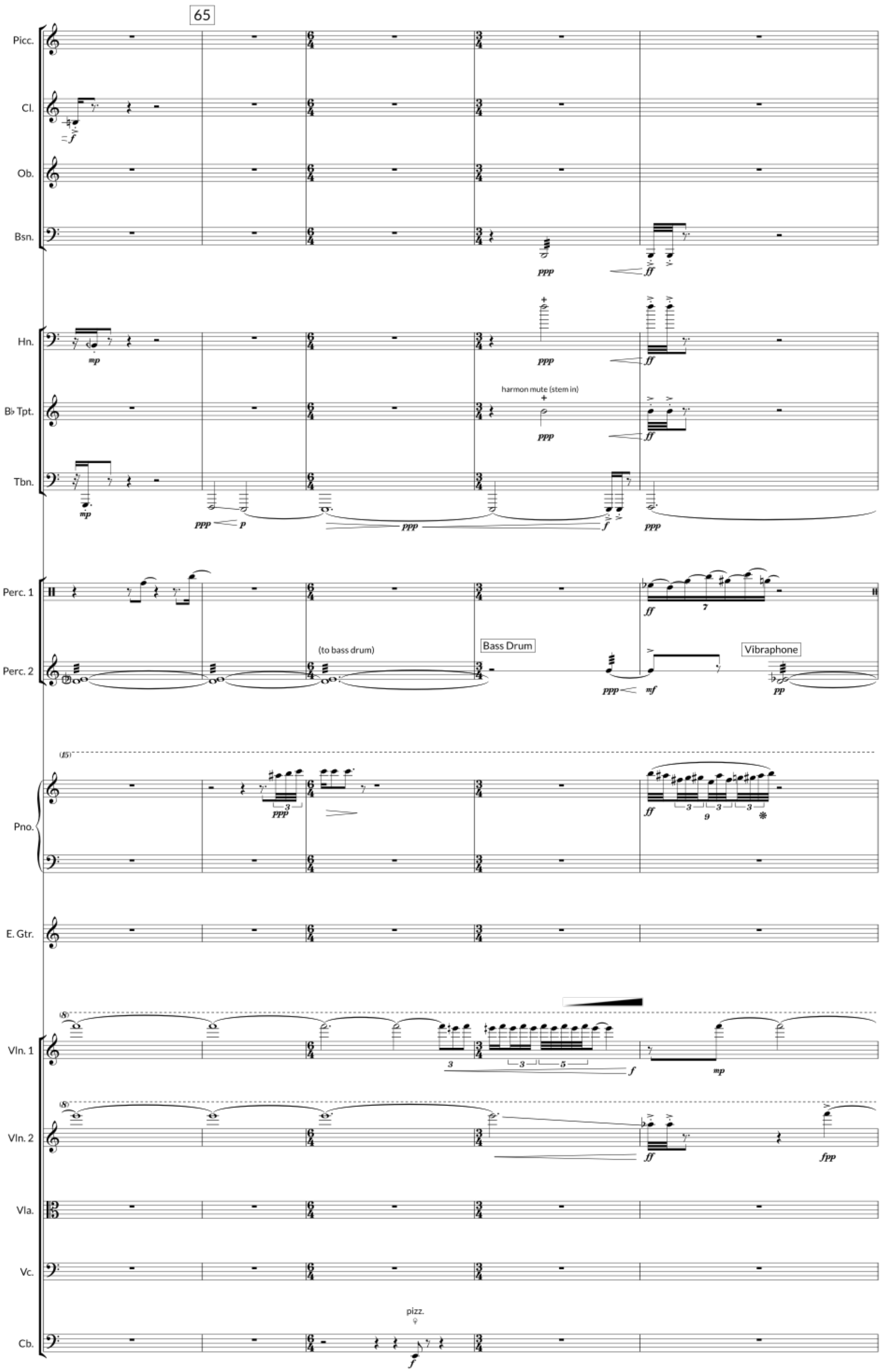

50
A. Fl.
Cl.
Ob.
Bsn.
(remove reed)
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
CLB
Vc.
Cb.


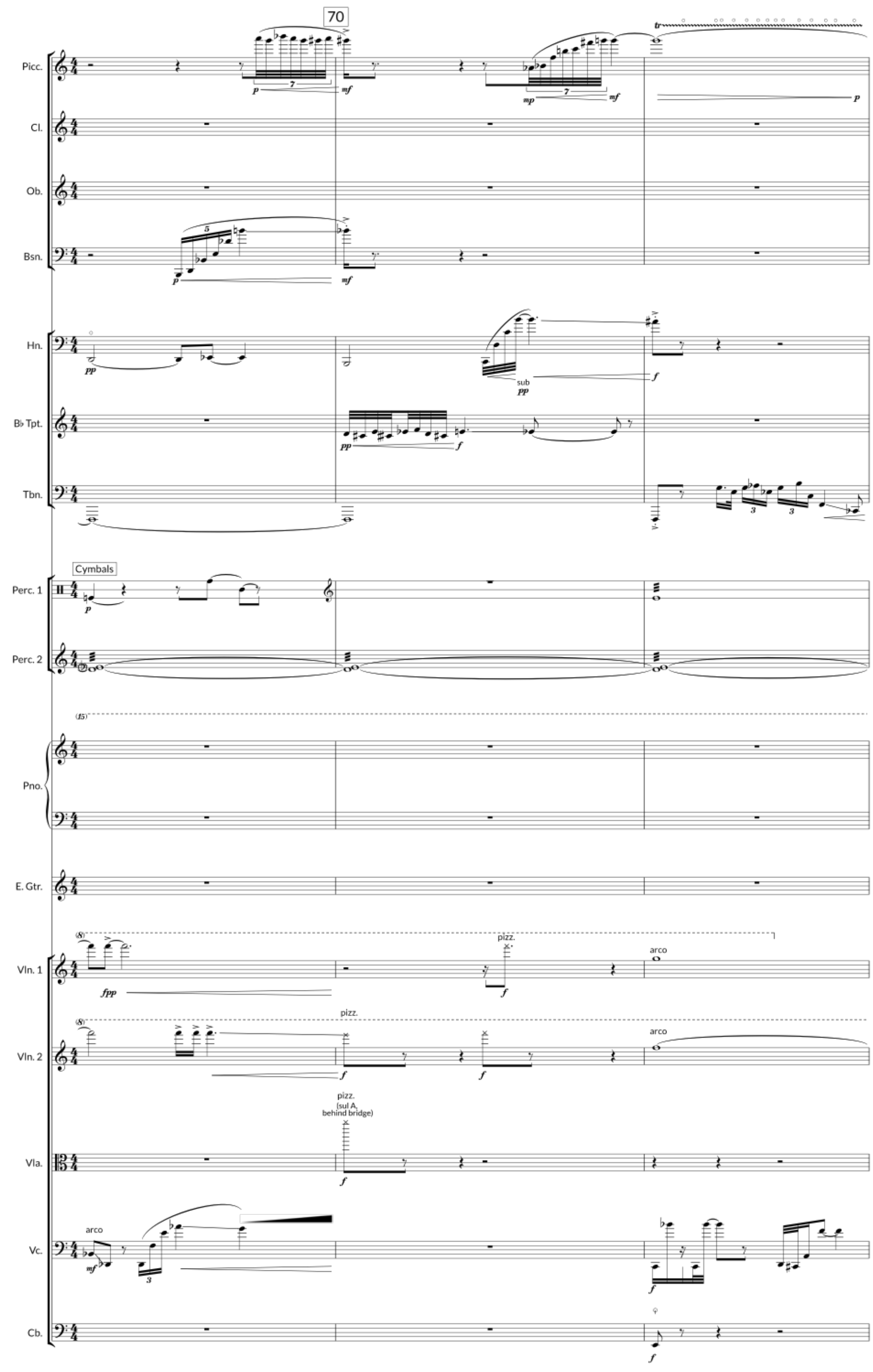
14
A. Fl.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
pizz.
(palms)
pizz.
E. Gtr.
Vln. 1
Vln. 2
Vla.
continue with similar rhythmic density
Vc.
Cb.


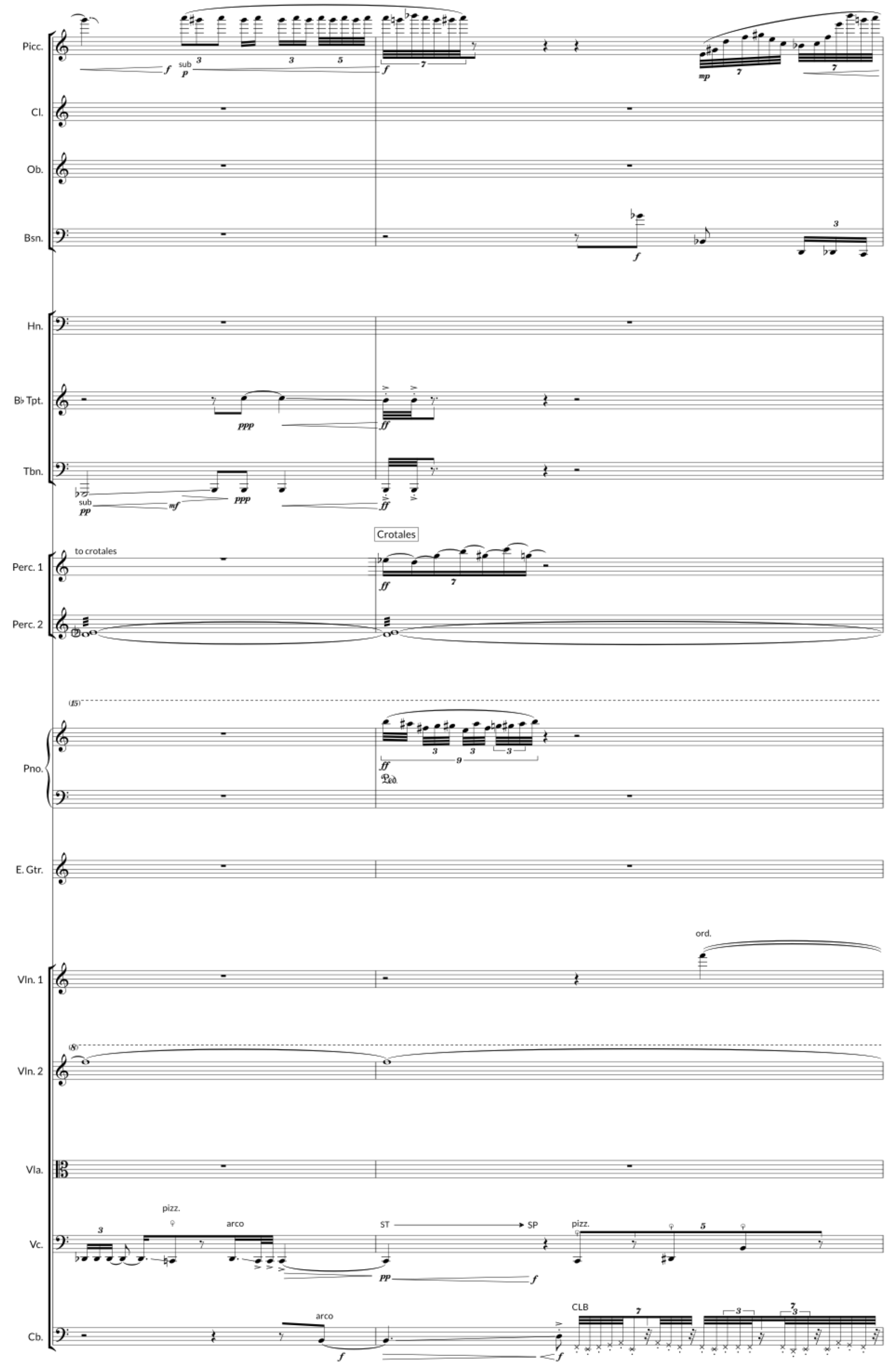
55
A. Fl.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
pizz.

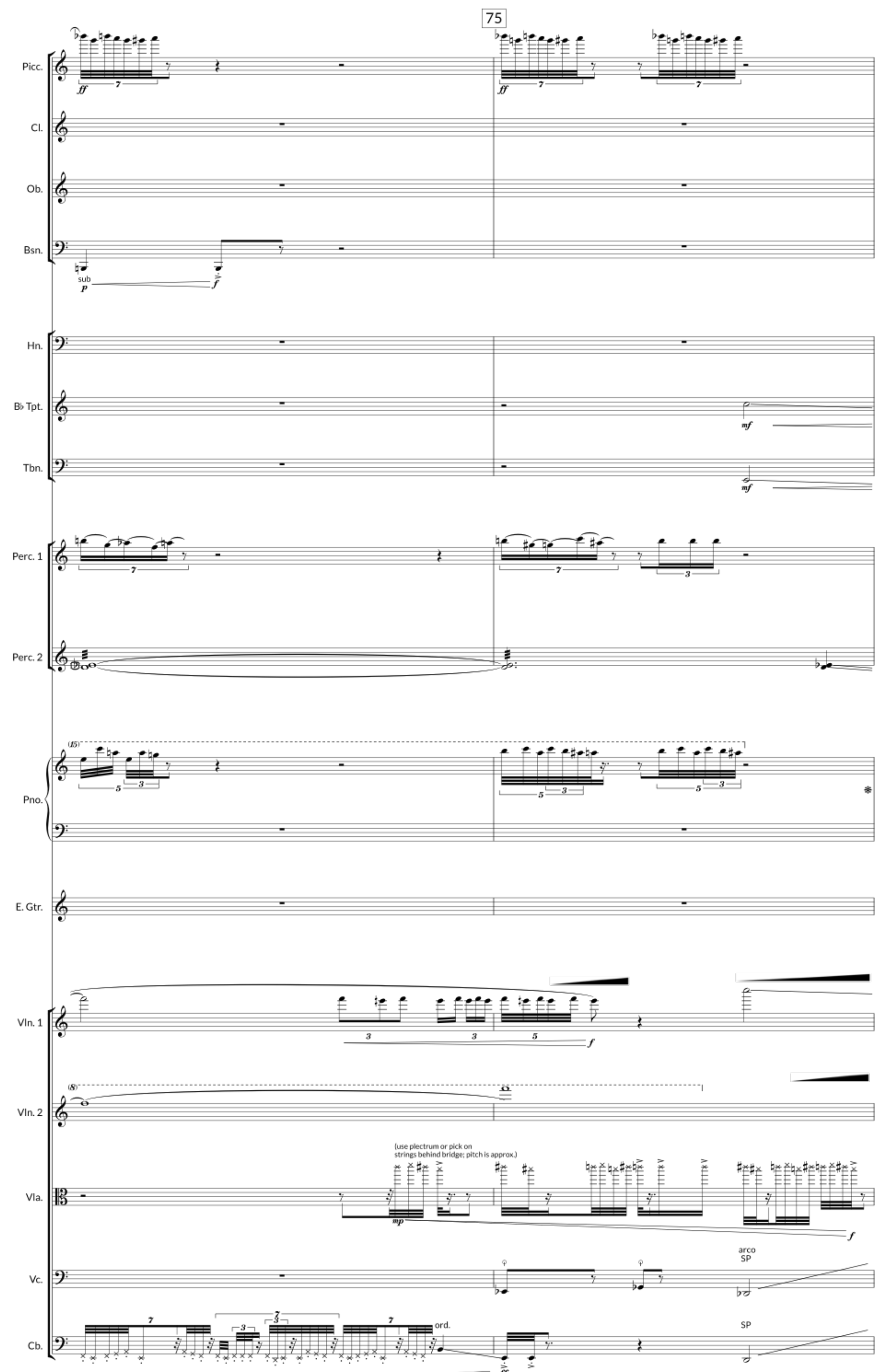

16
A. Fl.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
Cymbals
Perc. 1
Perc. 2
pizz.
keys
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
continue with similar rhythmic density
CLB
Cb.

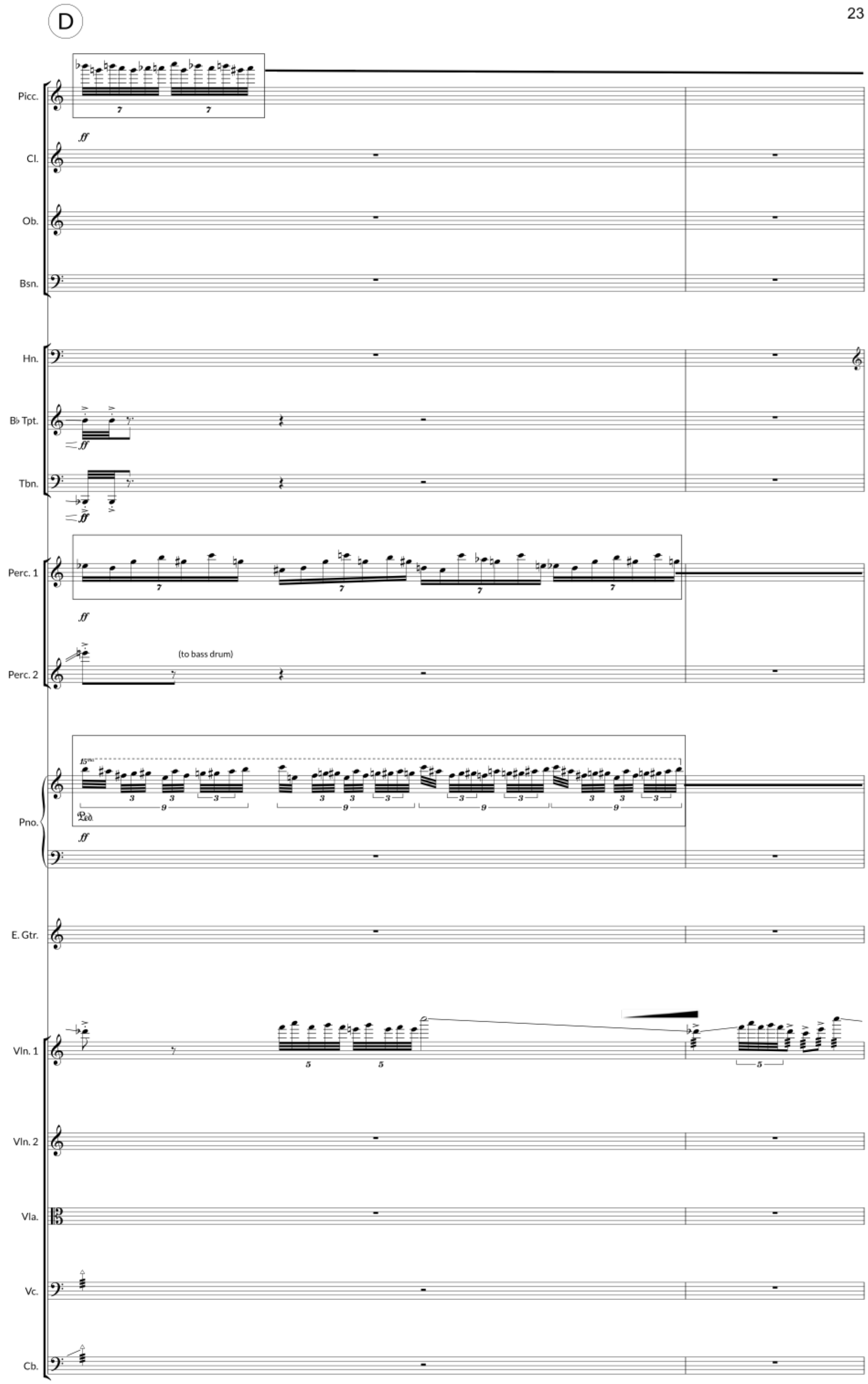

A. Fl.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
Perc. 1
(to crotales)
Perc. 2
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
(pizz. as fast as you can w/ multiple fingers)
Cb.

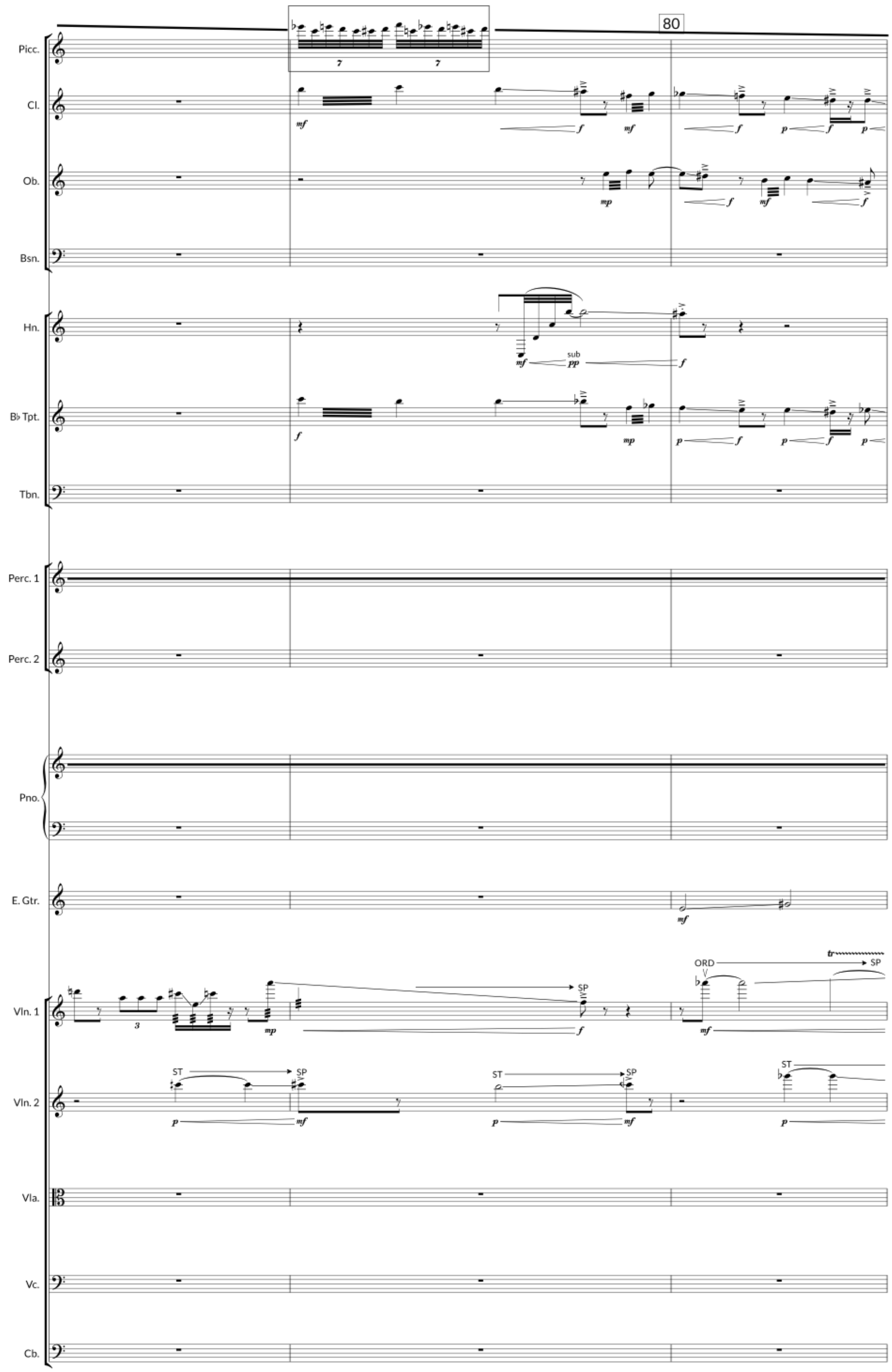

C
♩= 68
60
A. Fl.
(to piccolo)
Piccolo
Cl.
Ob.
(replace reed)
Bsn.
(replace reed)
Hn.
B♭ Tpt.
Tbn.
Crotales
Perc. 1
Vibraphone
(motors on)
Perc. 2
Pno.
E. Gtr.
ORD
Vln. 1
ORD
SP → ORD
Vln. 2
Vla.
Vc.
Cb.


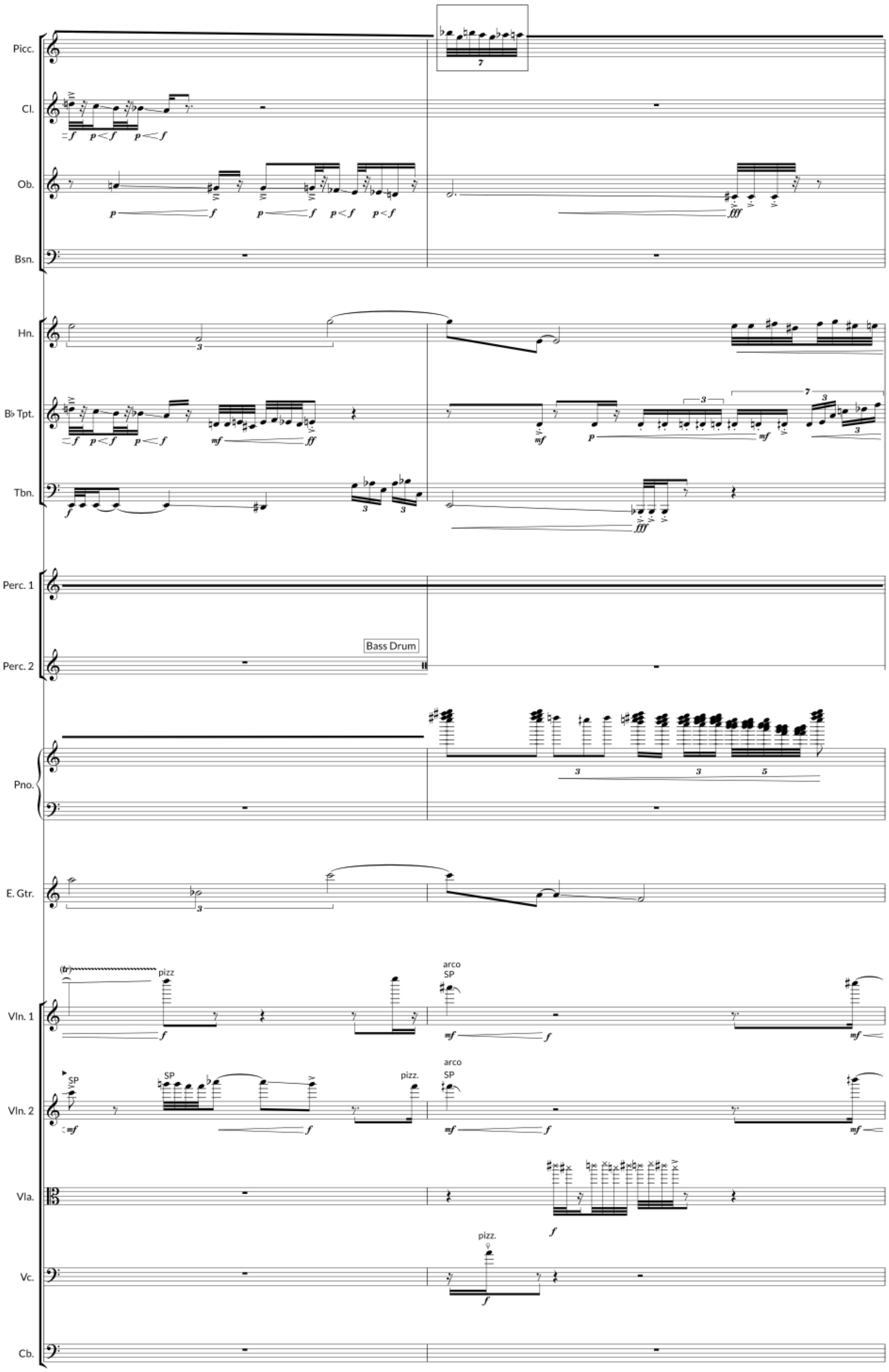
65
Picc.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
harmon mute (stem in)
Tbn.
Perc. 1
Perc. 2
(to bass drum)
Bass Drum
Vibraphone
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
pizz.


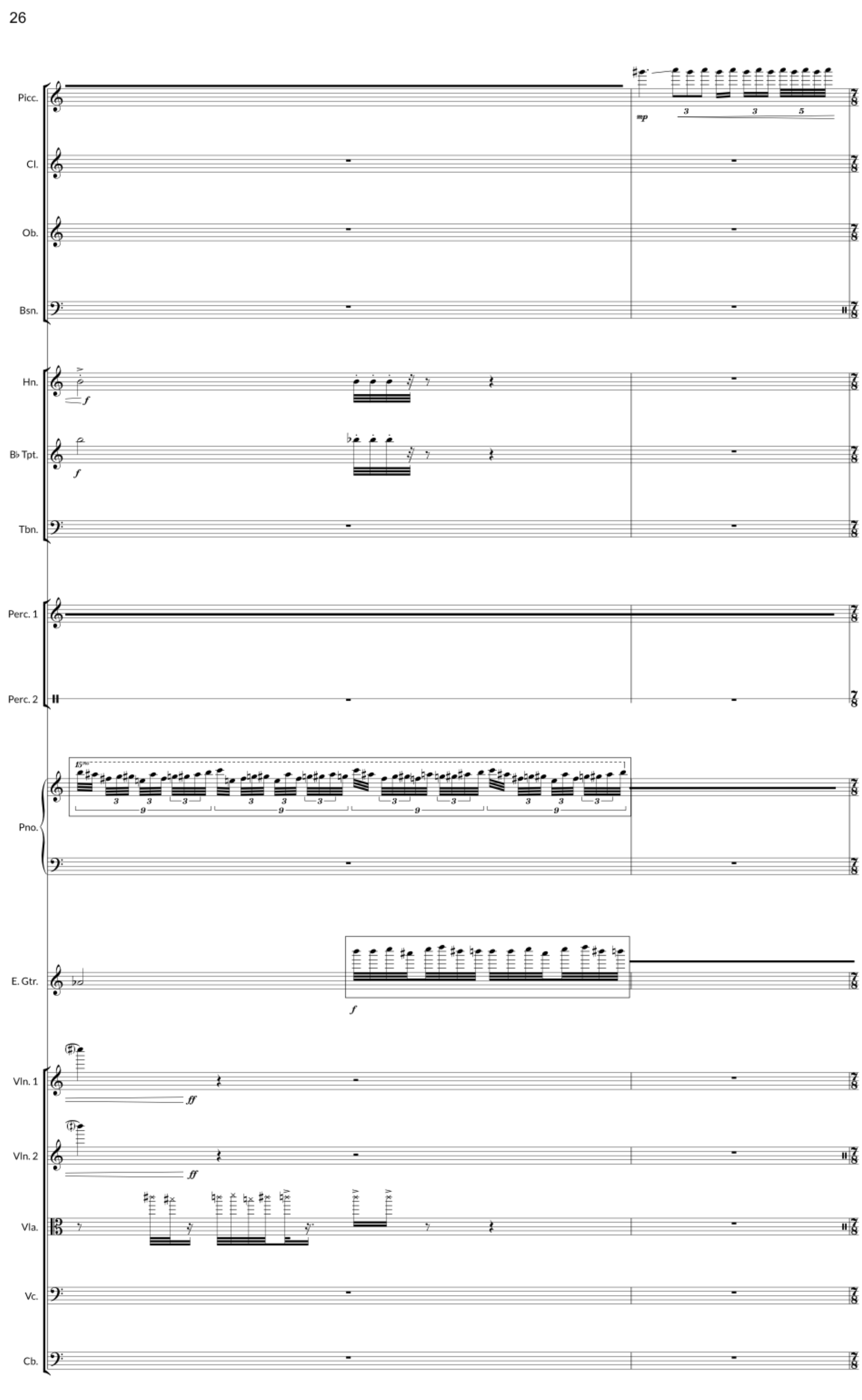
70
Picc.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
Cymbals
Perc. 1
Perc. 2
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
sub pp
pizz.
arco
pizz. (sul A, behind bridge)


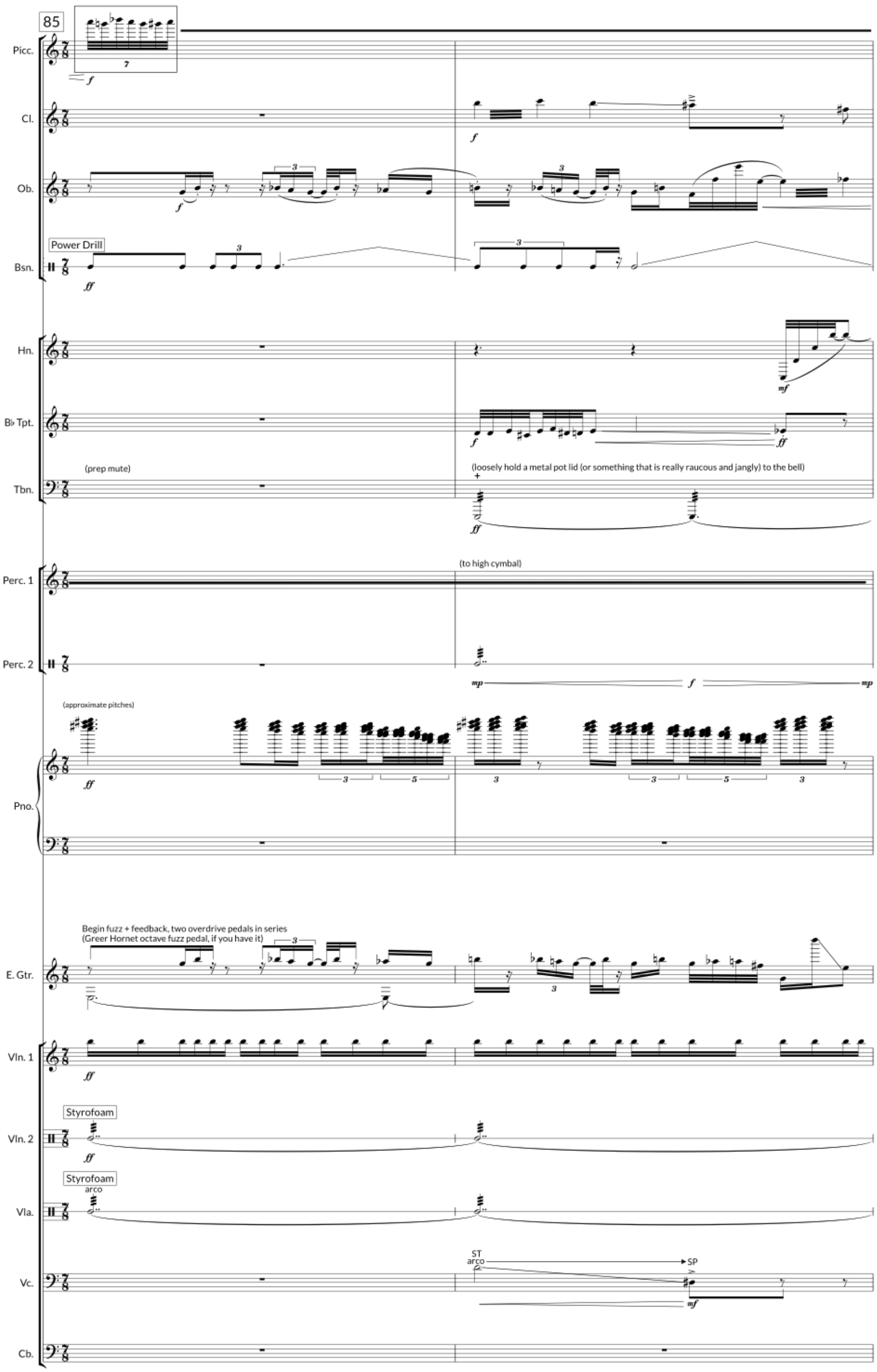
Picc.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
sub
to crotales
Crotales
ord.
pizz.
arco
ST
SP
pizz.
arco
CLB


75
Picc.
Cl.
Ob.
Bsn.
sub
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
E. Gtr.
Vln. 1
Vln. 2
(use plectrum or pick on strings behind bridge; pitch is approx.)
Vla.
arco
SP
Vc.
ord.
SP
Cb.


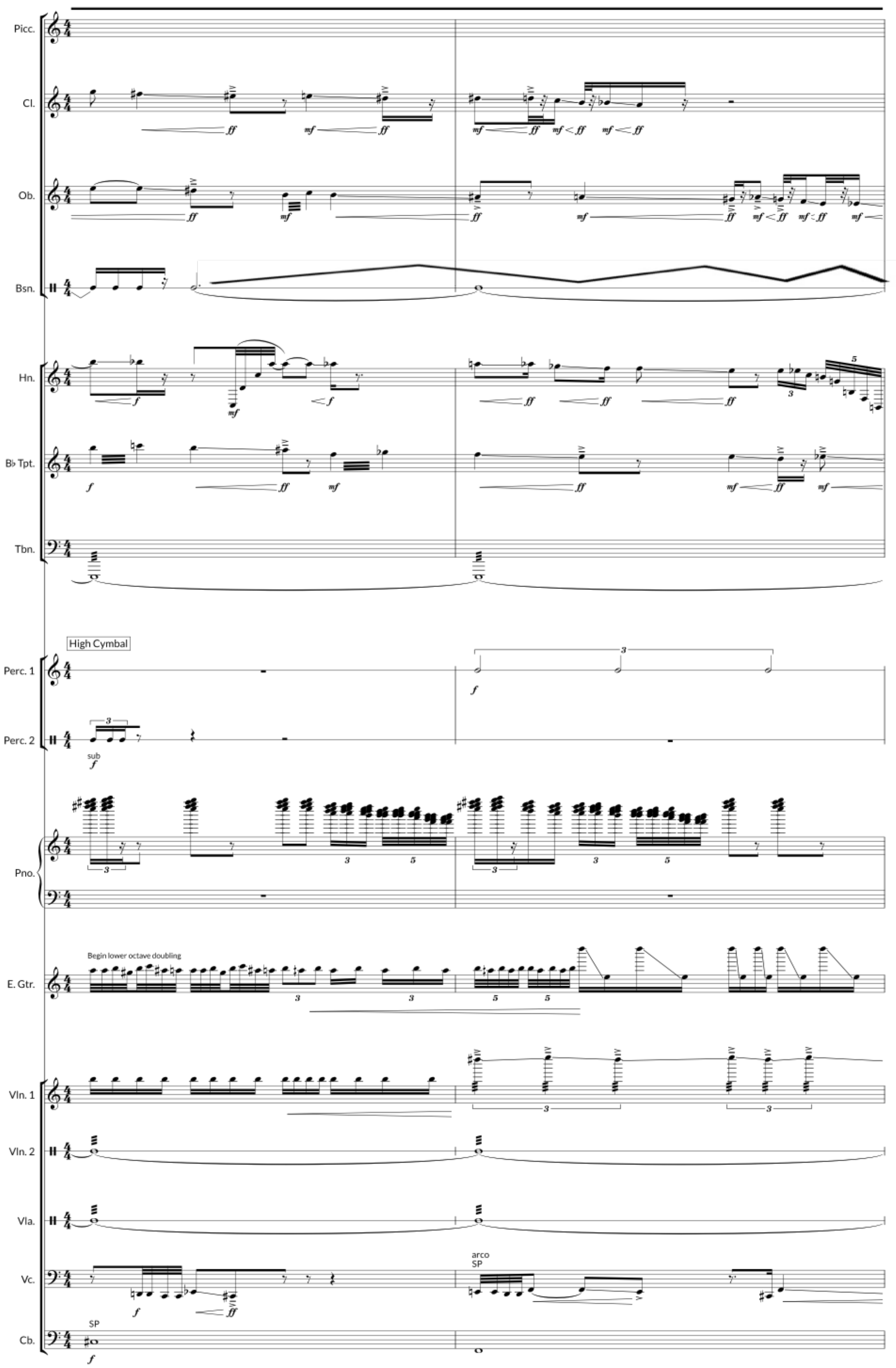
D
Picc.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
Perc. 1
(to bass drum)
Perc. 2
15ma
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.


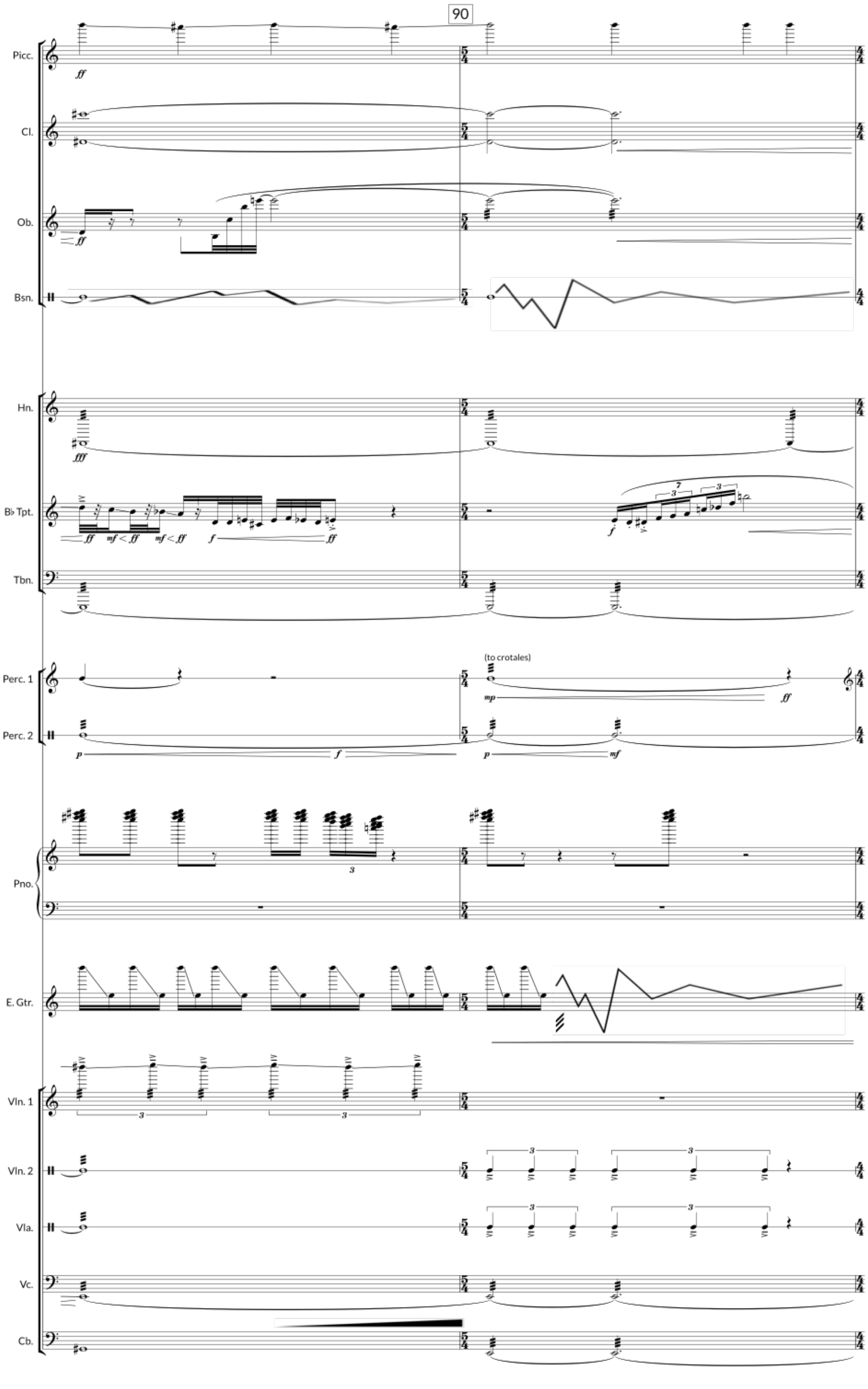
80
Picc.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
sub
pp
ORD
SP
ST
tr


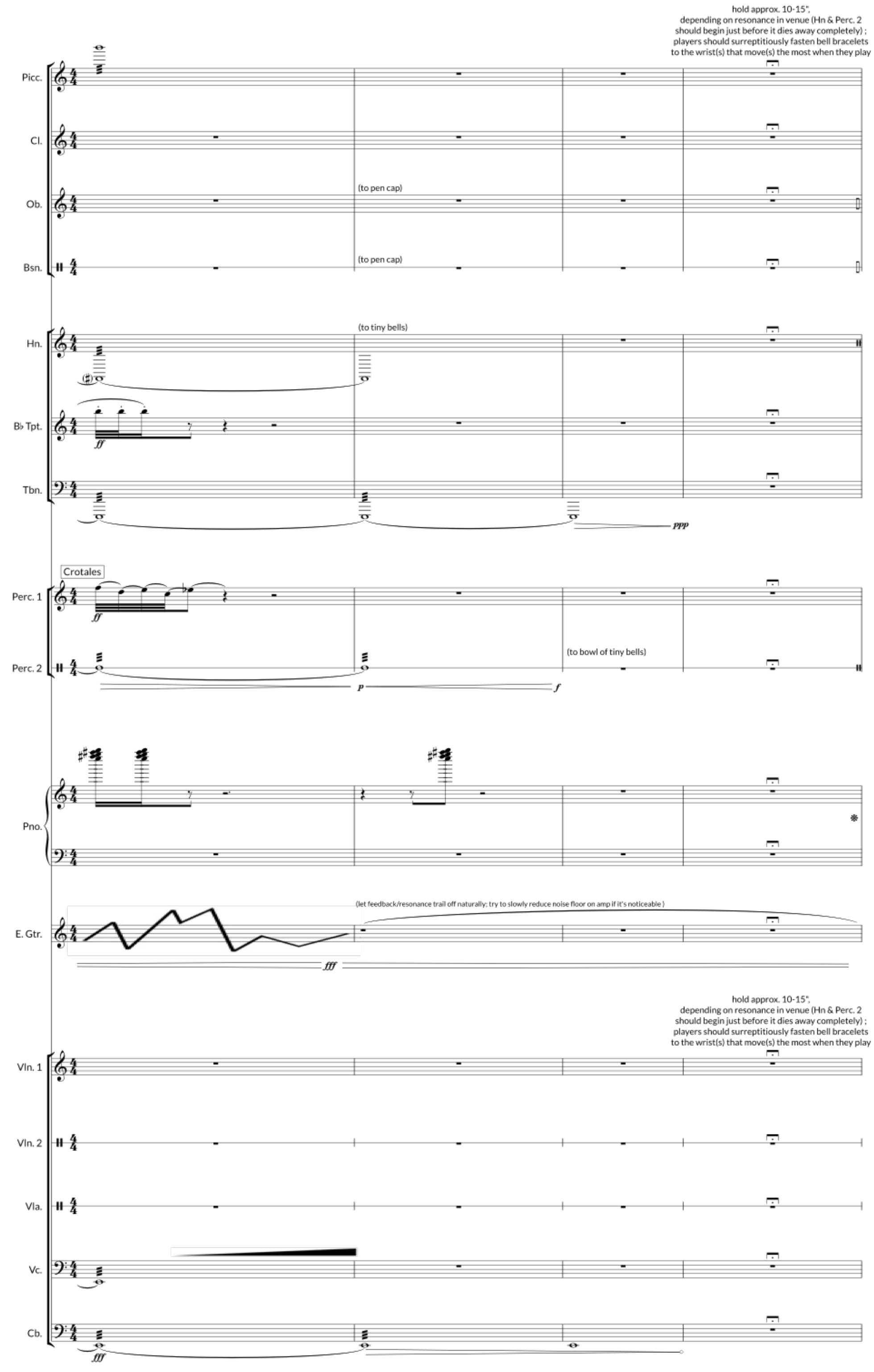
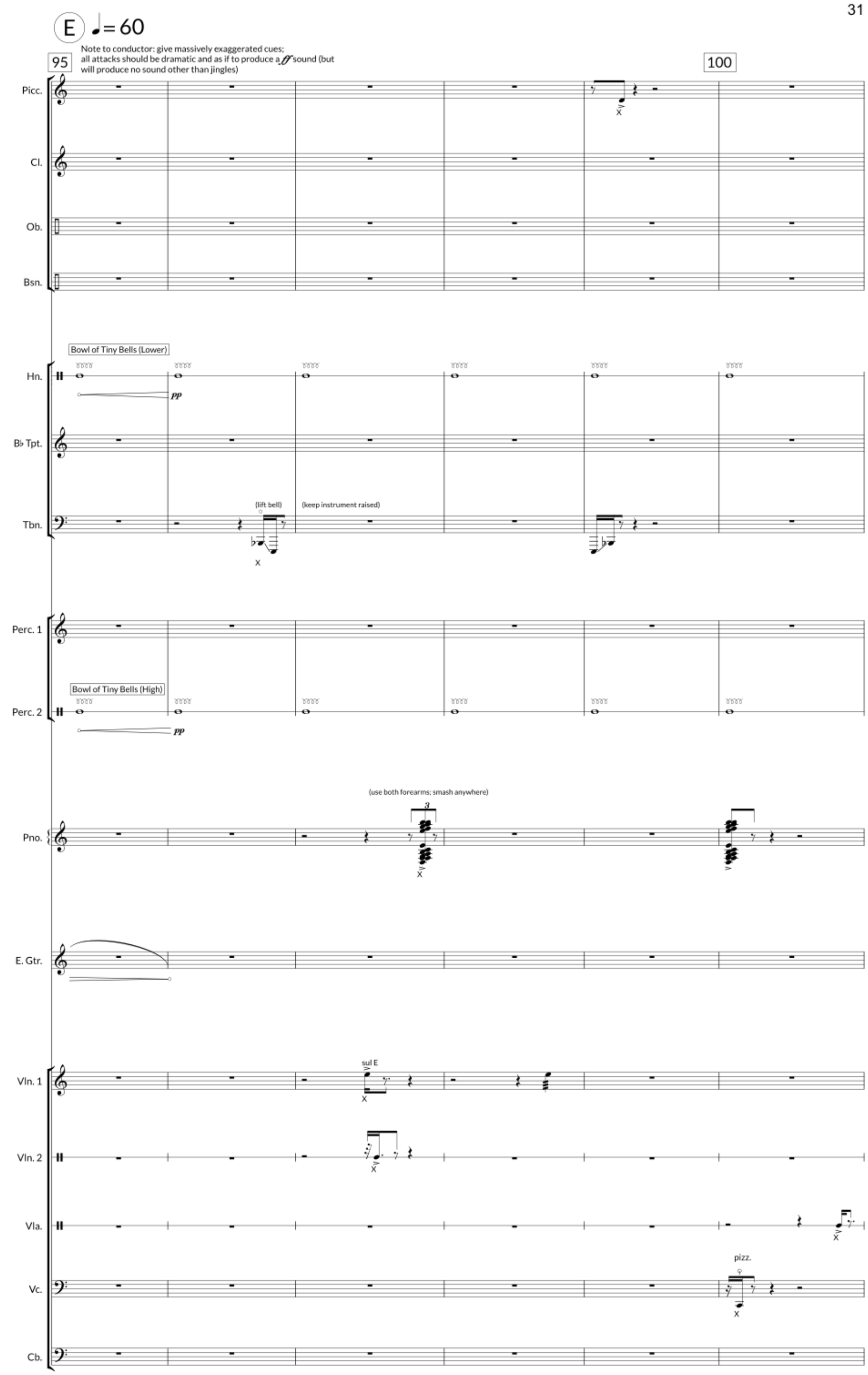
Picc.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Bass Drum
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
pizz
arco
SP
pizz.


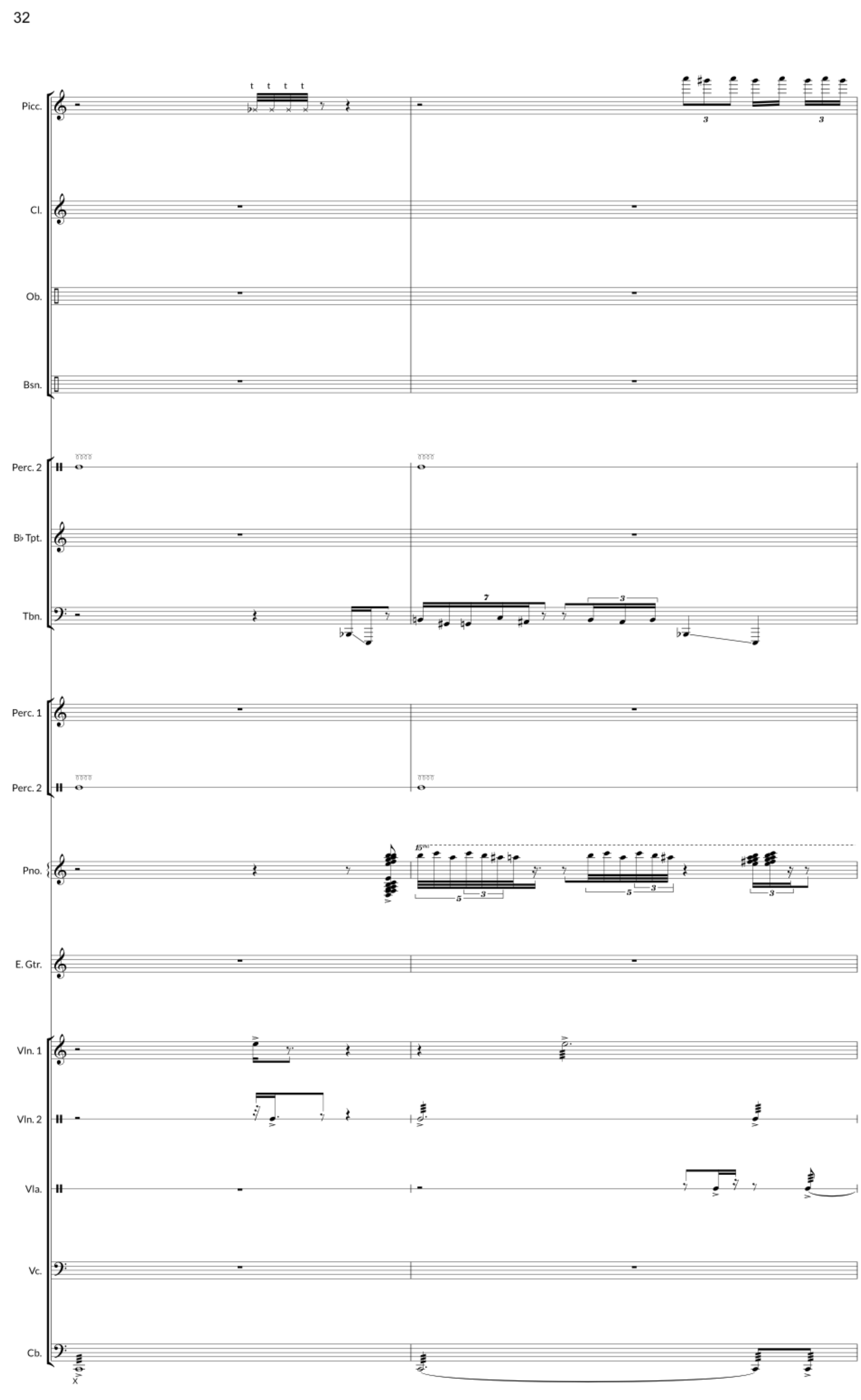
26
Picc.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.


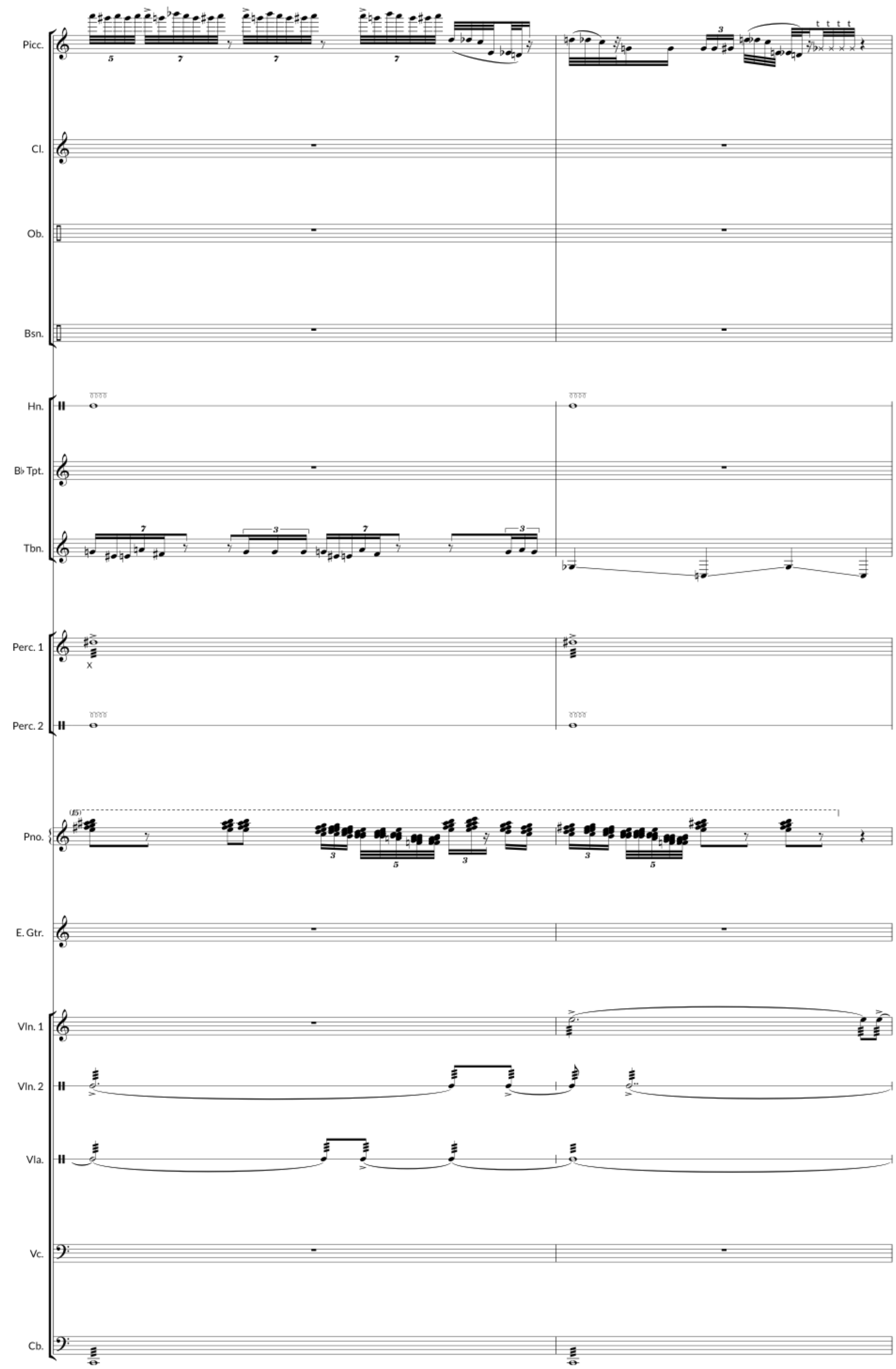
85
Picc.
Cl.
Ob.
Power Drill
Bsn.
Hn.
B♭ Tpt.
(prep mute)
(loosely hold a metal pot lid (or something that is really raucous and jangly) to the bell)
Tbn.
(to high cymbal)
Perc. 1
Perc. 2
(approximate pitches)
Pno.
Begin fuzz + feedback, two overdrive pedals in series
(Greer Hornet octave fuzz pedal, if you have it)
E. Gtr.
Vln. 1
Styrofoam
Vln. 2
Styrofoam
arco
Vla.
ST
arco
SP
Vc.
Cb.

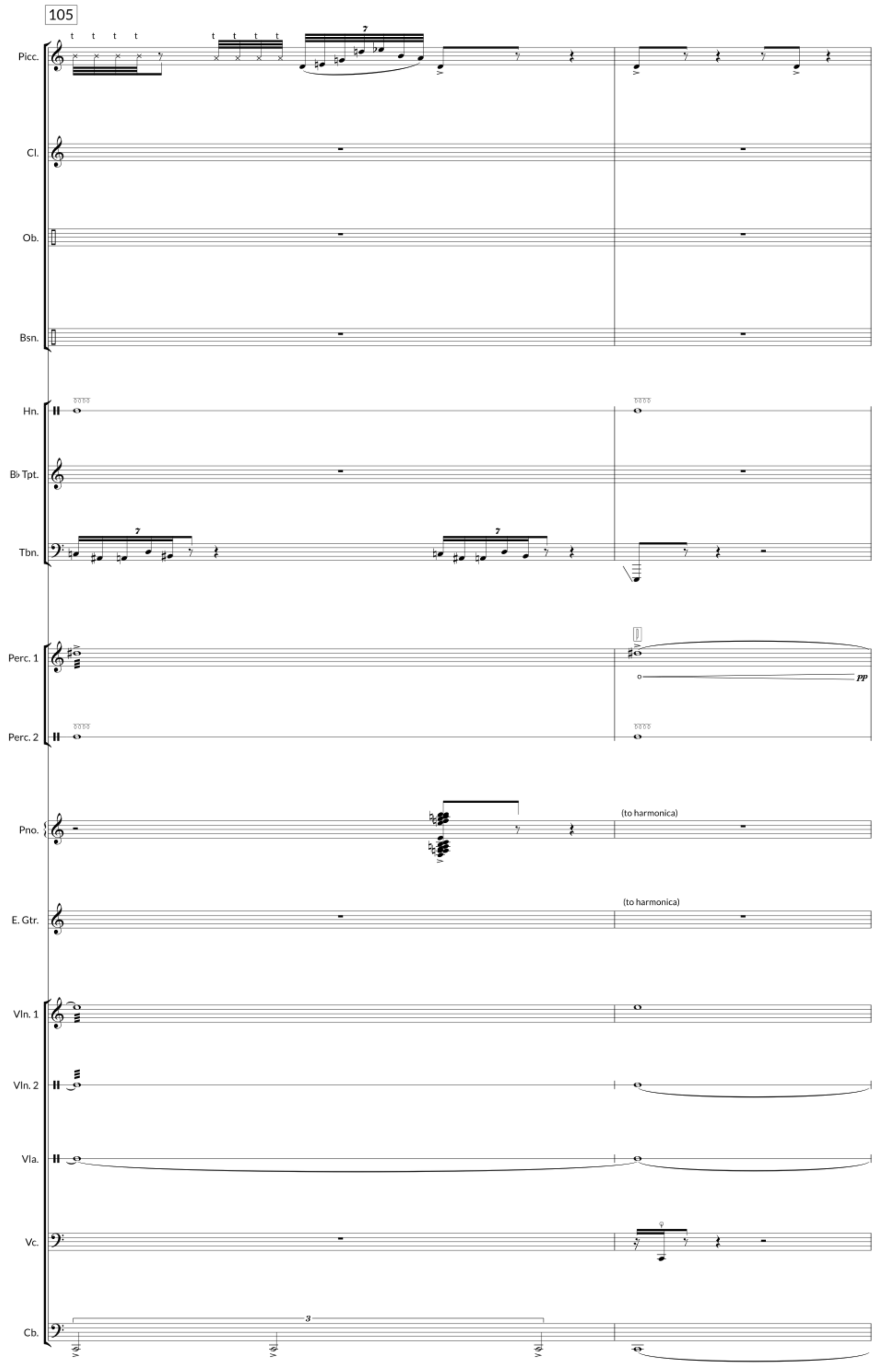

Picc.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
High Cymbal
Perc. 1
Perc. 2
sub f
Pno.
Begin lower octave doubling
E. Gtr.
Vln. 1
Vln. 2
Vla.
arco
SP
Vc.
SP
Cb.

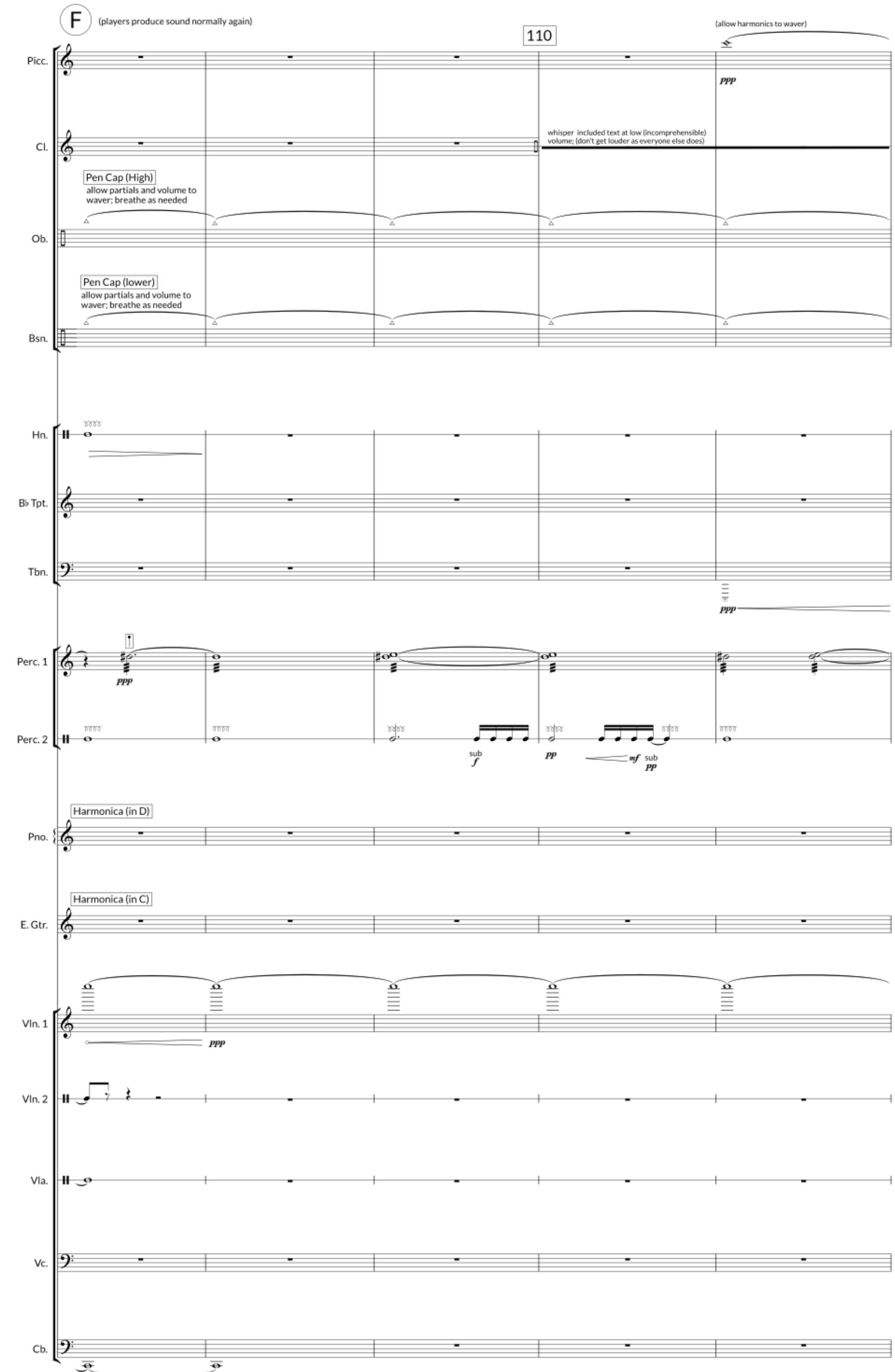

90
Picc.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
(to crotales)
ff
fff
mf
f
mp
p
mf

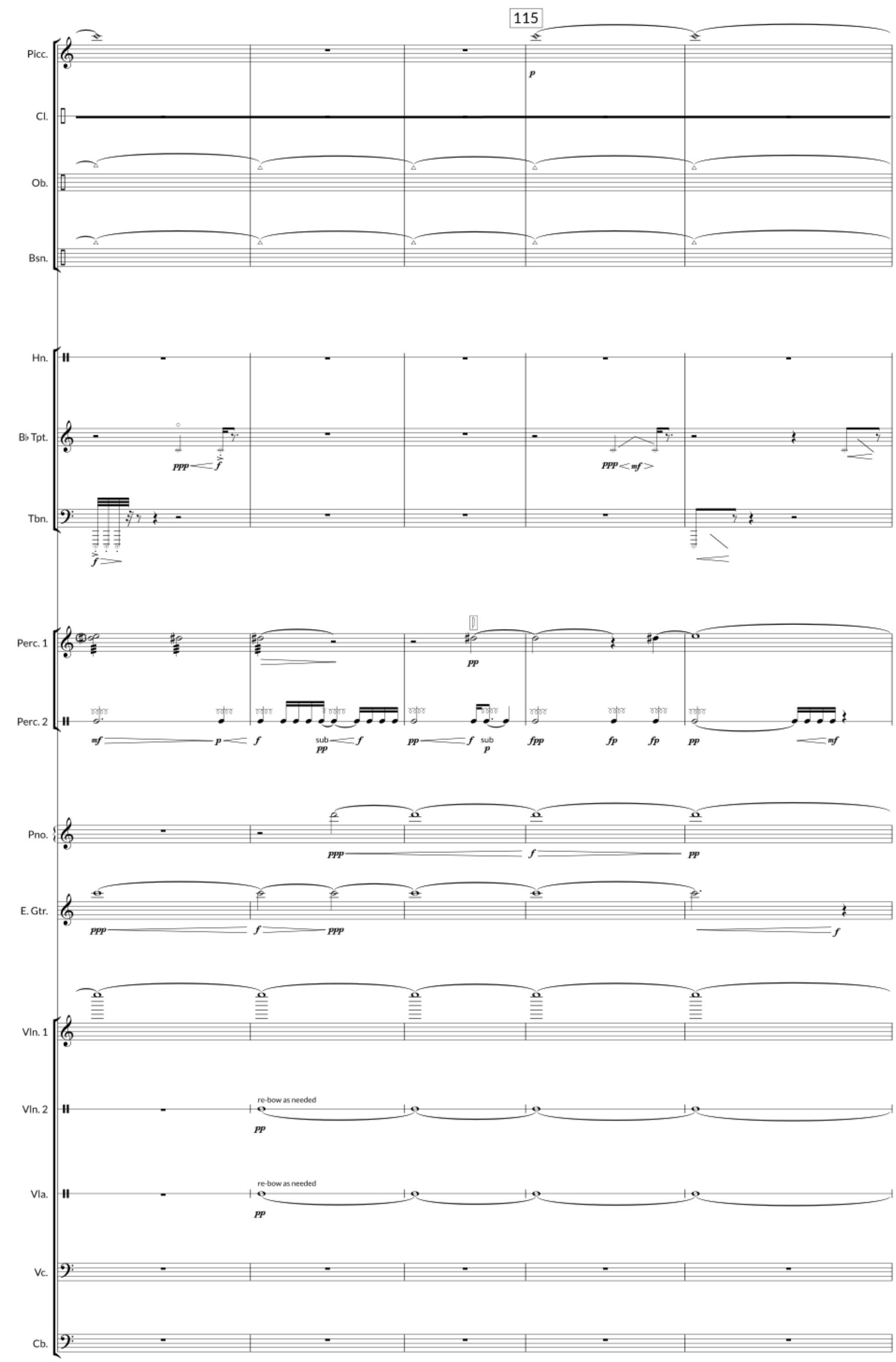

hold approx. 10-15",
depending on resonance in venue (Hn & Perc. 2
should begin just before it dies away completely) ;
players should surreptitiously fasten bell bracelets
to the wrist(s) that move(s) the most when they play
Picc.
Cl.
Ob.
(to pen cap)
Bsn.
(to pen cap)
Hn.
(to tiny bells)
B♭ Tpt.
ff
Tbn.
ppp
Crotales
Perc. 1
ff
Perc. 2
(to bowl of tiny bells)
p
f
Pno.
E. Gtr.
(let feedback/resonance trail off naturally; try to slowly reduce noise floor on amp if it's noticeable)
fff
hold approx. 10-15",
depending on resonance in venue (Hn & Perc. 2
should begin just before it dies away completely) ;
players should surreptitiously fasten bell bracelets
to the wrist(s) that move(s) the most when they play
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
fff


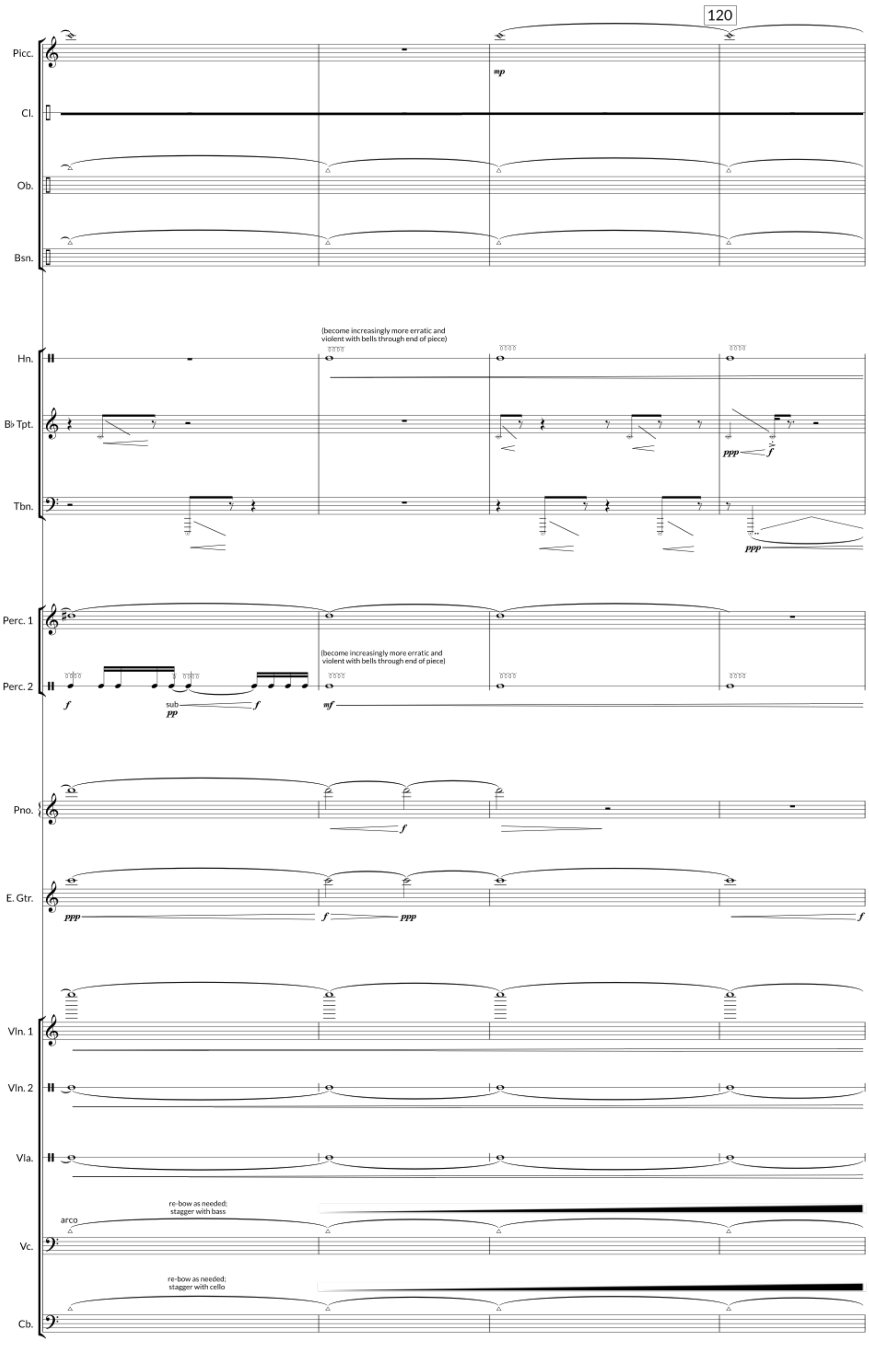
E
♩= 60
Note to conductor: give massively exaggerated cues; all attacks should be dramatic and as if to produce a ff sound (but will produce no sound other than jingles)
95
100
Picc.
Cl.
Ob.
Bsn.
Bowl of Tiny Bells (Lower)
Hn.
pp
B♭ Tpt.
(lift bell)
(keep instrument raised)
Tbn.
Perc. 1
Bowl of Tiny Bells (High)
Perc. 2
pp
(use both forearms; smash anywhere)
Pno.
E. Gtr.
sul E
Vln. 1
Vln. 2
Vla.
pizz.
Vc.
Cb.


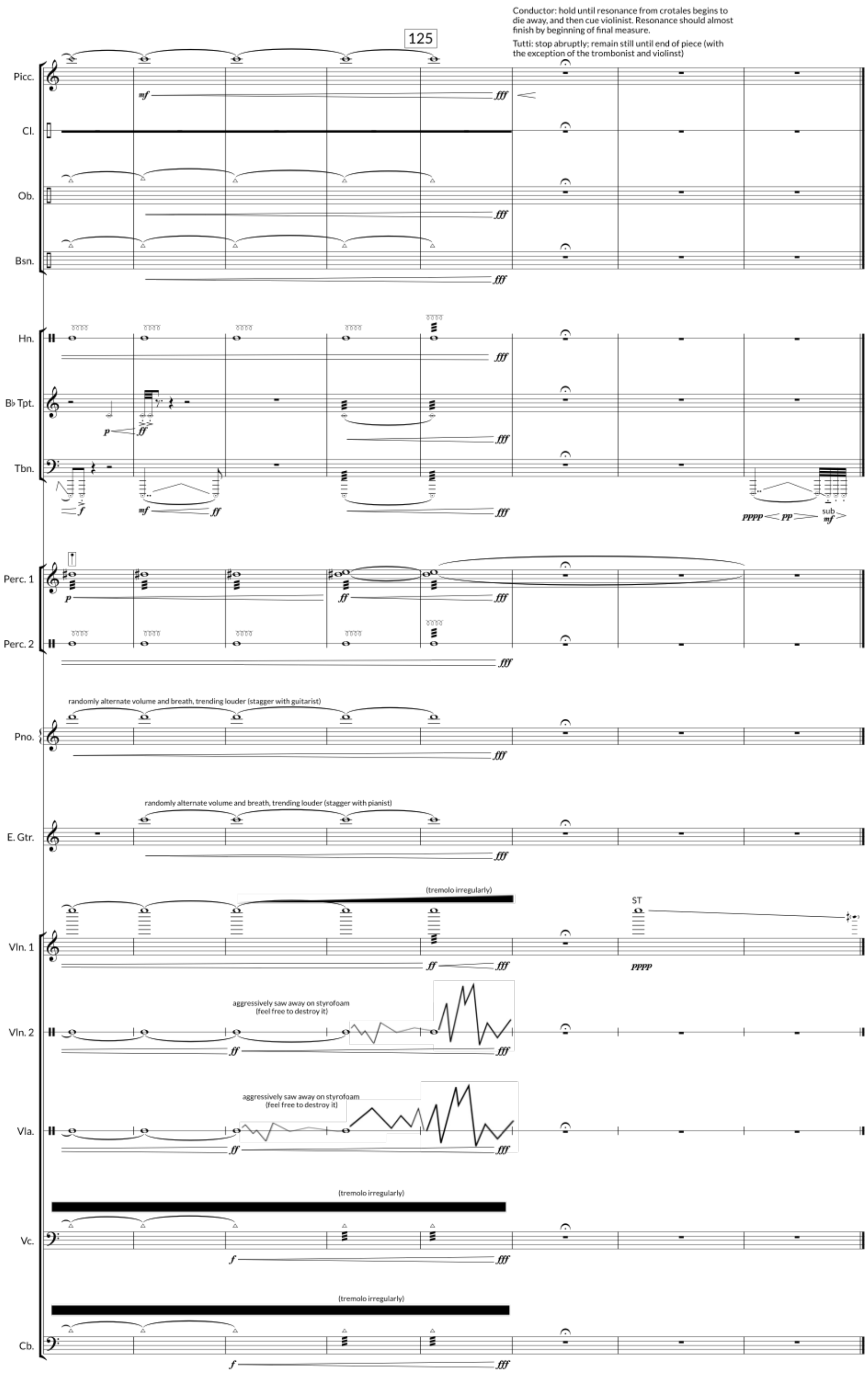
32
Picc.
Cl.
Ob.
Bsn.
Perc. 2
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.


Picc.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.


105
Picc.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
(to harmonica)
(to harmonica)
pp


F
(players produce sound normally again)
110
(allow harmonics to waver)
Picc.
ppp
Cl.
whisper included text at low (incomprehensible) volume; (don't get louder as everyone else does)
Pen Cap (High)
allow partials and volume to waver; breathe as needed
Ob.
Pen Cap (lower)
allow partials and volume to waver; breathe as needed
Bsn.
Hn.
B♭ Tpt.
Tbn.
ppp
Perc. 1
ppp
Perc. 2
sub
f
pp
mf
sub
pp
Harmonica (in D)
Pno.
Harmonica (in C)
E. Gtr.
Vln. 1
ppp
Vln. 2
Vla.
Vc.
Cb.


115
Picc.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
E. Gtr.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
re-bow as needed
re-bow as needed
sub
sub


120
Picc.
mp
Cl.
Ob.
Bsn.
(become increasingly more erratic and violent with bells through end of piece)
Hn.
B♭ Tpt.
ppp
f
Tbn.
ppp
Perc. 1
Perc. 2
f
sub pp
f
(become increasingly more erratic and violent with bells through end of piece)
mf
Pno.
f
E. Gtr.
ppp
f
ppp
f
Vln. 1
Vln. 2
Vla.
arco
re-bow as needed; stagger with bass
Vc.
re-bow as needed; stagger with cello
Cb.


Conductor: hold until resonance from crotales begins to die away, and then cue violinist. Resonance should almost finish by beginning of final measure.
Tutti: stop abruptly; remain still until end of piece (with the exception of the trombonist and violinst)
125
Picc.
Cl.
Ob.
Bsn.
Hn.
B♭ Tpt.
Tbn.
Perc. 1
Perc. 2
Pno.
randomly alternate volume and breath, trending louder (stagger with guitarist)
E. Gtr.
randomly alternate volume and breath, trending louder (stagger with pianist)
Vln. 1
(tremolo irregularly)
ST
Vln. 2
aggressively saw away on styrofoam
(feel free to destroy it)
Vla.
aggressively saw away on styrofoam
(feel free to destroy it)
Vc.
(tremolo irregularly)
Cb.
(tremolo irregularly)
sub

luscinia

for orchestra and live electronics

tina tallon
2017

commissioned by the La Jolla Symphony
Steven Schick, artistic director

epigraph:

> every poem here.
> is an unwrite.
> of all that has been written in me without. permission.
>
> -Nayyirah Waheed, from *salt*

luscinia

for orchestra and live electronics
duration: 10.5'

INSTRUMENTATION

Bass Flute*
Piccolo*
Flute
2 Oboes
English Horn
2 Clarinets in Bb
Bass Clarinet
2 Bassoons
Contrabassoon

4 Horns in F
3 Trumpets in C
3 Trombones
Tuba

2 Percussion:
- Percussion 1: Vibraphone, Crotales (high octave), 3 cymbals (low, med., high), bird call
- Percussion 2: Bowl of 6mm bells, snare drum, bass drum, bird call

Harp

Strings:
- 3-way Violin I divisi (1st desk, 2nd desk, all other desks)
- 3-way Violin II divisi (1st desk, 2nd desk, all other desks)
- 2-way Voila divisi (1st desk, all other desks)
- Cello
- Contrabass

Live electronics (8 channels of input, spatialized quadrophonic output)
- MICROPHONE CHANNEL LISTING:
- Channels 1-2: Main stereo pair
- Channel 3: Principal Contrabass (or whichever player will play the solo bass part)
- Channel 4: Principal Violin I
- Channel 5: Bass flute
- Channel 6: Percussion 1
- Channel 7: Percussion 2
- Channel 8: Harp

Please see technical addendum for more details information, software explanation, and troubleshooting instructions.

*Note: the bass flute has an extended solo section and should be performed by the flutist most adept at playing the bass flute (assumed to be Flute 1, which is why it is listed first). The piccolo also has an extended solo, and should be performed by the player most adept at playing the piccolo (assumed to be Flute 2).

NOTES TO PERFORMERS

GENERAL

All trills are to be a 1/2-step unless otherwise noted (the other option is usually “timbral” (sometimes notated with an “o” above the trill if space is particularly limited).

All accidentals hold for the entirety of the measure unless canceled by a different accidental.

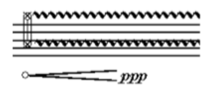
In places where noteheads do not provide information about duration, the number of beats appear above the note in question in parentheses.

In general, the piece is very, very quiet. The vast majority of the sounds should have a brittle, strained quality about them.

INSTRUMENT-SPECIFIC NOTES

Harp:

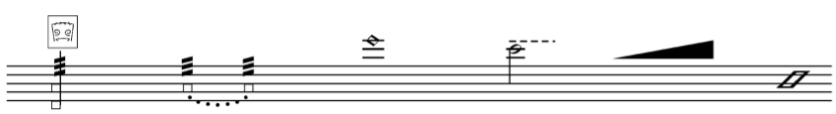
Wavy lines extending from notes indicate that one should quickly and gently rub the string (either with their thumb and forefinger for one note, or with their palm for a cluster, as shown).



A demonstration can be found here: http://sites.siba.fi/en/web/harpnotation/manual/sliding-sounds/rubbing-strings

Winds and Brass:

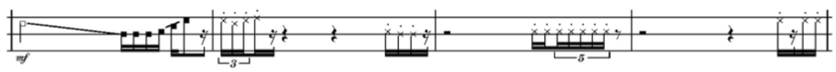
Strings:



Any pitches written with a diamond notehead need not be exact; because of the breathy nature of the sounds (which are often found during glissandi), a pitch center will not always be discernible and thus a general ballpark frequency is adequate.

For the violins and viola, the string writing is split into either two or three parts. In instances where one of the lines in the divisi is marked “solo” and the line below has a part that is not solo, the inner chair of the desk can play one of the other parts on the lines below.

Special instructions for bass solo sections:



X noteheads indicate small popping, crunching noises achieved by rolling the wood of a loose bow atop the hair while pressing the string into the fingerboard with the bow.

Box noteheads indicate overpressure with vertical bowing, but with the details of overpressure (how much pressure, position, and articulation) determined by the position on the string.

A staff with three lines delineates relative position of the bow along the fingerboard (oriented with the bridge corresponding to the lowest line, and the nut to top). The left hand should mute all strings as close as possible to where the bow is striking the strings to limit resonance (sound should be very dry).

Also, during section E, the bassist is to run a superball mallet along the strings to produce "whale-like" sounds. The two strings upon which the head of the mallet should rest are indicated by box noteheads as well.

An example of these three techniques and the resulting sounds can be found here: https://www.youtube.com/watch?v=CM_0wxAq2nw

PROGAM NOTE FOR LUSCINIA

“luscinia” is the genus portion of the scientific name for the common nightingale, Luscinia megarhynchos. Nightingales are small birds found primarily throughout Europe and Asia, and are known for their highly varied song, which is often sung at night. They have been referenced throughout literature, music, and visual art for centuries, though perhaps one of the nightingale’s most well-known appearances is in the tale of Philomel, found in Ovid’s Metamorphoses. Ovid writes of a young woman who is raped by her brother-in-law, Tereus, who then cuts out her tongue to prevent her from identifying him as the perpetrator. Unable to speak, she weaves a tapestry depicting her assault and sends it to her sister Procne, who hatches a plan to exact revenge. After discovering this plan, Tereus chases Procne and Philomel into the forest, where they escape by being turned into birds - Procne into a swallow, and Philomel into a nightingale. For many artists, the nightingale’s song has often had melancholy connotations, presumably due in some part to Ovid’s story; however, in a somewhat cruelly ironic twist, modern ornithologists have found that it is usually only the male nightingale that actually sings (as is the case with many species of birds).

This piece incorporates live electronic processing, which involves both the generation of new sounds in response to the orchestra and live modification of what the orchestra is playing. This allows for the seamless integration of the acoustic and electronic elements of the piece, and in some cases, they may be indistinguishable. One of the most important aspects of the processing of the orchestra allows for the production of vocal sounds using the spectral profiles of the music that the orchestra is playing. In this way, the orchestra is able to give voice to those who have historically been silenced. In fact, *luscinia* is, most of all, a meditation on silence (albeit not a peaceful, pastoral one).

Anyone who has paid attention to the news as of late knows that we are currently experiencing a watershed moment with respect to societal conversations surrounding sexual assault. Though I began work on this piece many months prior to the Harvey Weinstein investigation (and the many others that have followed), I hope that someday soon, situations such as the impetus for this piece will no longer be commonplace. While many composers hope that their music stays relevant long after its premiere, I can say with certainty that I sincerely hope that this piece does not. It is time for change, and it is time for action.

I am immensely grateful to all of the people who contributed their stories to the electronic component of this piece, and to Maestro Schick and the orchestra for their trust and adventurousness in bringing it off of the page. I am also grateful to the Nee family for supporting this commission (and emerging composers in general), and for their belief in the importance of the creation of new music.

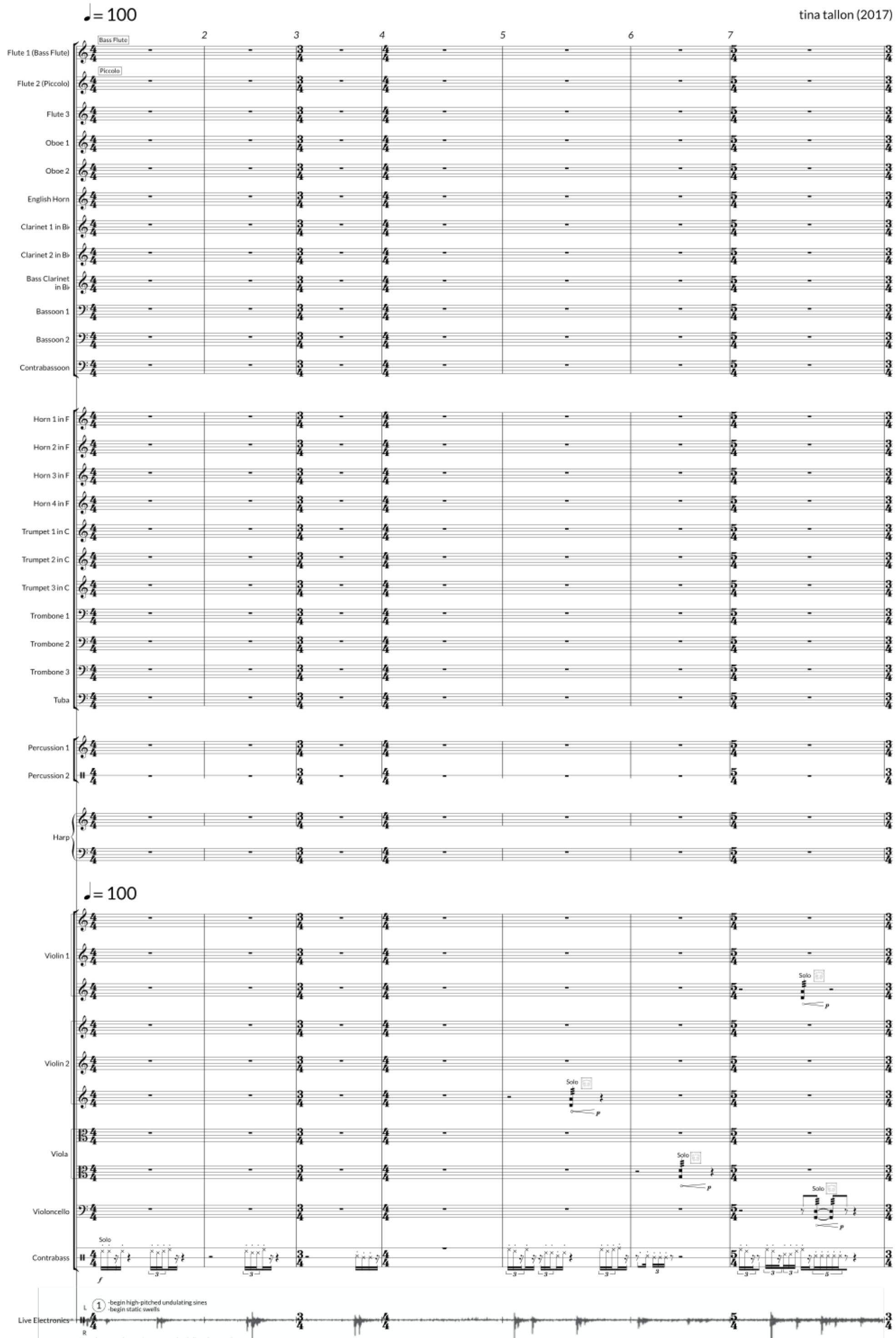
-Tina Tallon

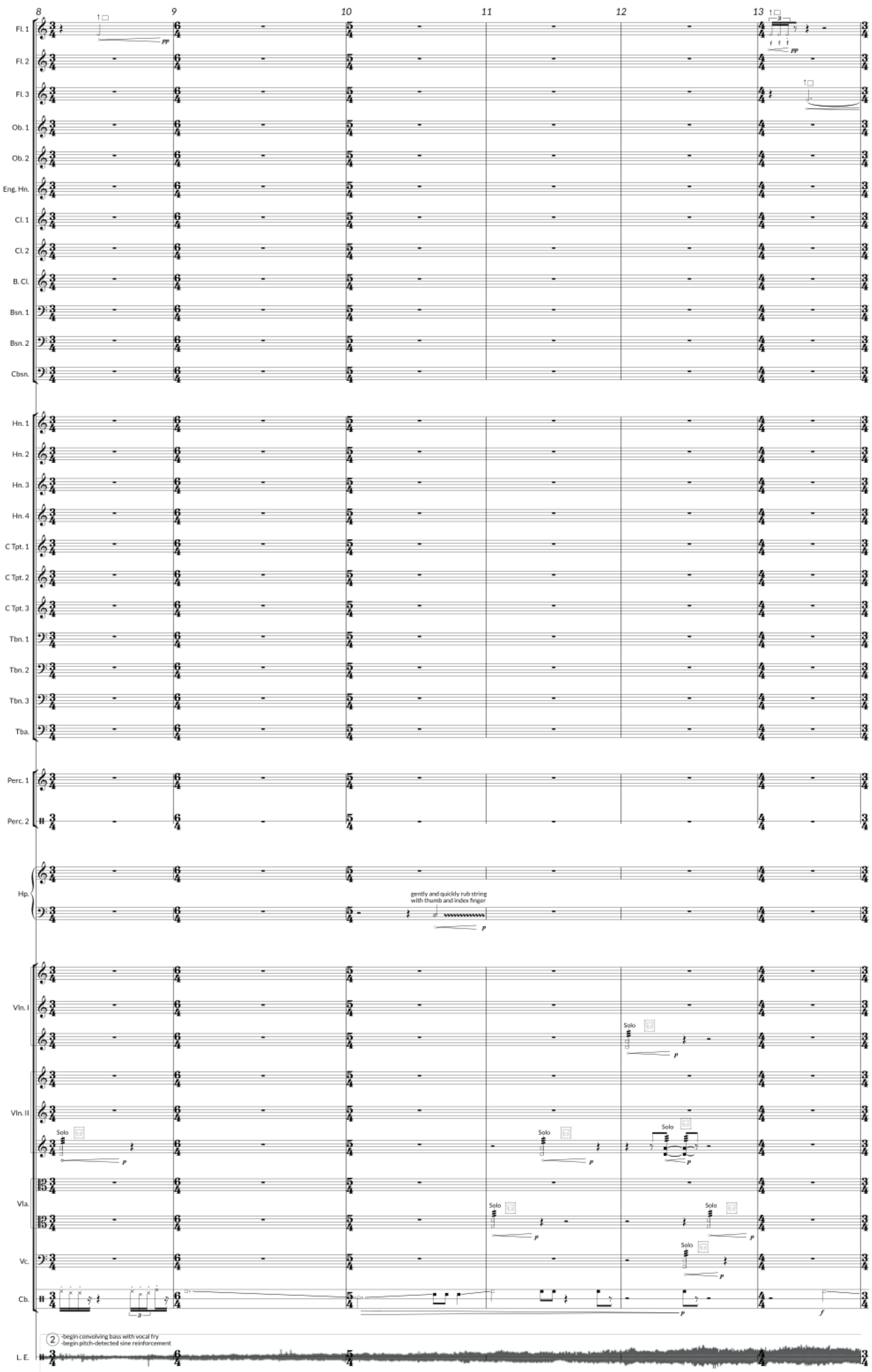
SCORE IN C

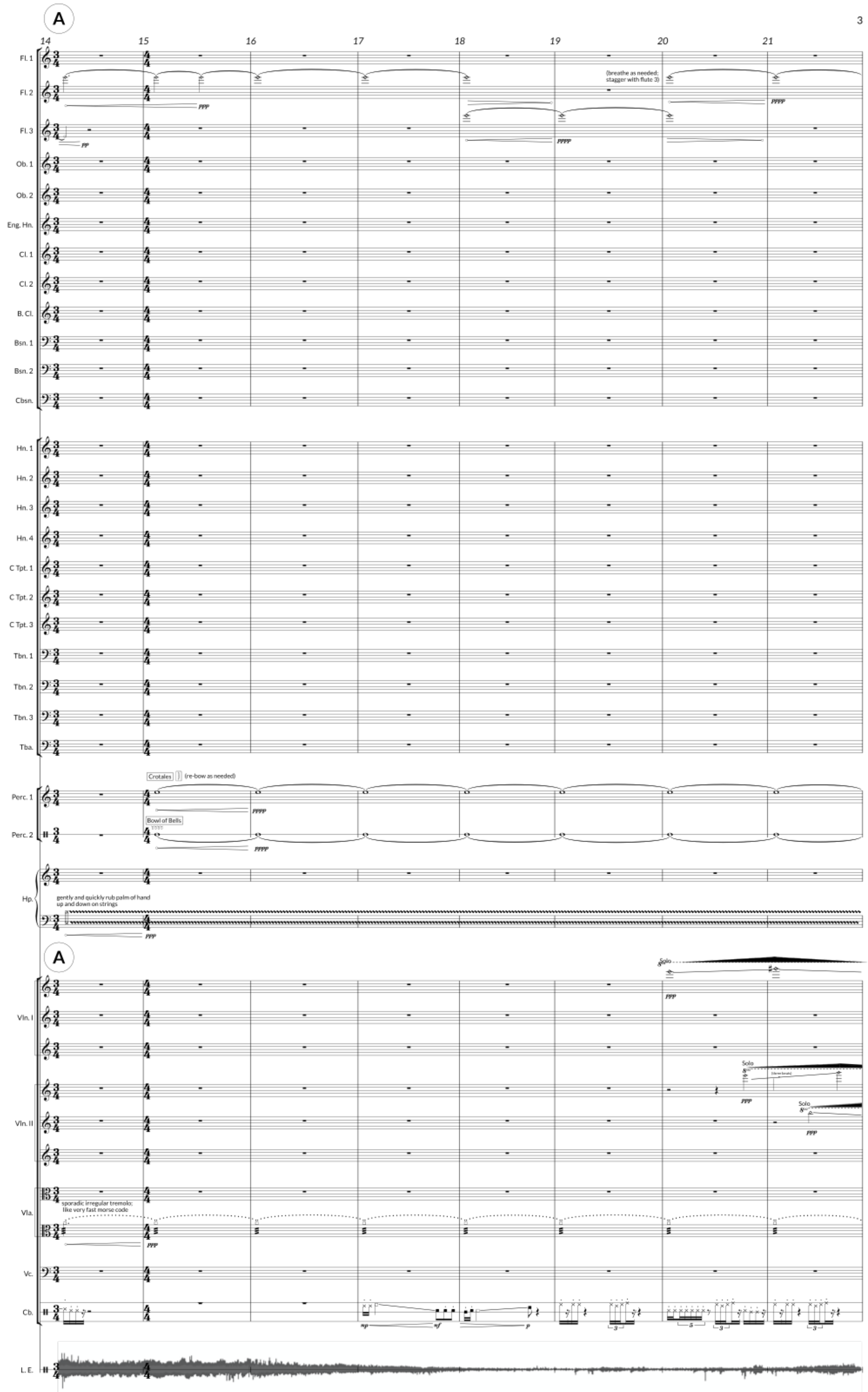
Commissioned by the La Jolla Symphony
Steven Schick, Artistic Director

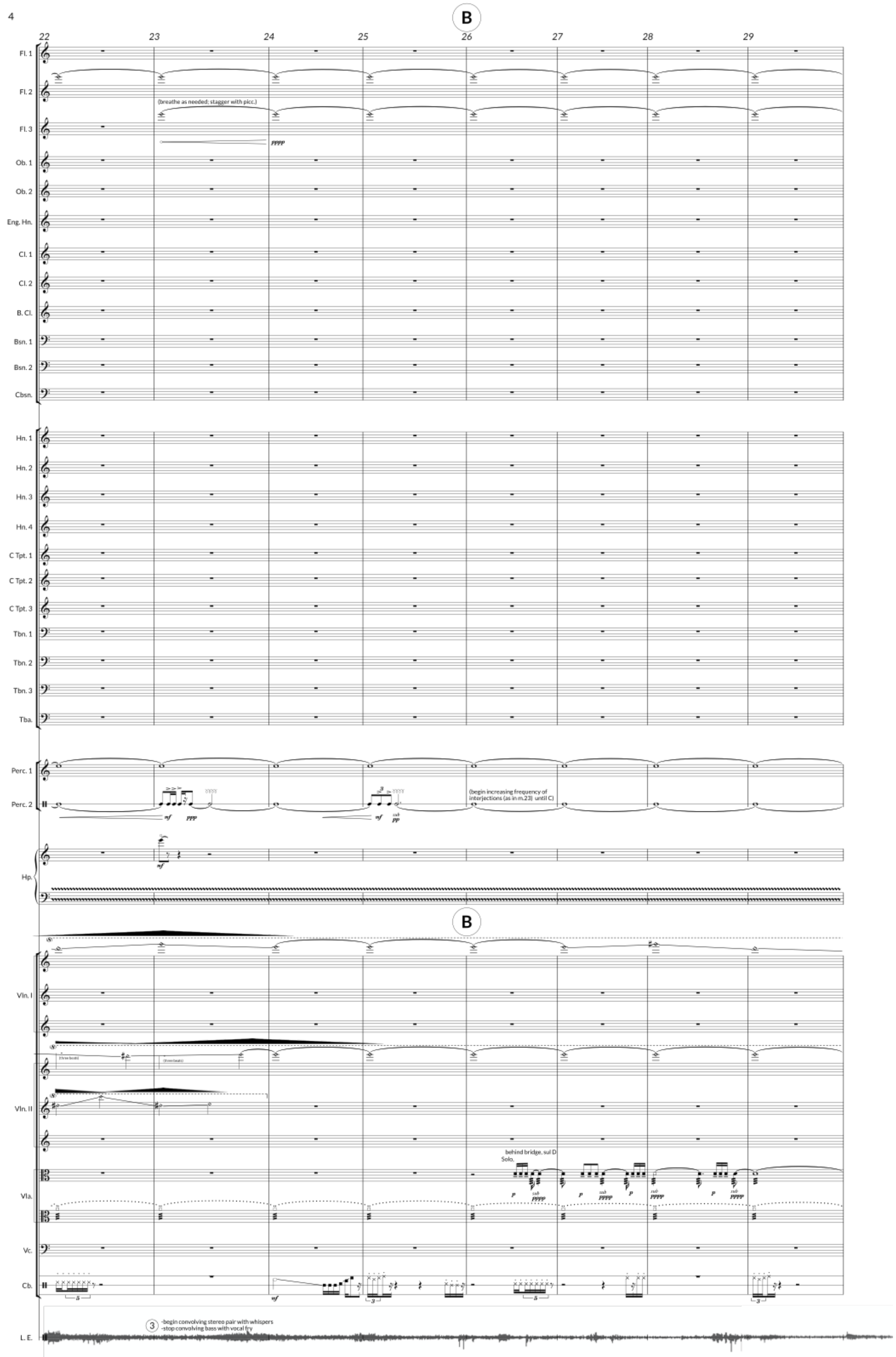
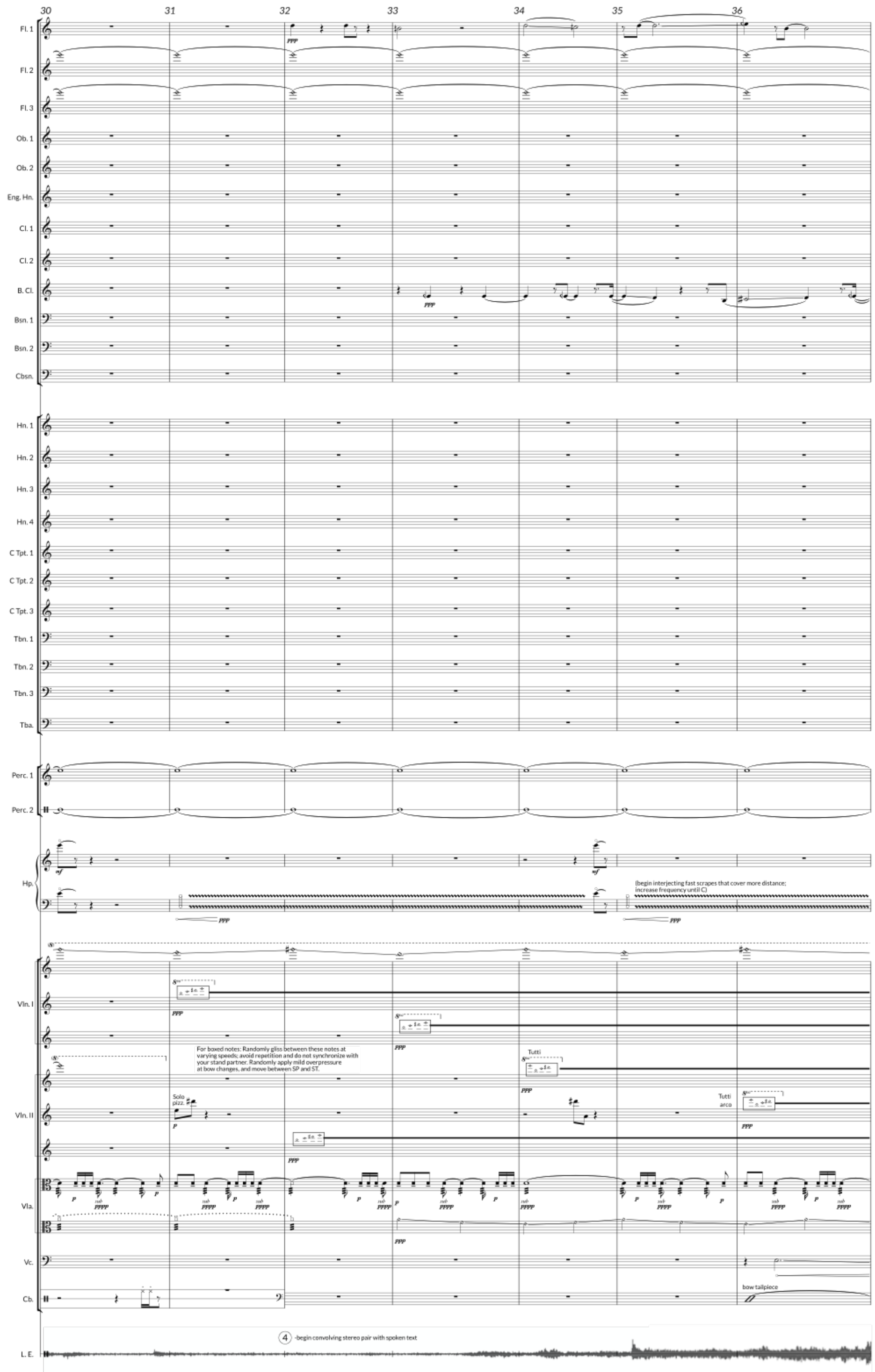
luscinia

tina tallon (2017)

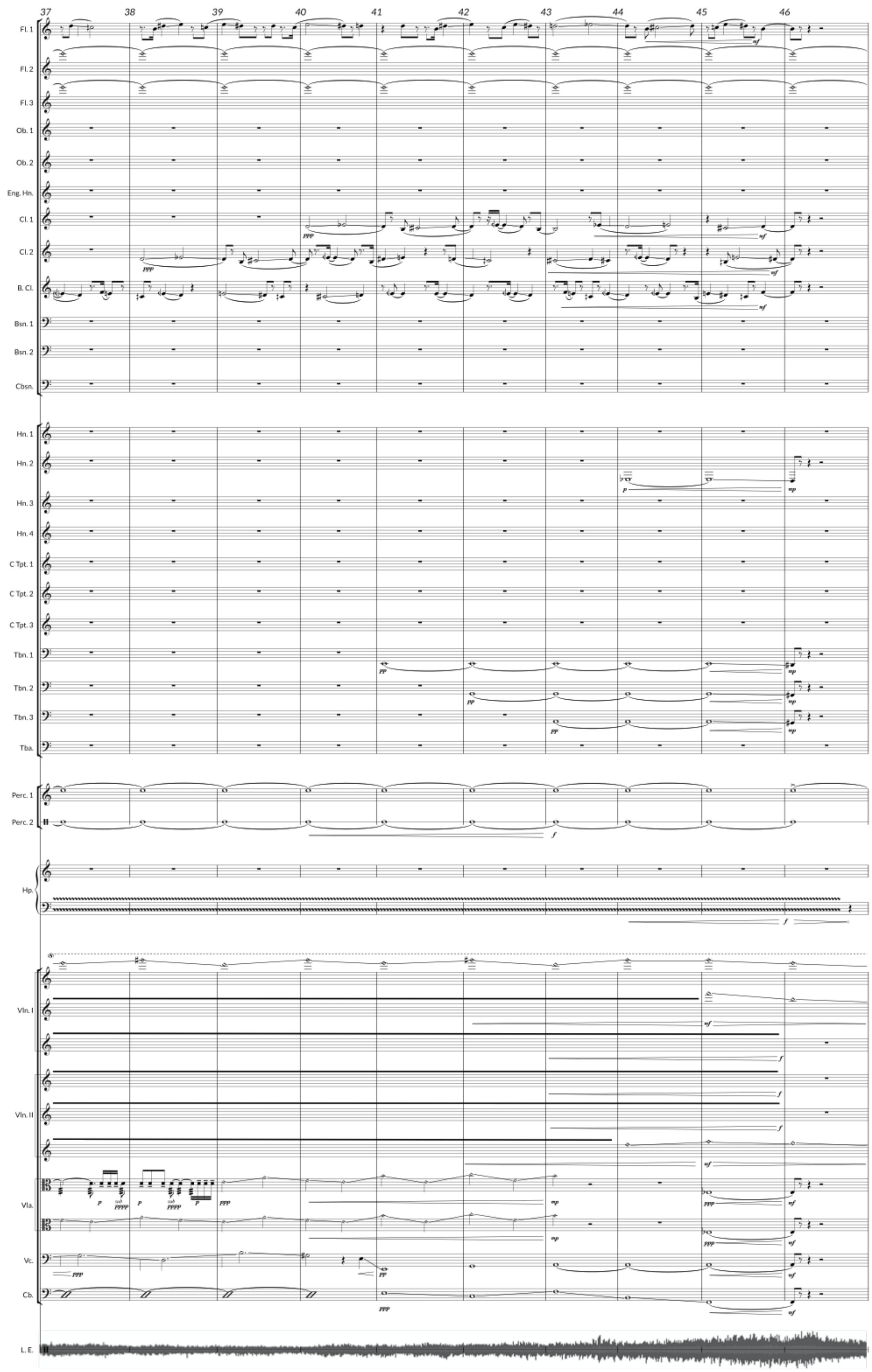


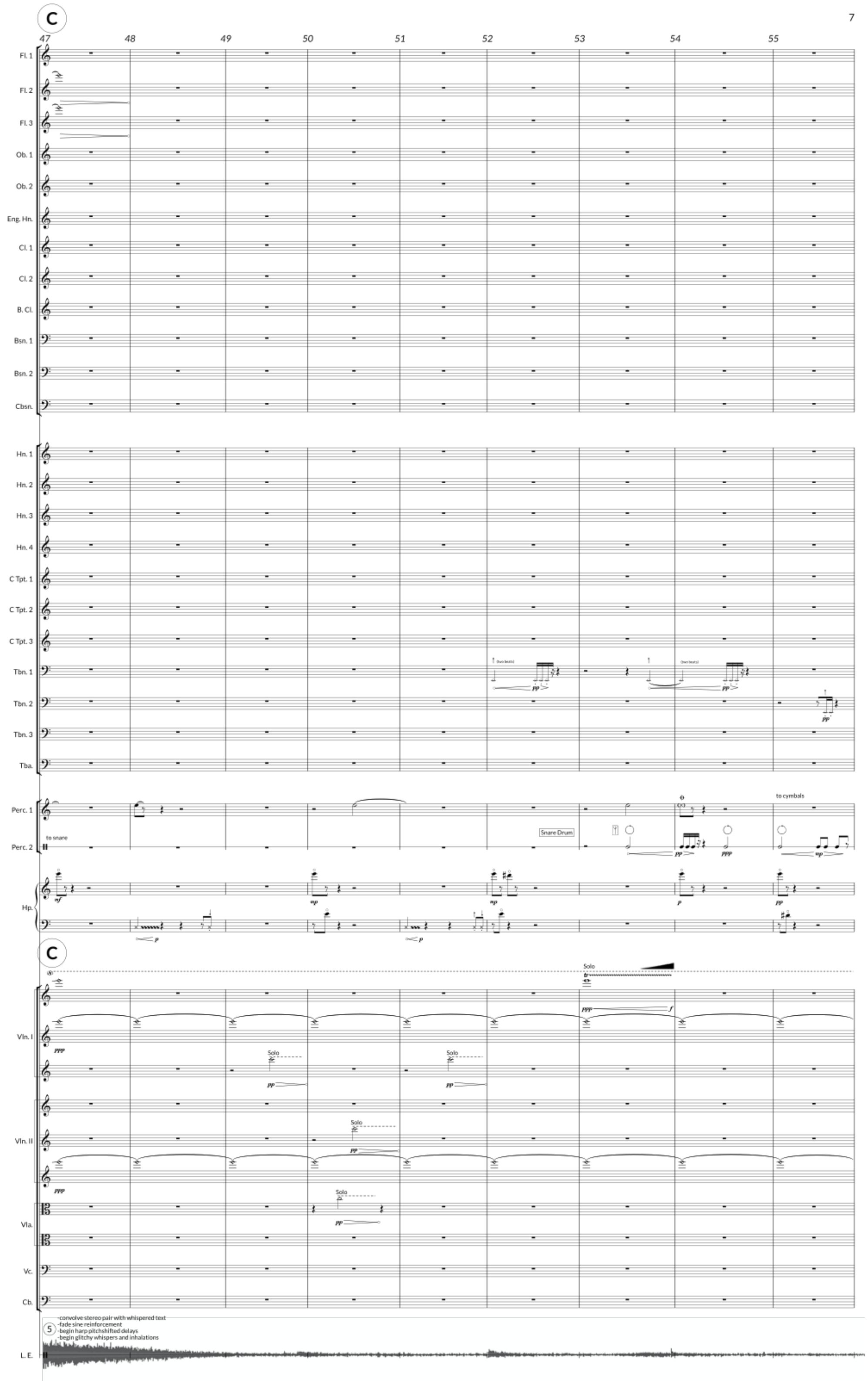

Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Hp.
gently and quickly rub string with thumb and index finger
Vln. I
Vln. II
Vla.
Vc.
Cb.
Solo
-begin convolving bass with vocal fry
-begin pitch-detected sine reinforcement
L. E.


A
14
15
16
17
18
19
20
21
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Cb.
L. E.
(breathe as needed; stagger with flute 3)
Crotales
(re-bow as needed)
Bowl of Bells
gently and quickly rub palm of hand up and down on strings
Solo
sporadic irregular tremolo; like very fast morse code
pp
ppp
pppp
mp
mf
p

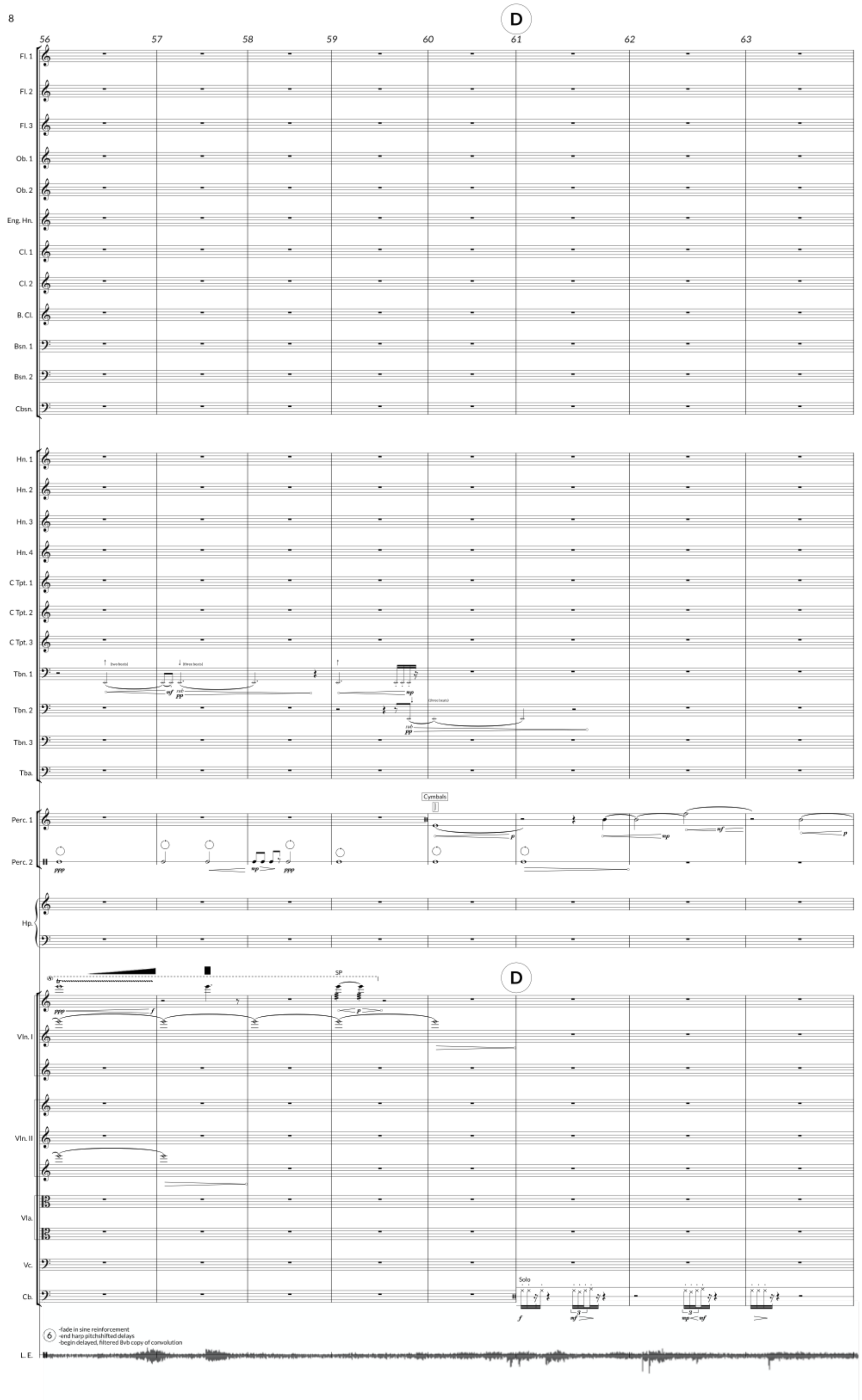

B
22
23
24
25
26
27
28
29
Fl. 1
Fl. 2
(breathe as needed; stagger with picc.)
Fl. 3
pppp
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
mf
ppp
(begin increasing frequency of interjections (as in m.23) until C)
Hp.
B
Vln. I
Vln. II
behind bridge, sul D
Solo.
Vla.
Vc.
Cb.
L. E.
3
-begin convolving stereo pair with whispers
-stop convolving bass with vocal fry


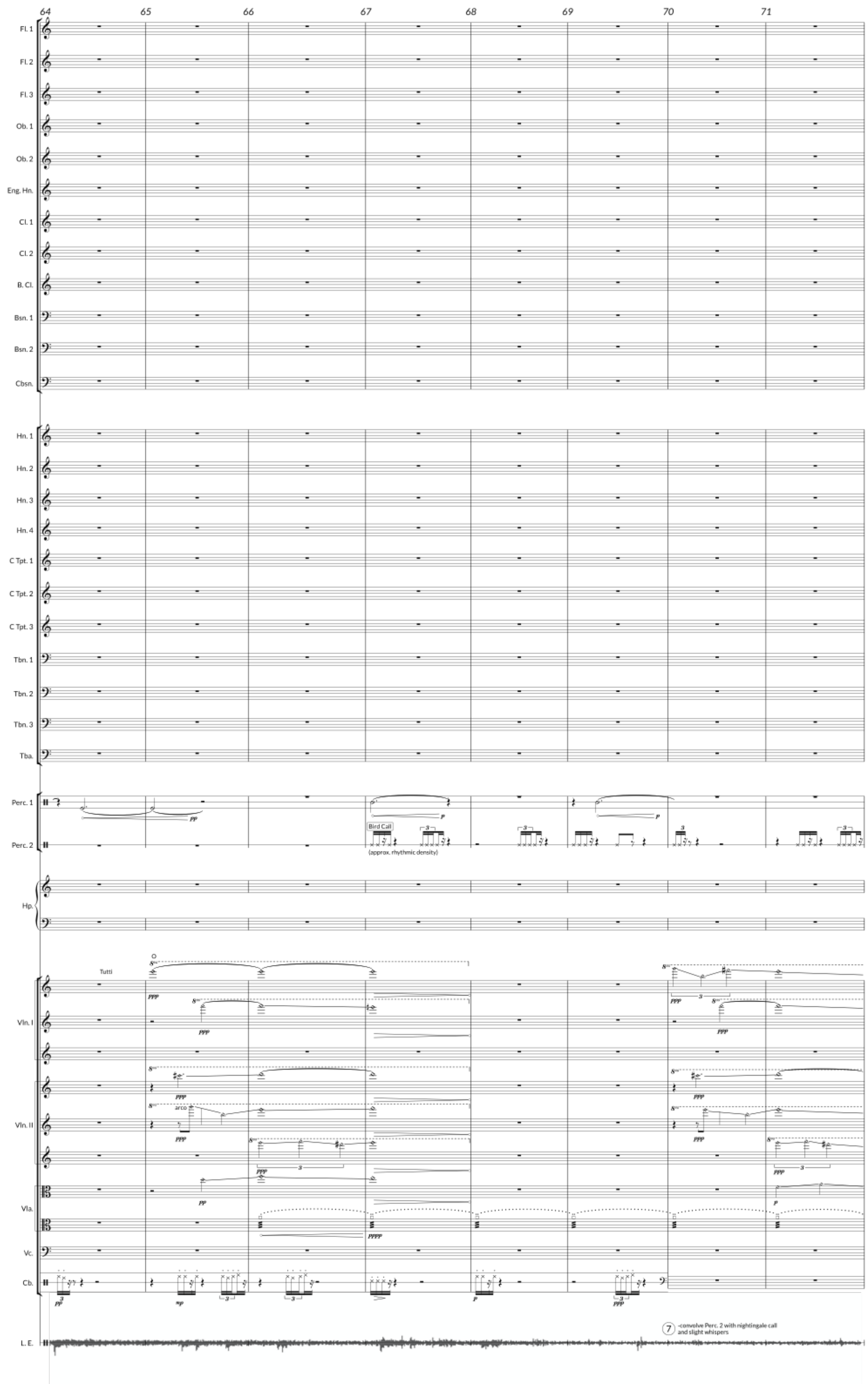
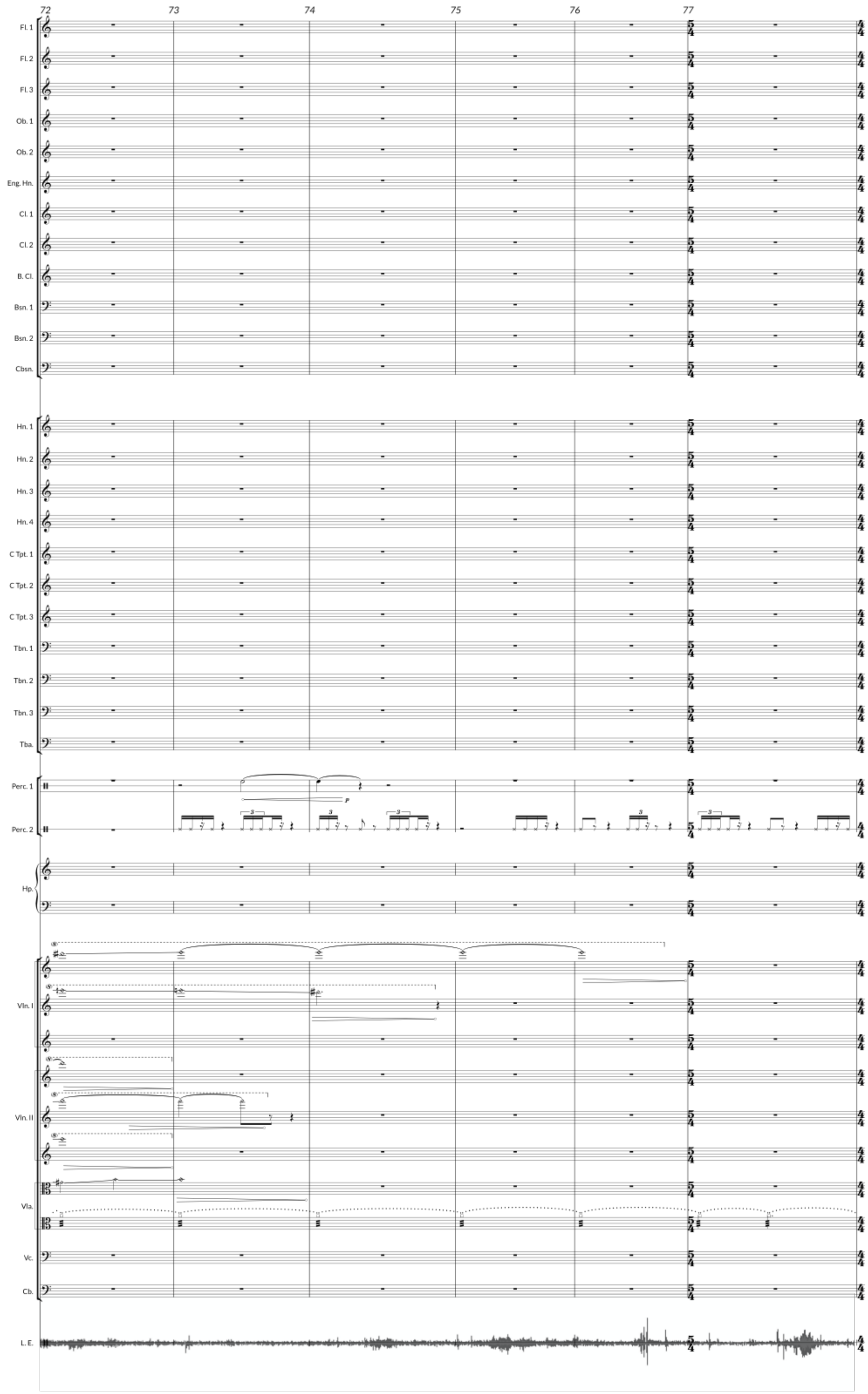
30
31
32
33
34
35
36
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Hp.
(begin interjecting fast scrapes that cover more distance; increase frequency until C)
Vln. I
For boxed notes: Randomly gliss between these notes at varying speeds; avoid repetition and do not synchronize with your stand partner. Randomly apply mild overpressure at bow changes, and move between SP and ST.
Tutti
Solo pizz.
Tutti arco
Vln. II
Vla.
Vc.
Cb.
bow tailpiece
4 -begin convolving stereo pair with spoken text
L. E.



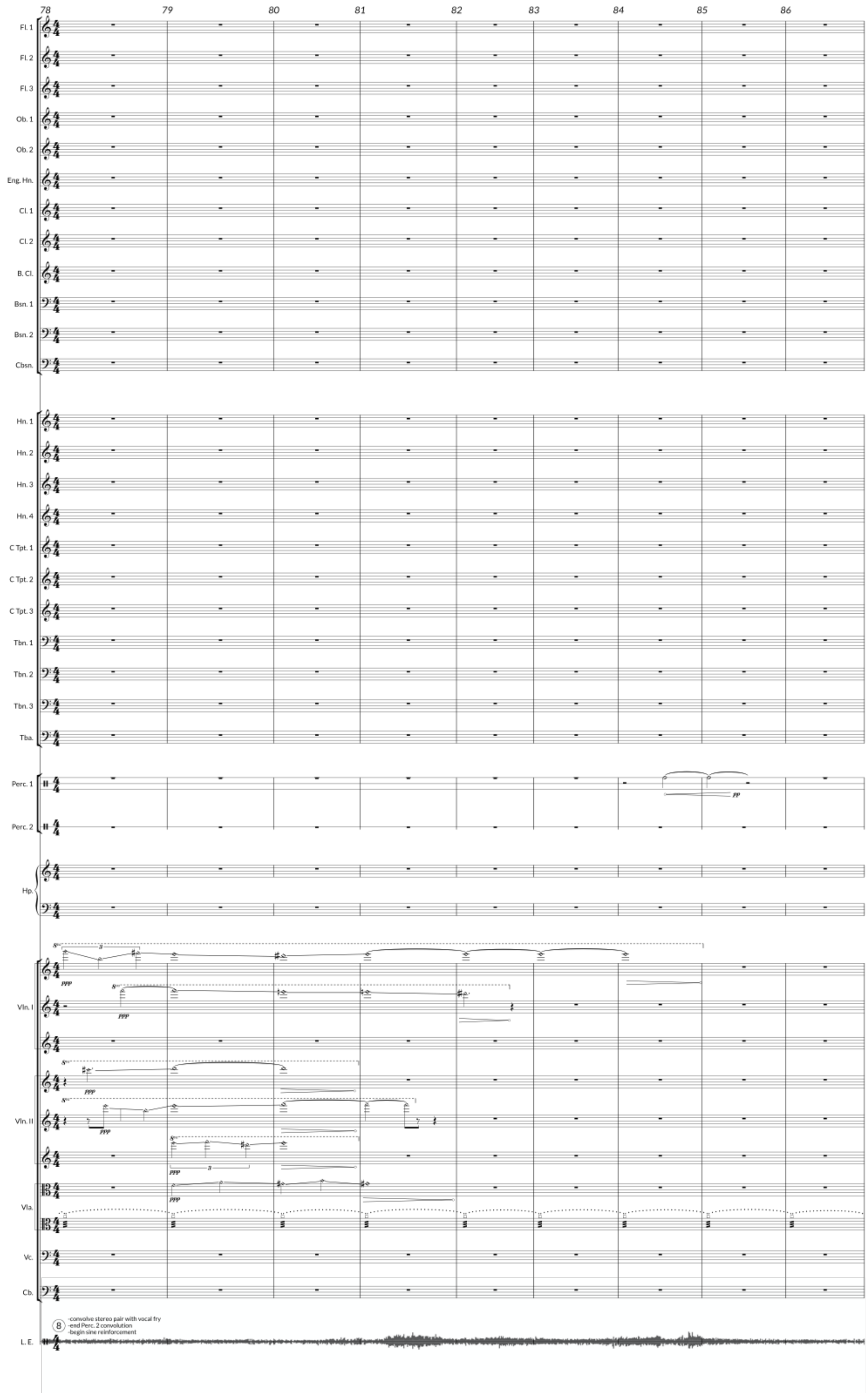
37
38
39
40
41
42
43
44
45
46
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Cb.
L. E.


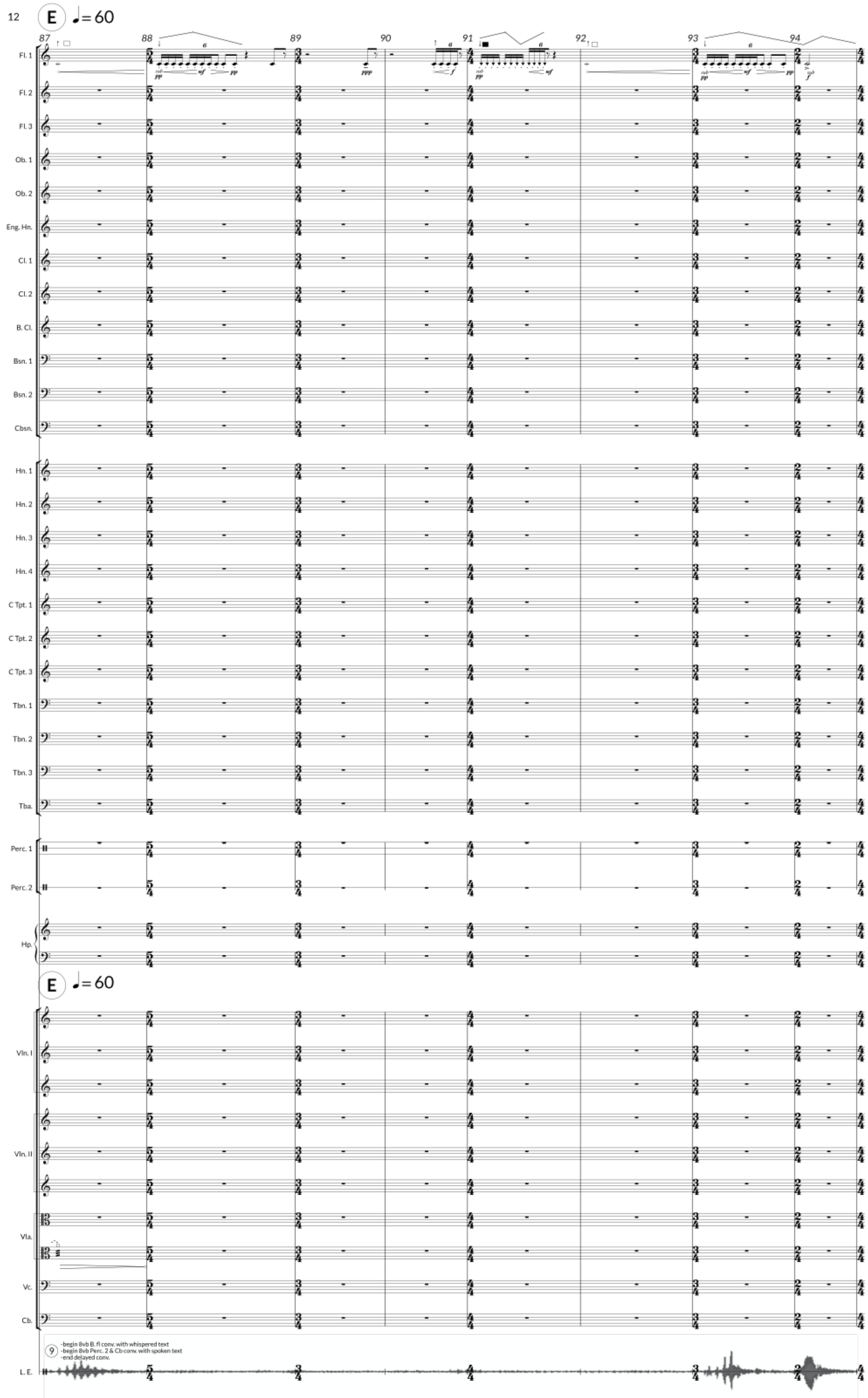
C
7
47
48
49
50
51
52
53
54
55
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
to snare
Snare Drum
to cymbals
Hp.
C
Solo
Vln. I
Vln. II
Vla.
Vc.
Cb.
5
-convolve stereo pair with whispered text
-fade sine reinforcement
-begin harp pitchshifted delays
-begin glitchy whispers and inhalations
L. E.

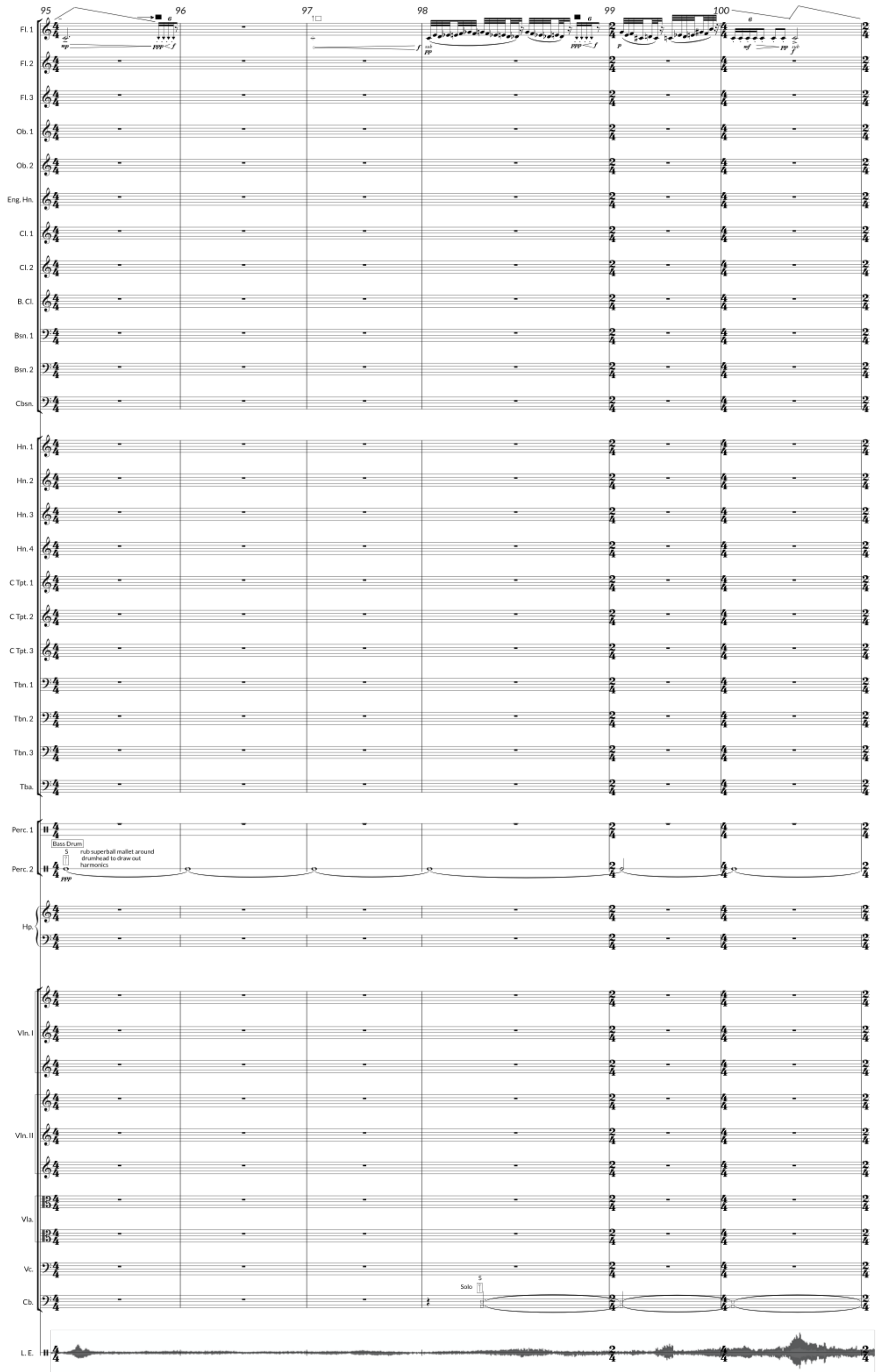

D
56
57
58
59
60
61
62
63
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Cymbals
Perc. 1
Perc. 2
Hp.
SP
D
Vln. I
Vln. II
Vla.
Vc.
Solo
Cb.
6
-fade in sine reinforcement
-end harp pitchshifted delays
-begin delayed, filtered 8vb copy of convolution
L. E.

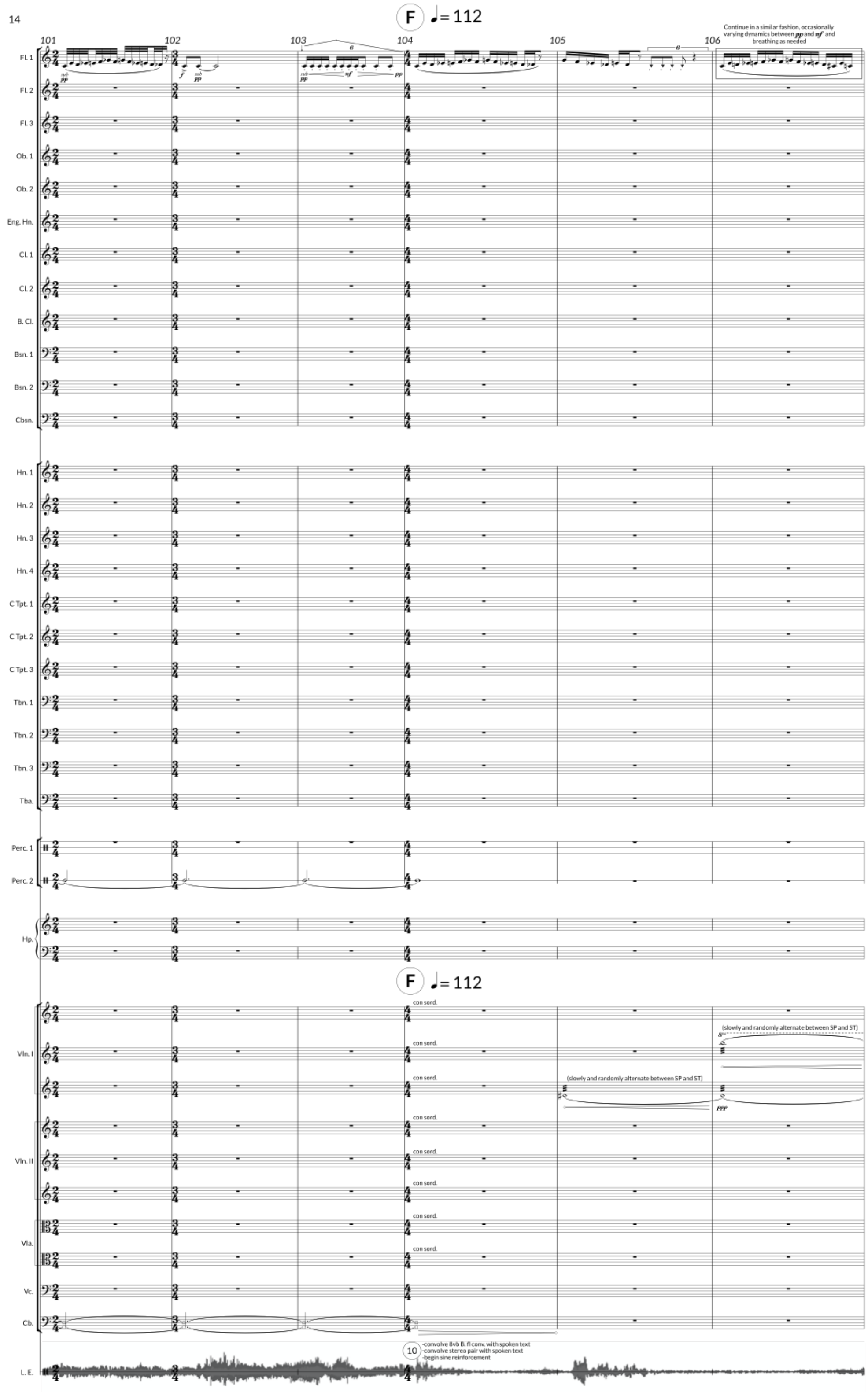

64
65
66
67
68
69
70
71
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Bird Call
(approx. rhythmic density)
Hp.
Tutti
Vln. I
Vln. II
arco
Vla.
Vc.
Cb.
L. E.
7
-convolve Perc. 2 with nightingale call
and slight whispers


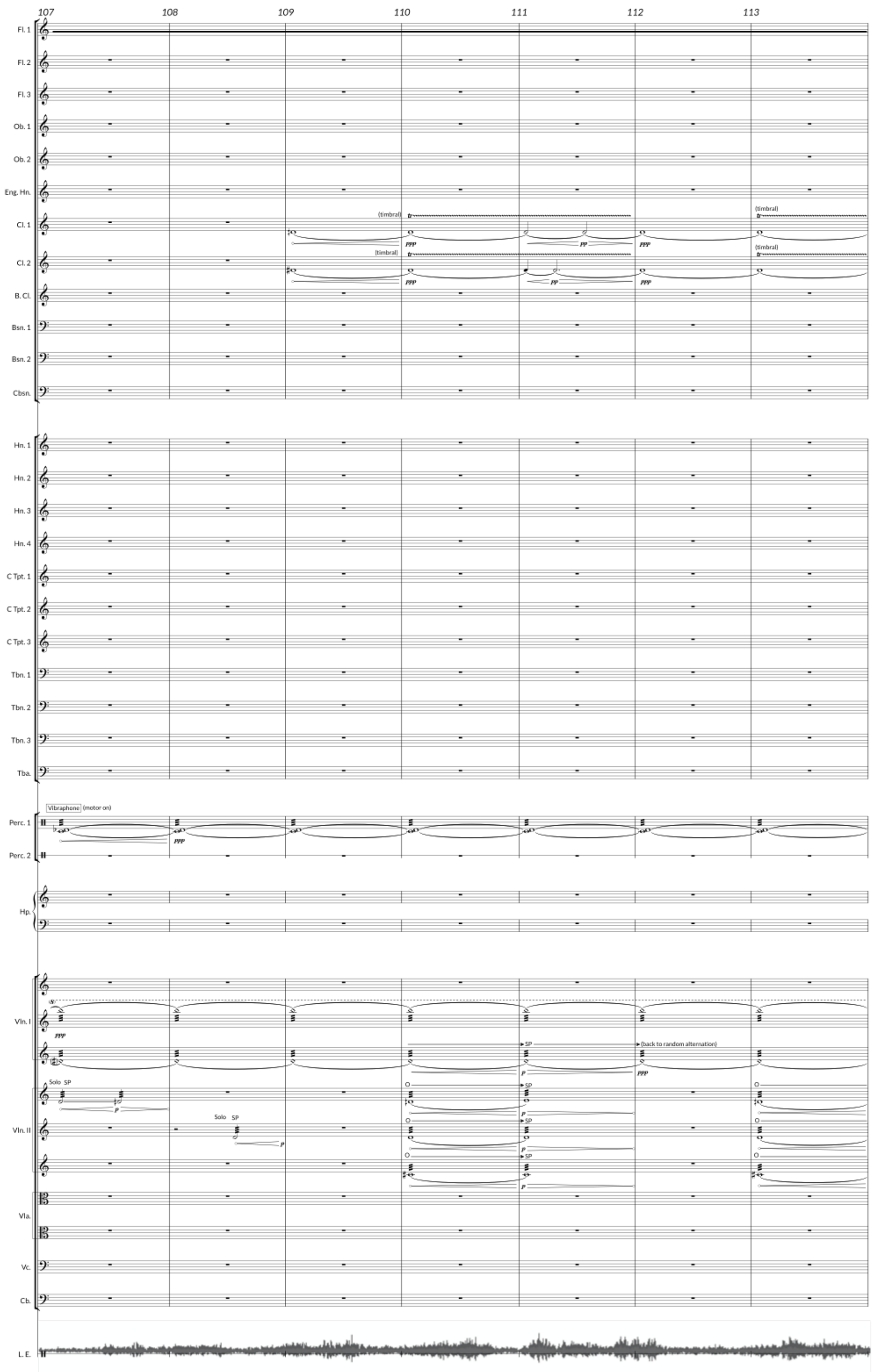
72
73
74
75
76
77
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Cb.
L. E.

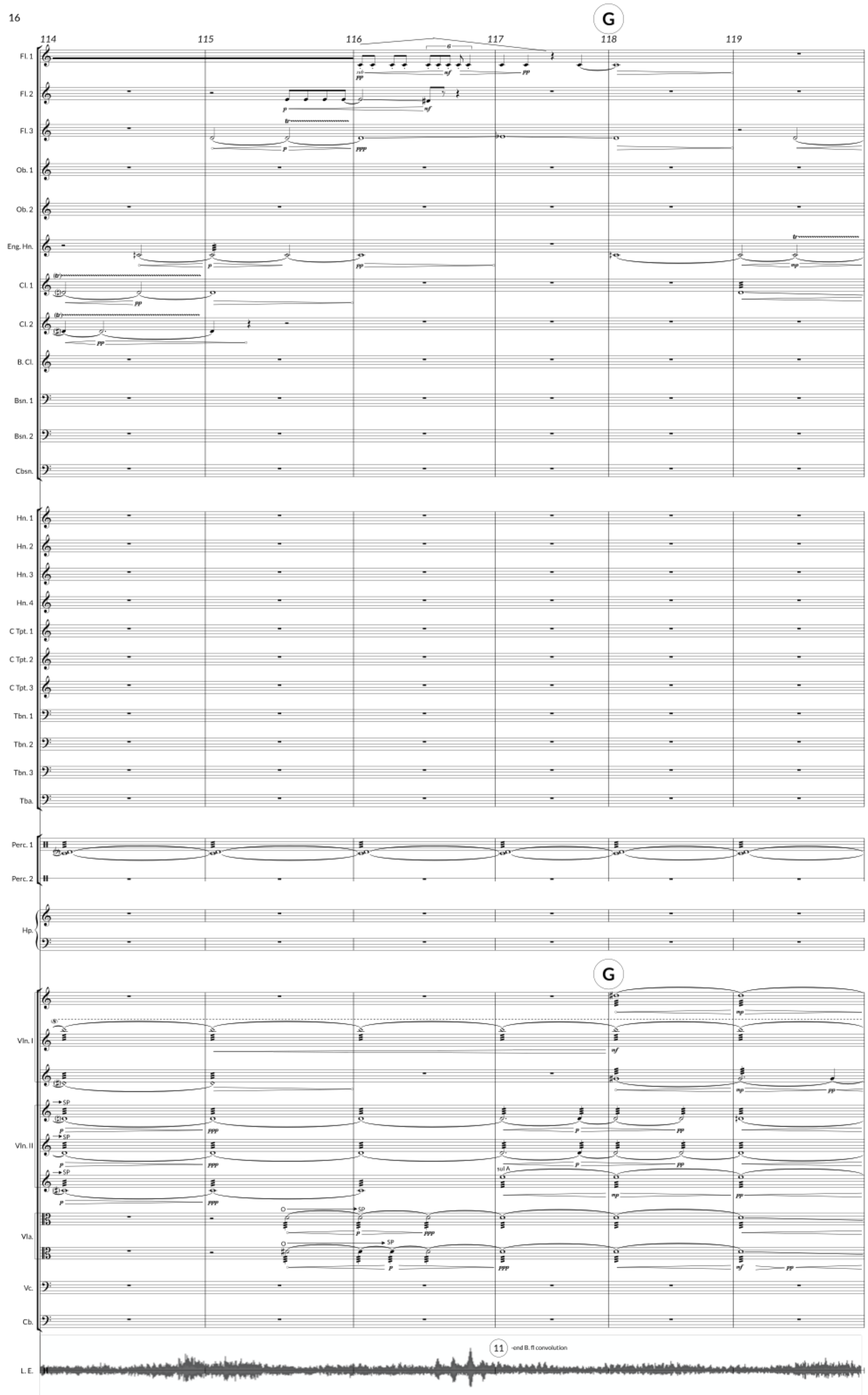

78
79
80
81
82
83
84
85
86
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Cb.
L. E.
8
-convolve stereo pair with vocal fry
-end Perc. 2 convolution
-begin sine reinforcement

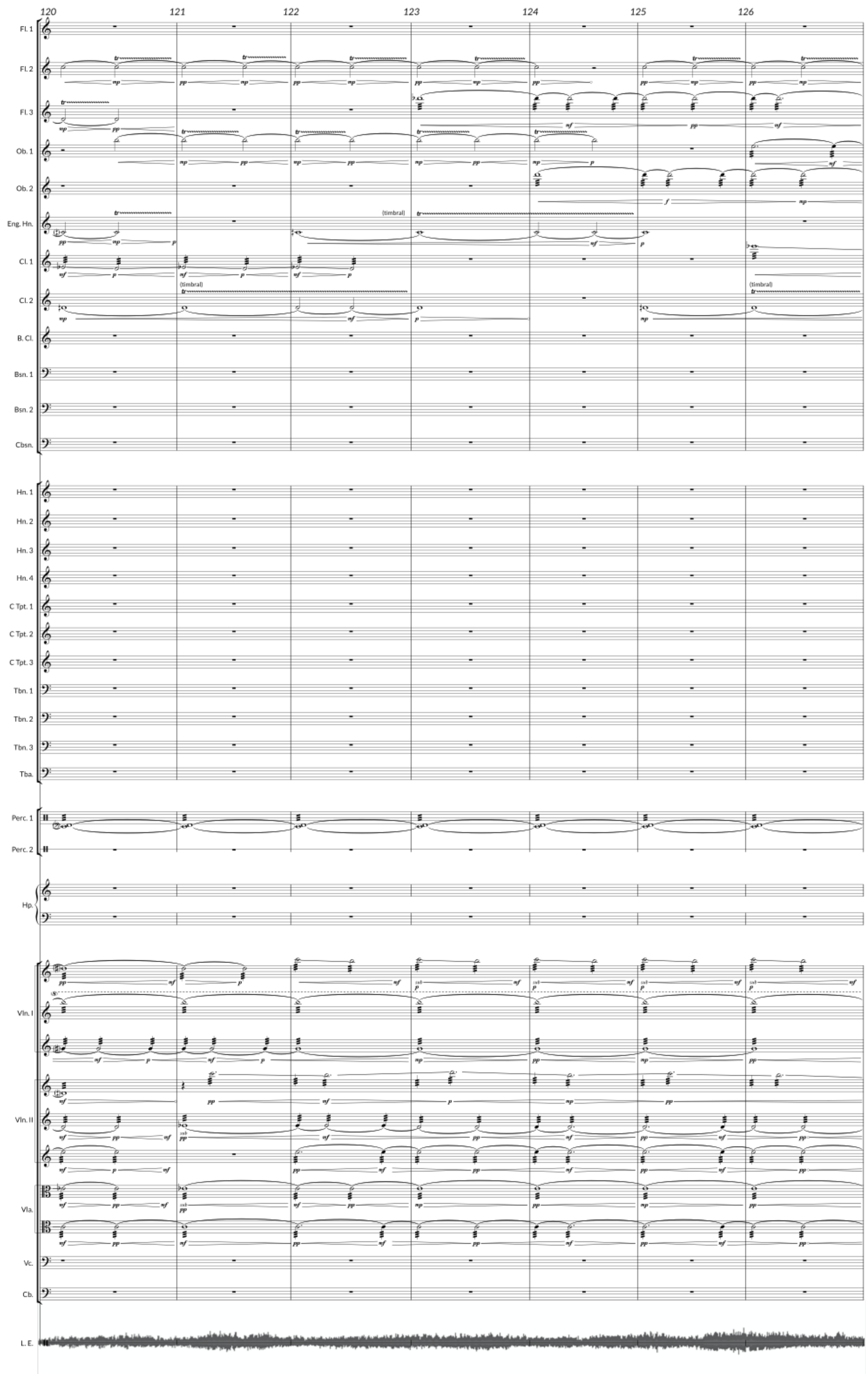
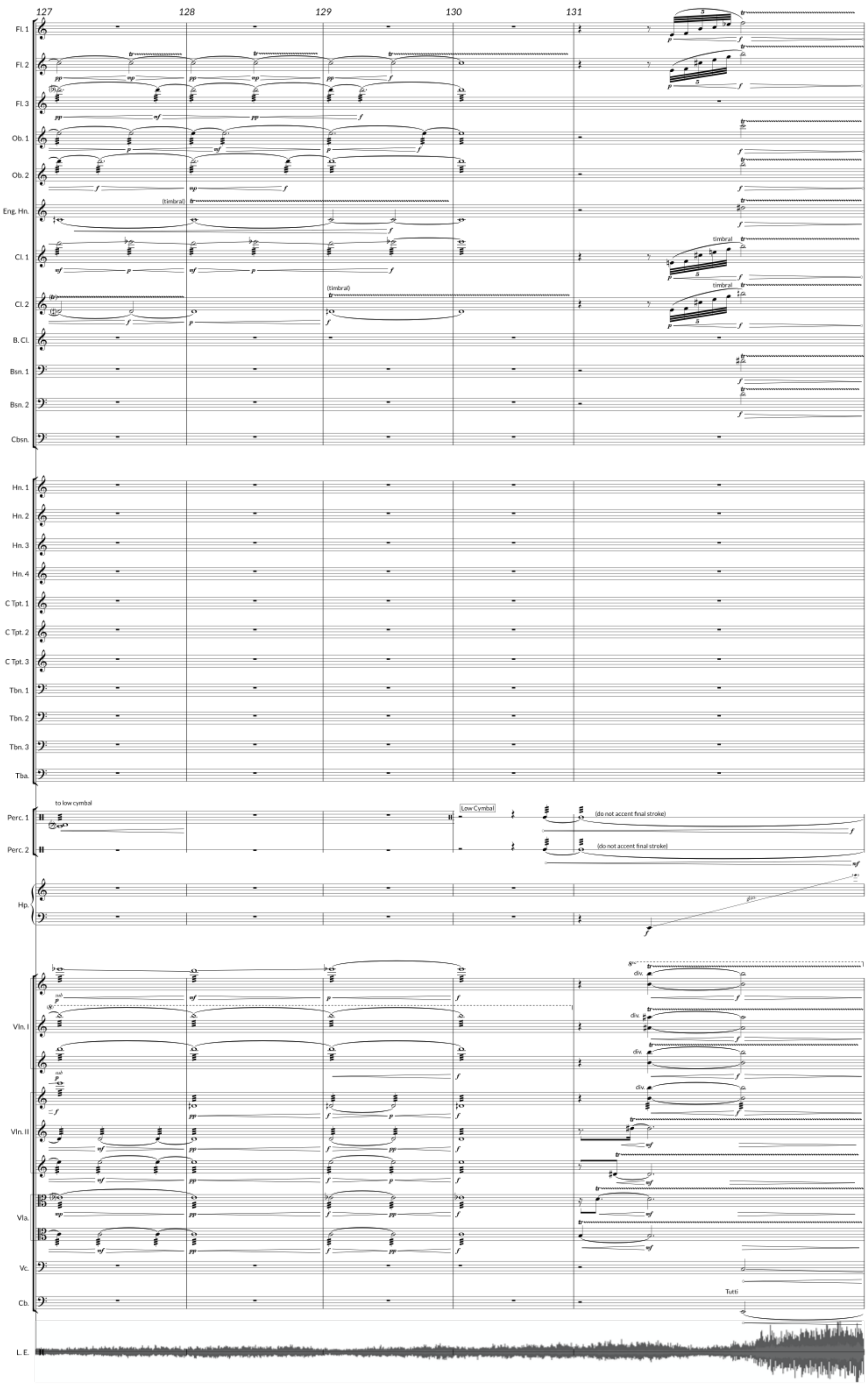

E ♩= 60
87
88
89
90
91
92
93
94
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Hp.
E ♩= 60
Vln. I
Vln. II
Vla.
Vc.
Cb.
9
-begin 8vb B. fl conv. with whispered text
-begin 8vb Perc. 2 & Cb conv. with spoken text
-end delayed conv.
L. E.


95
96
97
98
99
100
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Bass Drum
rub superball mallet around drumhead to draw out harmonics
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Solo
Cb.
L. E.

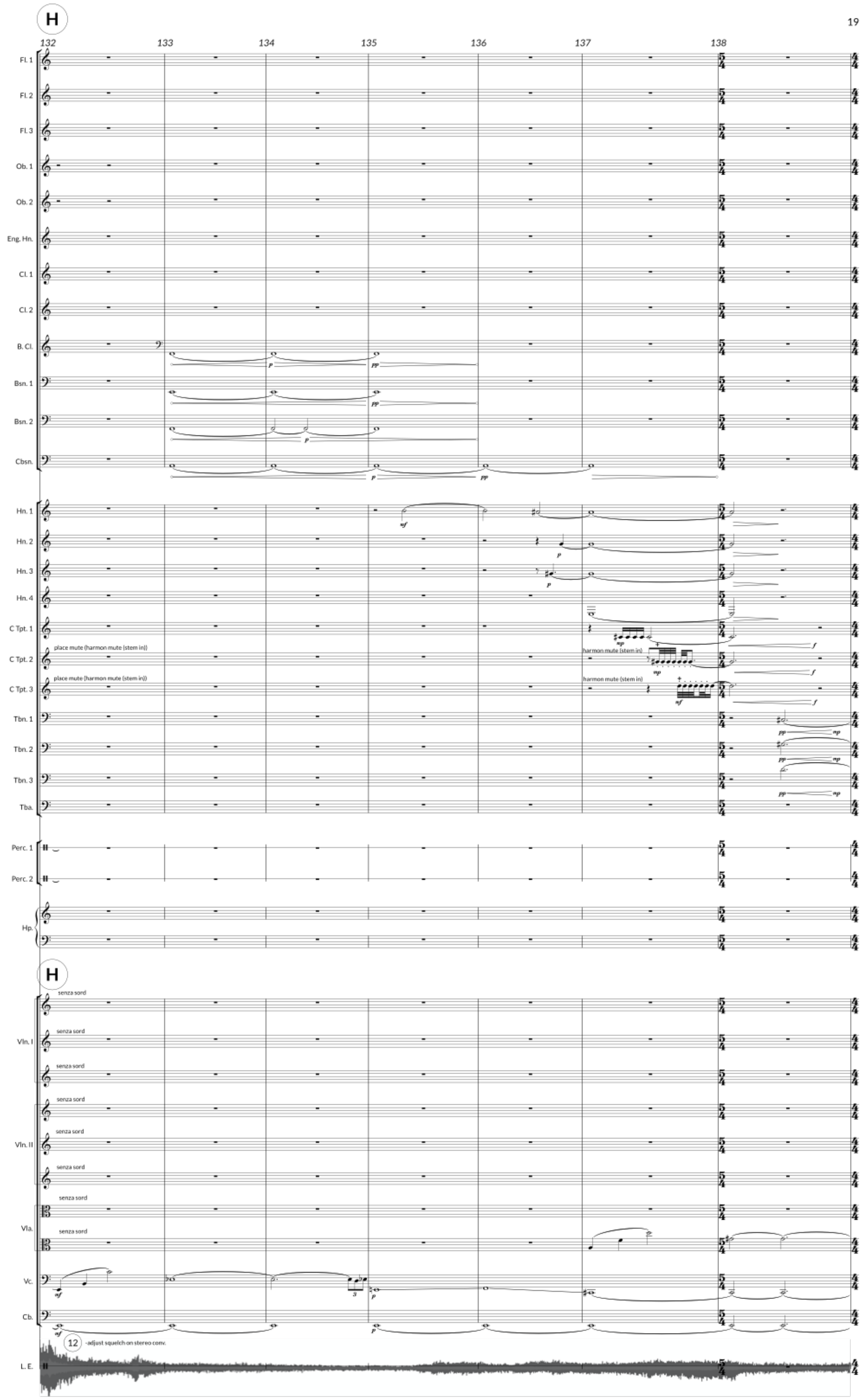

F ♩= 112
101
102
103
104
105
106
Continue in a similar fashion, occasionally varying dynamics between pp and mf and breathing as needed
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Hp.
con sord.
(slowly and randomly alternate between SP and ST)
Vln. I
Vln. II
Vla.
Vc.
Cb.
10
-convolve 8vb B. fl conv. with spoken text
-convolve stereo pair with spoken text
-begin sine reinforcement
L. E.

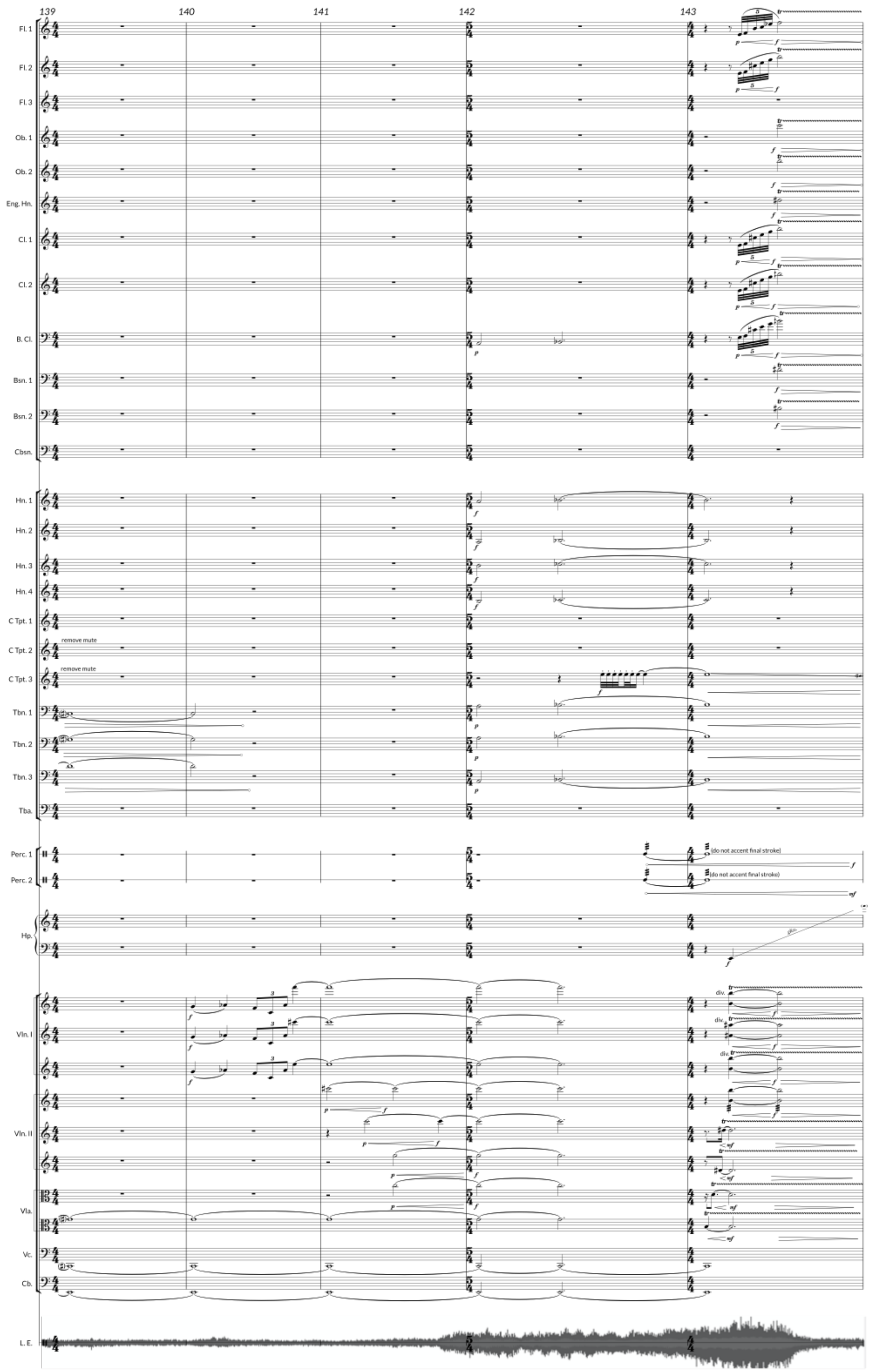

107
108
109
110
111
112
113
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Cb.
L. E.
(timbral)
Vibraphone
(motor on)
Solo SP
SP
(back to random alternation)

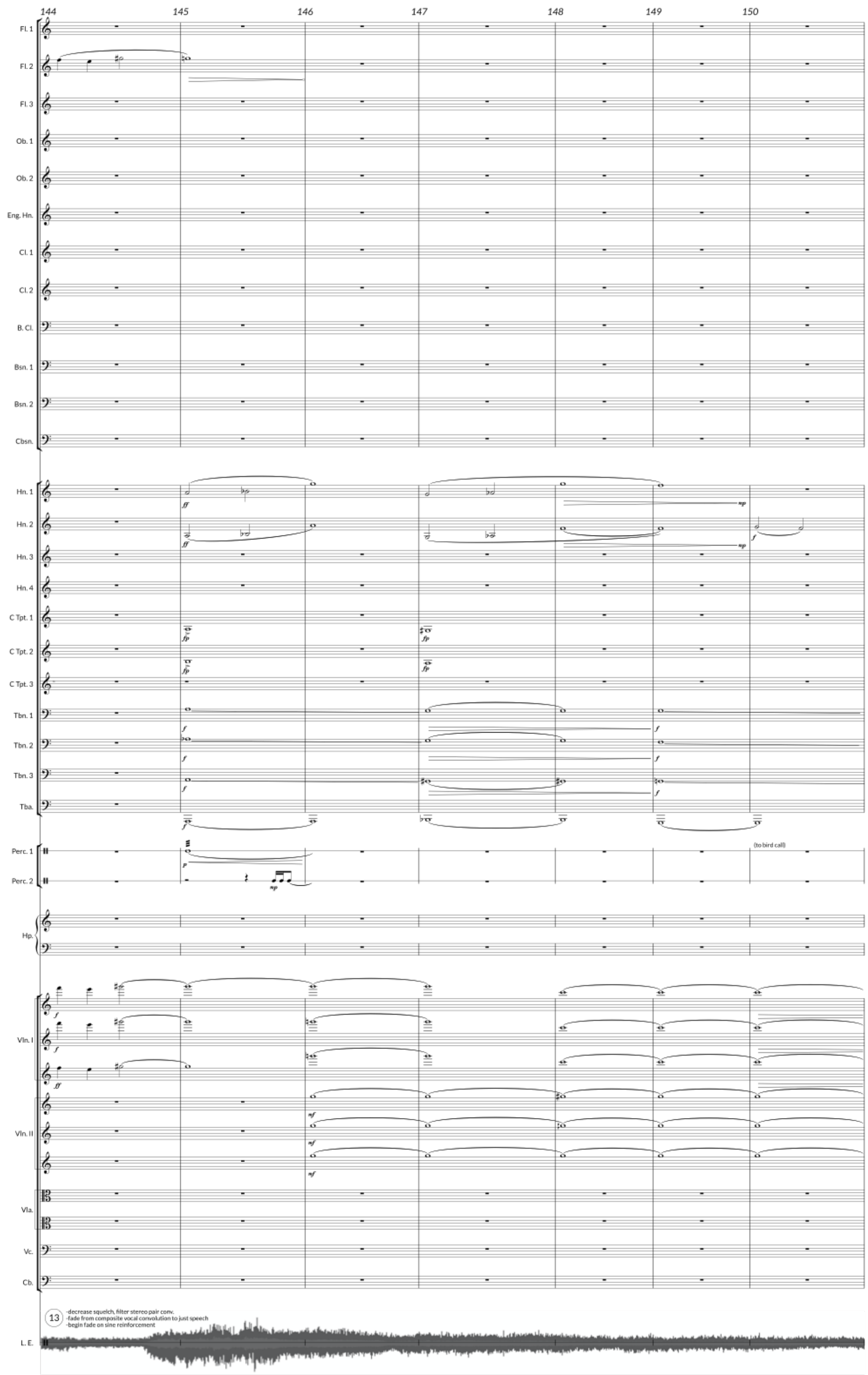
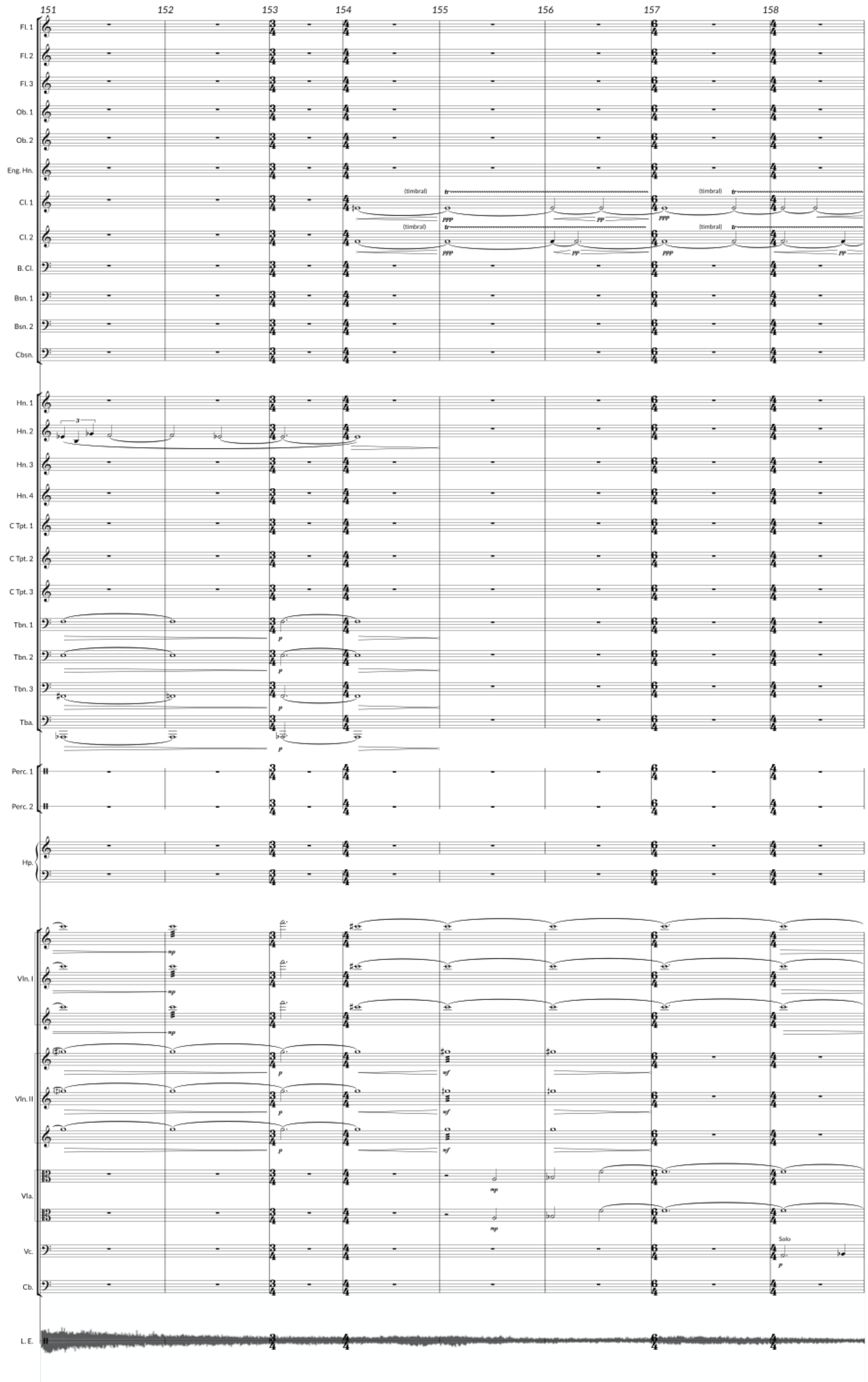

G
114
115
116
117
118
119
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Cb.
L. E.
sul A
SP
11 -end B. fl convolution

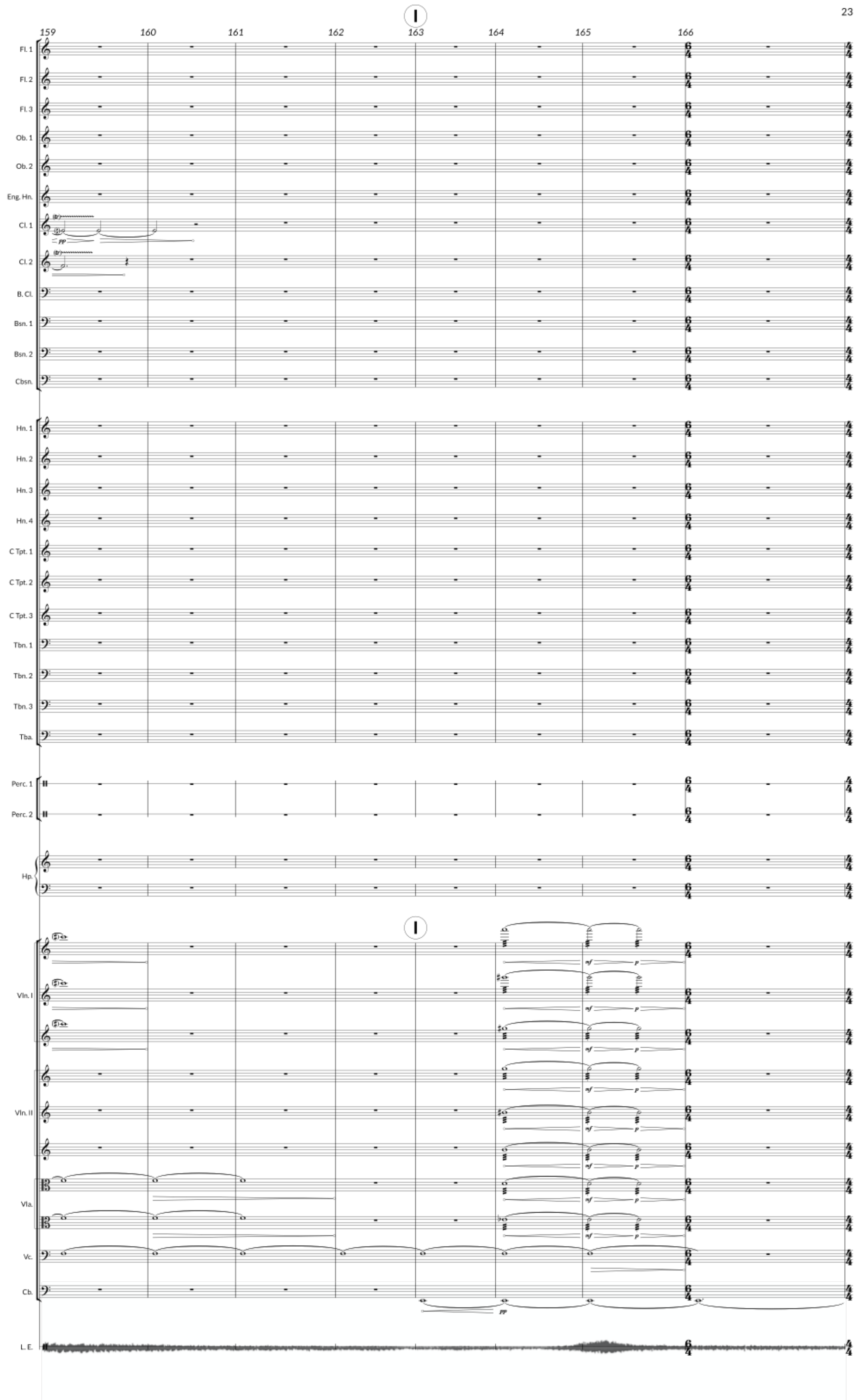

120
121
122
123
124
125
126
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
(timbral)
Cl. 1
Cl. 2
(timbral)
(timbral)
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Cb.
L. E.


127
128
129
130
131
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Cb.
L. E.
(timbral)
timbral
to low cymbal
Low Cymbal
(do not accent final stroke)
div.
Tutti

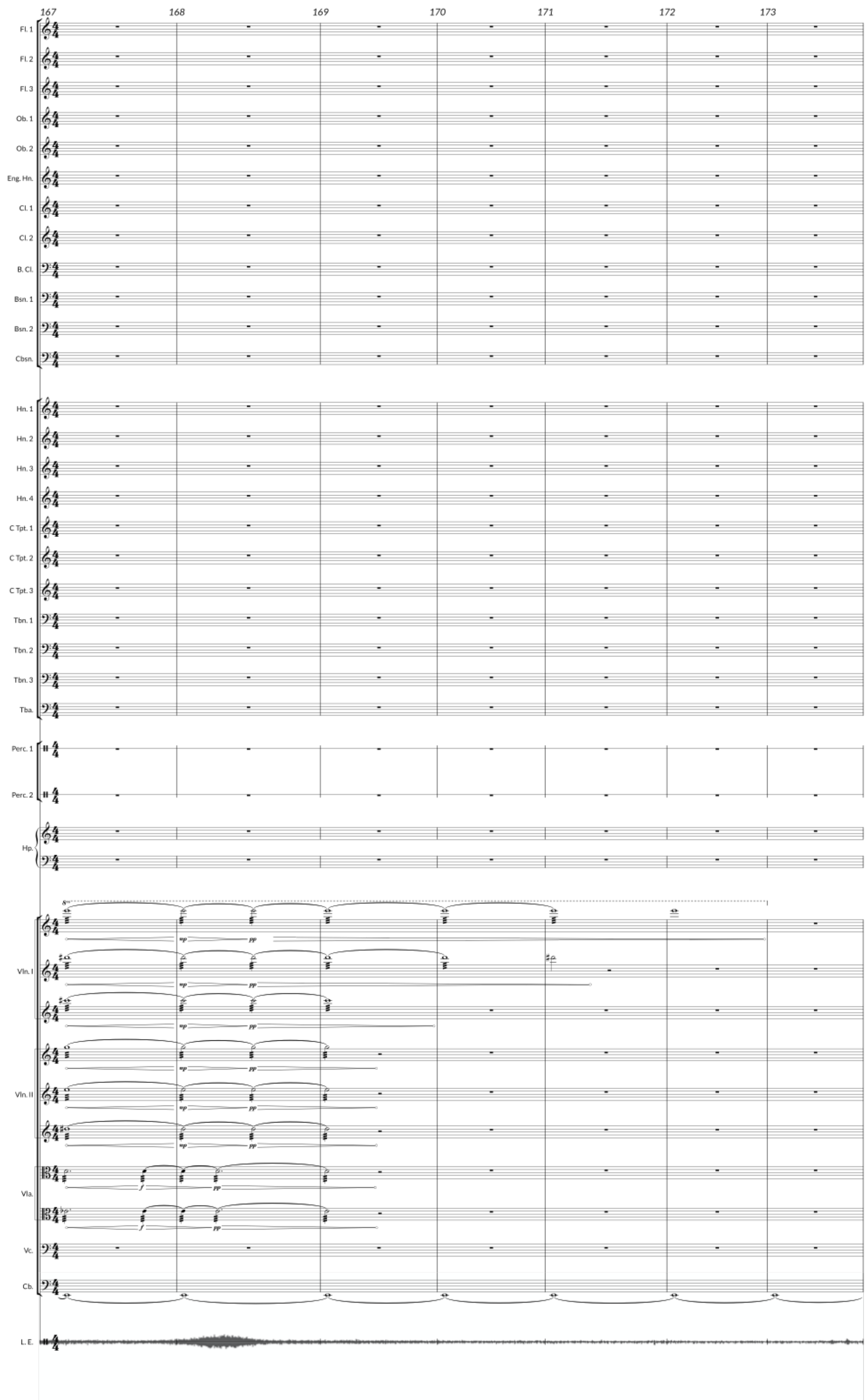

H
132
133
134
135
136
137
138
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
place mute (harmon mute (stem in))
harmon mute (stem in)
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Hp.
senza sord
Vln. I
Vln. II
Vla.
Vc.
Cb.
12
- adjust squelch on stereo conv.
L. E.

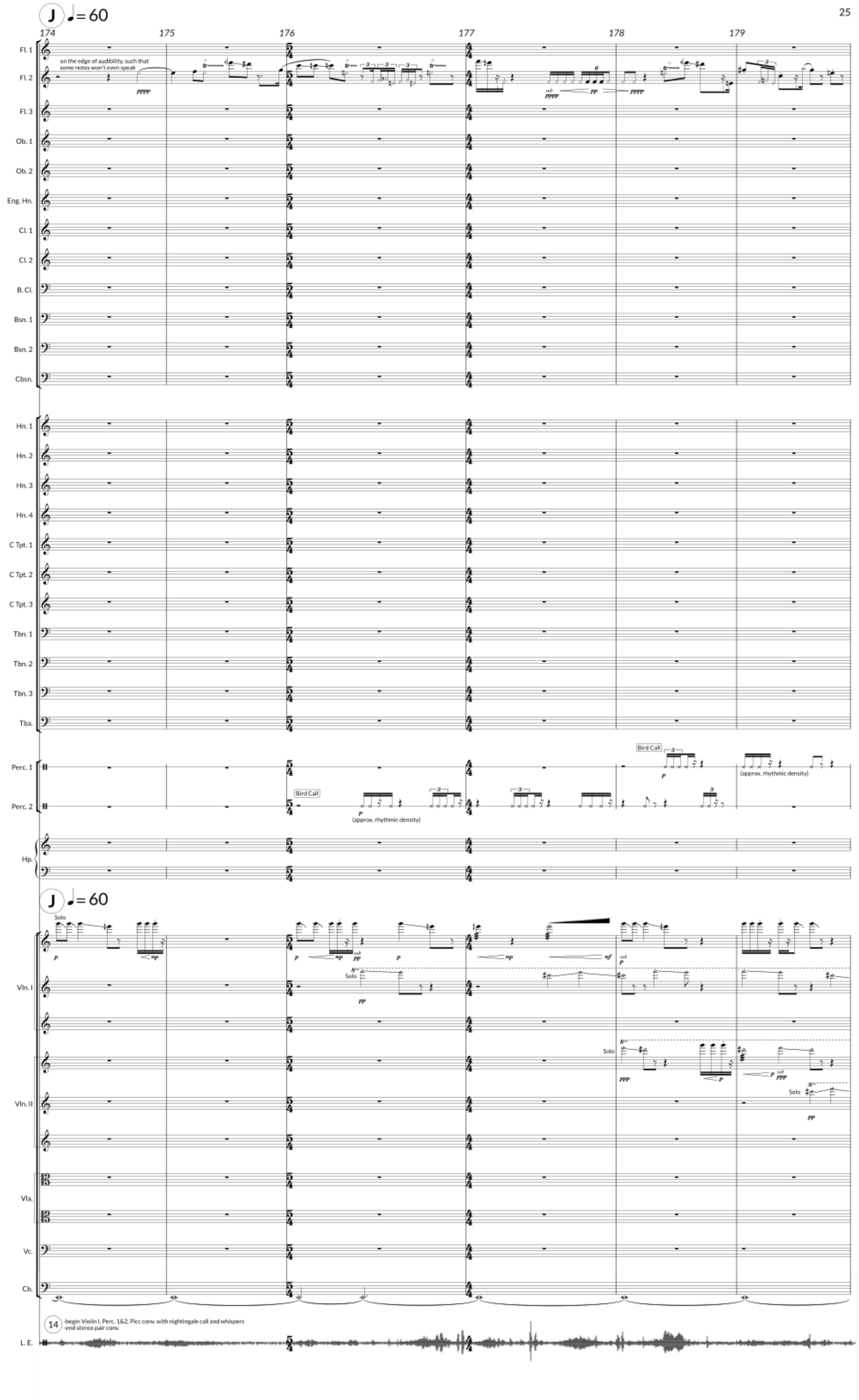
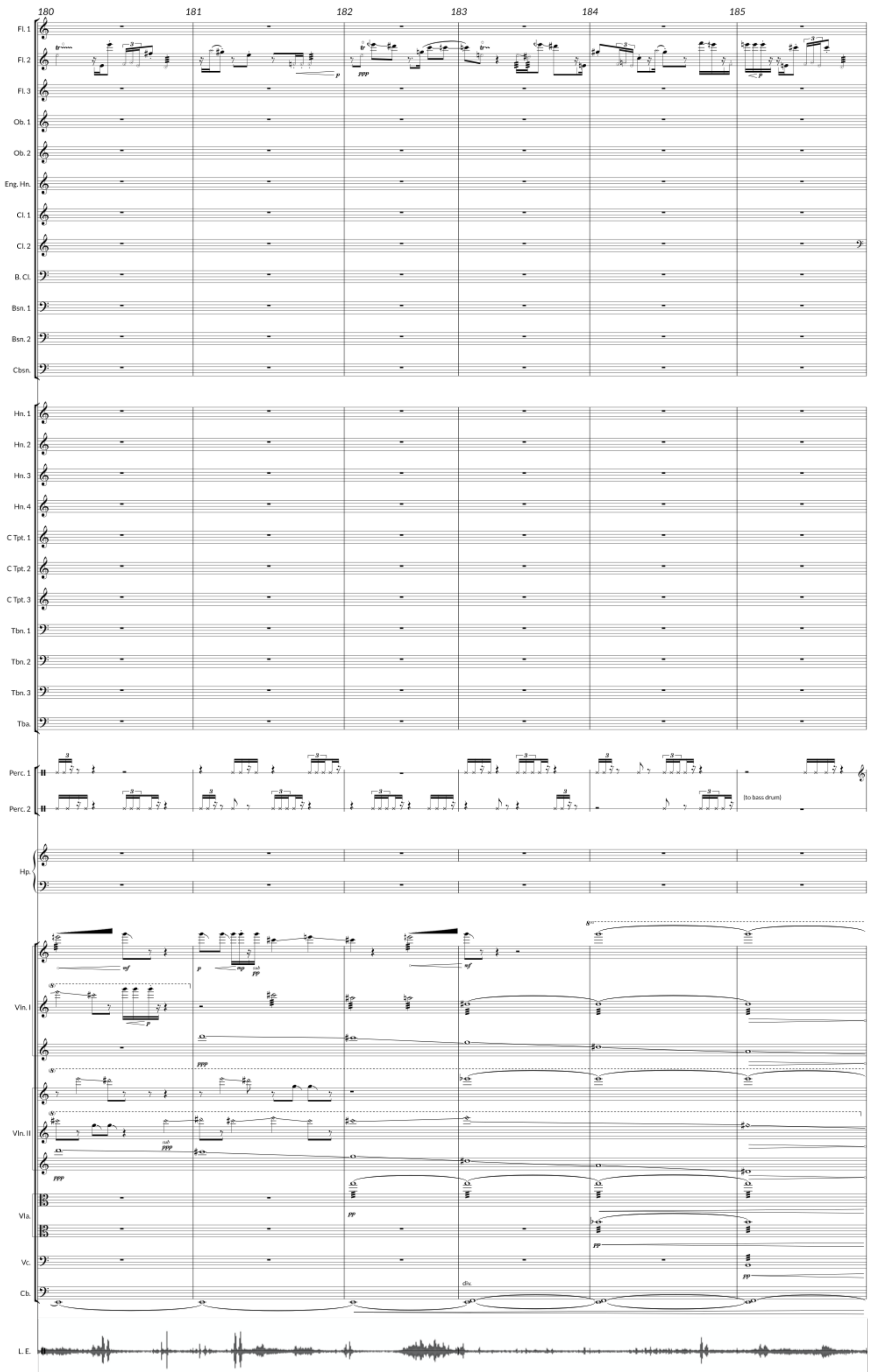

139
140
141
142
143
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
remove mute
remove mute
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
(do not accent final stroke)
(do not accent final stroke)
Hp.
Vln. I
Vln. II
Vla.
Vc.
Cb.
div.
L. E.


144
145
146
147
148
149
150
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
(to bird call)
Hp.
Vln. I
Vln. II
Vla.
Vc.
Cb.
13
-decrease squelch, filter stereo pair conv.
-fade from composite vocal convolution to just speech
-begin fade on sine reinforcement
L. E.


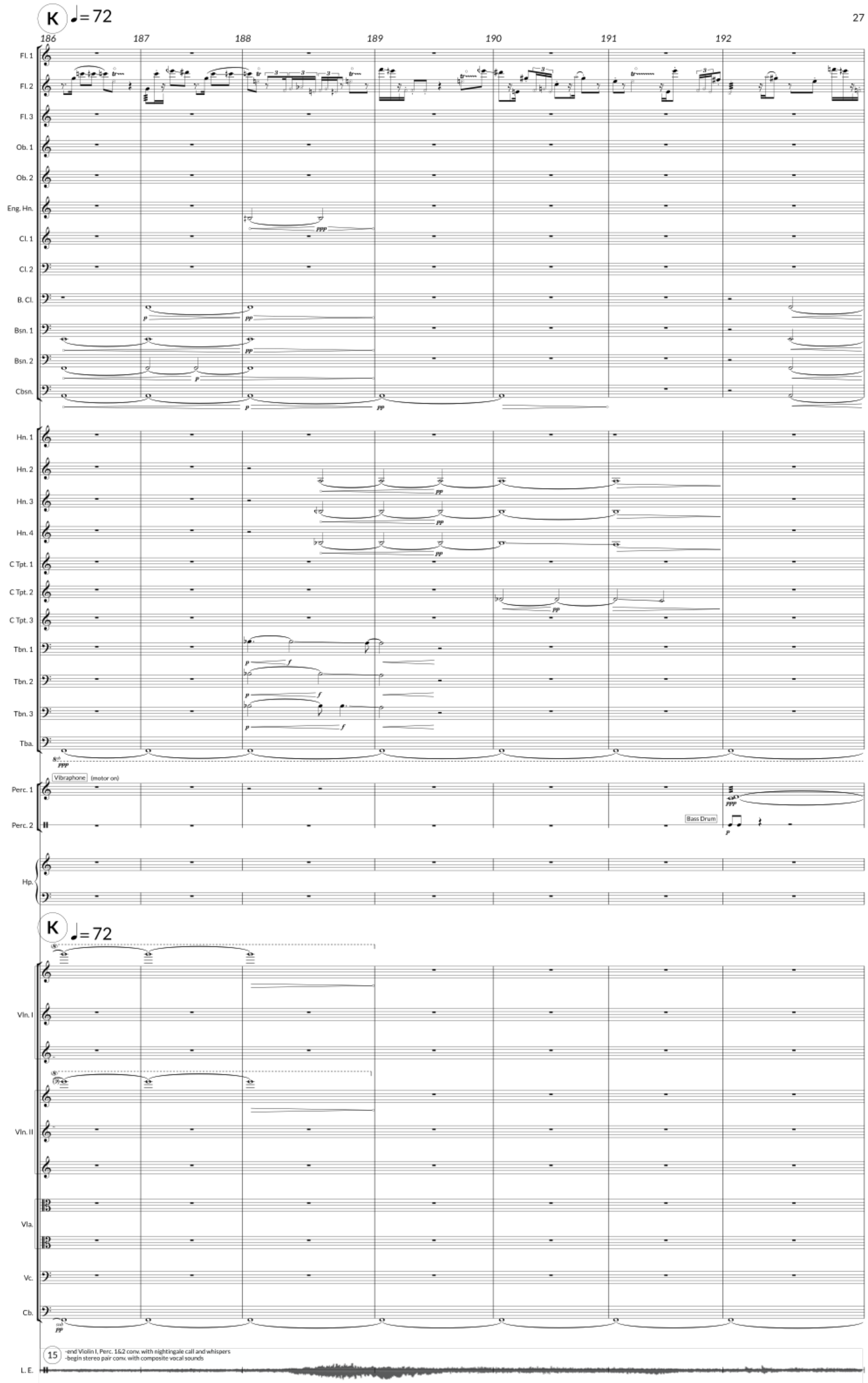
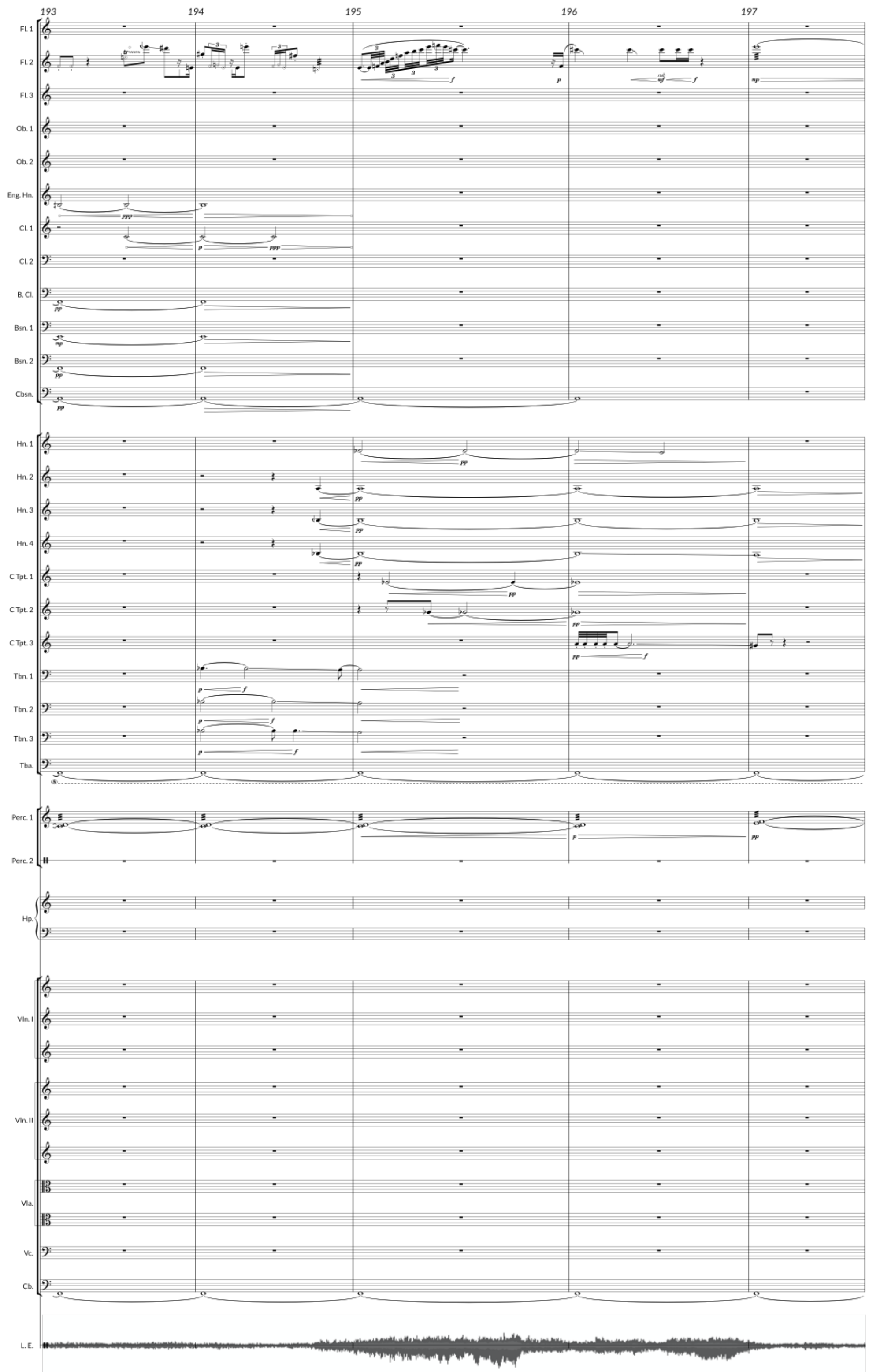
151
152
153
154
155
156
157
158
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
(timbral)
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Solo
Cb.
L. E.


I
159
160
161
162
163
164
165
166
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Cb.
L. E.
pp
mf
p

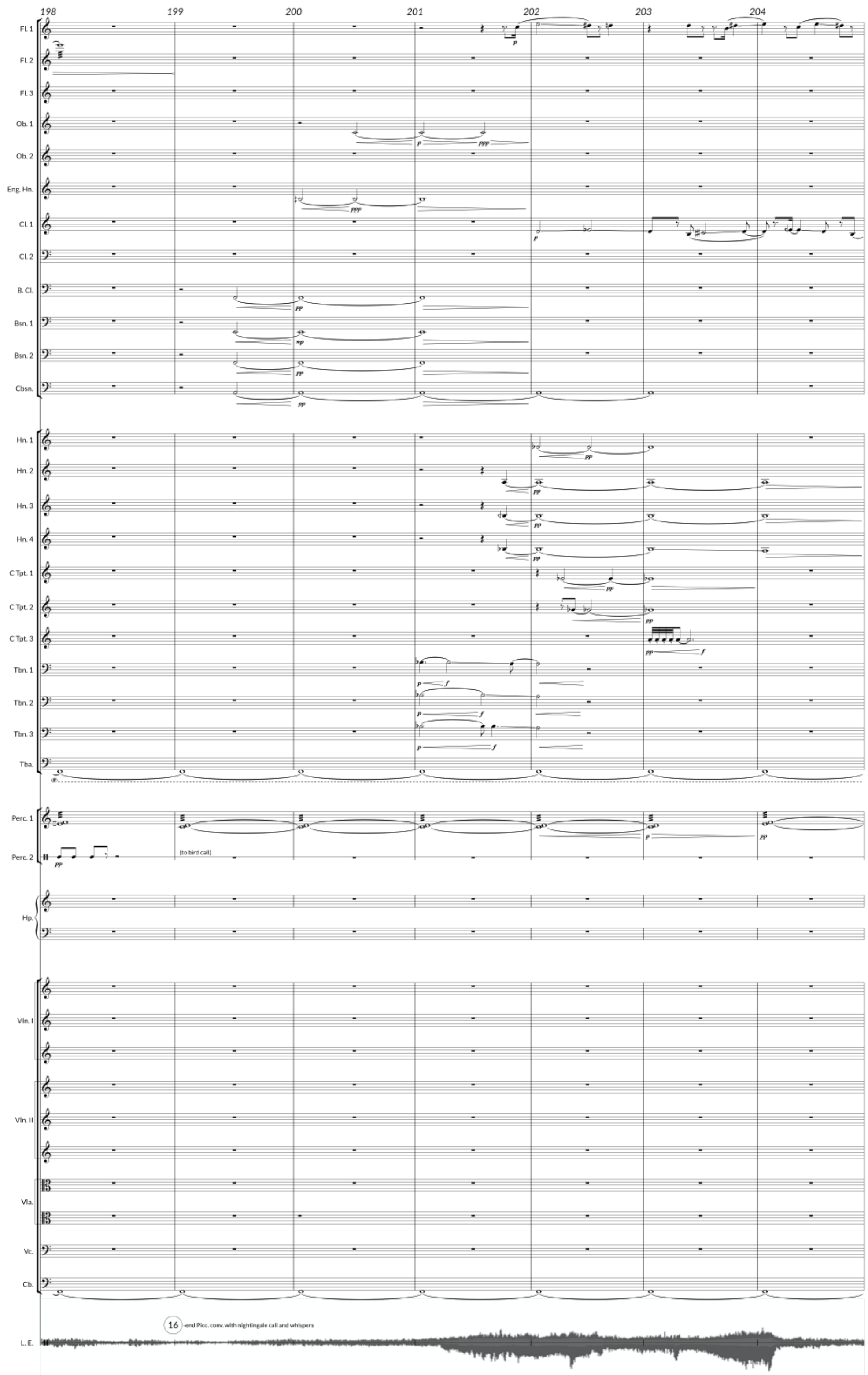

167
168
169
170
171
172
173
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Cb.
L. E.

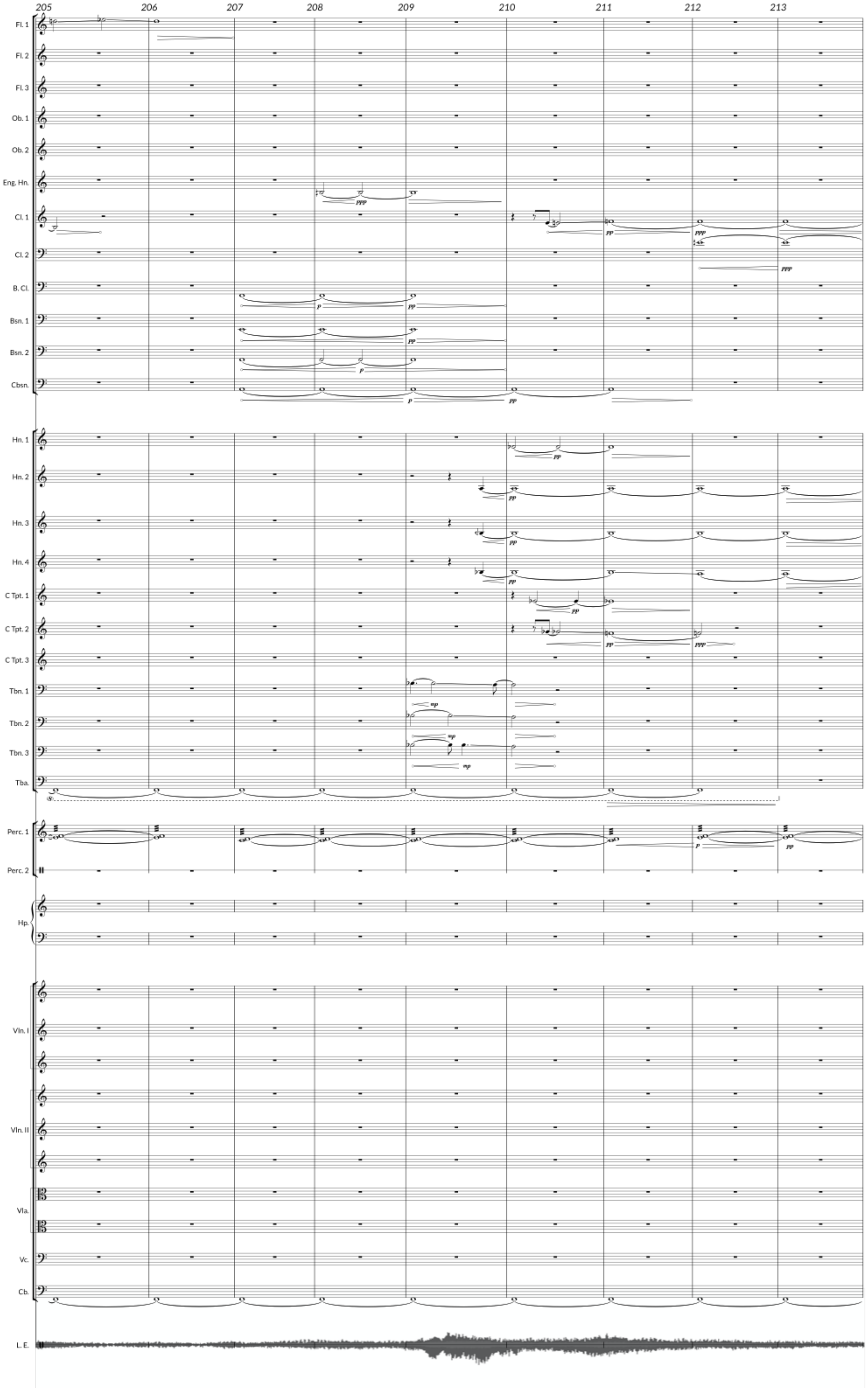

J ♩= 60
174
175
176
177
178
179
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Cb.
L. E.
on the edge of audibility, such that some notes won't even speak
Bird Call
(approx. rhythmic density)
Solo
14
-begin Violin I, Perc. 1&2, Picc conv. with nightingale call and whispers
-end stereo pair conv.


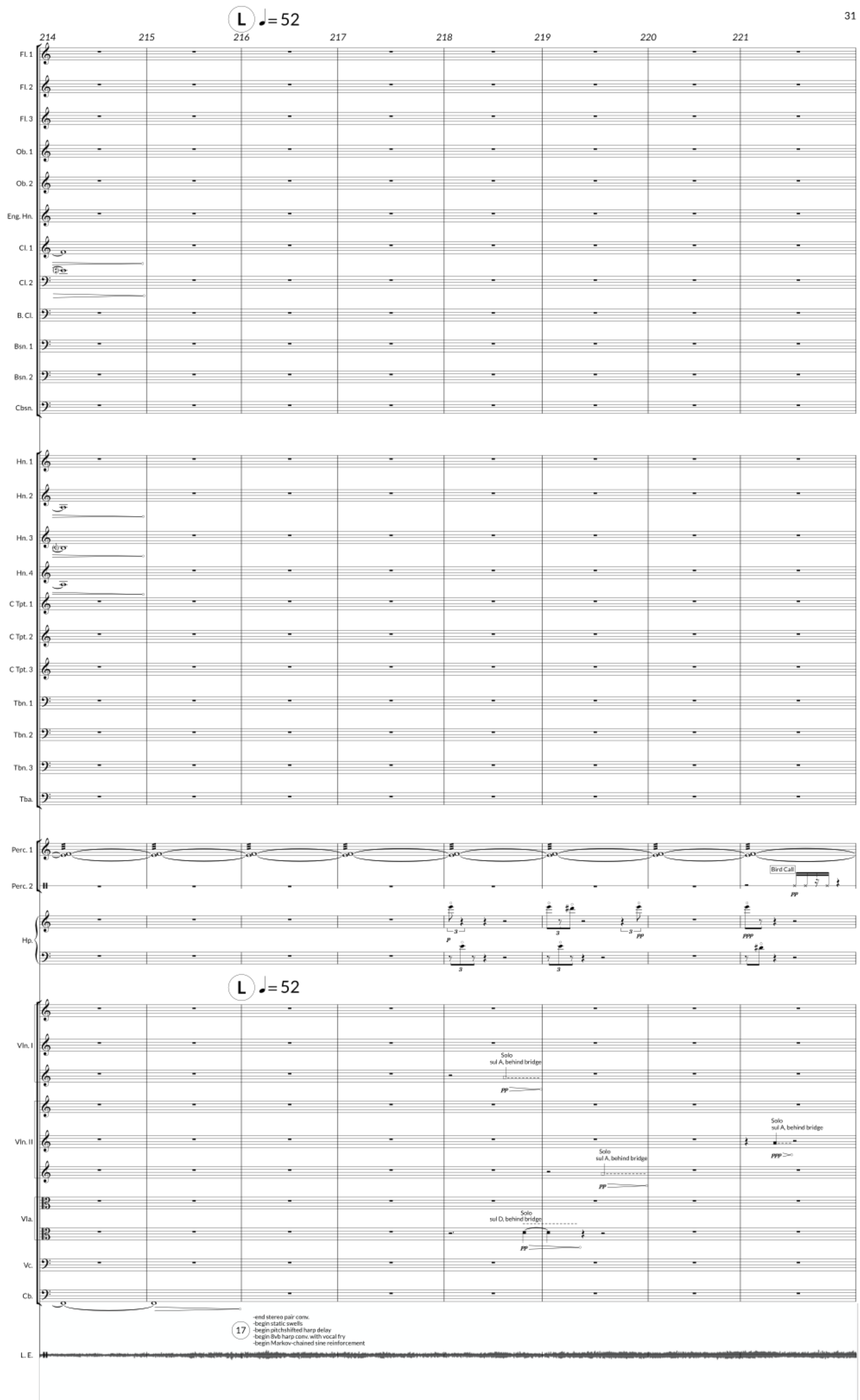
180
181
182
183
184
185
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
(to bass drum)
Hp.
Vln. I
Vln. II
Vla.
Vc.
Cb.
div.
L. E.

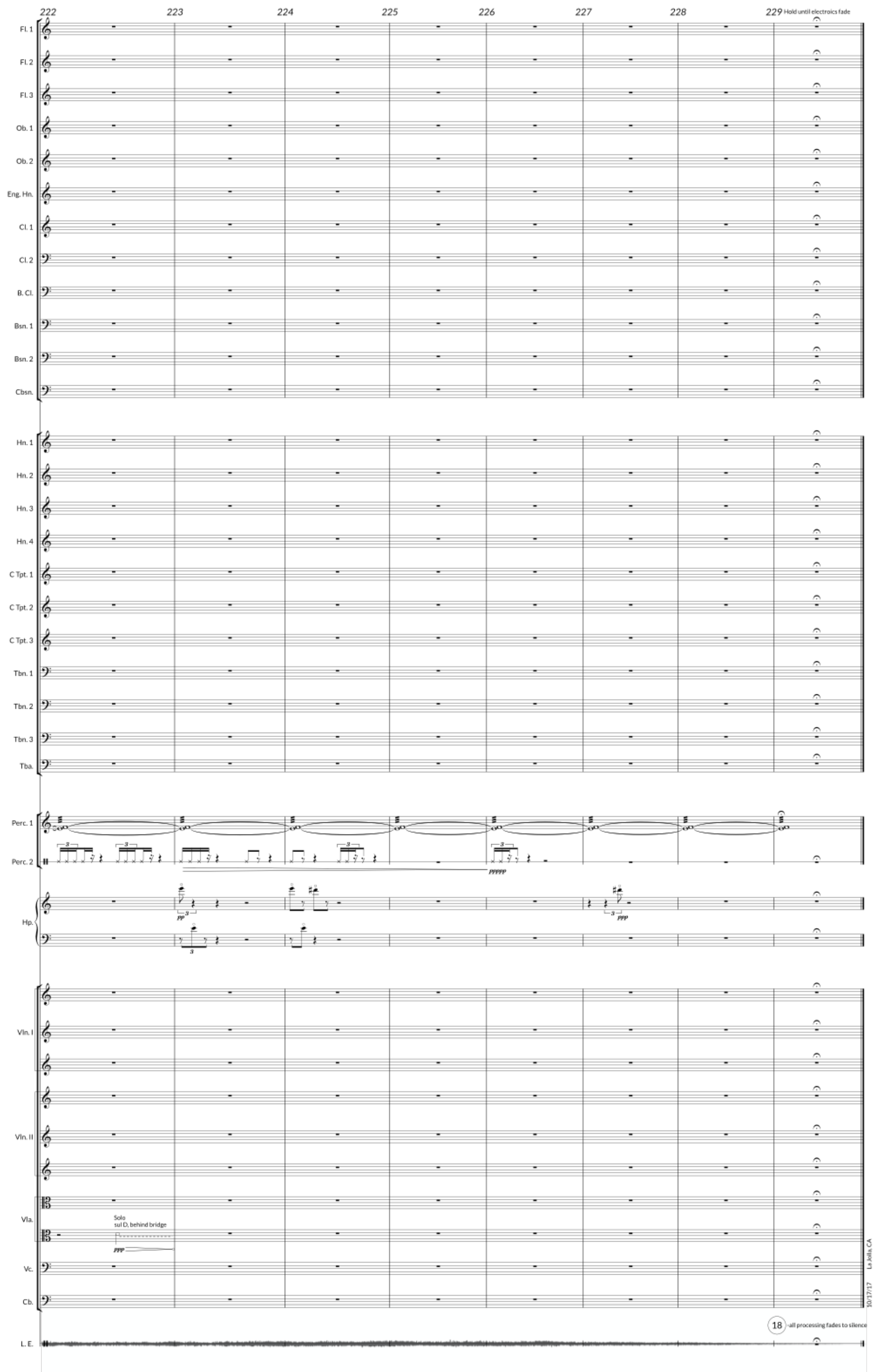

K
♩= 72
27
186
187
188
189
190
191
192
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Vibraphone
(motor on)
Perc. 1
Perc. 2
Bass Drum
Hp.
Vln. I
Vln. II
Vla.
Vc.
Cb.
15
-end Violin I, Perc. 1&2 conv. with nightingale call and whispers
-begin stereo pair conv. with composite vocal sounds
L. E.


193
194
195
196
197
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Cb.
L. E.


198
199
200
201
202
203
204
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
(to bird call)
Hp.
Vln. I
Vln. II
Vla.
Vc.
Cb.
16 -end Picc. conv. with nightingale call and whispers
L. E.


205
206
207
208
209
210
211
212
213
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Vc.
Cb.
L. E.
ppp
pp
p
mp


31
L ♩= 52
214
215
216
217
218
219
220
221
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Bird Call
Hp.
L ♩= 52
Vln. I
Solo
sul A, behind bridge
Vln. II
Solo
sul A, behind bridge
Solo
sul A, behind bridge
Vla.
Solo
sul D, behind bridge
Vc.
Cb.
17
-end stereo pair conv.
-begin static swells
-begin pitchshifted harp delay
-begin 8vb harp conv. with vocal fry
-begin Markov-chained sine reinforcement
L. E.


222
223
224
225
226
227
228
229 Hold until electroics fade
Fl. 1
Fl. 2
Fl. 3
Ob. 1
Ob. 2
Eng. Hn.
Cl. 1
Cl. 2
B. Cl.
Bsn. 1
Bsn. 2
Cbsn.
Hn. 1
Hn. 2
Hn. 3
Hn. 4
C Tpt. 1
C Tpt. 2
C Tpt. 3
Tbn. 1
Tbn. 2
Tbn. 3
Tba.
Perc. 1
Perc. 2
Hp.
Vln. I
Vln. II
Vla.
Solo
sul D, behind bridge
Vc.
Cb.
18
all processing fades to silence
L. E.
La Jolla, CA
10/17/17

excision no. 2: they didn't know we were seeds

for viola and live electronics

tina tallon (2017; rev. 2018)

for Kurt Rohde

commissioned by
the Barlow Endowment for Music Composition
at Brigham Young University

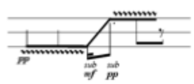
excision no. 2: they didn’t know we were seeds

for viola and live electronics
duration: approx. 10 minutes

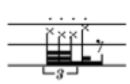
INSTRUMENTATION

viola
live electronics (available in both stereo and quadrophonic configur ations)

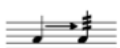
PERFORMANCEKEY



In places where a three-line staff is used, the primary purpose of the staff is to indicate bow position along the fingerboard, with the top line corresponding to the nut, the middle line corresponding to the shoulder of the instrument (where the fingerboard meets the body), and the bottom line corresponding to the bridge. Later al bow position, such as “frog,” “mid-bow,” or “tip” will be indicated where necessary (but otherwise, the bow should not move back and forth perpendicular to the fingerboard as it normally would). Wavy lines indicate a “shivering” motion, in which the bow is rapidly but barely moved up and down the fingerboard to create a “stuck” sound (as if a fly is trying to escape from flypaper). In gener al, dynamic is related to the amount of pressure applied to the bow, but not always - as the bow moves toward the nut, the lack of rosin will mean there is less friction, which will result in less sound. This is completely oka y - it’s a feature of the technique, not a flaw!



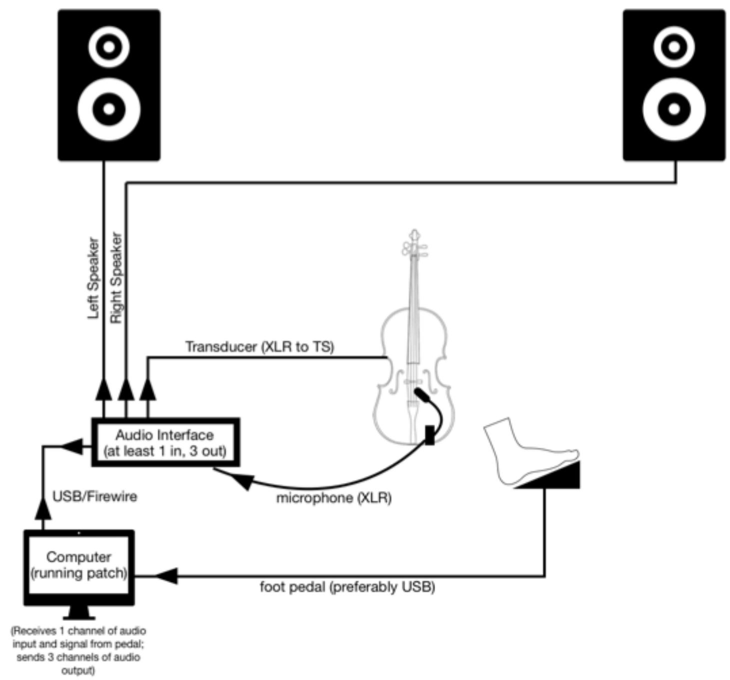
Rolling wood over hair: x noteheads indicate small popping, crunching noises achie ved by rolling the wood of the bow atop the hair while pressing the string into the fingerboard with the bow. This is generally best achieved near the middle of the bow, where the wood is closest to the hair (a bow with a circular shaft is best for this; a bow with an octagonal cross-section can decrease the r ange of motion and.or make it more difficult to roll).

Light finger pressure: diamond noteheads indicate to use light finger pressure, similar to that used in creating a harmonic.

Tremolo (an arrow between the stems of notes with and without tremolo markings indicates a gradual transition between non-tremolo and tremolo)

Scratch tone/overpressure

TECHNICAL REQUIREMENTS

-Computer running Pure Data 0.48-0 or later
-Patch (available by request from the composer)
-Transducer attachment (available by request from the composer)
-Microphone (preferably a DPA 4099 or equivalent)
-Foot pedal for triggering cues (USB is preferred)
-Audio interface with at least 1 channel of input and 3 channels of output (5 for quad. config.)
-Two speakers for stereo configuration or 4 speakers for quadraphonic configuration



Cues are listed in the score and should be triggered as close to the beginning of the measure as possible. While there is flexibility in timing prior to the start of a cue, the player should aim to begin playing as quickly after they trigger a cue as possible, as many cues involve recording material for use later in the piece. Missed cues can have drastic consequences for later cues.

Transducer: The transducer straps to the back of the viola and initiates a controlled (and highly processed) feedback loop between the microphone and the transducer beginning in cue 11.

PROGRAM NOTE

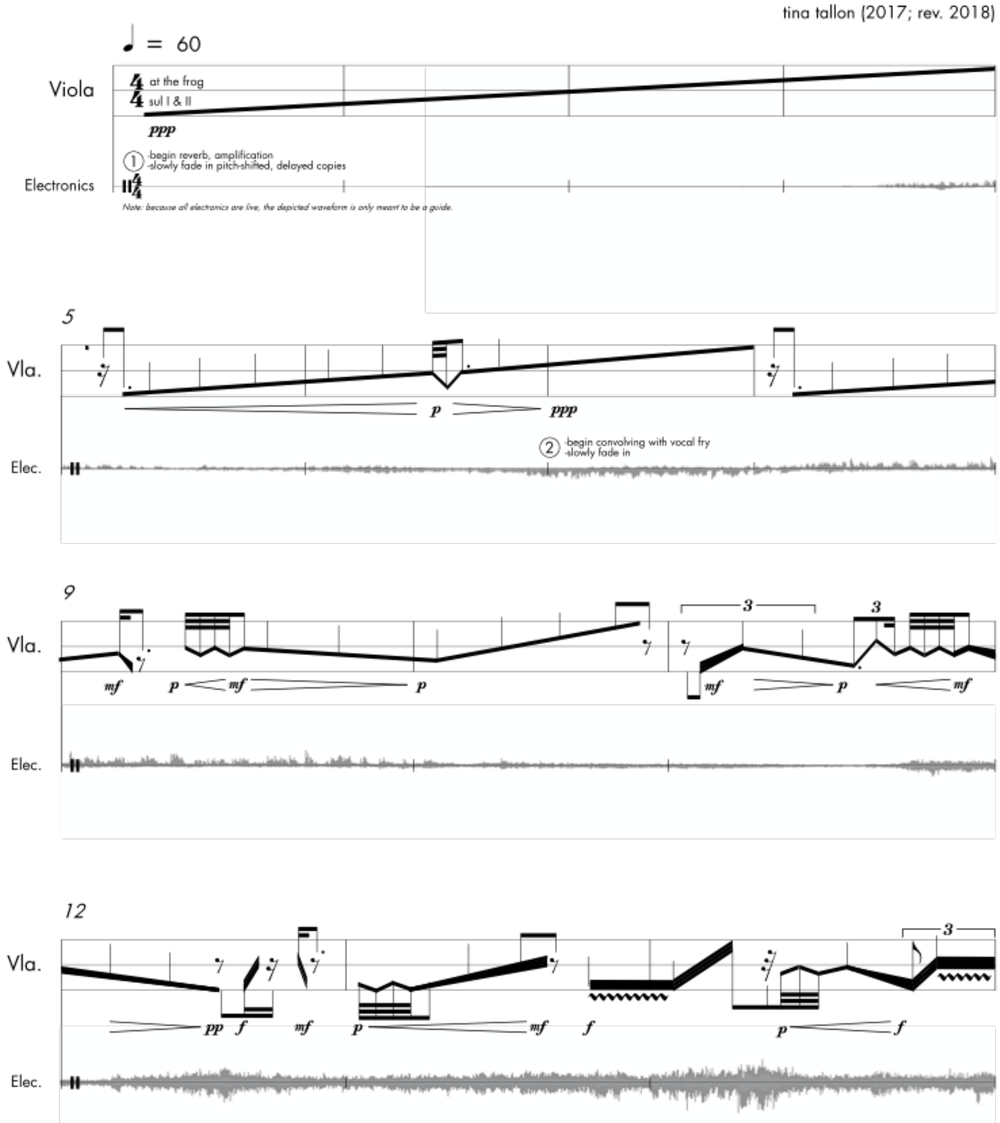
excision no. 2: they didn't know we were seeds takes as its points of departure the human voice and the performer's physical relationship with their instrument to explore notions of agency, subversion, and disenfranchisement. By using a transducer attached to the viola and live electronic processing, the electronic component of the piece questions agency and embodiment, ultimately deconstructing the player's physical intuition about their complicity in sound production through controlled feedback loops.

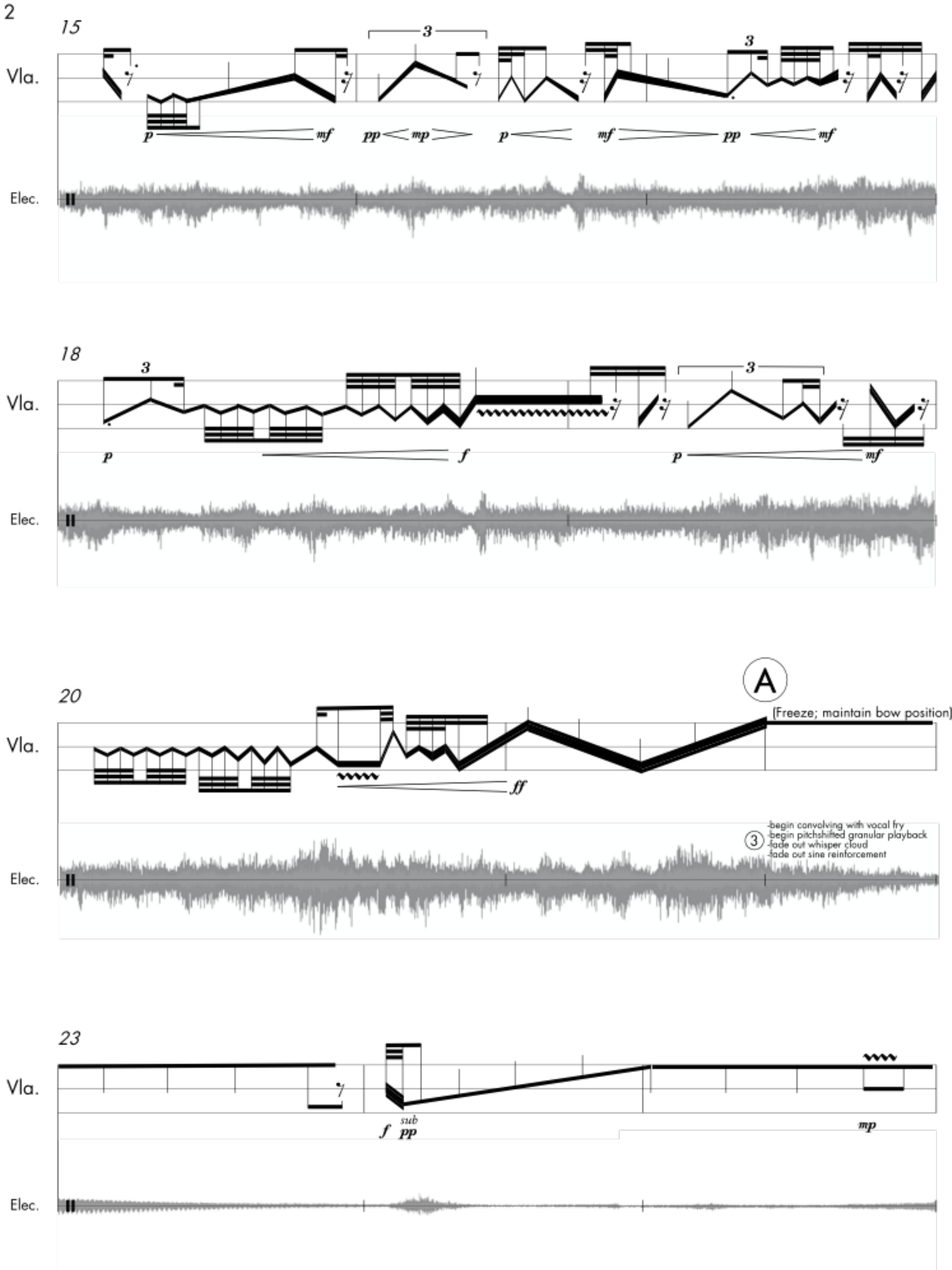
Commissioned by the
Barlow Endowment for Music Composition
at Brigham Young University

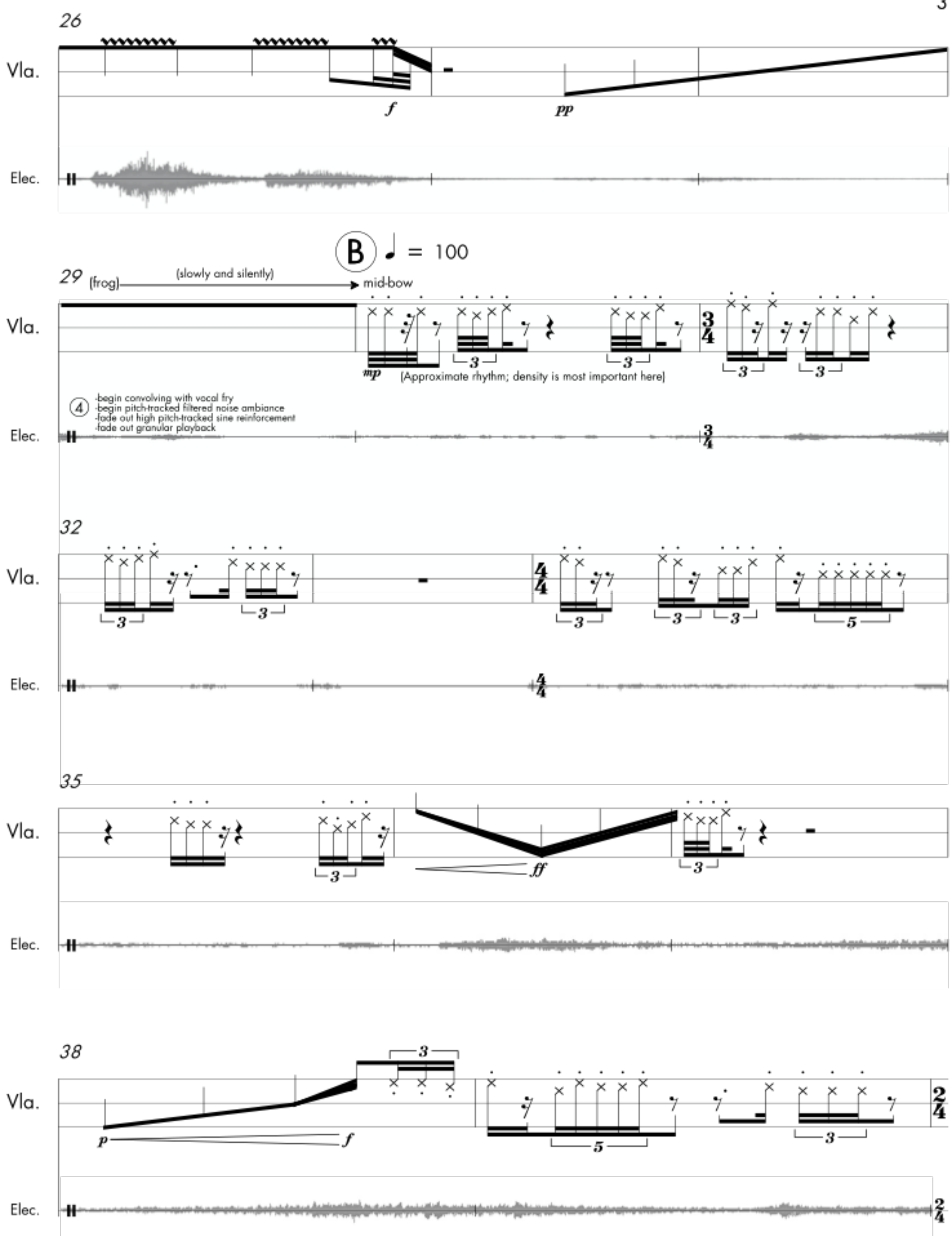
excision no. 2: they didn't know we were seeds

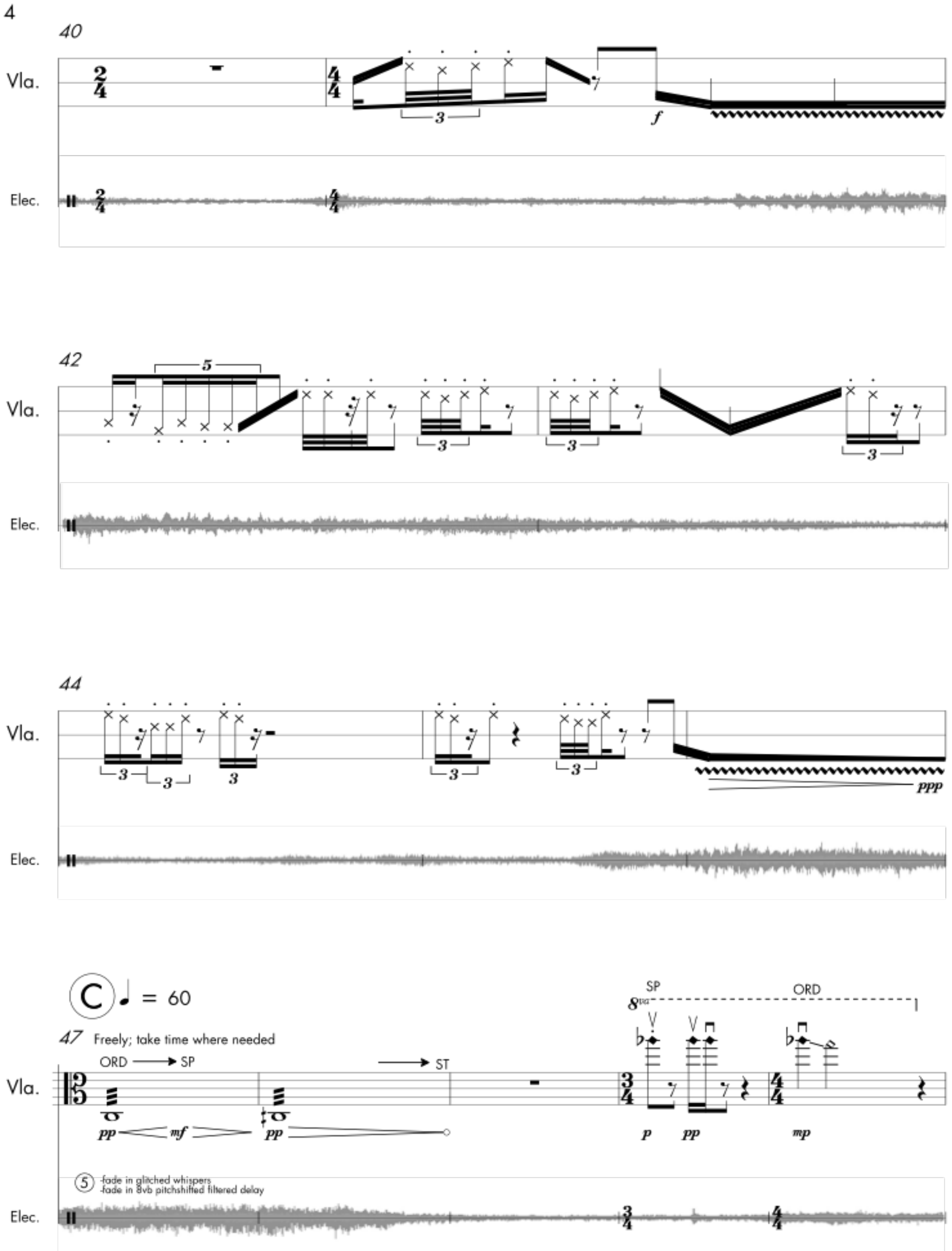
for Kurt Rohde

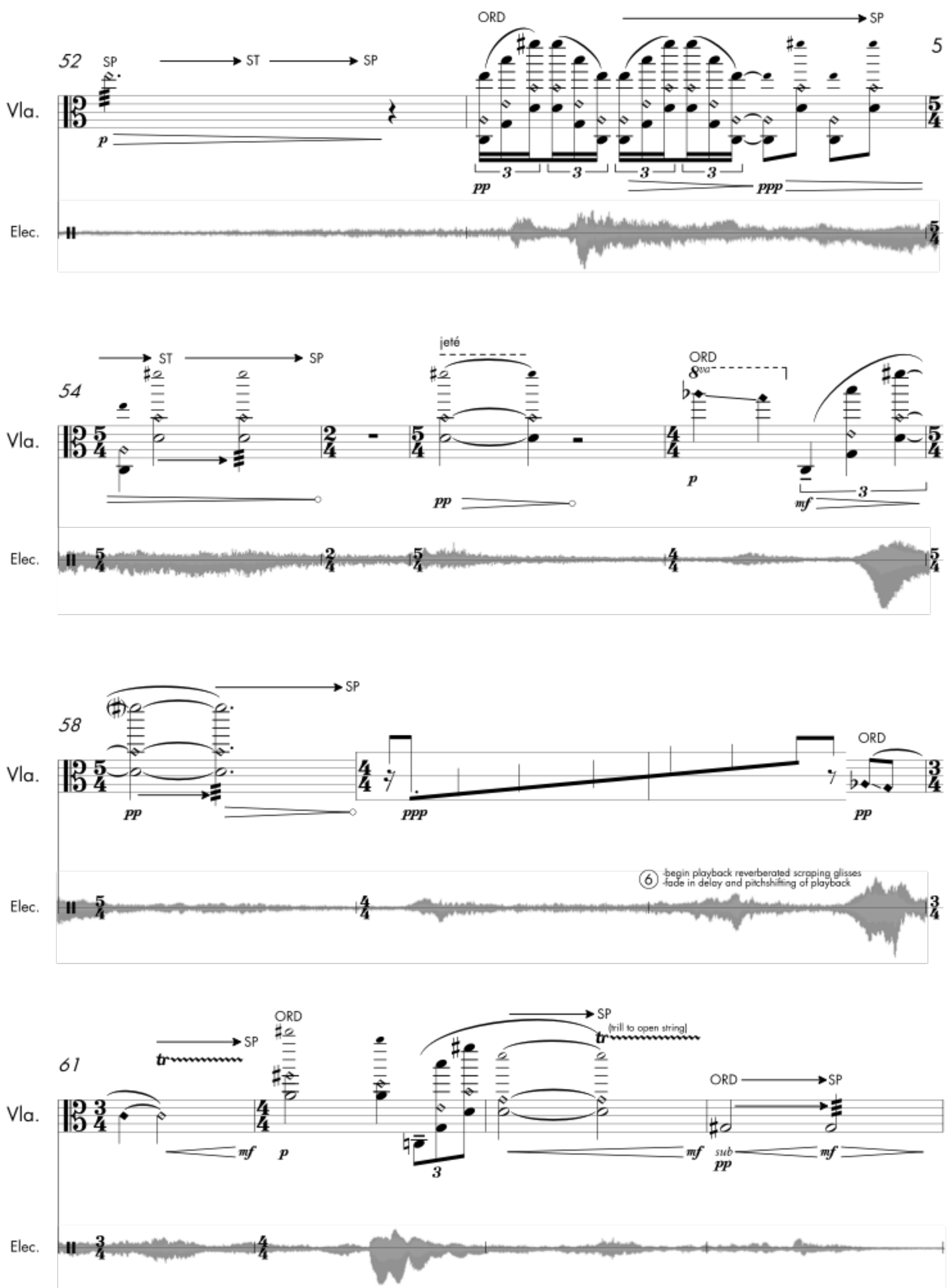
tina tallon (2017; rev. 2018)



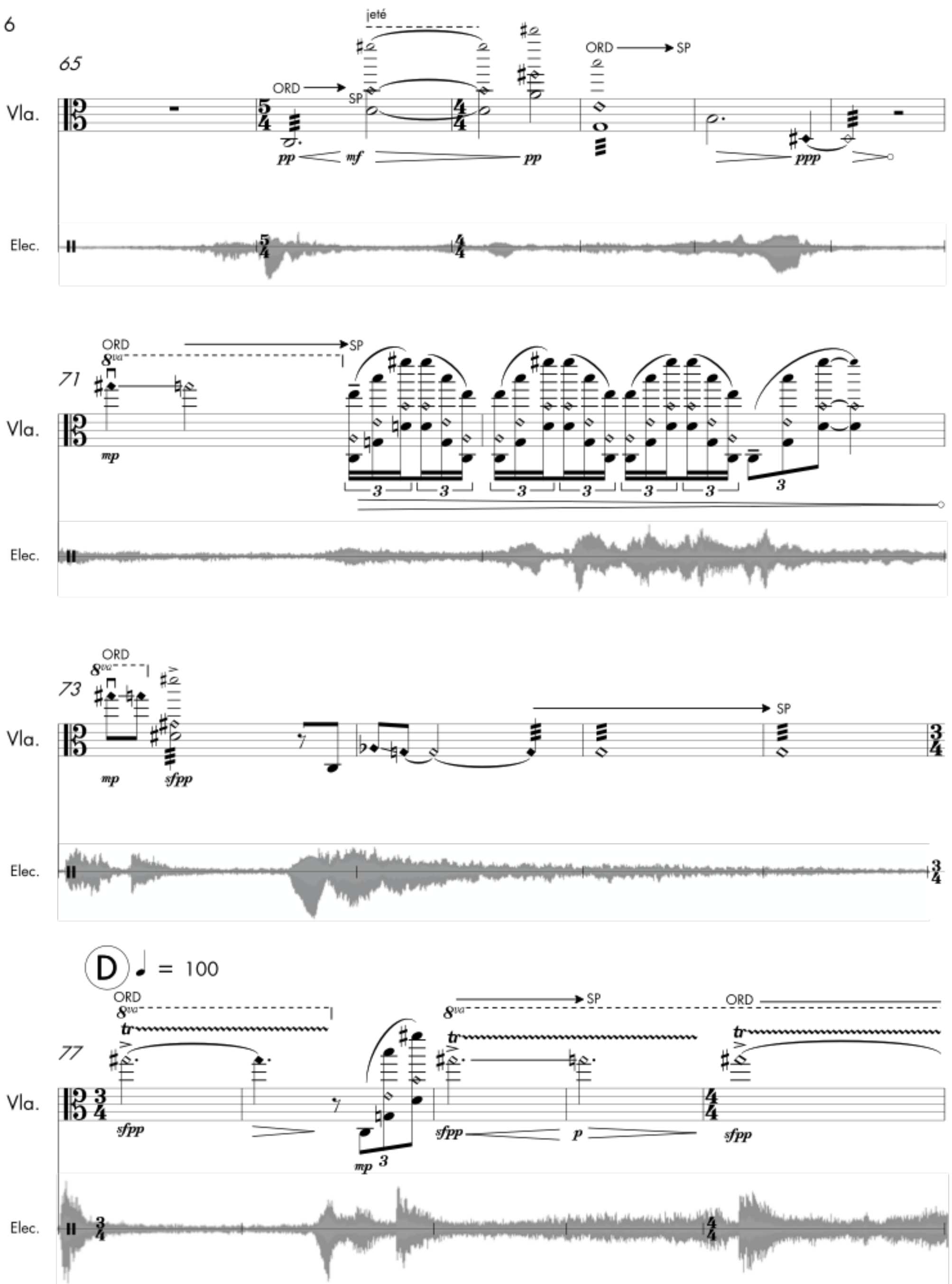

15
Vla.
3
3
p mf
pp mp
p
mf pp mf
Elec.
18
Vla.
3
3
p f
p mf
Elec.
20
A
(Freeze; maintain bow position)
Vla.
ff
Elec.
3
-begin convolving with vocal fry
-begin pitchshifted granular playback
-fade out whisper cloud
-fade out sine reinforcement
23
Vla.
f
sub
pp
mp
Elec.

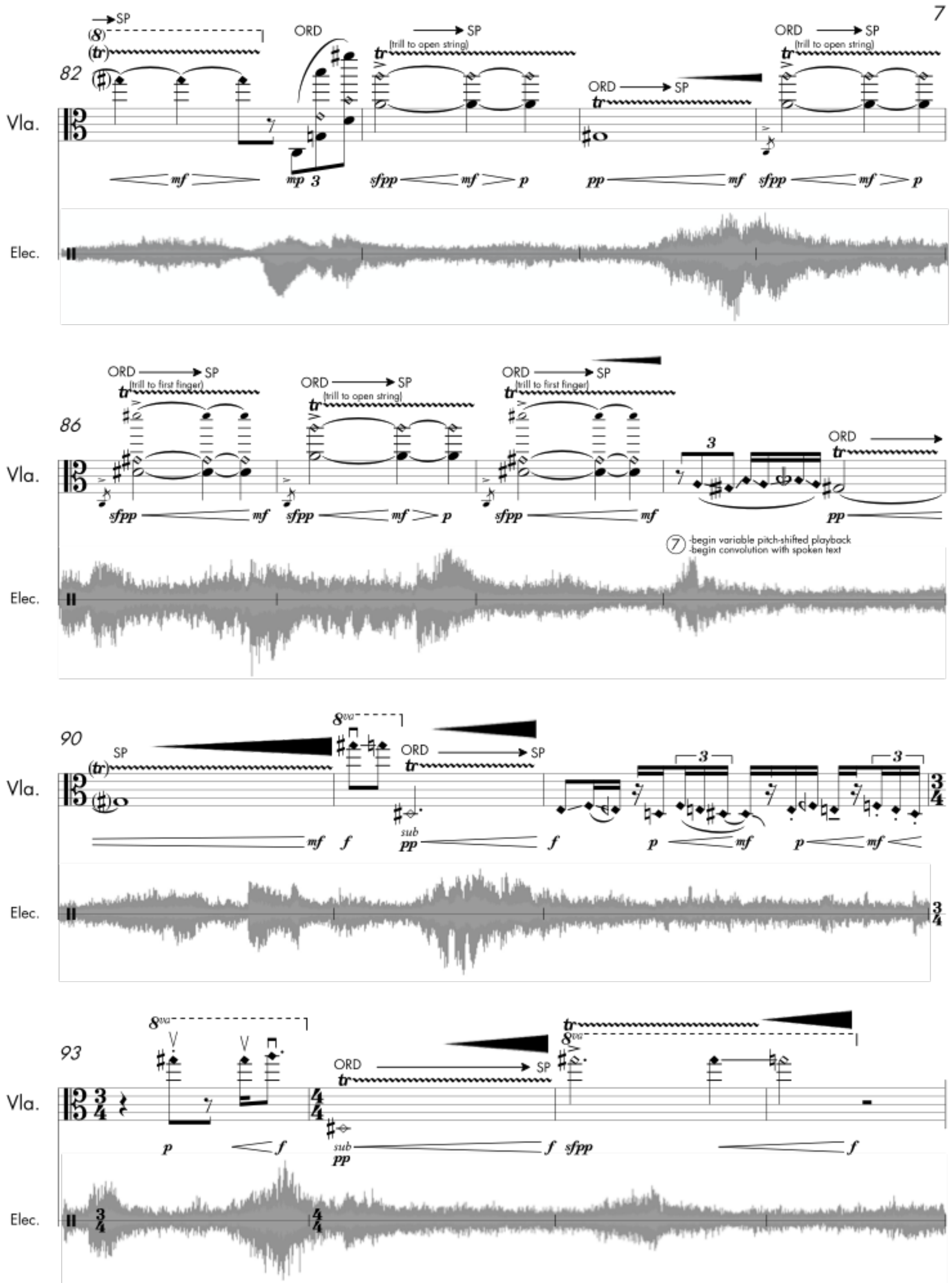

26
Vla.
f
pp
Elec.
B
♩ = 100
29
(frog)
(slowly and silently)
mid-bow
mp
(Approximate rhythm; density is most important here)
4
-begin convolving with vocal fry
-begin pitch-tracked filtered noise ambiance
-fade out high pitch-tracked sine reinforcement
-fade out granular playback
32
35
ff
38
p
f

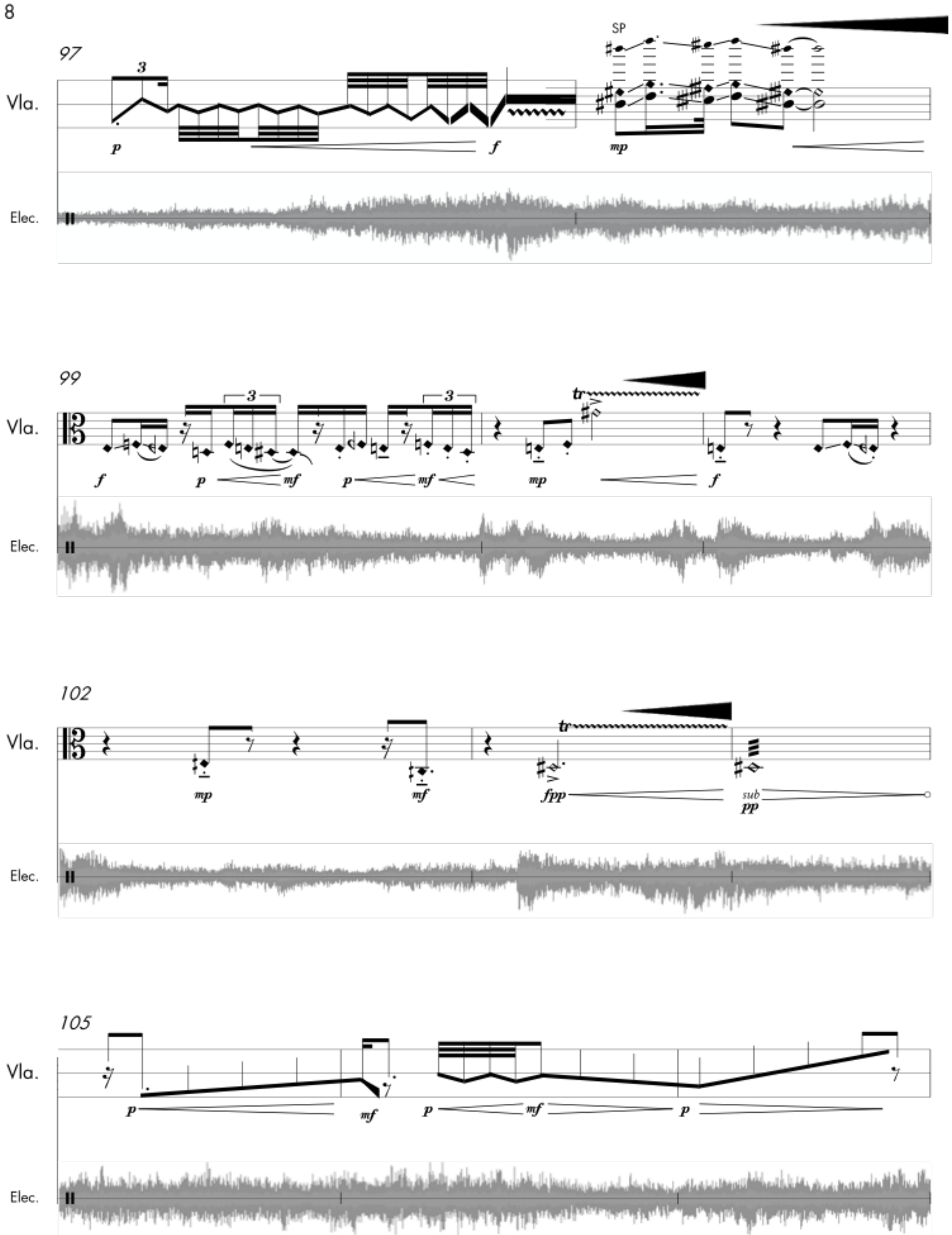

40
Vla.
Elec.
f
42
5
44
ppp
C
= 60
47 Freely; take time where needed
ORD
SP
ST
8va
SP
ORD
pp
mf
pp
p
pp
mp
5
-fade in glitched whispers
-fade in 8vb pitchshifted filtered delay

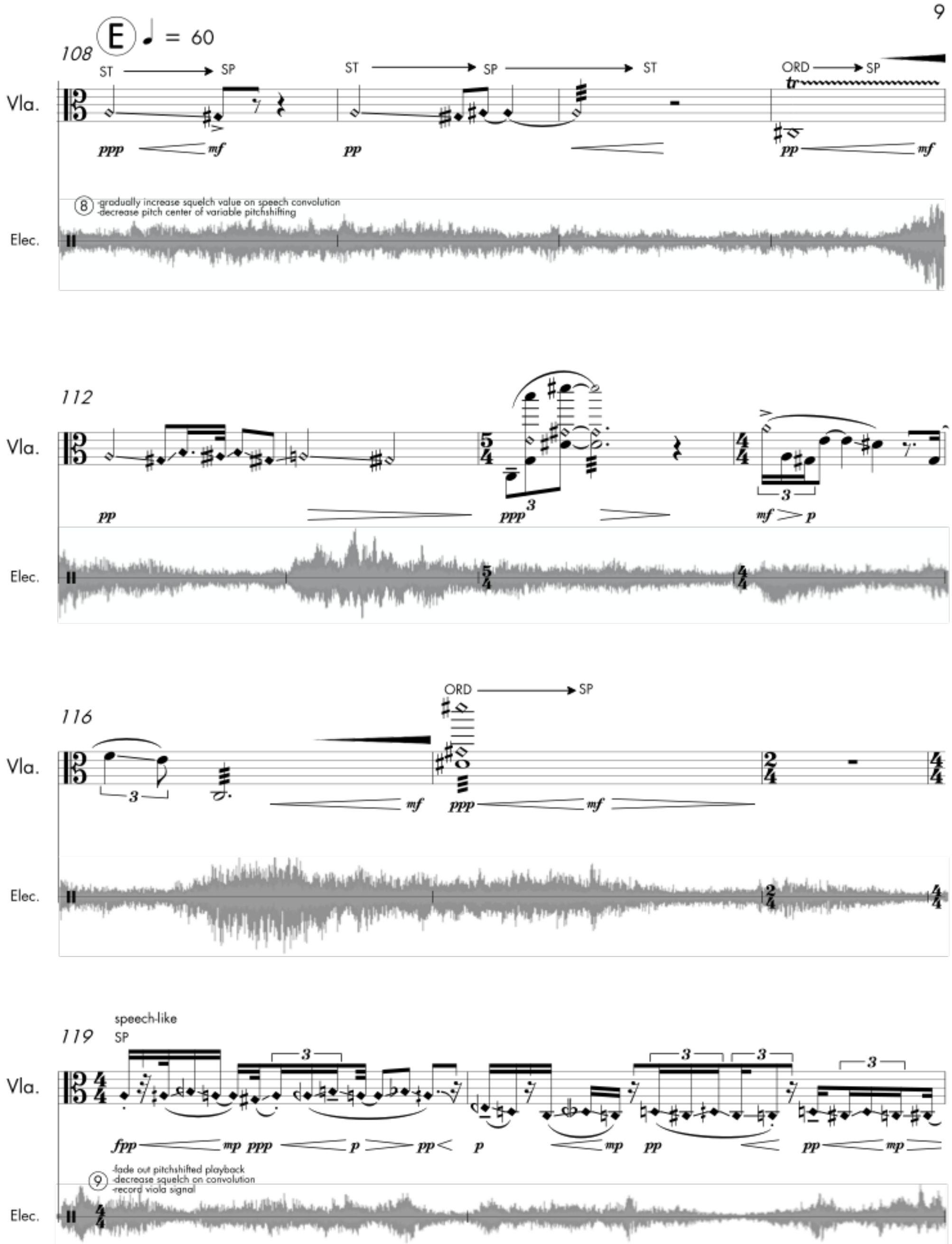


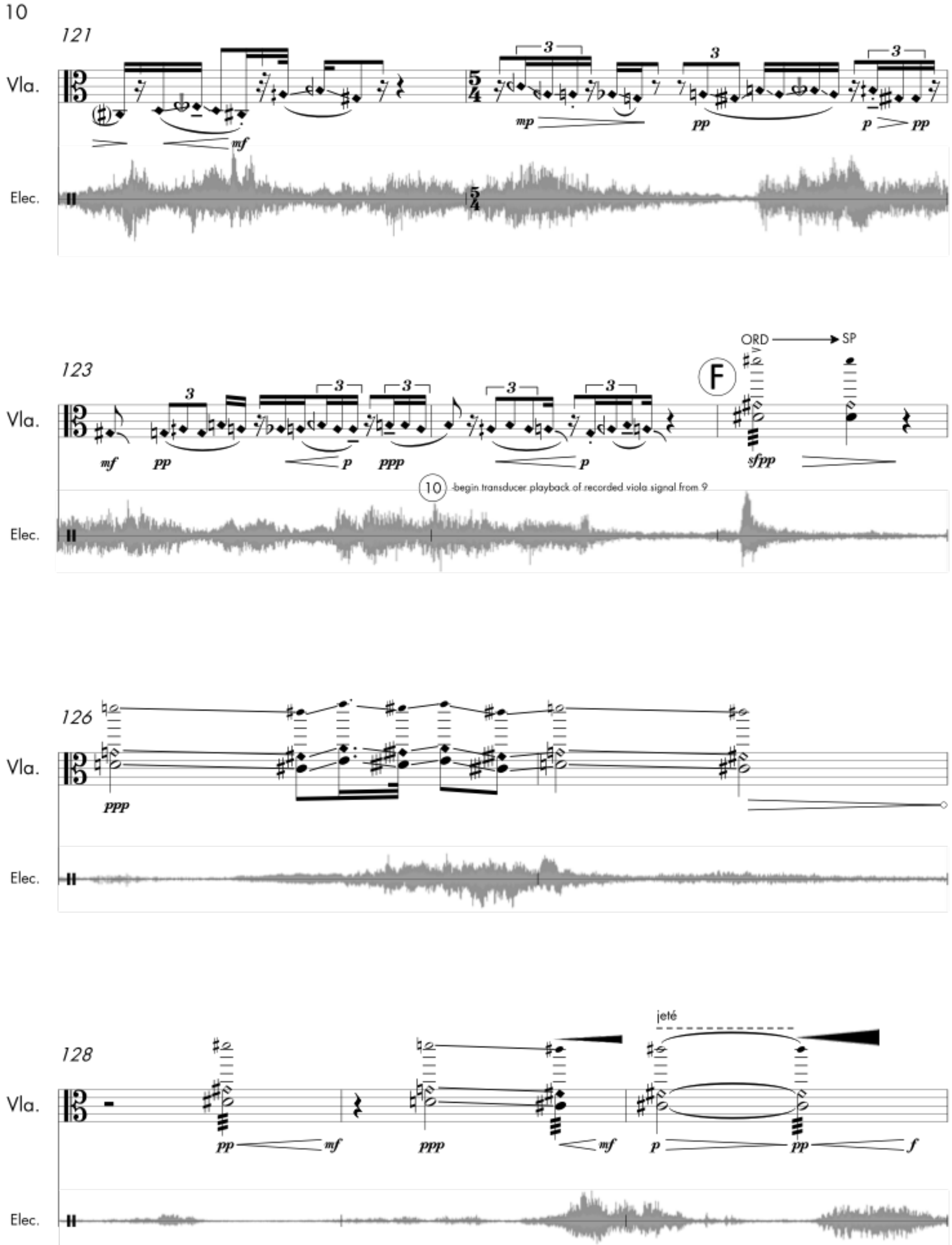
52
SP
ST
SP
ORD
Vla.
Elec.
54
jeté
8va
58
-begin playback reverberated scraping glisses
-fade in delay and pitchshifting of playback
61
(trill to open string)
sub

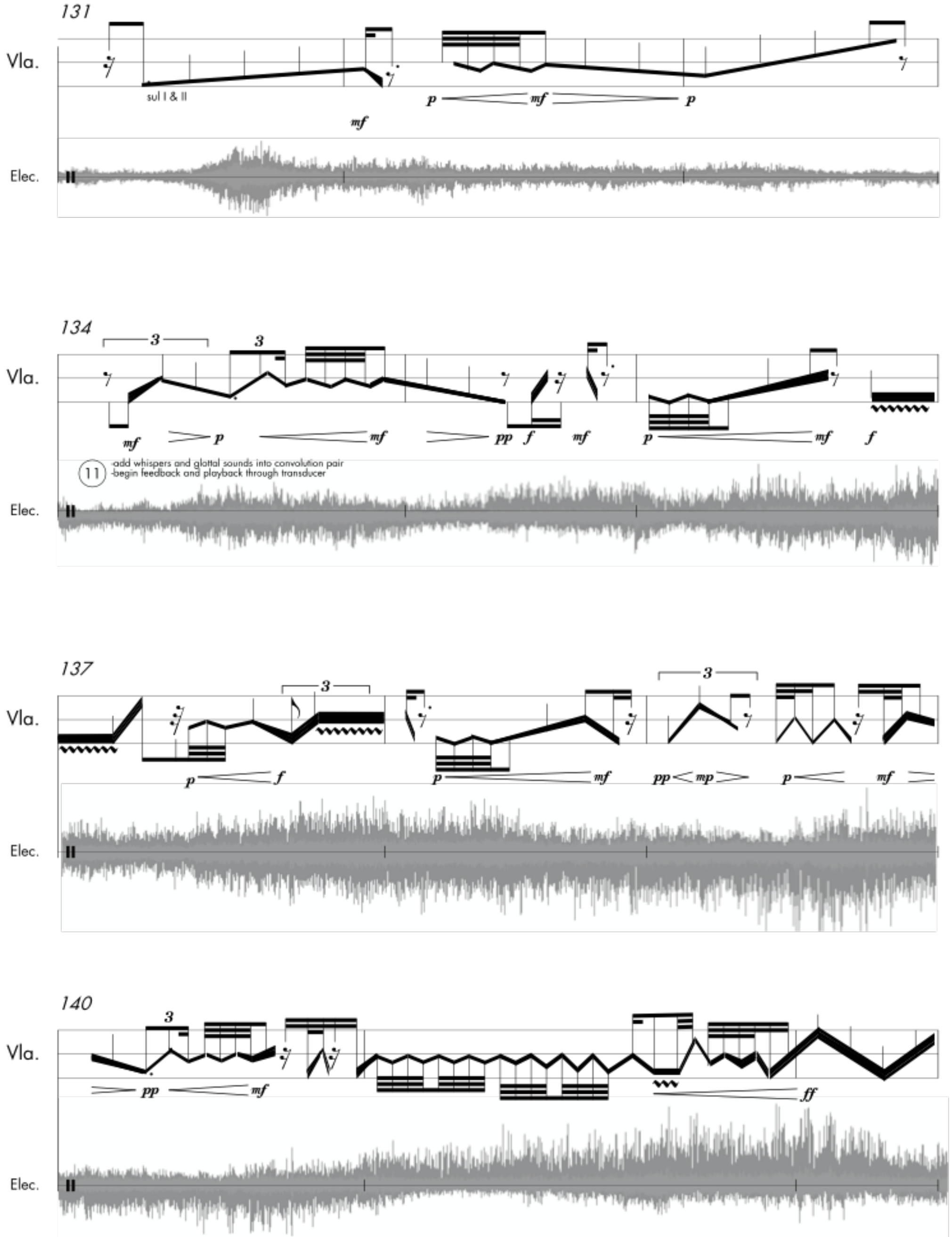

65
Vla.
Elec.
jeté
ORD
SP
ORD
SP
pp
mf
pp
ppp
71
ORD
8va
SP
mp
3
73
ORD
8va
mp
sfpp
SP
D
= 100
77
ORD
8va
tr
SP
ORD
sfpp
mp
sfpp
p
sfpp

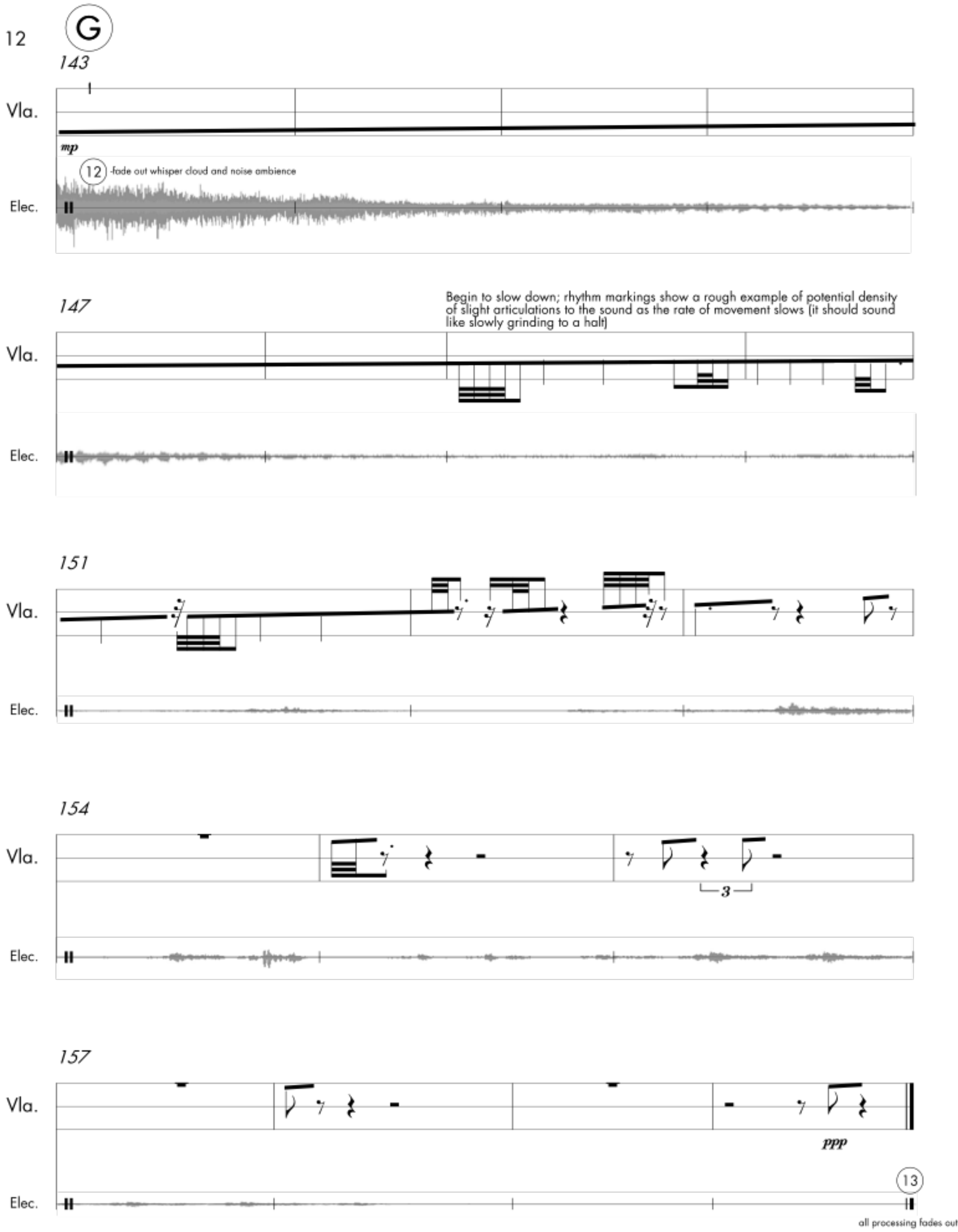

7
82
86
90
93
Vla.
Elec.
SP
ORD
tr
(trill to open string)
(trill to first finger)
8va
sub pp
sfpp
mf
mp
pp
p
f
7 -begin variable pitch-shifted playback
-begin convolution with spoken text


97
3
SP
Vla.
p
f
mp
Elec.
99
3
tr
Vla.
f
p
mf
p
mf
mp
f
Elec.
102
tr
Vla.
mp
mf
fpp
sub
pp
Elec.
105
Vla.
p
mf
p
mf
p
Elec.


108
E
♩ = 60
ST
SP
ST
SP
ST
ORD
SP
tr
Vla.
ppp
mf
pp
pp
mf
8
-gradually increase squelch value on speech convolution
-decrease pitch center of variable pitchshifting
Elec.
112
Vla.
pp
ppp
3
mf
p
Elec.
116
3
ORD
SP
Vla.
mf
ppp
mf
Elec.
119
speech-like
SP
Vla.
3
fpp
mp
ppp
p
pp
mp
9
-fade out pitchshifted playback
-decrease squelch on convolution
-record viola signal
Elec.


121
Vla.
mf
mp
pp
p
pp
Elec.
123
Vla.
mf
pp
p
ppp
p
F
ORD
SP
sfpp
10
begin transducer playback of recorded viola signal from 9
Elec.
126
Vla.
ppp
Elec.
128
jeté
Vla.
pp
mf
ppp
mf
p
pp
f
Elec.


131
Vla.
sul I & II
mf
p
mf
p
Elec.
134
Vla.
3
3
mf
p
mf
pp
f
mf
p
mf
f
11
-add whispers and glottal sounds into convolution pair
-begin feedback and playback through transducer
Elec.
137
Vla.
3
3
p
f
p
mf
pp
mp
p
mf
Elec.
140
Vla.
3
pp
mf
ff
Elec.


G
143
Vla.
mp
12
-fade out whisper cloud and noise ambience
Elec.
147
Begin to slow down; rhythm markings show a rough example of potential density of slight articulations to the sound as the rate of movement slows (it should sound like slowly grinding to a halt)
Vla.
Elec.
151
Vla.
Elec.
154
Vla.
3
Elec.
157
Vla.
ppp
13
Elec.
all processing fades out