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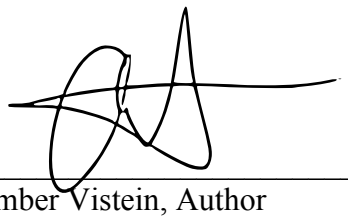

Amber Vistein, Author

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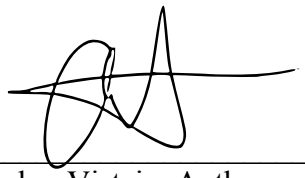

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Man Will Not Outlive the Weather:
A Sonic Assemblage for the Anthropocene

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Thesis

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Andrew G. Campbell, Dean of the Graduate School

Contents

Introduction

Man Will Not Outlive the Weather is a chamber opera composed for mezzo-soprano, flute, cello, piano, percussion, and electronics. It features acousmatic sound scores designed to accompany the live ensemble that are spatialized using a 7.2 speaker configuration. The score, acousmatic elements, and libretto for the piece all take their inspiration from historical, scientific, and literary sources engaged with one topic: weather. I should note that, in the context of this project, the word 'weather' is used to represent a broad range of dynamic meteorological and geological processes. And designation to this category intentionally retains a certain degree of ambiguity. The overall structure of the work was shaped by proceeding through a series of seven 'weather' events: glacial motion, a flood, an episode of deep fog, the movement of surface waves, a volcanic eruption, atmospheric circulation, and a hurricane. Each movement of this seven-movement work is devoted to investigating one of these phenomena in detail.

Once I finalized my selections, I began to collect field recordings representative of each weather event. I created several of these recordings myself, but was also given access to field recordings from the Woods Hole Oceanographic Institution's sound archive, and acquired recordings of less readily accessible events (for example, volcanic eruption) from the website FreeSound.org. Field recordings characteristic of each weather event were analyzed using a computer-assisted orchestration program created by IRCAM: Orchids. This software allows the user to input a sound source, set analysis parameters, and return possible orchestral realizations of that sound source.

Using the computer as an intermediary allowed me to step away from my own habitual associations tied to these events and offered a new interpretative perspective. I found

this process to be inspirational and productive; it provided a roadmap for new aesthetic directions to be undertaken. In several movements of the piece, most notably the first and last sections, these analyses became the primary building blocks for the acoustic ensemble's scores.

I also consulted scientific diagrams, literary depictions, and historical descriptions of each weather event in order to enrich and guide my interpretive process. These resources provided a rich array of dramatic content and striking imagery, which worked its way into the libretto. While the movement patters and empirical details described made themselves manifest in the acousmatic sound scores designed to accompany the live ensemble. I carefully considered each event in terms of its temporal evolution and gestural content—seeking out both spatial cues and narrative shape. Using these references, I composed the sound scores, drawing heavily from the field recordings themselves, and spatialized each one in accordance with the movement patterns that I discovered through my research. The acousmatic scores were spatialized and diffused across an array of speakers surrounding the audience in a 7.1 configuration. This enabled the audience to experience the enveloping effect of a living environment and the gestural content of each unseen weather event.

My intentions for this project were not to create an accurate sonic reproduction of any of these events, nor to produce a precise sonification. This work does not represent a one-to-one mapping of scientific data to sonic realization. Rather, this project has been an attempt to think *in, with, through*, and *at* these events. I wanted to engage with their sonic materiality, explore correspondences across disciplines, and locate affinities between weather and the thoughts, emotions, and actions of human beings. For these reasons, aural analysis, the

remapping of physical gestures, and use of metaphor, especially anthropomorphization, were as important to the compositional process as the computer-derived analyses.

The way that we think about, talk about, and otherwise represent weather, climate, and the natural world reflects on how we construct our selves as agents, our relationships to these entities, and how we interpret our position within an expanded ecology. Therefore, *Man Will Not Outlive the Weather* is as much an investigation of human expressivity, emotion, and identity as that of the natural world. It is an attempt to use poetic language and sonic affect to translate, pluralize, and diffuse our conceptions of these events: to learnt to relate in a new way, to rethink our position, and to lay the groundwork for thinking about weather as an aspect of our selves. This task has become more pointed, if not crucial, in the historical moment that we currently occupy at the dawn of the Anthropocene.

Chapter 1: Everyday Influences

An Autobiography of Shorelines

I have always lived near water. I grew up in Florida, never more than a few miles from the Gulf of Mexico. Venice Beach, where I lived as a child, is nestled in the elbow-crook of the long arm of the Gulf Coast. Because of this place, my native landscape, I will always believe that saltwater *should* be emerald green; that *that* is its elemental color. And *sand* is pale blonde. Where the two mingle, you can stand with one bare foot in the world of dust and one in the depths, watching the orange sky. In August, the Gulf is like bathwater--nearly body temperature. The sand is even hotter, compelling a quick series of hops from shoeless youths.

My childhood was full of storms. I would sneak down to the beach to catch the clearest view of impending downpour: as the clouds roll in on the jet stream you can feel the hot, sticky breath of the currents--an admixture of suspended salt, sand, and humidity--play across your skin. Then the clouds turn dark, streaks of lightning bolt across shivering waves, and sizzling thunderclaps send chills darting up your neck, leaving a wake of gooseflesh. You have to dig your toes deeper into the sand, to ground yourself in its grit. In all the wide world--the implosive, bubbling sound of rain hitting waves is my favorite. I'd return home soaking wet.

As children my sister and I combed the sugar sand shore for shark's teeth, mermaid's purses, and fossilized wood: tokens from deep beneath and long ago. I learned that the ocean is a different kind of clock. It has a different logic. Its layers don't always stay set. It can hide a trilobite for 100 million years and one day spit it up on shore in an anamnesis compelled by vortices. This situation is not altogether unlike noticing that you

sound exactly like your dead mother when you cough.

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When I was 23, I moved to Boston, Allston to be exact, less than a mile from the Charles River: the great brown body that winds all the way through the city. For a long time, it was just about daily that the Charles River and I ran alongside each other. I trotted along as close to the water's edge as possible and was doubly bathed in my own streams of sweat and the occasional splash of an over-enthusiastic lap. Until winter, when I stopped running outdoors, and the river's flow turned white and still. My breath trailed me like a cloud on the mornings when I stood, waiting for the bus, next to the Charles as it exhaled steam.

As soon as spring arrived, I felt pulled towards the oceanic shoreline. I walked alongside the cold, black-blue waves of the Northeastern coast, shoes on. I listened to how different the shore sounded when, instead of sugar stand, underfoot were grey stones: the persistent waves having craved and sanded them into smooth, near-ceramic percussion instruments. They rattled in agitation whenever the waves sucked in. One sunbaked August, I remember running full-tilt into the dark water: the cold squeezed the air from my lungs in an all-encompassing embrace. I let out a gasp just as the waves broke against the shore. I stood there waist-deep, breathless: the waves scraped against my skin, amid the stony clatter of the beach and the chattering of my teeth.

I still miss the storms.

An Encounter with Glacial Vocality

Given the passage between a childhood spent on the green-blonde coast of a

Southern clime and the state-shifting blue-black of the Northeast waters, perhaps it is not surprising that the natural world became the focal point of my creative practice. But in addition to an awareness of geography cultivated by migration, a few notable sonic encounters have strongly contributed to my curiosity regarding the natural world. The most startling involved an entity composed of several tons of ice and an equal measure of expressive tension.

Several years ago, I was invited to collaborate with Woods Hole Oceanographic Institution (WHOI) and Contrapose Dance Company to create an evening length work about the ocean. My contributions to the project were to be music composition and sound design. I already knew that I wanted to incorporate field recordings of water—to re-contextualize, reinterpret, and reimagine them—but then my collaborators at WHOI, offered to let me use recordings from their sound archives. Some of these had been were made hundreds of miles from shore, with powerful hydrophones positioned deep below the surface of the water. I was excited that my ears were now invited to visit an alien locale hundreds of feet from the glint of sunlight! But in the end, the most compelling soundscapes actually resided much closer to the water's surface.

Among the recordings that I received was a short audio 'quiz' used to train the ears of young oceanographers and biologists. It consisted of 13 short recordings preceded by the title: *Ice or Animal?* Hydrophone recordings of harp seal calls were played back immediately following a sonic postcard of the sputtering sound of shifting sea ice; a recording of glacial calving characterized by deep bellowing followed just behind a chorus of young orcas singing. If you were taking the test, your job was to guess: which one of these sounds is made by an animal and which one is made by ice? One of the

scientists from WHOI gave me the answer sheet. I made an honest effort and reviewed my work: I failed miserably. But it was then that I learned something very important: glaciers can scream.

The recordings of glaciers squealing, creaking, and swaying stuck with me. I heard the glaciers as living things—and I quite literally could not tell the difference when tested. I heard the tension in their 'voices', the effort of their 'speaking,' and made no hesitation in giving such an attribution. I imagined their bones shifting, and their lungs emptying under the effort of migration. This initiated a series of reflections: Why did I hear them as 'living'? What perceptual model might accommodate such an experience? What did I mean by 'living'—active, intentional, or something else entirely? Ultimately, these recordings and the questions that they raised became the conceptual impetus underlying *Man Will Not Outlive the Weather*.

Why Weather?

After my surprising listening experience with the glacier recordings made me reconsider my relationship to a vast ice sheet, I wondered: how had these sounds managed to exert such a powerful effect? How might the sounds produced by other weather events be revealing, interesting, or allow me to also reframe my relationship to those entities? Could thinking about weather also help us to think about sound? In the end, I think there are several features that made weather an appropriate topic for this kind of research-driven compositional project.

The first feature is temporal scale. Weather events occur within a timeframe that human beings can readily comprehend: a storm can last a few hours, a hurricane a few days, a mundane episode of fog can be part of one's daily commute. The finite duration

and ephemerality of these events means that they have a built in event shape or a narrative arc.

The second feature is perceptibility. Each one of these events contain readily perceptible features that can be recognized and recalled by a diverse audience. While most events have a readily identifiable auditory component, a few (deep fog and atmospheric circulation) do not. For these events, I shifted emphasis to focus on gestural, visual, and other experiential content.

The third feature is that weather is already deeply ingrained into both the metaphors we use to explain behavior, emotion, and situations that feel beyond our control: a wave of relief, the fog of war, erupting with rage, etc. In terms both of creating new connections to weather and compositional flexibility, this predisposition is useful. As the composer, a wealth of experiential, emotional, and narrative options were ready-at-hand to aid me in extending and exploring the content of each event.

The fourth feature is that weather events often have a close association with mythology and supernatural beings: from the numerous creation stories that reference a flood to the idea of thunder being the result of Thor striking his hammer. We have been primed to imaginatively project, transform, and anthropomorphize these events. Stories of supernatural beings who are able to direct or control the weather are ready-made intermediaries for thinking *with, through,* and *at* the dynamic assemblages that compose weather.

And lastly, at our current historical moment in the dawn of the Anthropocene, it is vital that we produce perceptual models capable of engaging our enmeshed, dynamic world. As the now-primary agents of change regarding the environment and climate, it is

necessary that we find ways to think of our selves as part of an interconnected whole, rather than intentional subjects who are masters of inert matter. We are part of the weather. And it is part of us. We must develop a sense of responsibility and empathy towards the complex, diffuse, and non-human. And in order to do that, we have to listen.

Chapter 2: A Short History of Critical Listenings

My geographic surroundings shaped the way that I listen. My exposure to a wide range of sound art, sonic composition, and contemporary music has also played a significant role in molding my ear. In the context of this project, a few listening experiences stand out as having been particularly significant and influential. The following pieces and musical movements have all meaningfully impacted both how I listen and how I think about listening in ways that are readily reflected in *Man Will Not Outlive the Weather*.

The Material Fact of Field Recordings

Chris Watson is a recordist who edits the field recordings he creates into "filmic narratives."[1] By "putting a microphone where you can't put your ears," he grants the listener privileged access to otherwise inaccessible locations and environments[2]. The first piece that I ever heard by Chris Watson was *Ol-Olool-O* from his album Weather Report. This piece documents a "fourteen hour drama in Kenya's Masai Mara from 0500h - 1900h on Thursday 17th Oct. 2002," but compresses the timespan of this event to occupy just 18 minutes[3]. The other two tracks on the album follow a similar plan and are also 18 minutes in duration. *The Lapaich* documents a "Scottish highland glen through autumn and into winter during the four months of September to December" and *Vatnajkull* recreates "the 10,000 year climatic journey of ice formed deep within this Icelandic glacier"[4]—one that not only myself, but several reviewers are tempted assign a voice, one that alternately sings, creaks, hums, or gurgles. A striking feature of these

[1] Chris. Watson, http://chriswatson.net/.
[2] Ibid.
[3] Ibid.
[4] Ibid.

highly affective pieces is that—although exquisitely edited, layered, and mixed—there is little or no alteration to the sounds of the field recordings themselves. Time is compressed, temporality shifts from a geologic to a human timescale. But the audible content of the field recordings remains unprocessed and recognizable. I consider this compositional strategy to be a way of dealing with the field recordings as *material*: as recalcitrant, lively material facts.

Chris Watson frequently presents his work in a quad or other multi-channel configuration, with the audience seated in the middle of the array. These sonic works are generally presented without visuals. The result is an immersive replacement of the auditory environment. If you close your eyes, you are elsewhere—although we might ask: where exactly? If you keep them open, you find yourself amidst a new sonic world somehow blossoming up, in disjunction with the visible one. I attended one of these performances in New York City in 2012. The piece was presented in a cathedral in Brooklyn using a quad speaker set-up. The lights were dimmed low, but not extinguished; candlelight remained. A work composed using field recordings of the rainforest canopy began echoing through the space—monkeys squabbled across the pews and birds took flight from the corners of the altar.

When considering the work of Chris Watson, and other artists who deal extensively with recorded sound, I often find myself captivated by the effect of sonic material liberated from its original context. Brain Kane would qualify this as having encountered an *acousmatic situation*. All sounds have a source and a cause where the "interaction of a source (cymbal, string, reed, vocal tract, or windowpane) with a cause

(rosined bow, moving air, raindrop) produces an audible effect"[5]. But "acousmatic sound is constituted by a structural gap"[6] in that it results from a 'spacing' between source, cause, and sonic effect. This 'spacing' produces a sense of underdetermination that can initiate a series of sonic deferrals and referrals. The listener both imaginatively projects and cross-references in guessing at the possible connections between the audible effect and its absent source and cause[7]. *Why is the monkey making that sound? What is causing the tree to make that noise? What will happen next?* As a listener, this is what I feel gives acousmatic sound its intrigue and power.

In my piece, I exploited the ambiguity of the acousmatic situation as I used field recordings to create dynamic sonic environments that enveloped the listener. Although layered and edited, in a way that is reminiscent of Chris Watson's approach, these sound scores remain relatively faithful to the field recordings; the material facts presented in the field recordings persist. The samples were not significantly processed and continue to be identifiable as examples of a given event: a thunderstorm, a wave, some wind, etc. Although no visuals of these events were provided, thereby making it impossible to visually corroborate or verify that which was heard. They also retained enough information for an event-structure or an abstract 'narrative arc' to be conveyed. However, the acousmatic scores are free of sound marks, sounds that tend to powerfully associate themselves with a specific location, allowing each listener to personalize their encounter—to draw from their own experiences, memories, and imaginings. In this way, acousmatic ambiguity actually contributes to an individualized intimacy that allows the listener to develop a personalized sense of connection with what they hear.

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[5] Brian Kane, *Sound Unseen : Acousmatic Sound in Theory and Practice* (2016).
[6] Ibid., 149.
[7] Ibid., 7.

The Body in the Voice

In the context of music, the materiality of sound often takes the form of noise, tension, and fleshiness. Many contemporary composers have taken advantage of the wide range of expressive possibilities that these material-centric inflections offer. The use of extended techniques has dramatically increased in the works late 20th and 21st century composers. Perhaps the most exemplary example of confronting the materiality of sound in music is *Sequenza III* by Luciano Berio. *Sequenza III* is a virtuosic piece for a singer, an actress, or both. Throughout the score, Berio employs a cascading array of vocal production techniques and oral expressivities (including laughter, coughing, sharply articulated breathing, etc.), physical gestures, and psychological states to inflect the sonic landscape of the piece.

However, the succession of these elements proceeds at such a rate as to eschew traditional forms of either song or narrative. It is as if he had decomposed 'song' into its vital elements (physical, linguistic, musical) and then recomposed them according to a new organizing principle, one that instead foregrounds their materiality. *Sequenza III* explicitly takes up the coordinated operation of the material elements of the voice as a compositional strategy. In any instance of vocality, all of these components are always in operation—the combination of breathing, mood, pitch, and dynamic always contributes to both the quality of a sound and how it will be interpreted by a listener—but Berio makes the contributions of each of these interrelated components explicit. By combining elements from across psychological, physical, and musical registers together in novel combinations he produces a striking sonic effect. And in terms of our perception of the performer, she no longer appears as an intentional subject, as her frenetic succession of

expressive outbursts do not seem to follow a narrative or logical thread. Significantly, he has also decomposed and recomposed the performer into a material assemblage, as opposed to subject.

Listening for the material, traditionally non-musical, aspects of the voice took on an important role for me while composing this piece. I thought about what constituted the 'voice' I perceived in the glacier recordings—the squealing, creaking, and moaning that sounded out from the ice. And the physical gestures of scraping, collision, and cracking that caused these sounds to issue forth from the glacier. When it came time to reconcile this 'voice' with the voice of a human singer, I turned to these features. These gestural and noise-based qualities took on new significance when mapped onto the voice and body of the human singer—who trills her tongue against her teeth in a gesture of friction, slides between pitches as though scraping along an unseen surface, and repeats percussive 't' sounds in imitation of the echo of falling fragments of ice. The same logic was similarly applied to the gestures and techniques undertaken by the ensemble: for example, in the use of over-pressured bowing to create a squealing, noisy effect or the use of breath blown through the flute at various speeds to evoke different kinds of movement.

Spectral Music

Spectral composers break down the materiality of sound in another way entirely. With the exception of a sine wave, every sound is already a complex entity comprised of many partials. Using techniques of spectral analysis, one can figure out the components that make up any given sound: the frequency and amplitude of each partial and how each partial behaves over time. And once the components comprising a given sound source are

understood, they can be transformed: extended, compressed, inverted, or interpolated with the analysis of a second sound. They can also be reinterpreted and produced by other means. For example, a violin can play a pitch according to the amplitude and frequency of one partial while a viola plays another and a cello a third—re-presenting the original source sound through the lens of a string trio. In terms of musical aesthetics, this invites a reappraisal of musical parameters—if all sounds are complex, harmony and timbre cannot be thought of as exclusive categories, but as ones that exist along a continuum.

These techniques have most frequently been applied to instrumental sounds. For example, the analysis of an E2 played on the trombone became the model for the opening section of Gerard Grisey's classic *Partiels*. However, the techniques and compositional strategies of the spectral composers were highly inspirational for me as I pursued different ways to bridge the distance between the 'natural' sounds of the field recordings and those of an acoustic ensemble. Spectral analysis, applied instead to field recordings in this instance, became one of the most valuable tools available to me during this project. Because spectra belong equally to both 'natural' sounds and musical ones, these techniques allowed me to establish a language common to both and to set up a zone of exchange between them.

Microtiming & Musical Photorealism

Similarly, Musical Photorealism takes up the tiny variations in timing that result from a given musical performance as compositional material by translating "millisecond-level microtimings... back into standard notation."[8] Beginning from a specific recording, say "Argerich's Deutsche Grammophon recording of Chopin's Prelude in E minor, Op.

[8] Richard Beaudoin and Neil Hyde, "The Handless Watch: On Composing and Performing Flutter Echoes," *Divp Divergence Press*, no. 1 (2013).

28, no. 4, recorded in Munich on 22-25 October 1975,"[9] composers such as Richard Beaudoin use computer analysis programs, for example LARA (Lucerne Audio Recording Analyser), to aid in the detection and measurement of infinitesimal variations in timing and amplitude.[10] These micro-variations are then re-scaled, extended and used to derive new rhythmic and dynamic material that proportionally re-express the pitch content of a given piece of music; i.e. re-expressing a Chopin Prelude through the lens of the performance decisions and style of Argerich.

By foregrounding the materiality of the recording, a new interrelated whole is created between performative interpretation and notated intent, between the continuous time of the recording and the metrical time of notation. Although I did not explicitly use microtiming analysis techniques in the composition of *Man Will Not Outlive the Weather*, the translation between the non-metrical fact of recorded sound and the metrical representation of sound in standard notation was an important consideration throughout my compositional process. Reflecting on these techniques helped me to develop strategies to translate from one kind of time to the other. The compromise between the two often took the form of rhythmic subdivisions that eschew the downbeat and sustained gestures that accede through a range of dynamics, in order to capture the nuance of the amplitudinal morphology, the dynamic shape, of a sound.

In each of these examples, the materiality of sound is taken up and foregrounded in a different way. Although the parameters emphasized in each approach vary, they all revolve around detailed analysis and the disruption of sonic norms: exhibiting field recordings in an unrelated environment, un-joining the coordinated elements of song,

[9] Ibid., 9.
[10] Ibid., 10.

unearthing the complexity of a single note, or uncovering the multiple temporalities at play in musical performance. They each reveal complex interactions quietly at work in every instance of sonic activity and provided me with many avenues to explore as I sought out the material connections to be made between field recordings and acoustic music.

I applied strategies derived from each of these techniques to the field recordings I collected, and have given a few examples of the creative compositional solutions that these techniques disclosed to me. On one level, I understood why it was that I wanted to deal with the recordings in their materiality: to thoughtfully analyze their sonic content, gestures, and interactions. I knew that once these elements were unearthed, they could then be re-composed and re-combined—but to what end?

The complex interaction of multiple elements also guides how we interpret, define, and give meaning to sounds. I asked myself: How can meaning be redistributed? Can it be transferred? How might one be able to achieve such an end? Throughout the composition of *Man Will Not Will Outlive the Weather* the process of 'making meaningful' remained an important issue for me. In my attempts to answer these questions I found a few concepts to be especially useful.

Ch. 3 Conceptual Groundworks

Construction: The Emergence of the Assemblage

In several instances I have commented on the complex interactions and numerous elements that comprise a given sound or speech act. In order to consider how these diverse components contribute to 'making meaningful,' we first need to acquire a concept capable of accounting for these teeming totalities. Thus, the first concept to be added to our conceptual toolbox will be the idea of the *assemblage*.

An *assemblage* is a grouping of heterogeneous elements that come together to form a composite. We could compare an assemblage to a given ecological zone: the interactions between humans, animals, climate, and the physical environment come together to define its unique ecology. Similarly, assemblages incorporate elements from across many registers (physical, behavioral, linguistic, social, etc.) to form a whole. At times the interactions of the elements comprising an assemblage enact volatile events: "earthquakes, flash floods, tsunamis, stock exchange collapses, anarchic G8 demonstrations".[11] And at other times they exist in more fixed and stable formations: sedimentary stone, the Oxford English Dictionary, The World Bank.[12]

Assemblages make things happen based on the unique configuration of interacting elements. In this way, we can say that they have *emergent properties*. We can think of an emergent property, as the unique effect generated by a given assemblage, one that is greater than the sum of its parts, yet requires the interaction of all the elements. Put another way, the assemblage can be thought of as a heterogeneous 'team' of interrelated materials and processes. Emergent properties may arise from this team-based material

[11] Dianne Chisholm, "Rhizome, Ecology, Geophilosophy (a Map to This Issue)," *Rhizomes: Cultural Studies in Emerging Knowledge*, no. 15 (2007).
[12] Ibid.

configuration, but no specific or individual member of the 'team' wholly defines it.[13] Changing one element of the assemblage exerts an effect that resonates through the whole, but the interaction of all the elements that comprise the assemblage is always required in order for an effect to be produced.

As an example, consider the interacting components at work in speech acts. The volume at which you pronounce a speech act can be seen to inflect the physical gesture of the act (consider the physical motions of one who is shouting in comparison with one who is whispering), the act's emotional tenor (a loud volume might convey excitement or anger; a very quiet one, vulnerability; a monotone might convey indifference), and the semantics of what is pronounced (articulation reflects on context; shouting might indicate sarcasm or a state of emergency depending on the situation). The emergent property in this case can be thought of as the meaning conveyed by the act. The meaning is not reducible to any single component, but results from an assemblage of interacting elements. In the same way, an assemblage can be said to have a 'style' or character—an assemblage may be an angry mob, a mournful procession, a joyous throng—this style is not determined by any single member of the group, but rather its overall set of interrelated materials within a context.

The idea of the assemblage becomes very useful, in respect to this project, when we consider the entities at play. Weather is a dynamic, temporally grounded, perceptible assemblage: it happens in a place, at a time, it is sonic, and physical. It becomes meaningful in terms of its actions or effects; and the behavioral responses, emotions, and ideas it generates. Sound is also a dynamic, temporally grounded, perceptible assemblage: it too occurs at a given time and place and has perceptible features. Sound

[13] Jane Bennett, *Vibrant Matter : A Political Ecology of Things* (Durham: Duke University Press, 2010), ix.

becomes meaningful as it triggers mental associations and conditions actions or responses within a context. Even the human body itself can be thought of as a performative assemblage—one comprised of many components that contribute to create meaningful effects, as demonstrated in our example of the speech act.

Thinking about events, sounds, and performers as assemblages expanded the possibilities available to me as I attempted to remap and rescale one onto the other. Using the assemblage as a perceptual model re-directs observation and analysis away for the traditional subject object dichotomy. Considered from the standpoint of intentionality a stone and a human being may have little to do with one another: a stone is an object, a human is a subject. But considering both from the standpoint of the assemblage tells a very different story: a sedimentary stone accumulates layers over time, taking in the elements of its environment, and compressing them into a new configuration thanks to the pressure and shaping influence of geographic features in its region. A human slowly acquires memories, knowledge, and behaviors over time, which are shaped and solidified by social pressures, resulting in the unique configuration that is a given individual. The accumulation and compression of sand to make stone becomes meaningful in a very different way when held up alongside its human counterpoint. Thinking in terms of the assemblage thus helps us to re-imagine the relationships between all kinds of entities: music and sound, human and natural histories, organic and non-organic actors. And in light of Anthropocene, these relationships must be recast.

Perception: Acousmaticity and Transmodal Linking

The next concept I would like to add to the toolbox extends the idea of the assemblage, but specifically considers it in the context of the acousmatic situation. I

briefly described the concept of the acousmatic situation earlier while discussing Chris Watson's work, but would like to extend that discussion. Let us recall that, all sounds have a source and a cause where the "interaction of a source (cymbal, string, reed, vocal tract, or windowpane) with a cause (rosined bow, moving air, raindrop) produces an audible effect"[14] and that "acousmatic sound is constituted by a structural gap"[15] resulting from a 'spacing' between source, cause, and sonic effect. This 'spacing' produces a sense of underdetermination and ambiguity that leads the listener to imaginatively project in guessing at the possible connections between the audible effect and its absent source and cause.[16] Put in terms of the assemblage: the ambiguity of the acousmatic situation can be viewed as an emergent property of an assemblage that includes a spacing of its elements.

In addition to being personalized and listener-dependent, in that the listener draws from their own reservoir of knowledge and experience, the effect of the acousmatic situation is one of multiplying experiential space. A listener need not define only one space or set of relationships, but can imagine many. And can go on to cross associate between different interpretations or hearings—each with its own possibilities and perspective. While listening to Chris Watson's works, I may imagine being transported into the kind of forest-space that I hear as being recognizable based on the material fact of the recordings. I may also enfold the experience of the recorded space of the forest with the presentation environment of the recordings, resulting in the imaginative projection of unseen birds perching in the rafters of the church and occasionally swooping through the cathedral. I might also imagine that these sounds reveal subterranean forces at play beneath visible surface of the church; transposing the swaying

[14] Kane, 7.
[15] Ibid., 149.
[16] Ibid., 7.

of trees to the stone walls of the church—generating a sense that the stones might, at any moment, begin to bend or even to walk away. No one of these interpretations has primacy over the others. And I can even reflect on how each of these interpretations relate to one another. In short, one acousmatic situation can generate many interpretations and many re-framings of experiential space.

In an acousmatic situation, a listener may also or form associations across multiple senses. Since our senses themselves operate in assemblage, they are linked and interrelate:

> Our sense of texture is learned through vision and touch as well as sound; our experience of the physical act of sound making involves both touch and proprioception; spectral motion, and the movement and distribution of sounds in space relate to our own experience of physical motion and cultural and natural environments.[17]

This interlinking, or transmodal linking,[18] of the senses allows us to coordinate between our perception of pitch and the spatial categories of like 'high' or 'low' that associate with the movement of that pitch. In a broader way, transmodal linking allows us to redistribute shapes or forms created through sound and link them to our own experiences of physical motion—which will be inflected by our personal histories, our culture, and our geography.[19] We can transpose the form or shape created by the evolution of a sound over time to the physical, social, cultural, and conceptual registers.

Transmodal linking allow us to engage the idea of ascension generated by a continually rising frequency on a level that incorporates our sense of proprioception, spatial placement, and all the physical and cultural signifiers associated with that gesture. In this way, meaning is never created by one sense working in isolation, but rather

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[17] Denis Smalley, "Space-Form and the Acousmatic Image," *Org. Sound Organised Sound* 12, no. 01 (2007): 39.
[18] Ibid.
[19] Ibid.

formed by a complex assemblage that includes all our senses, our personal experiences, and our emplacement within the world. The entwining of personal and cultural history with sensory perception means that, not only can I associate the sound of a volcano erupting with the shape of a violent explosion, but that the volcano can have a personality, a character, a sense of will, and become meaningful as a social actor. The ambiguity of the acousmatic situation along with the inherent incompleteness of sound allow for powerful, re-contextualizing sensory metaphors to be composed.

One acousmatic listening experience may reveal many alternative points of view "on what the world is," on how elements within the world relate, and on how else the world might be constructed.[20]In the acousmatic situation we can observe the composition of complex, interacting assemblages that operate across multiple senses, spaces, and temporalities—yet remain grounded in the affective and efficacious materiality of sound. Throughout the composition of *Man Will Not Outlive the Weather*, I thought of the ambiguity of the acousmatic situation as a way to encourage the listener to think of one assemblage in terms of another, while still being able to personalize their interpretation through the lens of their own experiences. Finding their own connections between the fact of sonic materiality represented by the field recordings and the re-interpreted, expressive content of the libretto and acoustic musical realization. This allows for a variety of 'making meaningful' that is guided by the assemblages brought into play (and the zones of sonic, gestural, and semantic exchange and association established between them), but ultimately dependent on the listener.

[20] Salome Voegelin, *Sonic Possible Worlds : Hearing the Continuum of Sound* (New York [u.a.]: Bloomsbury, 2014), 22.

Interpretation: Agency and the Anthropocene

Ultimately, thinking through the assemblage, uncovering the ambiguity of the acousmatic situation, and thinking through the polymorphous forms made available to us through transmodal linking are ways of doing something simple: telling a story. In the story of the Anthropocene, new characters emerge. And there is a plot twist. Human activity has now become the dominant influence on the environment and climate. And the Earth has not stood idly by: "the Earth has now taken back all the characteristics of a full-fledged actor".[21]

This is demonstrated most forcefully at our current historical moment as temperatures rise, glaciers recede, the sea level goes up, and occurrences of extreme weather increase. We, as human beings, are implicated in the creation of this situation. Historically, human beings have routinely been designated as active, willing agents standing over and against objects comprised of passive, yielding matter. But the fallacy of this argument's logic is made visible when the Earth responds—and demonstrates its power in ways that run contrary to our will and are beyond our control. It becomes obvious that the Earth is no passive 'object'. The lesson of the Anthropocene is thus to figure out how *agency*, traditionally the most 'human' of properties, belonging to the active, willing subject; and *matter*, traditionally consigned to the domain of the dumb, passive object might be reconceived. *How can we tell this new story?*

It is certainly a story is of entanglement. Just as my sensory perception never occurs in isolation—but rather engages all of my other senses, my personal history, and my emplacement—so, my own agency is never isolated nor absolute. In functioning as

[21] Bruno Latour, "Agency at the Time of the Anthropocene," *New Literary History New Literary History* 45, no. 1 (2014): 3.

part of an assemblage, my ability *to do* anything is always reliant on the cooperation of an ensemble of participants: the chair in which I am sitting, the coffee in my bloodstream, the computer on which I am typing, the accumulated listening experiences of the last 32 years, and the books and articles I have internalized. To acknowledge the role that these material entities play in my ability to be efficacious means that I must share 'my' agency with them. I must learn to think of agency as distributed.

But when not considered as a uniquely human property—one that is the result of internal, will or consciousness—what does agency look like? What would a distributed form of agency—an agency of the assemblage—look like? In her book, *Vibrant Matter*, Jane Bennett offers the electrical power grid as an example of an agenic assemblage: "the elements of this assemblage, while they include humans and their (social, legal, linguistic) constructions, also include some very active and powerful nonhumans: electrons, trees, wind, fire, electromagnetic fields".[22] She then focuses on a real life event involving this assemblage, "a power blackout that affected 50 million people in North America in 2003."[23]

What caused the blackout? The answer is diffuse and includes a "variety of agential loci"[24]: the flow of the electricity itself played an important role, as did transmission wires, Neoliberal senators, consumers, economic incentives, government agencies, electromagnetic properties, weather conditions, and a brush fire in Ohio.[25] These combined to produce a blackout that spanned 24,000 square kilometers.[26] Moreover, the blackout was, in part, the result of aleatory effects, those based on chance,

[22] Bennett, 24.
[23] Ibid., 21.
[24] Ibid., 26.
[25] Ibid., 25-6.
[26] Ibid., 26.

caused by sudden shifts in the flow of electrons that are never entirely predictable.[27] The agency in this situation was "distributed".[28]

Meanwhile Bruno Latour finds an impressive model of the assemblage in the modern novel: where a given outcome has less to do with the decision of a single actor, than with many instances of cooperation, confrontation, and chance happenings that occur across a tremendous number of interacting assemblages[29]. The complexity of the modern novel is a way of telling the story that demonstrates the agency of the assemblage. If we are able to rethink agency as being simply tied to the ability to exert an effect, we can begin to conceive of agency as existing along a continuum, in a "spectrum" of "agenic capacities".[30]

Latour also puts in a word for using anthropomorphization as strategy to re-distribute agency. To anthropomorphize is to create a metamorphic zone between a human being and a second term: the weather, a river, the Earth, etc. In this zone of metamorphosis one can inhabit a new shape, the river can take—be thought about through—the shape of a human being. This cultivates a different kind of attention and a new level of empathy; it creates a zone of exchange. Human beings understand the world in terms of their own motivations (desire, hunger, health, weariness) and cultivating a sense of motivation in a non-human, even non-organic entity enlivens it, makes is move—or at least *want* to! In this way, anthropomorphization can encourage us to look beneath the surface and attempt to understand entities that were previously dismissed as passive, mechanical, or 'dead.'

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[27] Ibid., 28.
[28] Ibid., ix.
[29] Latour, 9.
[30] Bennett, 30.

Throughout this essay, I've been looking for a perceptual model that could accommodate my experience of a glacier as a living, speaking entity. And this is how I think I can tell that story: The acousmatic situation sonically prompts an investigation of ambiguity. Through transmodal linking, I attempt to comprehend the expressive, voice-like features of the glacier using not only my ears, but through all of my other senses. This allows the glacier and I to enter a metamorphic zone, for it to morph into my own shape. Being an assemblage myself, this also means that I situate the glacier as fellow assemblage. And I seek out zones for exchange regarding our respective compositions, motivations, and emergent properties. Our shared temporality, vocality, and sense of gesture provide the starting grounds. Using this perceptual model, I am then led me to rethink my identity as 'subject', my agency, and my relationship to the world in the historical moment of the Anthropocene.

How did these conceptual influences manifest themselves in the composition of *Man Will Not Outlive the Weather*? What zones of exchange were created? I continued to analyze the specific material and expressive components involved in producing the perceptual experience of glacial vocality. I literalized and exaggerated zones of exchange in the sonic register by asking: when and how do humans and glaciers sound alike? I remapped gestures to create a zone of exchange across morphological space— while transmodally preserving a sense of shape in the context of either physical motion or narrative arc. And when translating between the non-metrical temporality of the field recordings and the metrically bound acoustic ensemble, I sought out rhythmic figures that allowed me to unfix the ensemble from the musical grid, creating a zone of exchange between varieties of temporality. I will now describe a few of the practical tools and

techniques that I used in order to exploit these points of connection, linkage, and exchange in greater detail.

Chapter 4: Methods and Materials

Orchids Analysis

Throughout the composition of *Man Will Not Outlive the Weather,* the computer was one of my most valuable tools. Using the computer as an intermediary allowed me to interact with a mode of 'hearing' not available to me by simply using my own ears. It became a kind of prosthetic ear capable of dealing with the sonorous materiality of the field recordings in a different way. The machine listens with an 'ear' that is very unlike my own: it has different abilities, different thresholds of detection, and it conducts its analysis on the level of sound as material fact—not according to cultural association, or political statement, or personal history.

This prosthetic ear provided new organizing principles as it went about impersonally interpreting the field recordings that I provided as sound sources. The availability of alternative interpretations enabled me to recognize my own habitual associations, interpretations, and modes of translation—and to step away from them. Now, I'd like to describe this analysis procedure in a little more detail.

The field recordings collected were analyzed using a computer-assisted orchestration program created by IRCAM: Orchids. This software allows the user to input a sound source, set analysis parameters, and return possible orchestral realizations of that sound source. To put this in the terms of spectral music, we could say that with Orchids the field recordings undergo a process of instrumental resynthesis.[31] In this process, first a given sound is analyzed to determine the details of its *frequency spectrum*, the frequency and amplitude of each of the partials that comprise the sound; and *temporal evolution,* or how each of

[31] Joshua Fineberg, *Spectral Music : History and Techniques* (Overseas Publishers Association, published by license under the Harwood Academic Publishers imprint, 2000), 85.

those partials changes over time. A composer, in this case assisted by the computer, then utilizes this data to determine the pitches, dynamics, and playing techniques that would be required to reconstruct this sound given a designated set of acoustic instruments. This effectively remaps the sounds of a given field recording onto an acoustic ensemble. Of course, each pitch played by each instrument produces many partials, so this recreation is never a precisely accurate model of the original sound, but rather results in an enriched set of timbres that remain morphologically consistent with the source sound.

However, many spectral composers greatly extend the temporal dimension of an analyzed source sound in order to allow the sonic details to slowly and perceptibly unfold. The sound sample of an E2 played on the trombone that Grisey used to create the model for the opening section of *Partiels* was only a few seconds long—but this section of the piece unfolds over a period of several minutes. I should note that in an attempt to preserve the gestural content of the field recordings, I did not make any such extensions. The temporal unfolding of the field recordings and the scored music resulting from the resynthesis process remain, more of less, aligned.

Let's walk through this process: Orchids is best able to analyze short samples of sound, this is especially true in the case of complex sounds with rich spectral content. I would begin by selecting a short excerpt from a field recording, between 5-30 seconds long, and import it into Orchids. I would then select analysis parameters, also called *Orchestration criteria*, to direct the focus of the sonic analysis (visible on the left beneath the 'Orchestration criteria' header in *Figure 1*). These parameters include features such as: partials, loudness, harmonic energy, inharmonicity, noisiness, spectral variation, and total energy. Orchids uses the details obtained from the analysis parameters to guide its

orchestration choices. Inputting different criteria can lead to differences in instrumentation, playing techniques, and levels of spectral complexity.

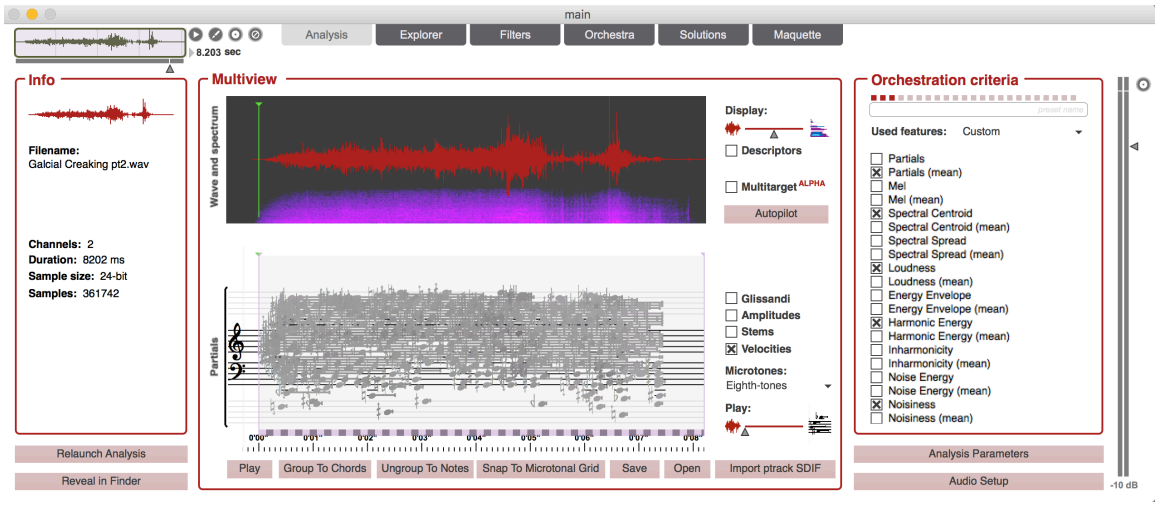


Figure 1: Example of sound source with waveform and perceptual criteria

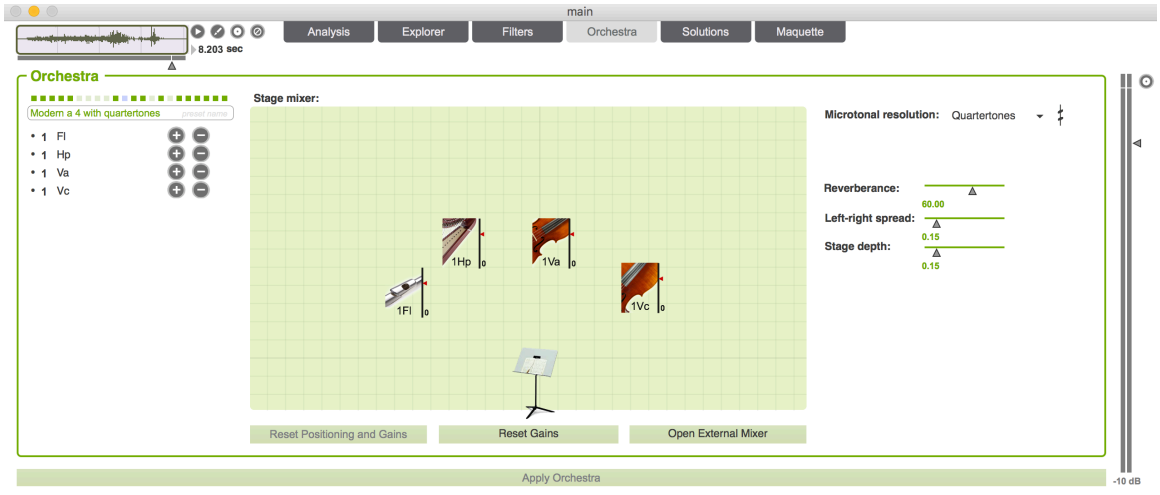


Figure 2: Selection of ensemble

After a source file and analysis parameters were determined, I then selected an ensemble of acoustic instruments to which the resynthesis process should be fitted (i.e. – the ensemble to which the sounds of the field recordings should be mapped). Sometimes I selected a small group of instruments closely resembling the ensemble of mezzo-soprano, flute, cello, piano, and percussion that would ultimately realize the piece. At other times, in order to create more complex and diverse textures, I performed analyses based on

much larger ensembles and re-orchestrated the results myself. An example of the ensemble selection process is visible in *Figure 2*.

Using the analysis parameters provided in the first step, and the ensemble selected in the second, Orchids will analyze the given source sound and return up to 100 possible resynthesis options. It refers to these options as 'solutions'. Any given solution is an answer to the question: given this source sounds, these parameters, and these instruments—what orchestration should be used to best resynthesize the sound? The solutions are presented in a scatter graph (*see Figure 3* the lower left corner under the heading 'Overview') that uses one of the analysis parameters to represent the x-axis and another to represent the y-axis. It is possible to select alternate parameters, and thereby re-plot the graph, using drop down menus at the top and bottom of the graph area. Each dot represents a solution that can be displayed by clicking on it. The solution is displayed to the right of the scatter graph, on musical staffs that are arranged according to the designated ensemble. The pith content, dynamic, and playing technique for each instrument is indicated on the staff in absolute durations.

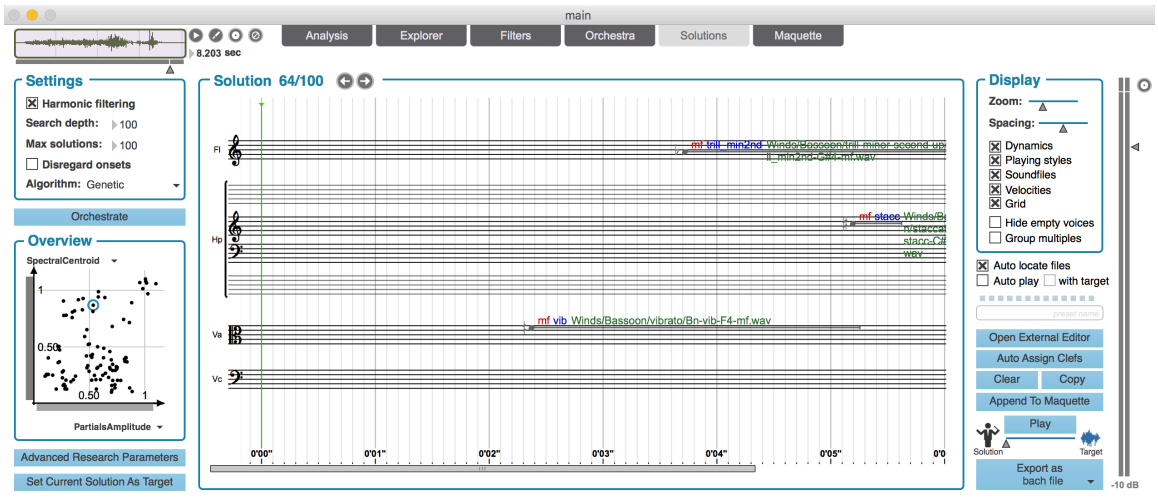
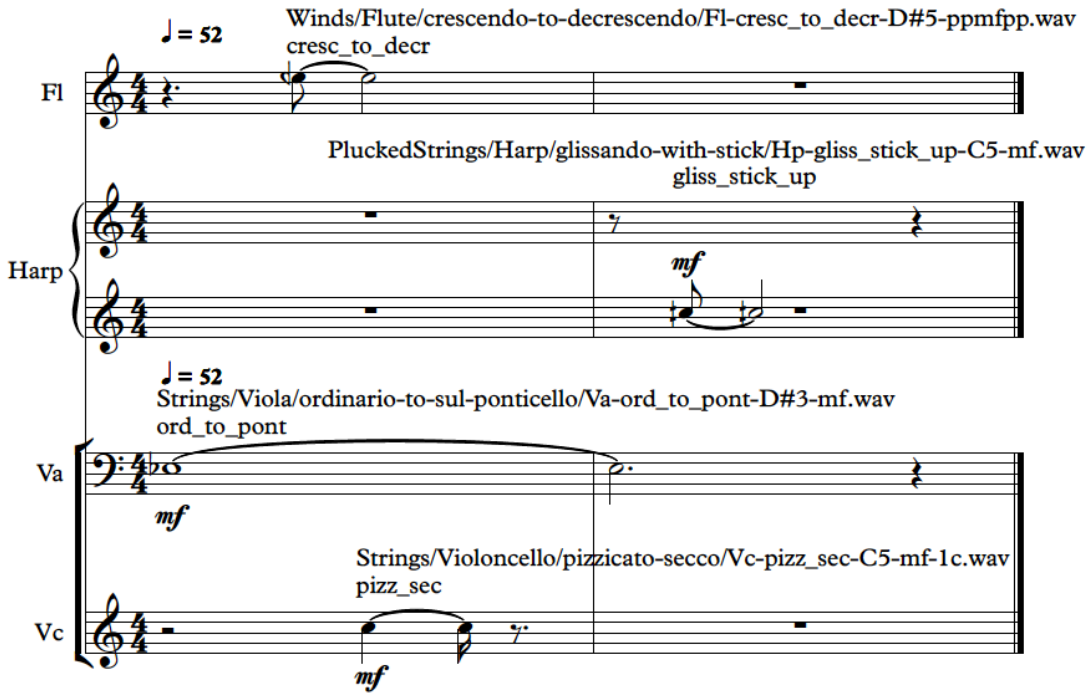


Figure 3: Example of resynthesis solutions

Figure 4: Notated Musical Fragment

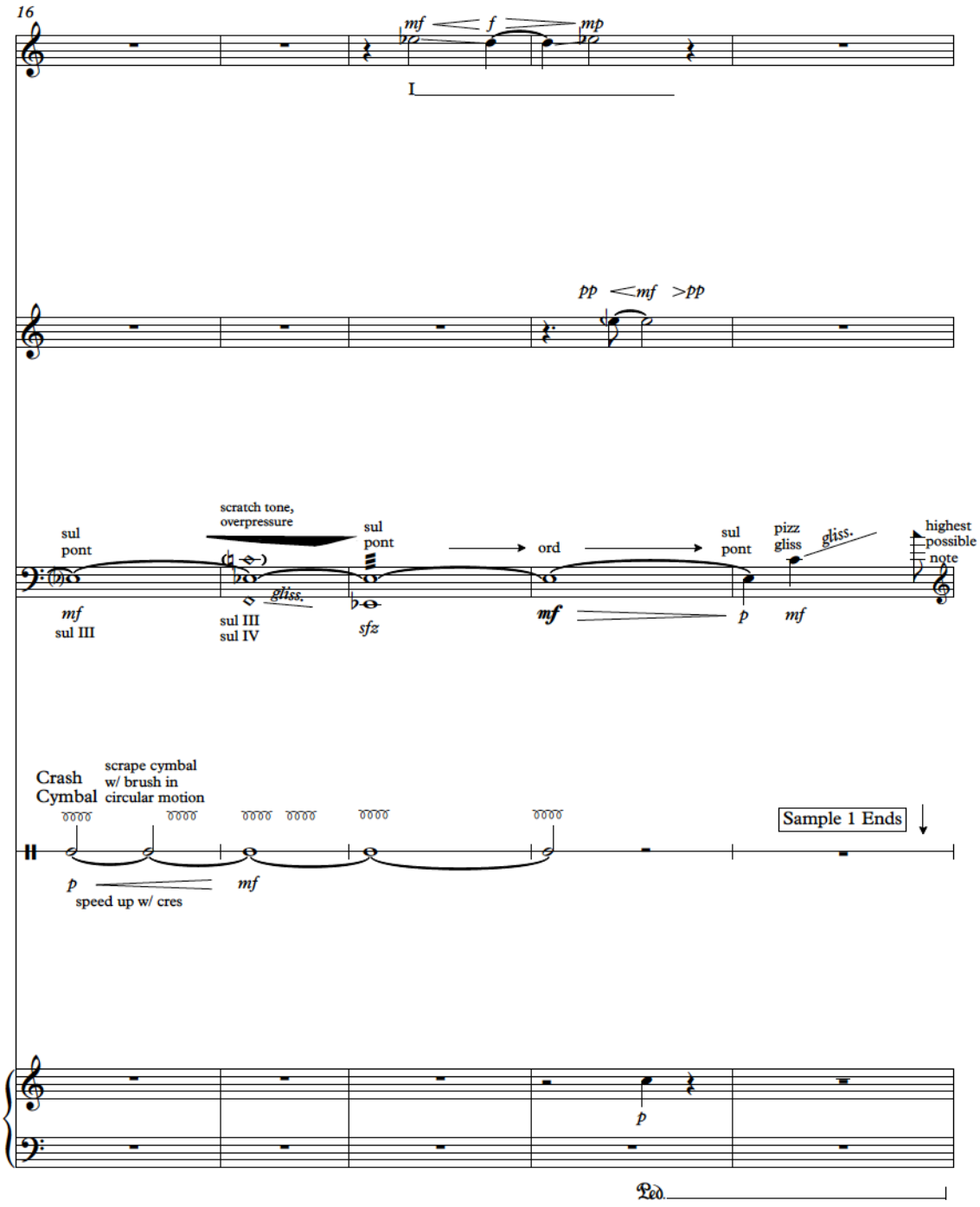


However, this information can be appended and converted into standard musical notation to produce a fully notated musical fragment. After reviewing several solutions, I would select one or more for each sound source and output the results as a MusicXML file that could be read by standard notation software. *Figure 4* reproduces an example of a musical fragment created using this technique after some slight re-working in Sibelius. This musical fragment was created from an analysis of field recordings of glaciers.

I then used the musical fragments created through this technique as compositional seeds. In the example shown in *Figure 5*, which reproduces measures 16-20 of *Movement I: I Grit My Teeth Against the Glacier*, we can see that the pitch content derived from the analysis is largely preserved, although the orchestration has changed slightly. The piano takes over the C5 pizzicato gesture originally allocated to the cello. The E3-flat gesture, originally designated for the viola, is moved to the cello voice and extended. The

movement from ordinario to sul ponticello is preserved, but the cello also takes up the glissando gesture originally allocated to the harp, in the form of an ascending pizzicato glissando beginning on C4. The flute enriches the harmonic profile of this fairly thin

Figure 5: Fragment incorporated into the score, *I Grit My Teeth Against the Glacier*, m.16-20



texture with an E5-quarter-flat that quickly crescendos and decrescendos from *pp*-to-*mf* and back again. This gesture dovetails with the mezzo-soprano line that has been added to the texture. The mezzo glides between an E5-flat and a D5, microtonally inflecting the harmonic spectrum of the ensemble while in terms of dynamics she proceeds from *mf-f-mp*, quickly moving forward and then receding into the texture.

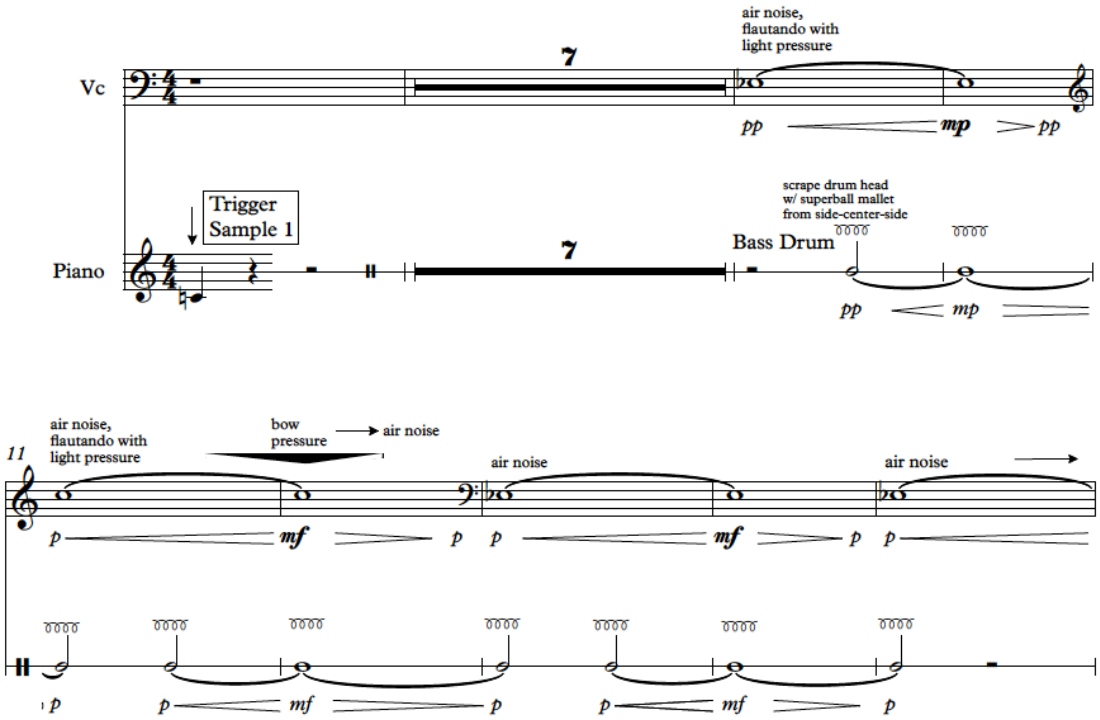
Although the Orchids solution has been modified and reinterpreted, many of the gestures and much of the harmonic content is carried over. Additionally, the morphology and temporal unfolding of the field recording itself is preserved. Through this kind of process of resynthesis, translation, and re-orchestration these fragments formed the musical bedrock for several movements of the piece, most prominently in movements 1 and 7.

Aural Analysis

The disruption of my listening habits, using the computer as a prosthetic ear, proved to be very productive. But the kind of aural analysis and transmodal linking available to me though using *my own* ears was also invaluable. I listened into the material, concrete, and signifying aspects of each sound in its particularity. I paid special attention the movement, spatial dimensions, and spectromorphology of the sounds in the field recordings. I took notes and created diffusion plans based, in part, on these observations. Meanwhile transmodal linking enabled me to remap what I heard in the recordings onto the human body, in terms of gesture, texture, and proprioperception. In the following section, I will provide examples of how these listening and analysis techniques were used.

In *Man Will Not Outlive the Weather* acousmatic scores sound out alongside the live ensemble, creating a sonorous zone of exchange between them. Further, the acousmatic scores are diffused across an array of speakers, in a 7.2 configuration, that envelops the ensemble and surrounds the audience. This heightens the gestural content of each unseen weather event. It also sets up a zone of exchange between the gestures 'performed' by the field recordings, of which the sound scores are largely comprised, and the gestures performed by the bodies of the musicians. The two form an active, complex assemblage that functions across many registers.

Figure 6: *I Grit My Teeth Against the Glacier*, m. 1-15



In terms of sonority, there were certain moments in the piece where I wanted the acousmatic sound scores and live performers to become indiscernible from one another—to operate within a very tight zone of sonorous exchange. We can see an example of this in *Figure 6,* which reproduces the opening measures of *Movement I: I Grit My Teeth*

Against the Glacier. This movement begins with a spatialized acousmatic sound score created from field recordings of glaciers. For the first 8 measures, approximately 37 seconds, the spatialized sound score plays alone. Then, at measure 9, cello and percussion gradually enter. The cello transitions back and forth between a gentle airy noise created by using a flautando bowing technique and a much louder, squealing noise generated by an overpressure of the bow. Meanwhile the percussionist scrapes a super ball mallet along the head of a concert bass drum generating many echoing low-pitched squeaks, squeals, and rumbles. The combination of these techniques sounds shockingly similar to the field recordings of glacial motion. And as the volume, of both the ensemble and the acousmatic scores, begins to fluctuate it becomes difficult to distinguish one from the other.

To literally recreate a sonic effect present in the field recordings using instrumental means (i.e.- to produce sonorities indistinguishable from one another), my own ears often proved to be the most useful tool. This was especially true when it came to very unstable or noisy sound samples. In their unmusical complexity, these sounds sometimes left Orchids befuddled and unable to return any solutions. Using a method very similar to the way that I aurally analyzed the field recordings—paying close attention to their spectromorphology, temporal evolution, and gestural content—I listened to the precise sonic characteristics of a variety of traditional and extended techniques for each acoustic instrument. With the help of the musicians involved in the project, I was able to refine and shape these sonic gestures. We experimented with various techniques until we arrived at an aural solution. By foregrounding the materiality and particularity of each sound, these analyses and experiments allowed me to create an intimate zone of

exchange between the human musicians and the field recordings. In terms of their sonorousness, the musicians become an extension of the glacier, and vice-versa—creating a zone of indiscernibility between geographic entity and human player.

Remapping Gesture and Spatialization

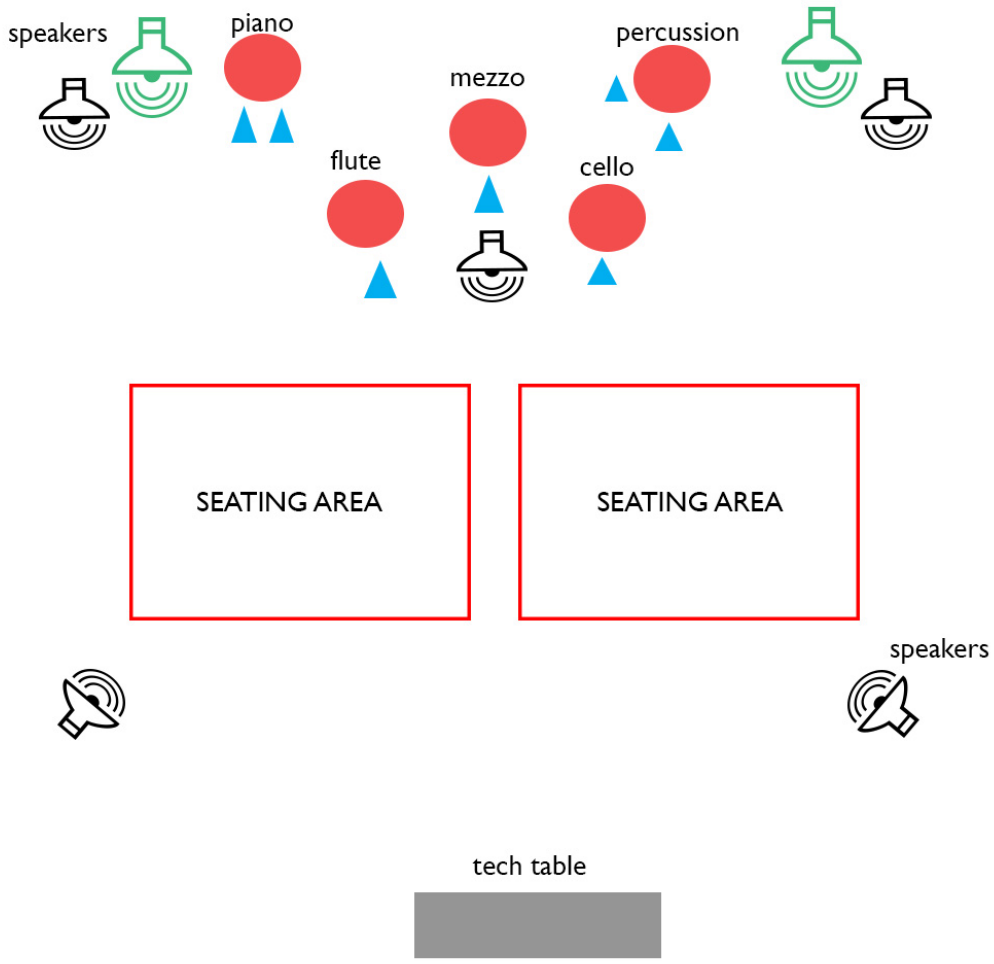


Figure 7: Floor plan including speaker and audience placement

The gestural content of each weather event is reflected in both the spatialization of the acousmatic sound scores and the physical gestures of the performers. The

acousmatic sound scores were diffused across a 7.2 speaker array that surrounded the audience and permeated the ensemble itself. The approximate placement of each of the speakers and performers is visualized in *Figure 7*. The speakers shown in green were elevated approximately twenty feet off the ground and faced the audience directly, the center speaker directly in front of the mezzo-soprano was placed on the floor, and all other speakers were positioned on stands at ear height. Placing the speakers at varying heights contributed to a greater sense of three-dimensionality across the sonic field.

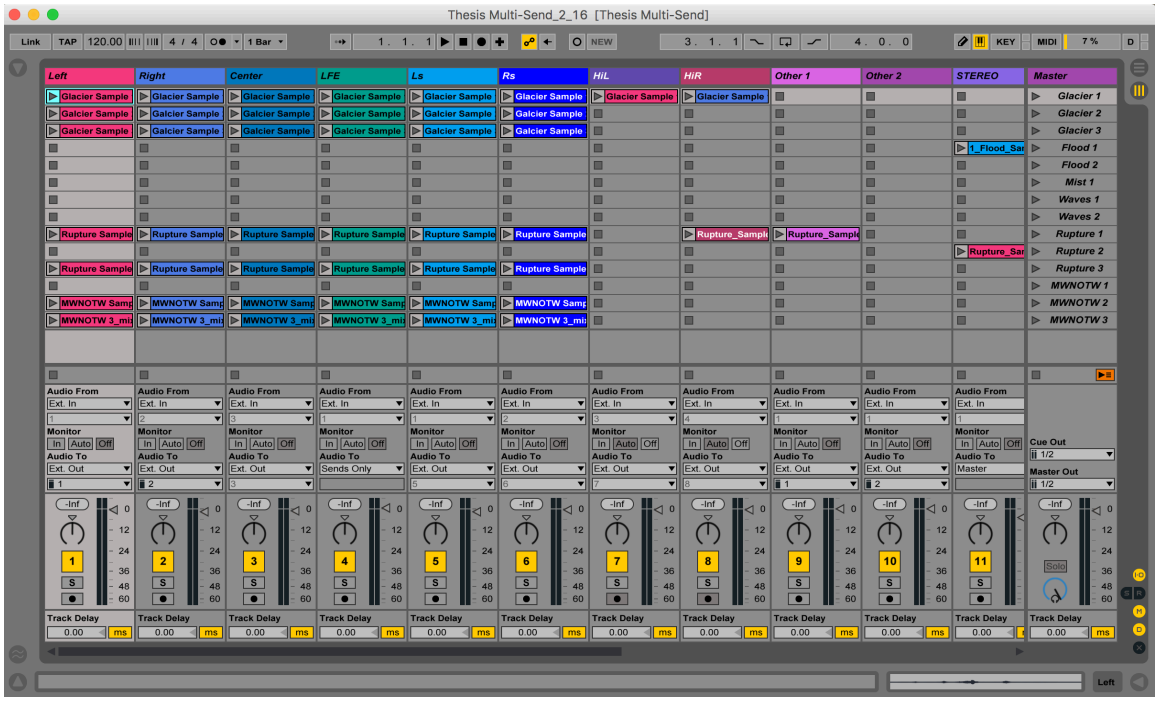


Figure 8: Ableton Live set containing programmed MIDI keyboard triggers and spatialization routing

The acousmatic scores were mixed in surround using Adobe Audition, and then exported as mono files (L, R, C, Ls, and Rs). Additional content for the elevated left and right speakers and other auxiliary sound was edited using Ableton Live: stereo files were exported as dual mono, separating the left and right channels. Each of these files were then placed into an Ableton Live set and appropriately routed, mapping each external out to a single speaker in the array. The Ableton Live set-up allowed each collection of

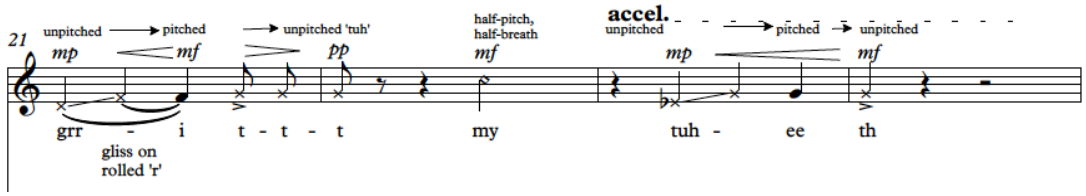
samples to easily be triggered simultaneously, by organizing those samples into distinct 'scenes,' and assigning a MIDI keyboard command to trigger each scene. *Figure 8* provides a visual representation of the Ableton Live set used in performance.

The 7.2 speaker array allowed me to heighten the listener's experience of the spatial and gestural content of each unseen weather event. In the opening eight measures of *I Grit My Teeth Against the Glacier* the acousmatic sound score slowly diffuses across all of the speakers, including the elevated ones. Sound fills the entire space in order to convey the scale of a glacier. And in line with the content of the field recordings, the primary gestures of interest to me in this movement were: scraping and cracking. When a large shift or crack occurs in the acousmatic score, the sound travels in synchronization with the event, sprinting from far right to the left surround speaker (or in another similar movement pattern). While the reverberant echo of sudden action hangs in the air, filling up the freshly vacated space. In the acousmatic sound score, a sense of scraping is conveyed spatially when sound from the front left section of the array is tersely pulled back, in straight line, towards the left surround speaker—while at the same time this gesture occurs in reverse on the right side: sound originating from the right surround speaker is tensely, and hesitatingly dragged forward towards the front right speakers. The result is a surrounding gesture of friction; of large segments simultaneously attempting to move in opposite directions.

The gestures of scraping and cracking are also mapped onto the bodies of the performers in the live ensemble. Throughout this section, in the friction of the bow pressed against the cello strings and the super ball mallet dragged across the head of the bass drum—there is a simile of gesture at work. Additionally, the mezzo-soprano's

tongue—as it moves against her lips, palate, and teeth—imitates the friction-laden motion of a glacier encountering stone as she transitions between pitched and unpitched syllables, holds rolled r's, lip trills, and forces out bursts of unpitched air. Additionally, her voice slides between pitches as though it were scraping along an unseen surface. This is exaggerated by the held rolled 'r' that simulates a rough texture. The gesture of cracking is also re-mapped as she repeats percussive 't' sounds that gradually fade: an imitation of the echo produced by falling fragments of ice. The notation of each of these oral gestures is reproduced in *Figure 9*.

Figure 9: *I Grit My Teeth Against the Glacier*, m. 21-23



In this way, the gestural content of the glacier is mapped onto the human body. And the physically isomorphic aspects of the human body and weather allow the two to enter into metamorphic exchange with one another.

The 7th movement, also entitled *Man Will Not Outlive the Weather,* focuses on the event of a hurricane. For this movement, I drew inspiration from scientific diagrams, historical descriptions, and personal experience to create the diffusion plan for the acousmatic sound score. Hurricanes exhibit a strong pattern of counterclockwise motion and that became the primary gesture I explored in this movement.

Growing up in Florida, 'hurricane days' were my 'snow days". I spent many hours listening to the thunder, lightning, and intense wind held in those arms. And I spent just as much time waiting, beneath a dull gray sky, in the duration between the arrivals of

those turbulent limbs. Accordingly, the diffusion pattern for this movement was based on a combination of both the counter-clockwise spin enacted by hurricanes and a narrative arc modeled after the experiential structure of a hurricane, one that alternates between moments of intense storming and relative calm. A perceptual effect was also added to the mix, one that punctuates the experience of waiting as an arm of the storm approaches, passes, and yet another arm approaches: the Doppler effect. The Doppler effect describes the perceptual experience of hearing the pitch of a moving sound source gradually rise as it approaches, and then lower as the source passes and recedes.

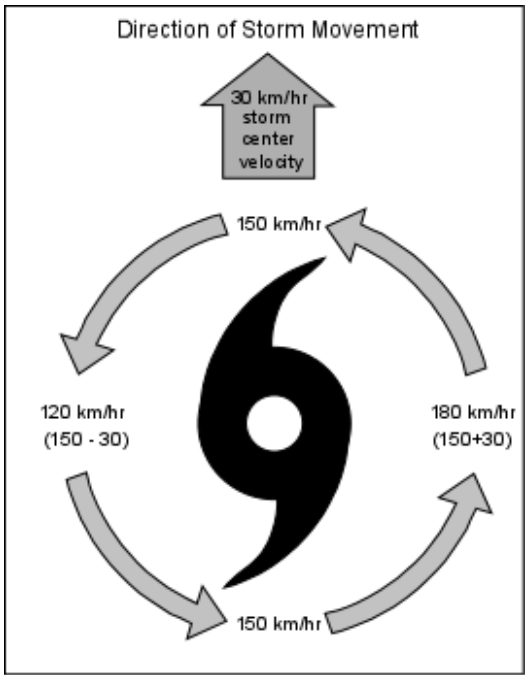


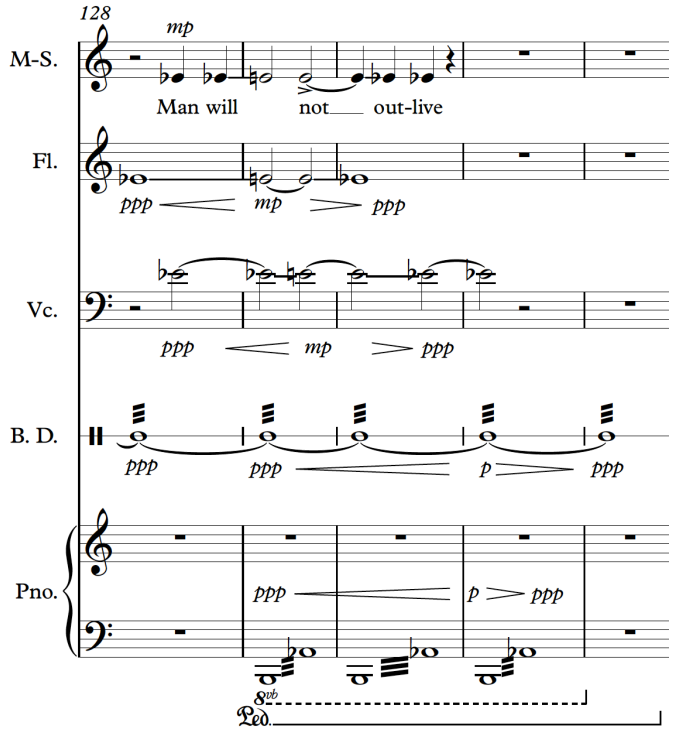
Image by Stephen A. Nelson

In this movement, I combined the pitch bending observed in the Doppler effect with the hurricane's defining counter-clockwise gesture in a few different ways. In *Figure 10*, which reproduces m. 128-132 of *Movement VII: Man Will Not Outlive the Weather*, we can see that the flute, mezzo-soprano, and cello all gradually glissando from E3-flat to E3 and back down again. The pitch bend here is imitative of the Doppler effect. And as each instrument gradually raises its pitch, it also increases its dynamic level: bringing it forward in the texture and simulating the moment of approach. The piano does not take up the same pitch material but plays a frequency-smearing, fast tremolo between a low B0 and A1-flat. Both the piano and the bass drum remain barely audible until the Doppler gesture for flute, mezzo-soprano, and cello has nearly concluded. In this

instance, the piano and bass drum act as a roll (quite literally) of thunder that follows a flash of lightning. Additionally, as each instrument is added to the texture, it creates a spatial gesture of counter-clockwise rotation in gradually widening circle (see floor plan above for placement).

Similarly, the acousmatic score that accompanies this passage contains field recordings of howling wind, rain, and distant thunder. The sample of howling wind also glides between the pitches of E and E-flat, microtonally inflecting the ensemble, and creating a zone of exchange between ensemble and field recording. In terms of gesture, in this passage, the acousmatic score is diffused through the space with a narrow spread: beginning from the right surround speaker and moving across the array in a counter-clockwise motion, until it reaches the left surround speaker and fades out. This gesture is coordinated with the counter-clockwise gesture of ensemble, creating nested counter-clockwise movements, and thus a sense of complex, layered motion.

Figure 10: *Man Will Not Outlive the Weather*, m. 128-132

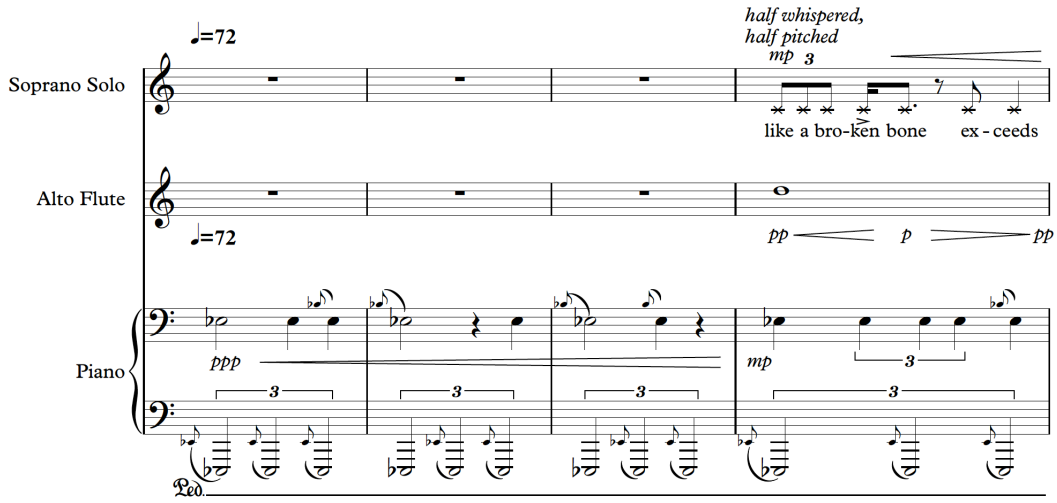


Temporality, Meter, and Rhythm

Rhythmically, I had to negotiate between the non-metrical temporality of the field recordings the grid-based time of the acoustic ensemble. The zone of exchange step up

between the two frequently led me to use subdivided rhythms that either eschewed the downbeat or a clear feeling of the meter. I also incorporated 'enveloped' sounds, whose evolving dynamics helped to unfix them from the musical grid; and to incorporate speech rhythms.

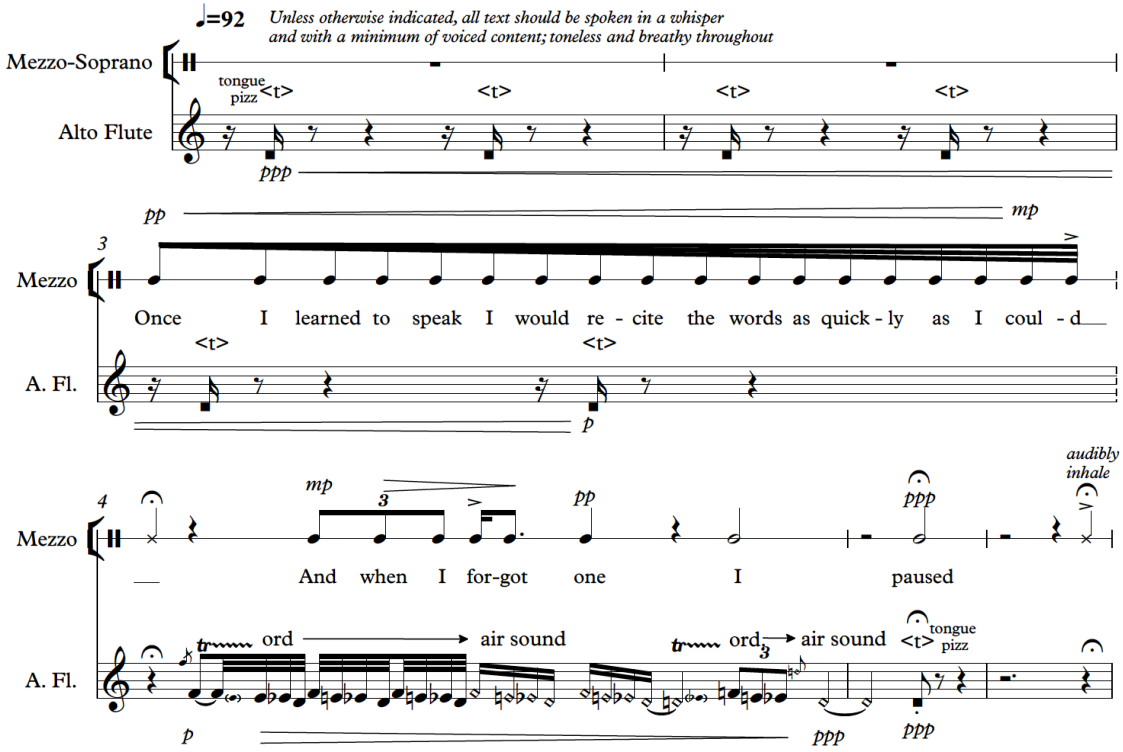
Figure 11: *Black Water*, m. 1-4



An example of each these strategies can be seen in *Figure 11*, which reproduces the opening measure of the *Movement II: Black Water.* The uneven 'rocking' of the piano emulates the uneven, but constant, rhythms of flowing water; the evolving dynamics of the flute create a more fluid, less beat-oriented structure; and the speech rhythms of the voice—although fully notated in all instances—already inhabit the rhythmic space of non-music.

Additionally, *Movement IV: The Space Between Vacant Seas* is primarily motivated by the confrontation between contrasting temporalities, as can be readily observed in *Figure 12*.

Figure 12: *The Distance Between Vacant Seas*, m. 1-6



This movement, inspired by the motion of surface waves, opens with a 'ticking' motif in the alto flute that emulates a fixed, stable clock time. The mezzo-soprano enters in m.3 speaking in an unpitched whisper that quickly accelerates, then immediately halts—illustrating a disconnection from the clock time articulated by the alto flute. In m.4 when the alto flute returns, its sense of time has become less fixed, and it lets loose a swirling melodic gesture that quickly transitions between pitched and unpitched; and between trill, ordinario, and air-based articulations. Meanwhile, as the mezzo-soprano re-enters, we find that her rhythms have become a little more regular. The two temporalities infect, echo, and mutate each other. And they remain in constant negotiation throughout the movement.

The field recording that inspired this movement is a short recording of ocean waves that I have had for years. It is one of the most cherished sounds in my collection. I

listened to this well-worn sonic fragment critically—paying careful attention to the morphology and gestures articulated by the waves. The quickly accelerating spoken line of the mezzo-soprano articulates the morphology of a wave approaching land—continually speeding up, gaining energy, then breaking, and dissipating on the shore. As I said earlier, the ocean is a different kind of clock.

Writing the Libretto

The libretto for *Man Will Not Outlive the Weather* draws indiscriminately from historical, scientific, literary, and personal sources in an attempt to create connective tissue between these disciplines. In order to operate with this level of hybridity and multiplicity, I have endeavored to maintain a certain ambiguity, a definite openness, and to invite the 'space' of the acousmatic situation into the text. I address hurricanes in a way that is both personal and philosophical, approach floods from perspectives that are simultaneously scientific and mythical, and try to balance materiality and wonder while contemplating the entity of a glacier.

The writing style is poetic, aphoristic, often metaphorical, and at times fragmentary. The libretto functions as a collection of experiences, but not the experiences of a defined individual. There are no characters. The mezzo-soprano as human performer more creates a zone of exchange between the listener and the assemblages with which she is enmeshed and engaged. Although there are dramatic arcs and moments of realization, frustration, sorrow, and enchantment—it is arguable whether there is any linear development. The resulting text is evocative, vague, full of affect, and decidedly fuzzy. Each of these approaches were undertaken in order to invite the listener to project or insert their own experiences, associations, and ideas. The text of the libretto is intended to catalyze the process of drawing

new connections, reconfiguring perspectives, and creating new assemblages without giving any definitive answer.

Sequence

The sequence of weather events presented in *Man Will Not Outlive the Weather* broadly aligns with a mytho-historical timeline. We begin with the most ancient of actors—glaciers. There are several ways in which glaciers can be thought of as pre-historical entities. A single ice sheet may persist for millions of years. Also, these ice giants reside in faraway Arctic and Antarctica regions so few of us have seen that they almost seem unreal, mythical. The work continues with the event of a flood, recalling the great floods embedded in numerous creation stories. It proceeds to a reflection on fog and waves—persistent, nearly timeless entities. Until a volcanic eruption, harkening back to Mt. Vesuvius and the destruction of Pompeii as described by Pliny the Younger in his vivid account of the event, breaks the comfortable stasis of cyclic motion and haze. Finally, the piece ends with an event that has, in recent years, garnered increasing media coverage and become more disconcerting to the public: a hurricane, recalling the contemporary devastation wrought by Hurricane Katrina and Superstorm Sandy. As sea levels rise and storms continue to intensify, for many Americans living along the Atlantic coast, hurricanes represent an imminent threat that hits all too close to home.

But this arc is also autobiographical, simultaneously tracing a line through geologic time and my own recollections. Personally, I first encountered glaciers in stories from Norse mythology that my dad told me as a child: I thought they were ‘frost giants’. As an adult, the hurricane is a meteorological event that I find myself contemplating with

increasing frequency, wondering when one might all but wipe away one of my coastal homes and the memories that reside in each.

Chapter 5: Libretto and Notes

While it is not possible to give an in-depth analysis of each of the movements in the space of this essay, below you will find the libretto for each movement of the work accompanied by brief notes. These include important historical, literary and scientific sources that informed each movement. A brief listing of the movement's primary sound sources, gestures, and aesthetic concerns is also provided.

Movement I: I Grit My Teeth Against the Glacier

Notes: This movement is a meditation on a glacial motion. The inspiration for this section was drawn primarily from scientific research that has revealed ice sheets thought to be 8 million years old[32] and the creation of the world as told in the mythological Norse story *Gylfaginningand.*[33] The primary gestures investigated in this movement are those of scraping and cracking. Throughout this movement the friction of the bow against the cello strings, mallets against the bass drum head, and the tongue of the mezzo-soprano against her palette, lips, and teeth imitate the friction-laden motion of a glacier encountering stone. The primary sound sources used in this movement are field recordings acquired through the website FreeSound.org.

Libretto:

I grit my teeth
against the glacier.

Hibernal eons
begin to murmur.

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[32] "Antarctic Research Project: The Oldest Ice on Earth?," Exploratorium, http://icestories.exploratorium.edu/dispatches/antarctic-projects/the-oldest-ice-on-earth/index.html.
[33] Sturluson Snorri and Anthony Faulkes, *Edda* (London; Vermont: J.M. Dent ; C.E. Tuttle, 2000).

After eight million years asleep,
the boreal humor thaws.

A throat
must be hewn out,

a tongue built;
passages lined, made soft,

before any word
is exhaled.

But always, the hard teeth,
Interrupt.

Movement II: Black Water

Notes: This movement is a meditation on floods. The movement was informed by a preponderance of ancient flood stories that exist across many cultures and religions; one of special significance is the Norse story of the death of Ymir.[34] The political complications that result from floods that, quite expectedly, do not respect the boundaries of countries but instead may flow through several, was also an inspiration for this movement.[35] The rhythm of this movement is grounded in the uneven rocking of waves. The spectromorphological characteristics of a flood approaching from a distance inform the orchestration. This section begins in the lower register and only gradually introduces the higher frequency to mimic the effect of a tremendous amount of water approaching from far off, which is first heard as low rumbling and gradually begins to approximate white noise. The primary sound sources for this section are field recordings of water recorded by me.

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[34] Ibid.
[35] Britta Horstmann and Germanwatch, *Glacial Lake Outburst Floods in Nepal and Switzerland : New Threats Due to Climate Change* (Bonn: Germanwatch, 2004).

Libretto:

like a broken bone
exceeds skin

floods do not respect boundaries

wounds that flow unconfined
they have no country

Recitation,
once breath,
becomes sediment;

a silt that
fills up the ears
and stops up the lungs.

But black water,
licks clean.

As it ebbs. Slows. Becomes still.

Submerged in gentle liquid,
I am washed of history.

Movement III: Thick Air

Notes: This movement investigates an episode of intense fog. It was inspired by the accounts of mist, haze, and other grounded cloud forms detailed in Steven Conner's book *The Matter of Air*.[36] It was also informed by my personal experiences driving through coastal fog; and the particular white-gray glow produced by the fog lights on my first car. The primary gestures of the piece are the swift movement through the full register of the cello that becomes 'blurred' using a relatively long reverb. It also features a swirling, yet smoothly connected vocal line that is processed using the same long reverb, to create a hazy, dreamy quality. Sonically, this movements draws from field recordings of the

[36] Steven Connor, *The Matter of Air : Science and the Art of the Ethereal* (London: Reaktion Books, 2010).

gentle, hushed movement of damp air. Visually it draws a reference from the haloing effect of light dispersed in fog.

Libretto:

hold.
hold.
and wait.

A caesura.

land unforms
the sea dissolves,
beneath a cocoon of mist.

a soft, mute elsewhere.
veiled. hushed. absent.

my feet are lacunae,
they amble across hiatus and cloud.

Night.

The orbit of
celestial bodies, is unfixed
in the blur of thick air.

fleet gleams scintillate
'cross quivering waves.

I could not tell the sky.

Movement IV: The Distance Between Vacant Seas

Notes: This movement is a meditation on surface waves and is based on a brief field recording of the ocean with which I have an enduring relationship and fondness. The event structure of this movement was modeled after the structure of a wave itself and the dynamics are imitative of its gesture and changes in intensity. These temporal and gestural structures are set against the ticking rhythm of 'clock time'.

Libretto:

Once-I-learned-to-speak-Iwouldrecitethewordsasquicklyas Icould
and when I forgot one
I
Paused

I-inhaled-as-though-breath-touching-the-lining-of-my-lungs-could-also-search
the deep recesses where memory hibernates
between pages
in the thickness
of ink

and-then-i-held-my-breath-silent-as-a--
afraid to break the silken threads
of nous
with the turbulence
of respiration

habitual motion thickens the lingering residue
condensation amasses
into deep pools
bestirred
by an uneven
tidal logic:

Rise. Suspend. Sleep.
thrall of habit.
Rise. Suspend. Sleep.

An incessant rhythm that slowly gnaws out the margins of the world
Dissolving connective isthmus, in a tissue of tide.

An archipelago of echoes,
sounds the distance between vacant seas.

Movement V: Rupture

Notes: This movement reflects on the phenomena of volcanic eruption. The libretto draws inspiration from Pliny the Younger's account of the eruption of Mt. Vesuvius and destruction of Pompeii.[37] The comparison between teeth, rocks, and scree is derived from

[37] "The Destruction of Pompeii, 79 Ad," www.eyewitnesstohistory.com.

Norse mythology.[38] It is also informed by stories of Pele in Hawaiian mythology. Lastly, this movement is informed by the recent grounding of airplanes due to an eruption in Iceland and reports on several other recent eruptions. The primary gestures comprising this motion are a gradual rising as of steam, the fast approach of a pyroclastic flow, and the various falling gestures of rocks, debris, and ash. Sound sources include a recording of the eruption of Mt. Saint Helen's and other minor recent eruptions accessed using the website FreeSound.org.

Libretto:

The air smells burnt.
It is hard to breathe.

Teeth crack, amid molten hurt.
Teeth crack, straining.
Teeth crack, amid hurt.

I speak dirt.
I could scream smoke.

Steam founts,
blossom unto billowing.

Rupture!

Dense black clouds
spread over the earth.

"Ashes begin to fall,
in heavy showers."

Movement VI: Smoke rising from the caldera, seems to stem from my navel

Notes: This movement is a meditation on the phenomena of atmospheric circulation. It draws inspiration from the aftermath of the eruption of Mt. Vesuvius. After the violence

[38] Snorri and Faulkes.

of the eruption itself subsides, Pliny the Younger ponders the particulate matter whirling in the wind.[39] Gestures in the ensemble imitate the uneven whirling structure of ash on the wind and are characterized by an upward drifting, swirling, and later aggregation into soft sonic masses or clouds. The description of a caldera as a navel occurs in many instances of myth and folklore across the globe, one example is the depiction of Bali's Mt. Agung as the Navel of the Universe.[40] There are no field recordings representing this event: none were analyzed and there is no accompanying acousmatic sound score. Instead, the ensemble itself *becomes* a field recording in this movement. They transform from being more melodically and harmonically driven in the opening sections to becoming sound world oriented, becoming less clearly harmonic and less metrically oriented towards the end.

Libretto:

Smoke rising from the caldera
Seems to stem from my navel.

Tormented atoms
Scatter and

Coalesce as a thin gray blanket
fringed with
glowing embers.

an orange-pink
an orange-pink
an orange-pink

airy wilderness
of whirled whispers
grows.

[39] "The Destruction of Pompeii, 79 Ad".
[40] Carl-Bernd Kaehlig, Andrew Wight, and Chris Smith, *Volcanoes of Indonesia : Creators and Destroyers* (2013), 113.

Migratory clouds
Bow. Bloom.

And elude
grasp.

Movement VII: Man Will Not Outlive the Weather

Notes: This movement contemplates a hurricane. The primary gesture explored in this section is strong counterclockwise motion. It is also modeled after the experiential structure of a hurricane: alternating between moments of intense storming and relative calm as when the arms of the storm arrive and then pass. Additionally, The Doppler effect, which describes the perceptual experience of hearing the pitch of a moving sound source gradually rise as it approaches, and then lower as the source passes and recedes, plays a role in the orchestration and arrangement of spatial effects. The primary sound sources used in this section were field recordings of thunder, rain, and howling wind. I both recorded some of these myself and accessed others using the website FreeSound.org. The quotation that ends the piece is taken from Voltaire's *Poem on the Lisbon Disaster*.[41]

Libretto:

Winds unify around a vacant center.
Operating through arms and emptiness.

Hurricanes are counter-clocks.

Palm leaves like ragged limbs,
flail towards embrace.

Amid the cracking of branches
and gush of flooded landscape

The spark of lighting

[41] Voltaire and Joseph MacCabe, *Toleration and Other Essays* (New York and London: G.P. Putnam's Sons, 1912).

arousal of distant thunder.

Dissipate.

"This frail construction of quick nerves and bones
Cannot sustain the shock of elements;

This temporary blend of blood and dust
Was put together only to dissolve"

Man will not outlive the weather.

Conclusion

Man Will Not Outlive the Weather intentionally engages not only the material, but also the affective, personal, and historical aspects of the relationship between human beings and weather. It is a piece that can, and indeed is intended to be, read politically—if for no other reason than the historical moment at which it has been produced. The title itself is a statement that begs a question, if it has been determined that 'man will not outlive the weather'—would it have been possible to do otherwise?

The answer is: no. Man will never be able to outlive the weather. The weather, constantly changing, dynamic and unpredictable as it is, will always be here. But at our current historical moment in the dawn of the Anthropocene, we are forced to ask the question: will we always be here? At a moment when the effects of climate change are increasingly felt around the world and many of our energy policies fail to reflect the urgency of the situation at hand, we have to ask: Why?

I believe that at least part of the reason for the disconnection is a lack of adequate perceptual models. The concept of the assemblage, the foregrounding of materiality, and the idea that matter can be active, expressive, and has a degree of agency all provide us with new ways of thinking. But in order to be moved to respond and take responsibility for the weather, for climate change—we require visceral, engaging, perceptual models. To matter, on a personal level, the critical nature of these issues must be not only known, but *felt*.

The goal of this project is thus to engage with, to morph into, and experience weather in a way that is affective, emotional, personal, and meaningful. In a way that feels human. The scale, temporality, and materiality of weather itself ripely aligns with

the agile, migratory, and associative properties of sound. Sound is a powerful medium to *think with* in regards to weather. Thus, I would like to invite the listener to experience this work across all their senses, plumb their personal associations, listen empathetically, and cultivate zones of exchange that exist across the sonorous, gestural, and temporal registers.

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Amber Vistein

Man Will Not Outlive the Weather

for Soprano, Flute, Cello, Piano,
Percussion and Electronics

Performance Notes

Electronics:

Laptop with Ableton Live 9
Audio Interface
7.1 Surround Playback System
Two octave MIDI Keyboard

Requires a two octave MIDI Keyboard in order to trigger the playback of taudio samples. Sample triggering and playback are handled by the Ableton Live set created to accompany the piece. All MIDI Keyboard triggers are notated in the score.

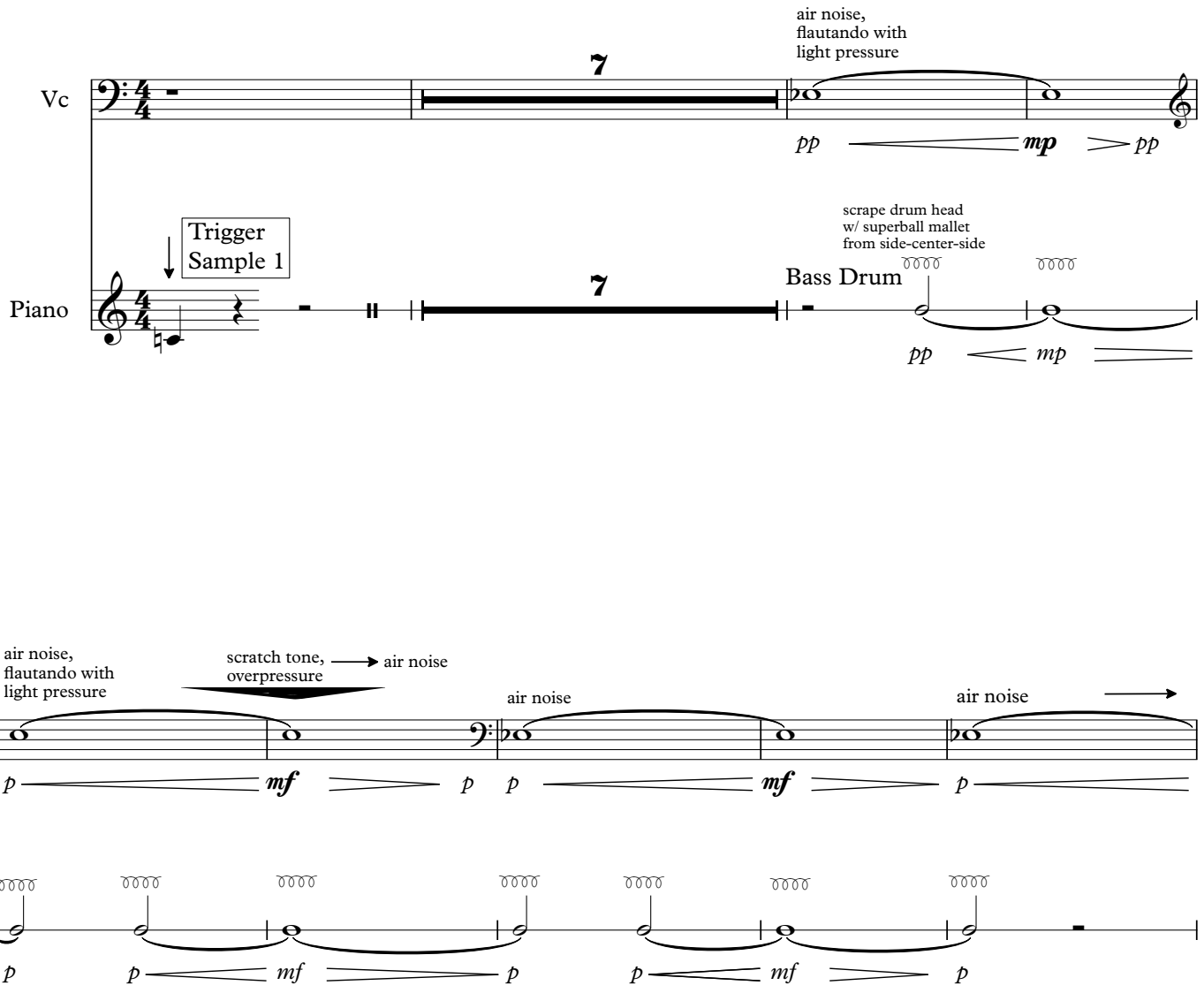
Samples may be triggered either by the Sound Engineer or Percussionist depending on what is most convenient for the situation.

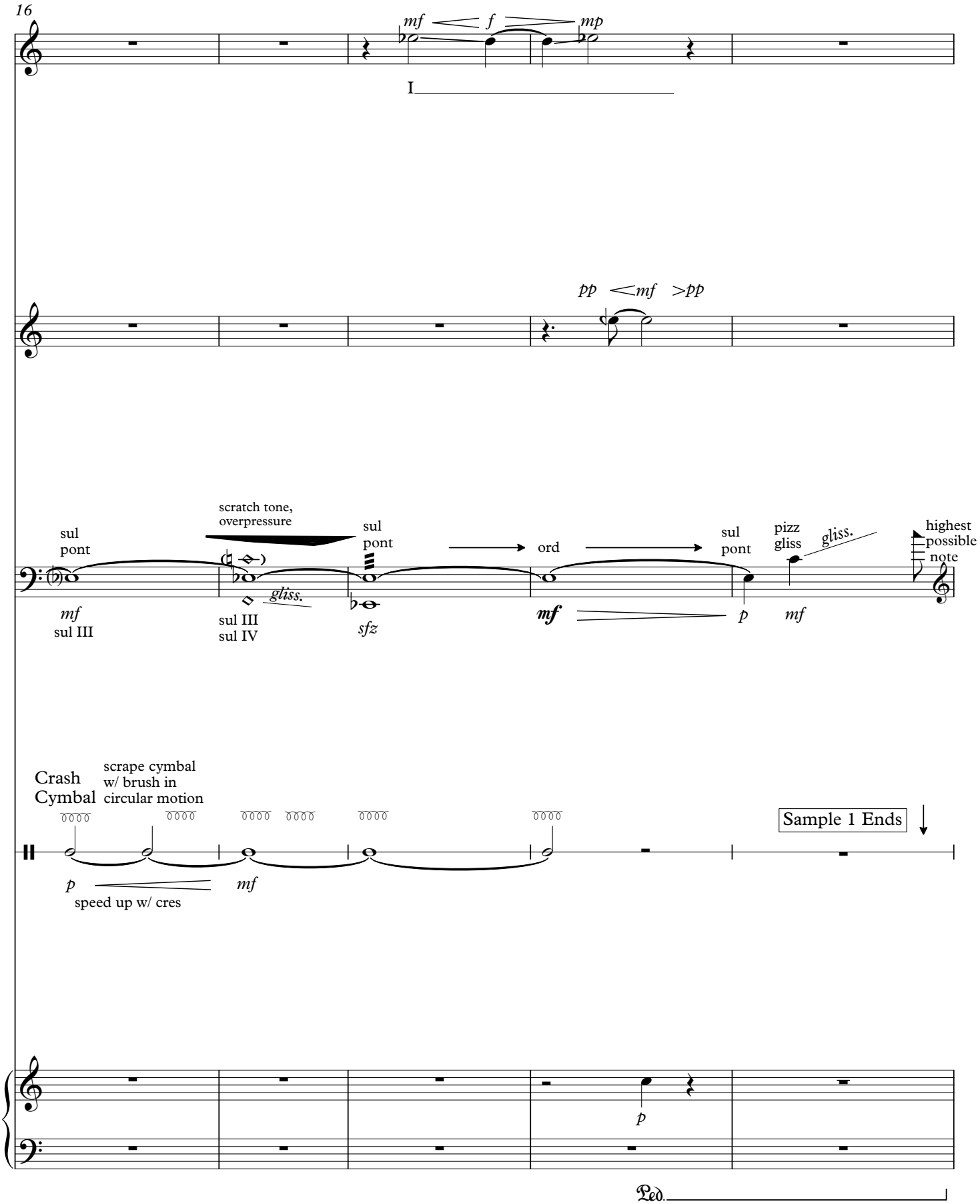
The soprano and all instruments should be lightly amplified and reverb should be utilized to create a sense of blend with the sound world of the audio samples.

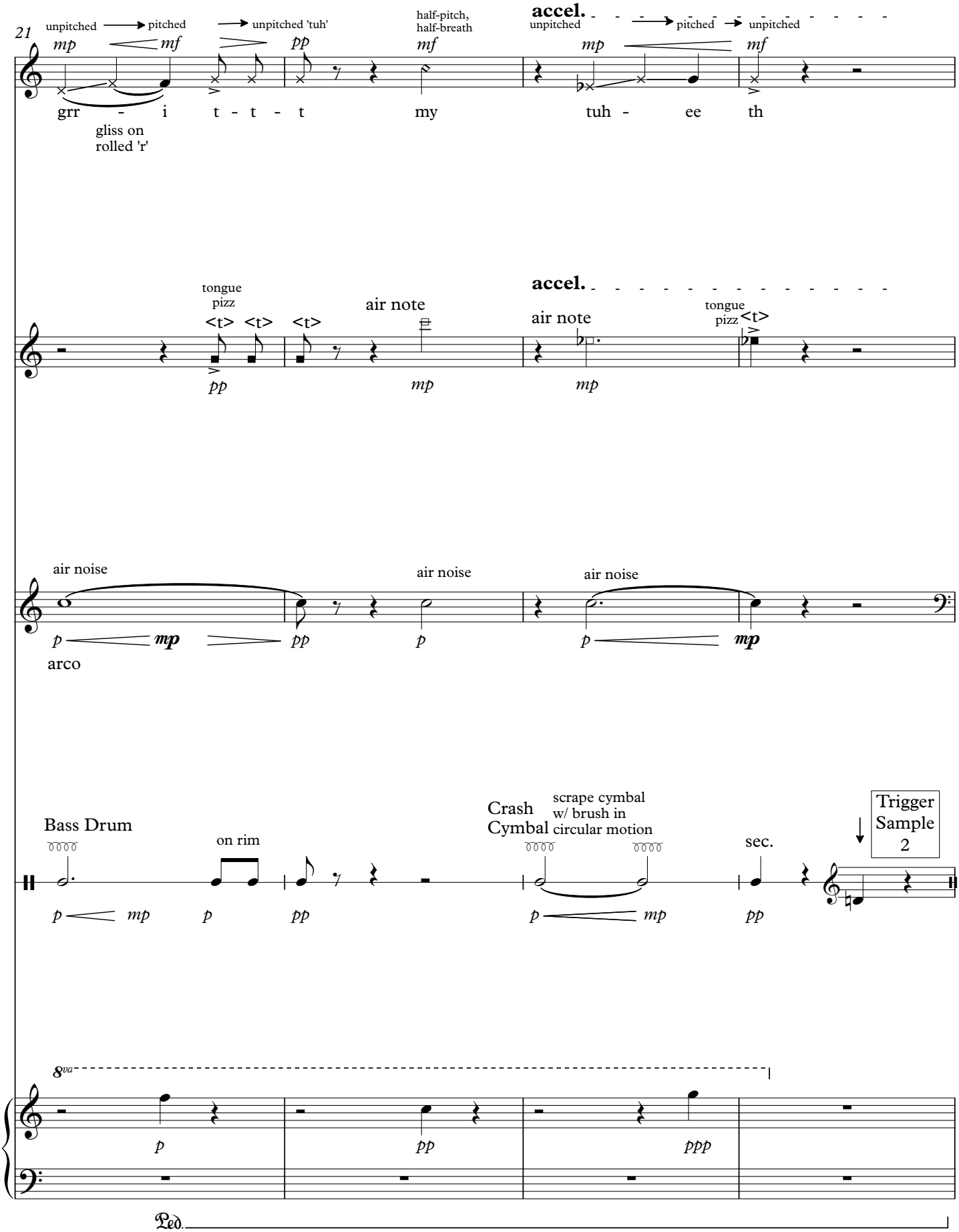
Note: In *Movement I: I Grit My Teeth Against the Glacier*, the loudest moments in the audio samples occur in measures 8-10, at this point the volume level of the audio sample should be slightly louder than the sound of the lightly amplified ensemble. Throughout much of the rest of the piece, the samples are intentionally mixed at a relatively low volume, and are primarily used to create a sense of atmosphere.

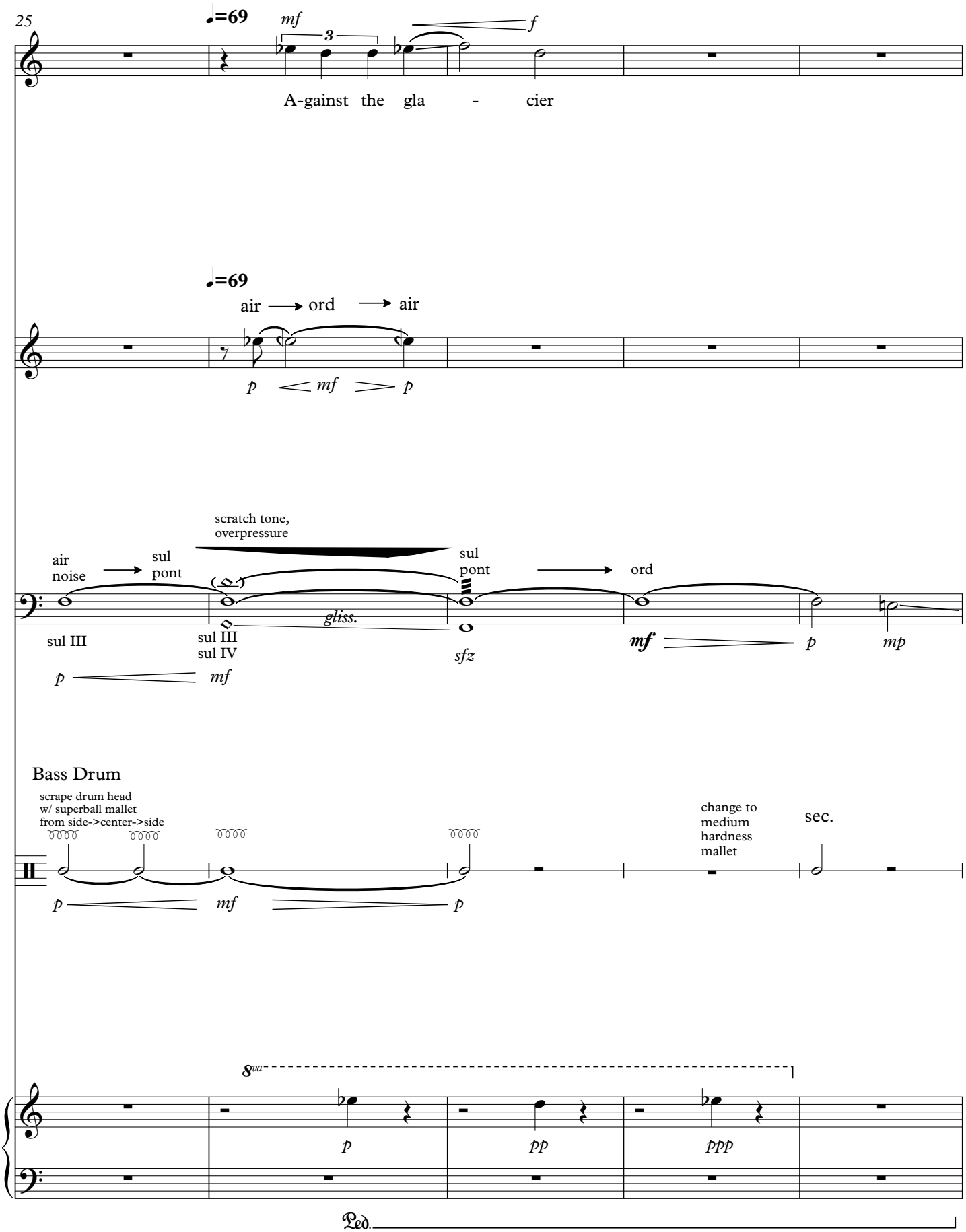
I. I Grit My Teeth Against the Glacier

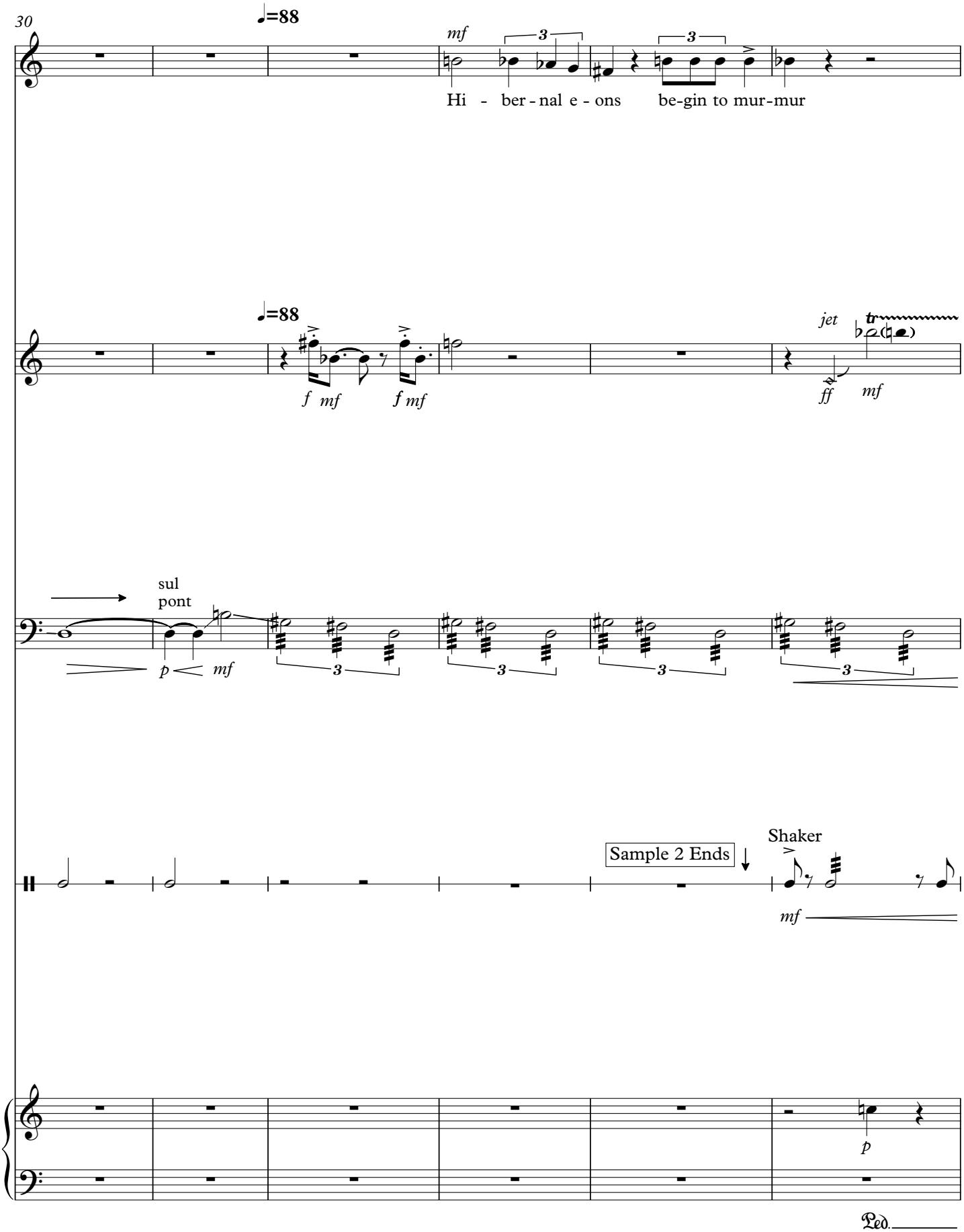
♩ = 52

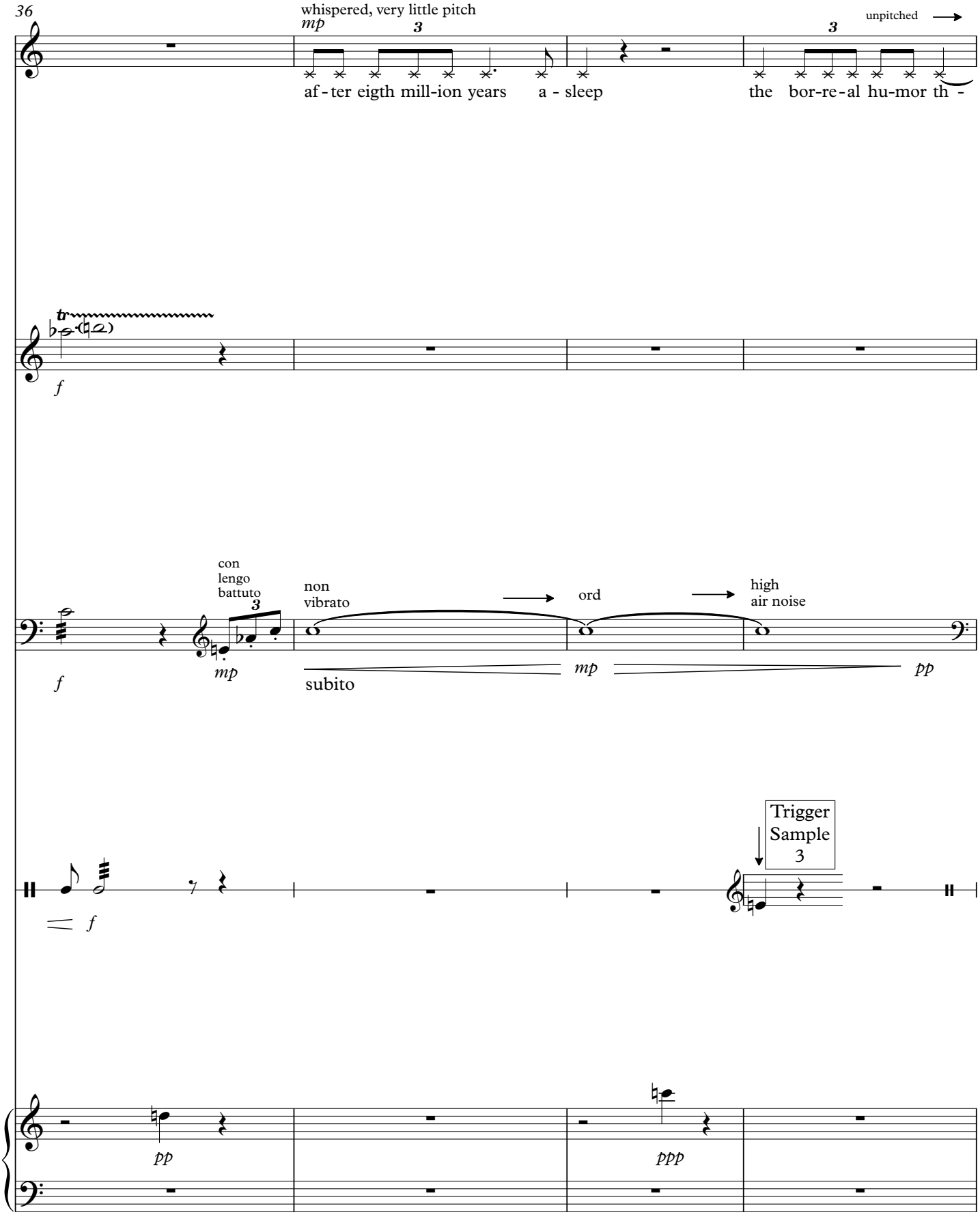


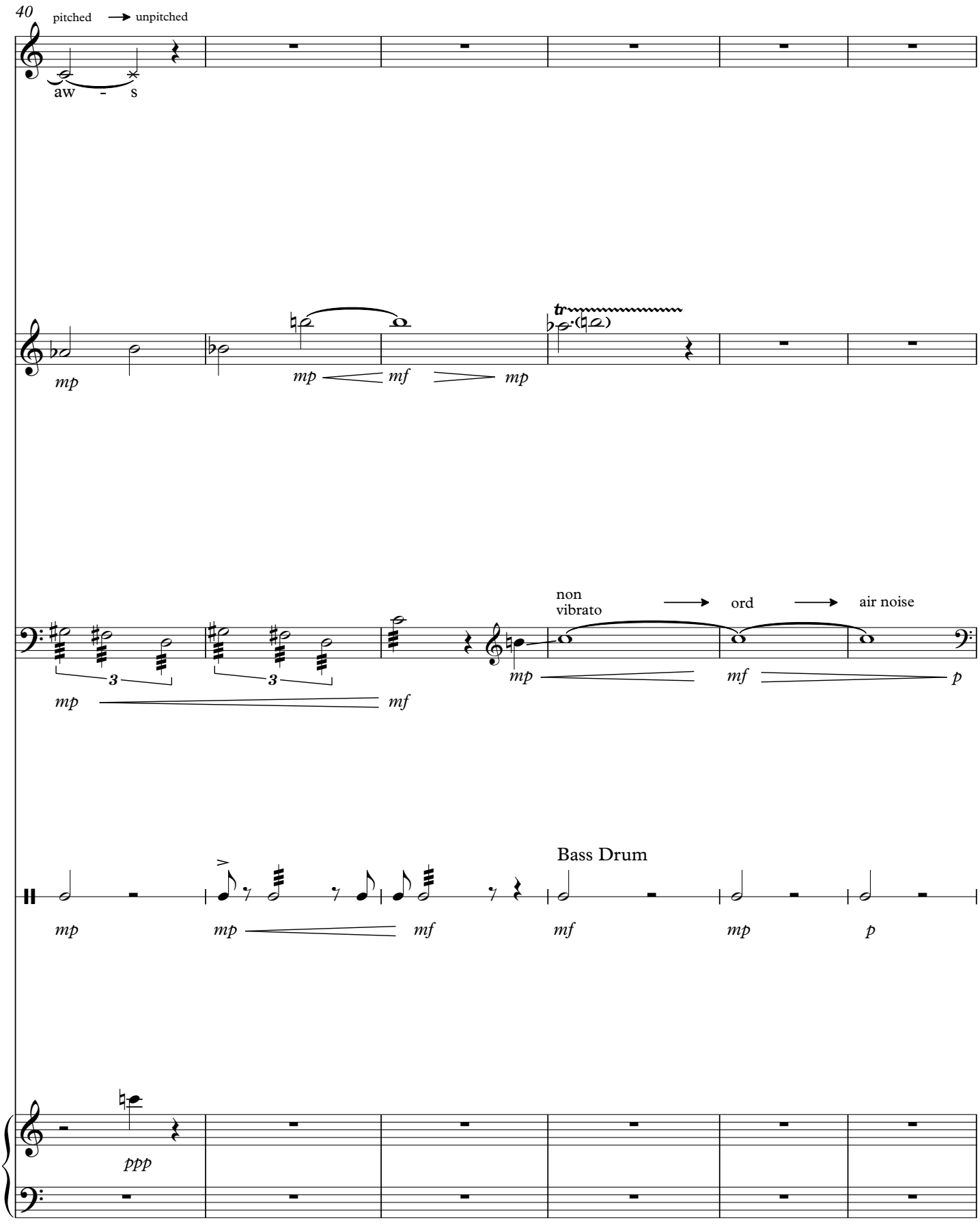

16
mf
f
mp
I
pp
mf
pp
sul
pont
mf
sul III
scratch tone,
overpressure
gliss.
sul III
sul IV
sul
pont
sfz
ord
mf
sul
pont
p
pizz
gliss
gliss.
mf
highest
possible
note
Crash
Cymbal
scrape cymbal
w/ brush in
circular motion
p
speed up w/ cres
mf
Sample 1 Ends
p
Ped.

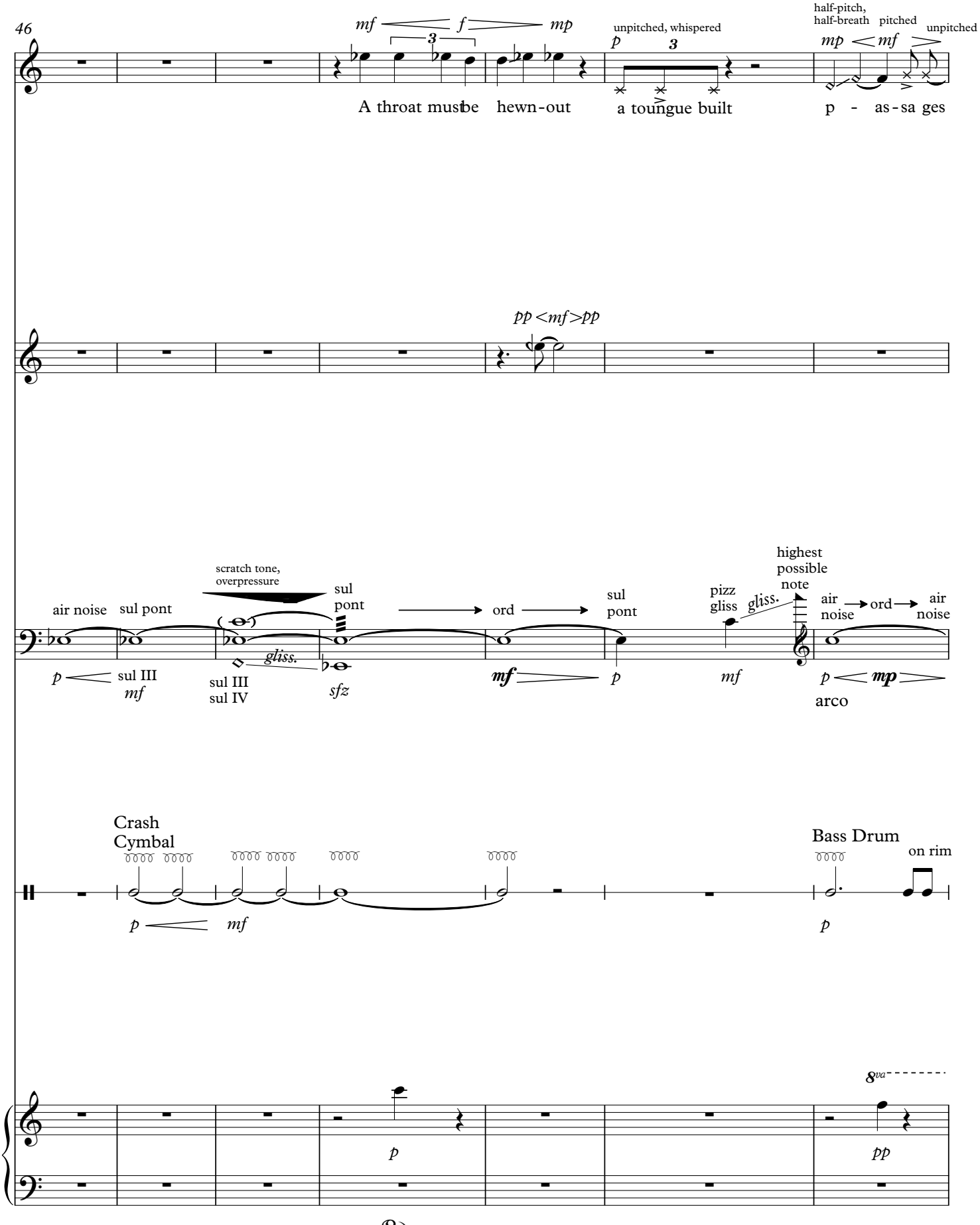

21
unpitched → pitched → unpitched 'tuh'
mp mf pp
grr - i t - t - t
gliss on rolled 'r'
half-pitch, half-breath
mf
my
accel.
unpitched → pitched → unpitched
mp mf
tuh - ee th
tongue pizz
<t> <t> <t>
pp
air note
mp
accel.
air note
mp
tongue pizz
<t>
air noise
p mp
arco
pp
air noise
p
air noise
p mp
Bass Drum
on rim
p mp p pp
Crash Cymbal
scrape cymbal w/ brush in circular motion
p mp
sec.
pp
Trigger Sample 2
8va
p
pp
ppp
Ped.

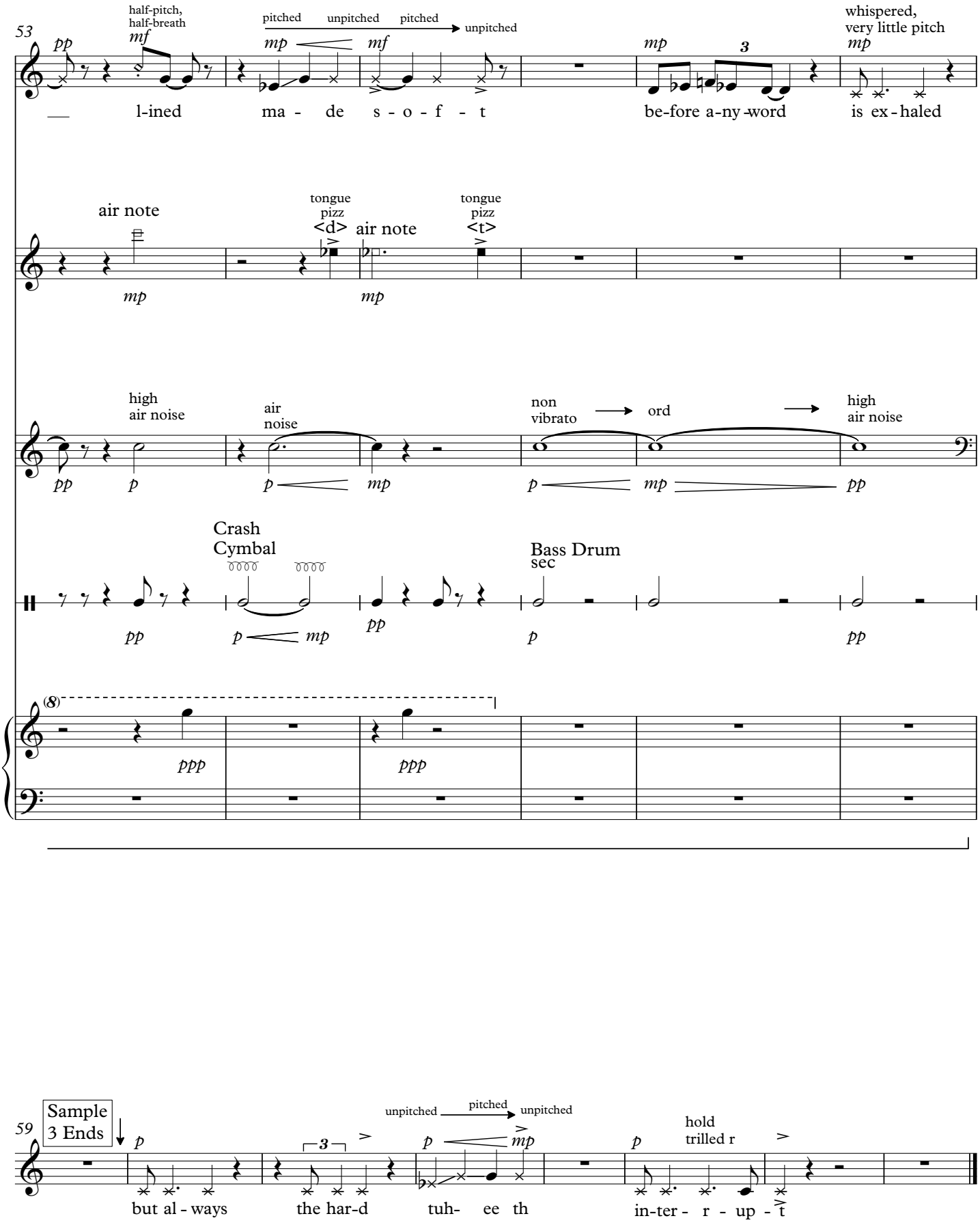

25
♩=69
mf
3
f
A-gainst the gla - cier
♩=69
air → ord → air
p mf p
scratch tone, overpressure
air noise
sul pont
sul pont
ord
gliss.
sul III
sul III
sul IV
sfz
mf
p
mp
p mf
Bass Drum
scrape drum head w/ superball mallet from side->center->side
change to medium hardness mallet
sec.
p mf p
8va
p
pp
ppp
Ped.


30
♩=88
mf
Hi - ber - nal e - ons be-gin to mur-mur
♩=88
f mf
f mf
jet
ff
mf
sul pont
p
mf
Sample 2 Ends
Shaker
mf
p
Ped.

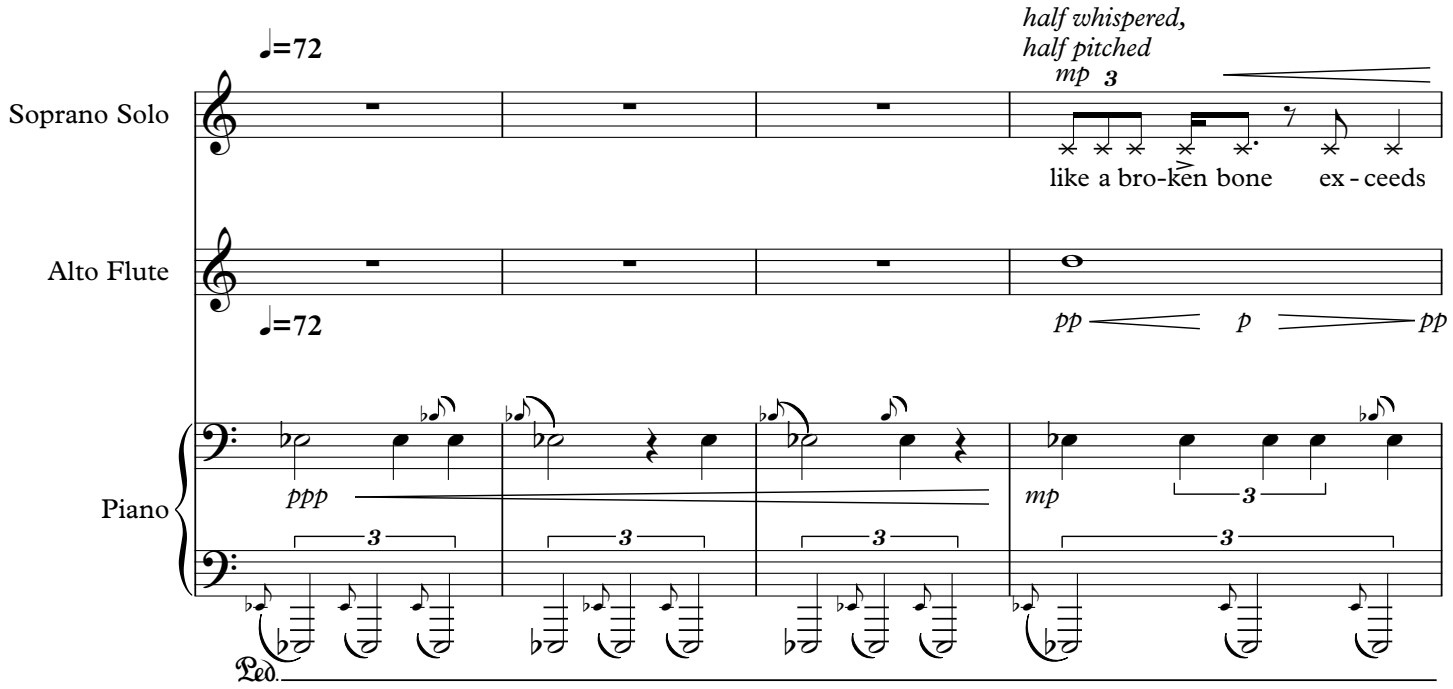

36
whispered, very little pitch
mp
3
af - ter eigth mill-ion years a - sleep
3
unpitched
the bor-re-al hu-mor th -
tr
f
con
lengo
battuto
3
mp
non
vibrato
ord
high
air noise
f
subito
mp
pp
Trigger
Sample
3
f
pp
ppp

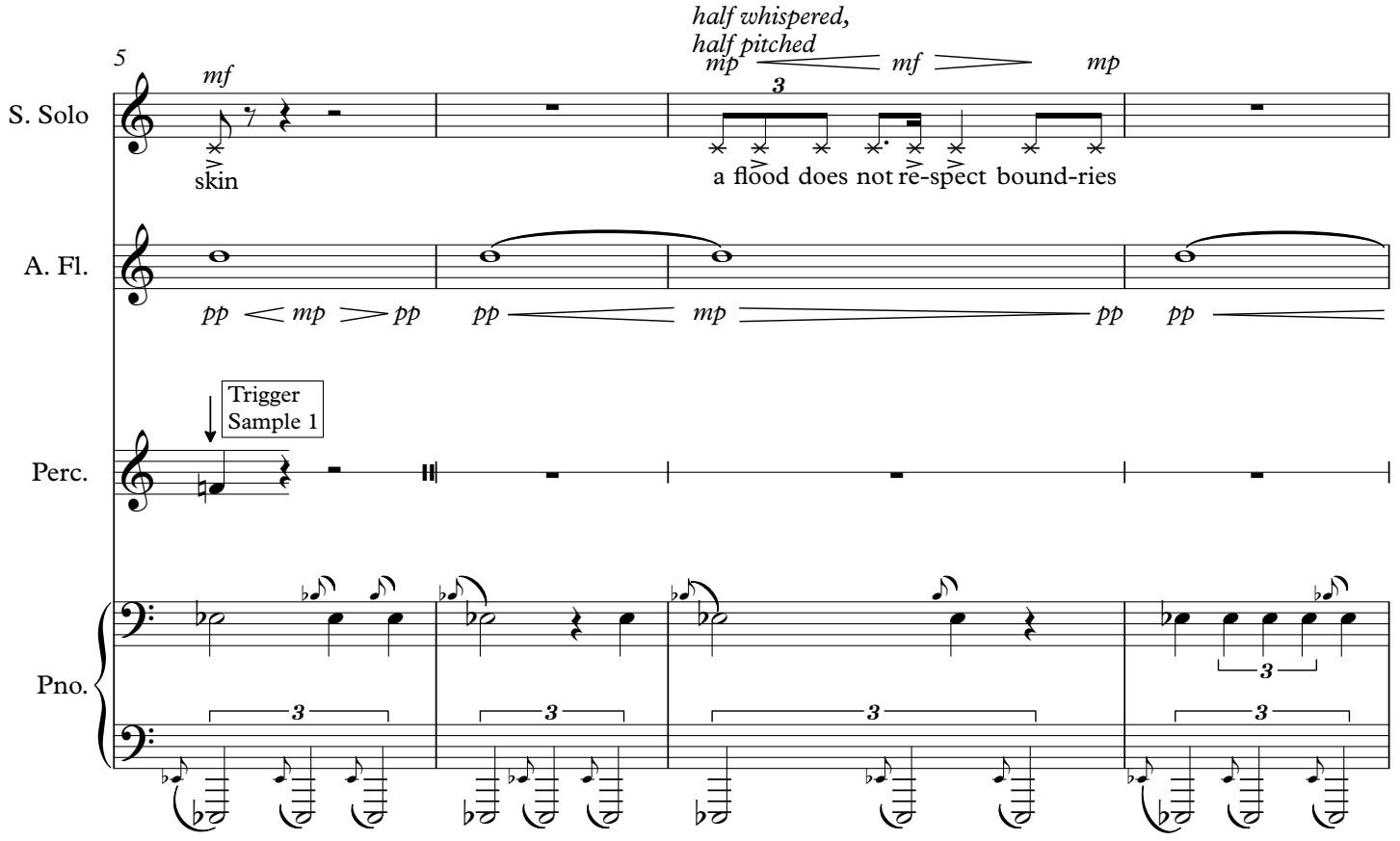

40
pitched → unpitched
aw - s
mp
mp mf mp
tr
non vibrato
ord
air noise
3
3
mp mf
mp mf p
Bass Drum
mp
mp mf
mf
mp
p
ppp

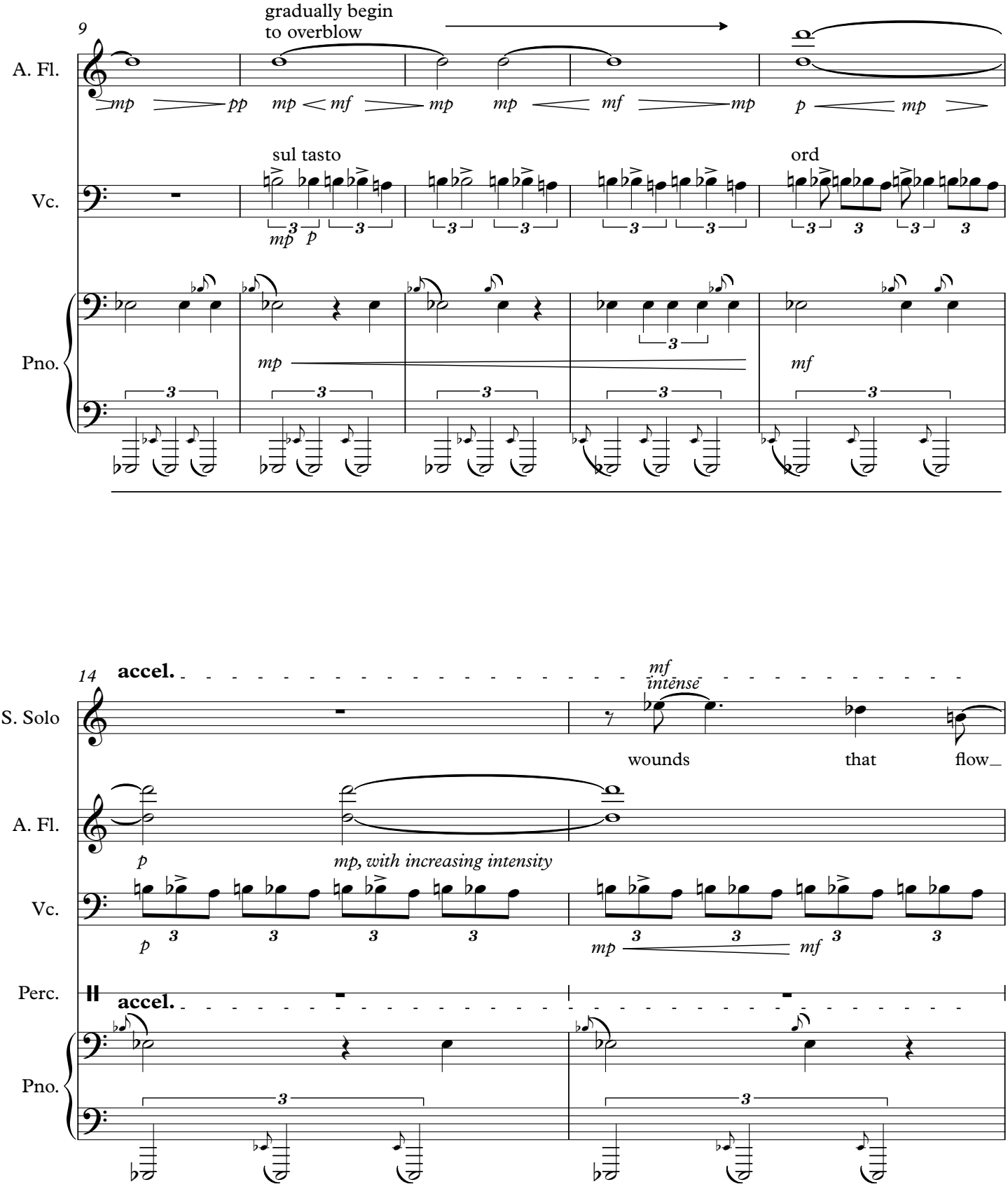

46
mf f mp
3
A throat must be hewn-out
unpitched, whispered
p
3
a tongue built
half-pitch, half-breath
pitched
unpitched
mp mf
p - as-sa ges
pp <mf> pp
air noise
sul pont
scratch tone, overpressure
sul pont
ord
sul pont
pizz
gliss
gliss.
highest possible note
air noise
ord
air noise
p
sul III
mf
sul III
sul IV
gliss.
sfz
mf
p
mf
p
mp
arco
Crash Cymbal
Bass Drum
on rim
p
mf
p
8va
p
pp
Ped.

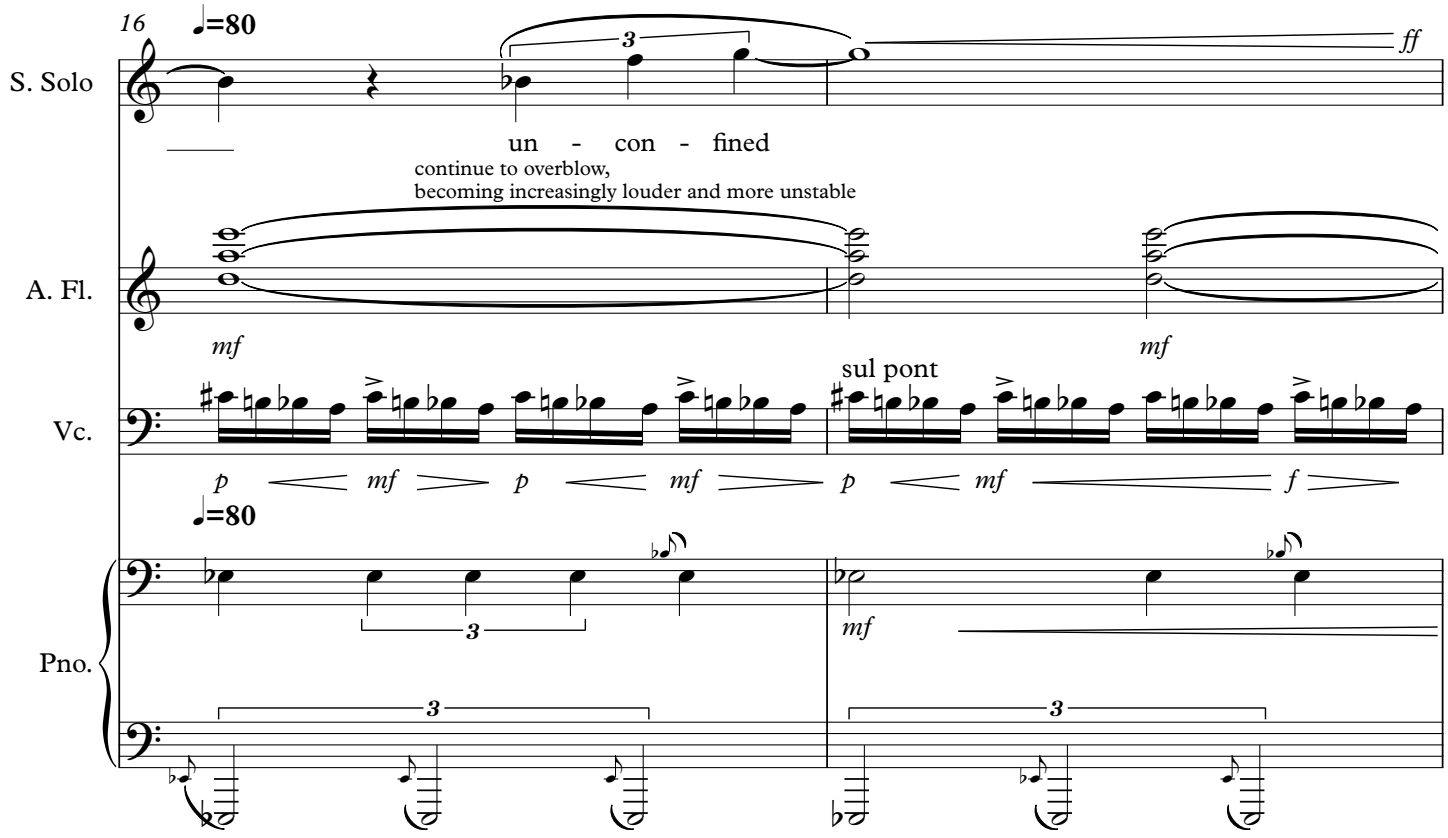

53
half-pitch, half-breath
pitched
unpitched
pitched
unpitched
whispered, very little pitch
l-ined
ma - de
s - o - f - t
be-fore a-ny-word
is ex-haled
air note
tongue pizz
<d>
air note
tongue pizz
<t>
high air noise
air noise
non vibrato
ord
high air noise
Crash Cymbal
Bass Drum
sec
(8)
Sample 3 Ends
59
unpitched
pitched
unpitched
hold trilled r
but al - ways
the har-d
tuh- ee th
in-ter - r - up - t

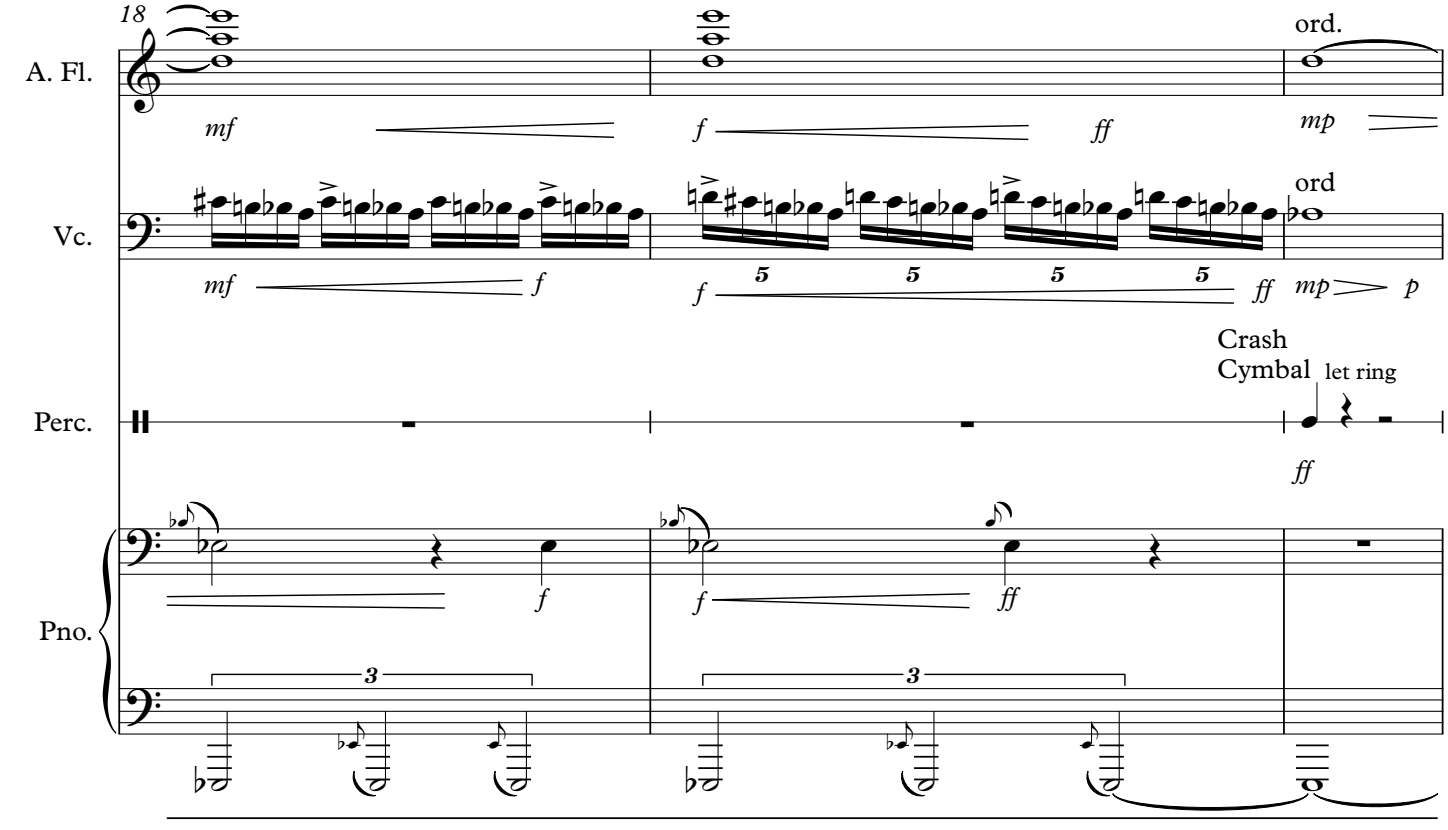
II. Black Water

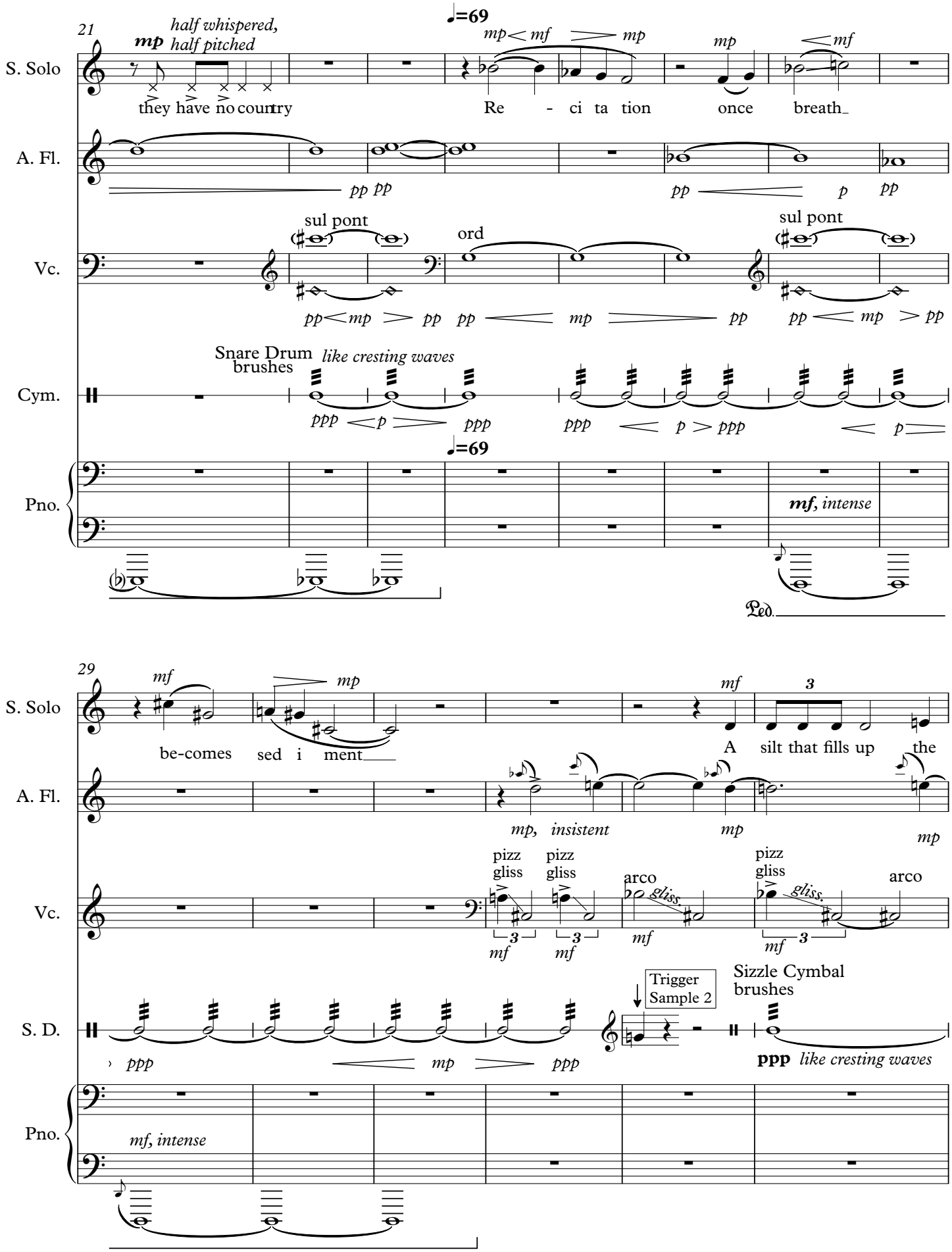


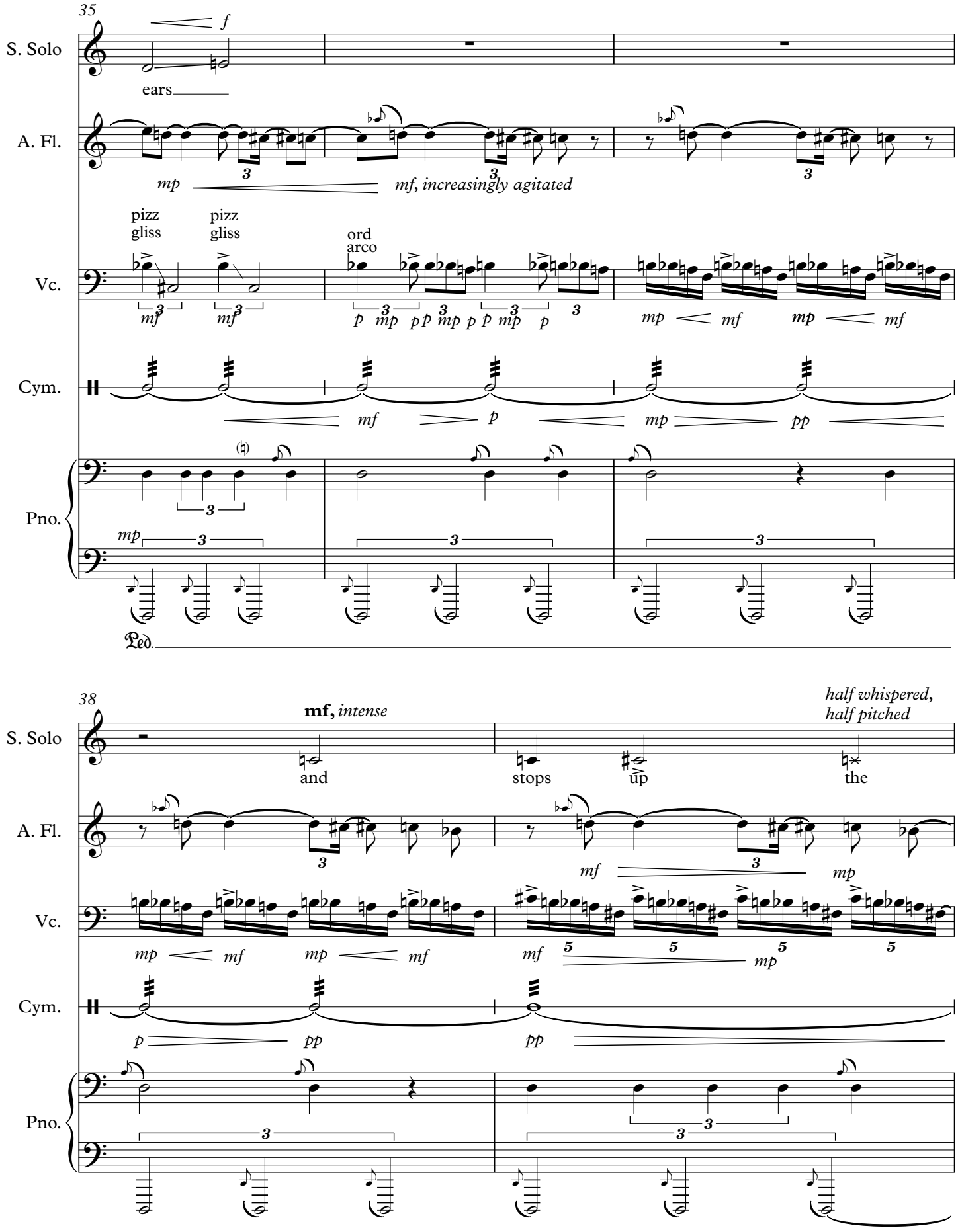



9
gradually begin
to overblow
A. Fl.
mp pp mp mf mp mp mf mp p mp
sul tasto
ord
Vc.
mp p
Pno.
mp
mf
14
accel.
mf
intēnsē
S. Solo
wounds that flow_
A. Fl.
p
mp, with increasing intensity
Vc.
p
mp mf
Perc.
accel.
Pno.


16
♩=80
S. Solo
un - con - fined
ff
continue to overblow,
becoming increasingly louder and more unstable
A. Fl.
mf
mf
sul pont
Vc.
p
mf
p
mf
p
mf
f
♩=80
Pno.
mf


18
A. Fl.
mf
f
ff
ord.
mp
Vc.
mf
f
f
ff
mp
p
ord
Crash
Cymbal
let ring
Perc.
ff
Pno.
f
f
ff


21
mp half whispered, half pitched
♩=69
mp < mf > mp
mp
< mf
S. Solo
they have no country
Re - ci ta tion
once
breath_
A. Fl.
pp pp
pp < p
pp
Vc.
sul pont
ord
sul pont
pp < mp > pp pp < mp > pp
pp < mp > pp
Cym.
Snare Drum brushes
like cresting waves
ppp < p > ppp
ppp < p > ppp
< p
Pno.
♩=69
mf, intense
Ped.
29
mf
mp
mf
3
S. Solo
be-comes
sed i ment
A
silt that fills up
the
A. Fl.
mp, insistent
mp
mp
Vc.
pizz
gliss
pizz
gliss
arco
gliss.
pizz
gliss
gliss.
arco
mf
mf
mf
mf
3
3
3
S. D.
Trigger Sample 2
Sizzle Cymbal brushes
ppp
mp
ppp
ppp like cresting waves
Pno.
mf, intense


35
S. Solo
A. Fl.
Vc.
Cym.
Pno.
f
ears
mp
mf, increasingly agitated
pizz
gliss
pizz
gliss
ord
arco
mf
mf
p mp pp mp p p mp p
mp mf mp mf
mf p mp pp
Ped.
38
mf, intense
half whispered,
half pitched
and
stops
up
the
mf
mp
mp mf mp mf
mf
mp
p pp
pp

40

S. Solo

lungs

A. Fl.

mp p

Vc.

mp p ppp

Cym.

ppp mp ppp

Pno.

mp mp ppp ppp

Ped. Ped.

48

S. Solo

mf f

The black wa-ter licks clean

A. Fl.

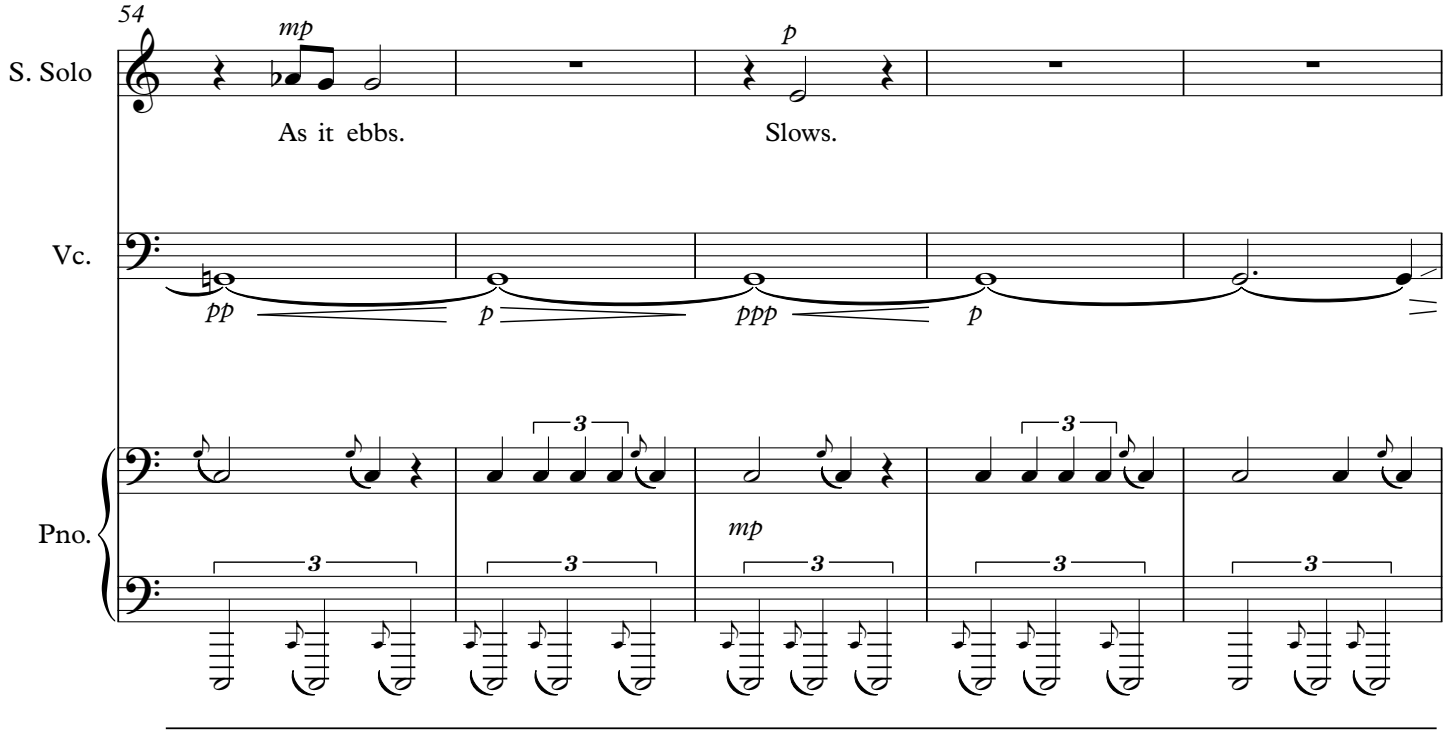
mp

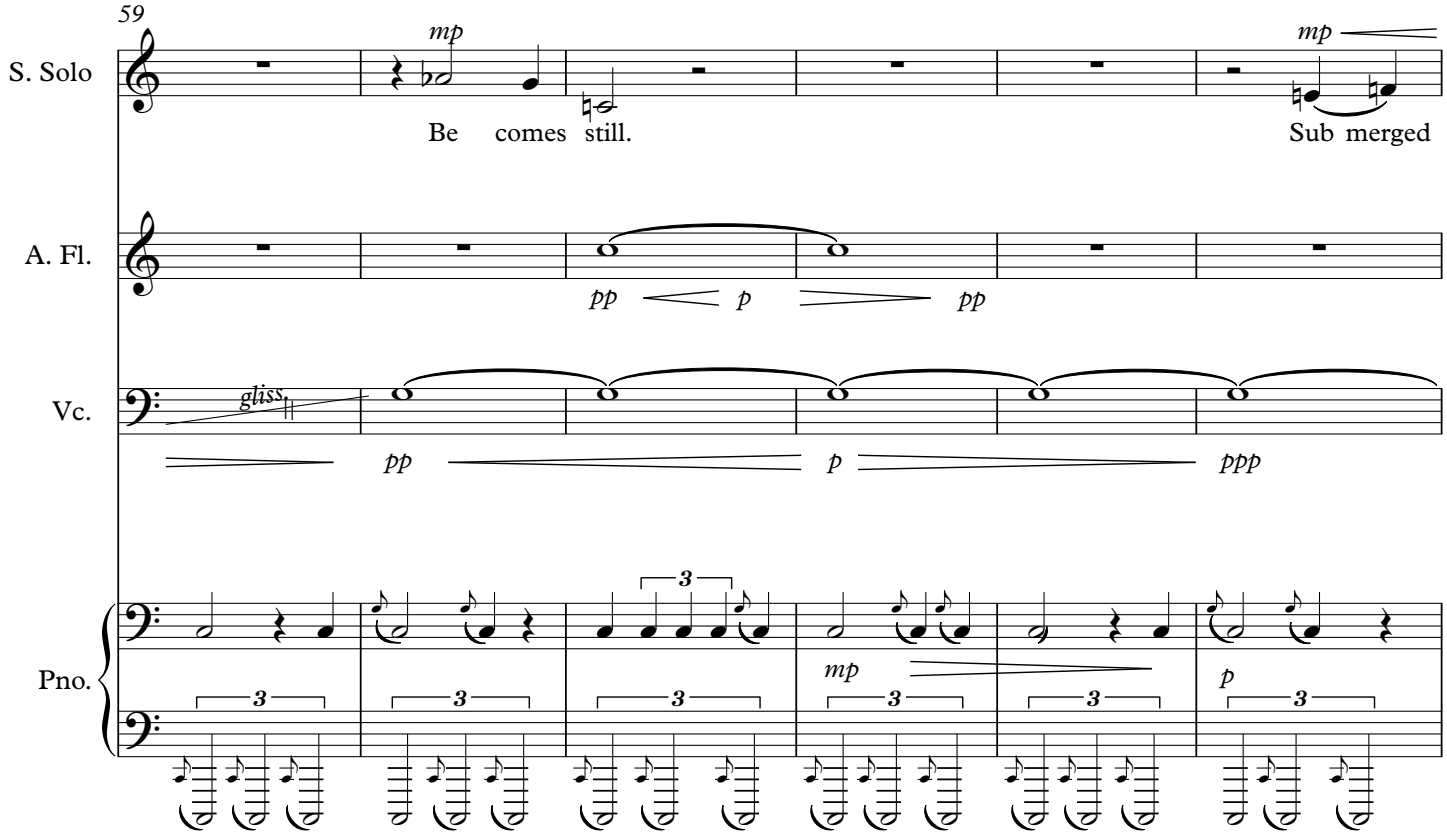
Vc.

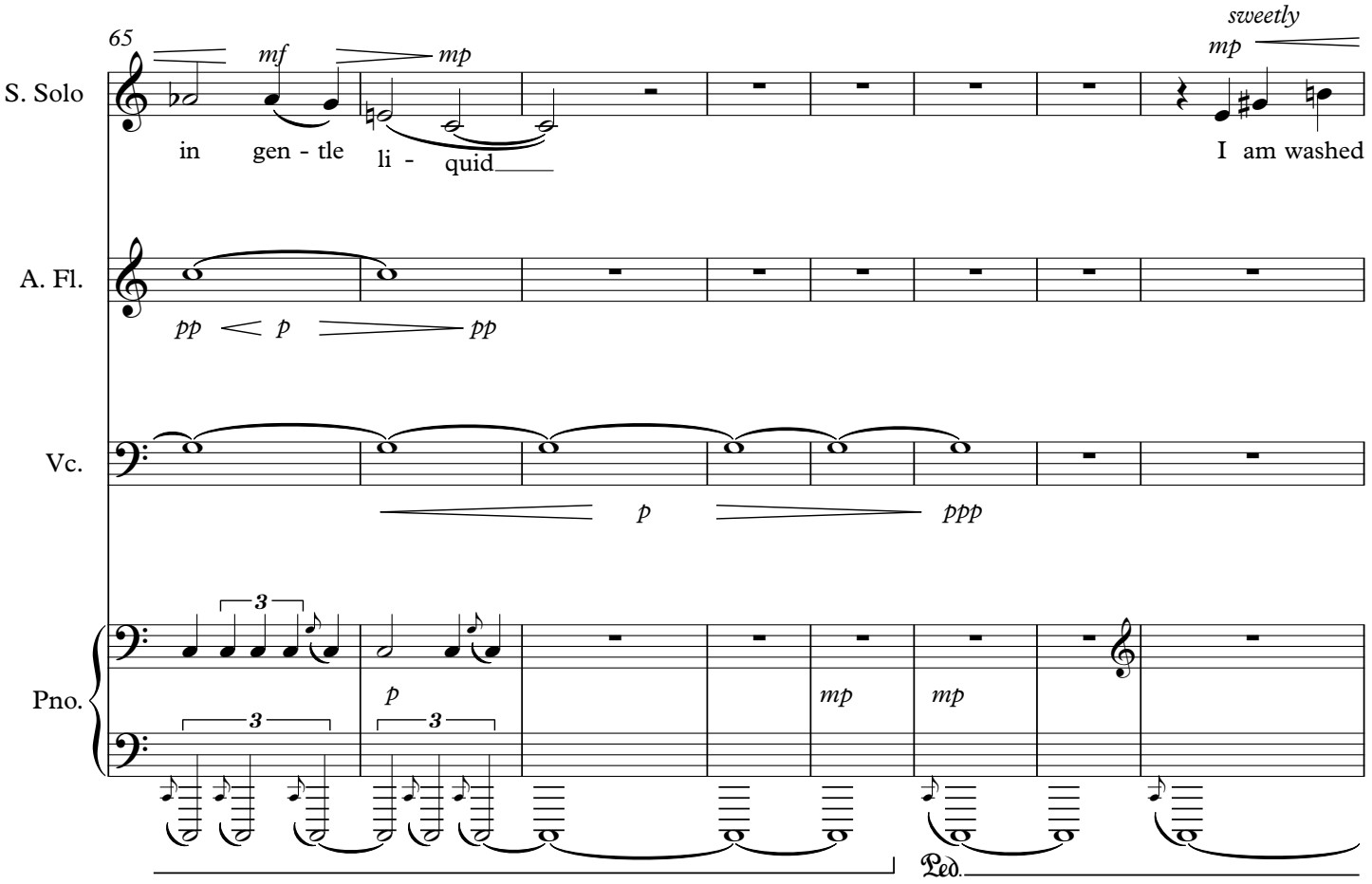
p ppp mp

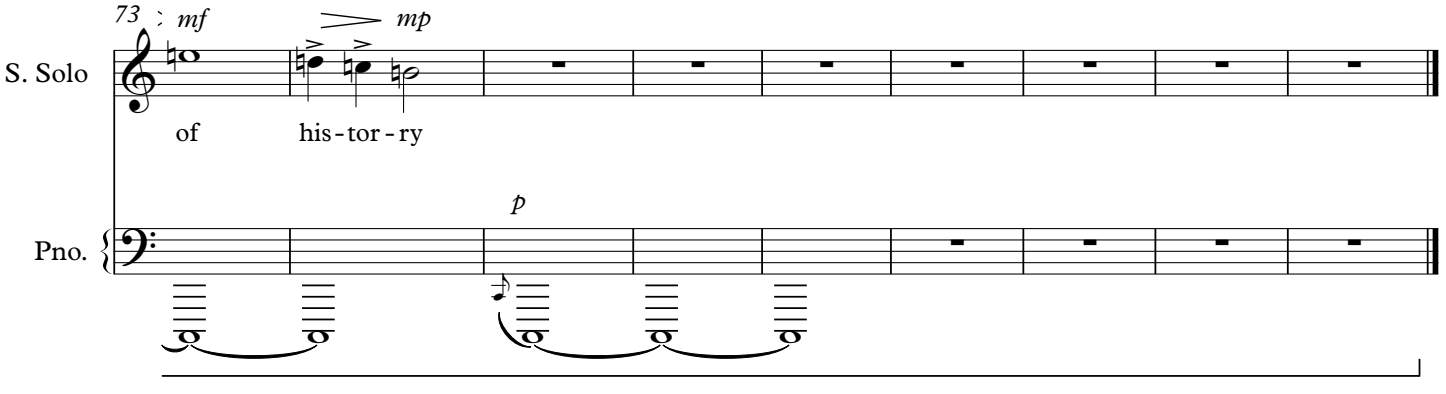
Pno.

mp

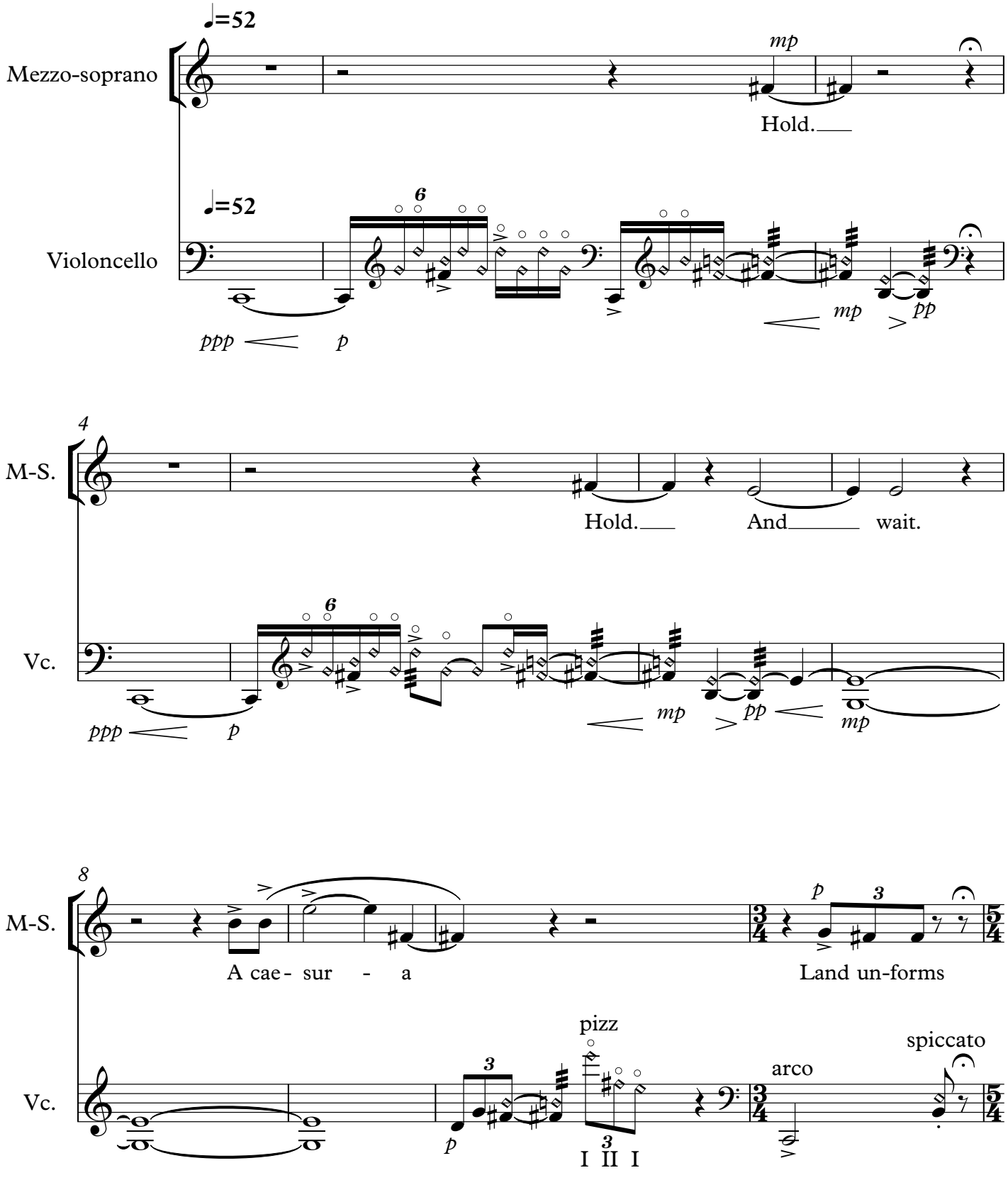

54
S. Solo
mp
As it ebbs.
p
Slows.
Vc.
pp
p
ppp
p
Pno.
3
mp

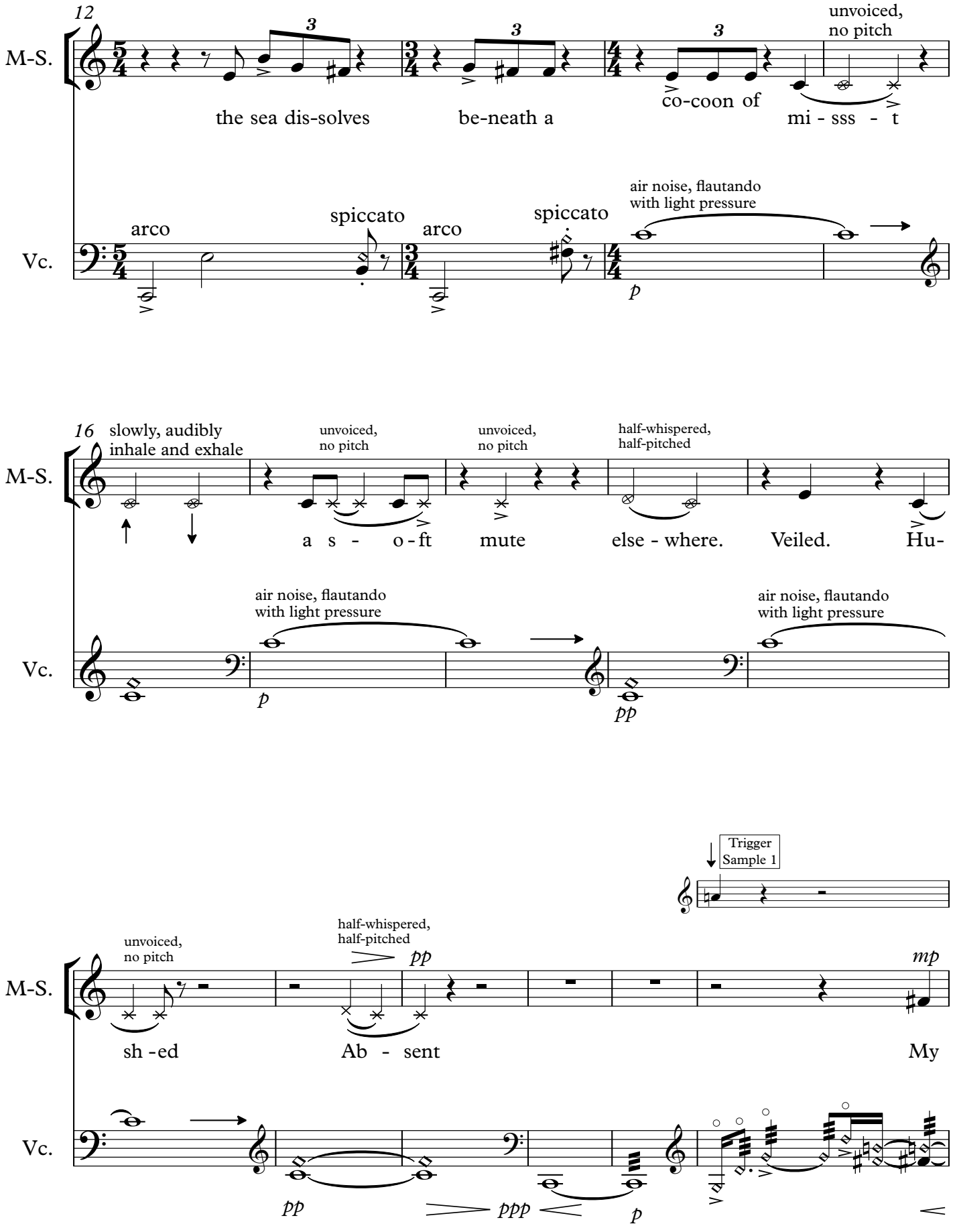

59
S. Solo
mp
Be comes still.
mp
Sub merged
A. Fl.
pp
p
pp
Vc.
gliss.
pp
p
ppp
Pno.
3
mp
p

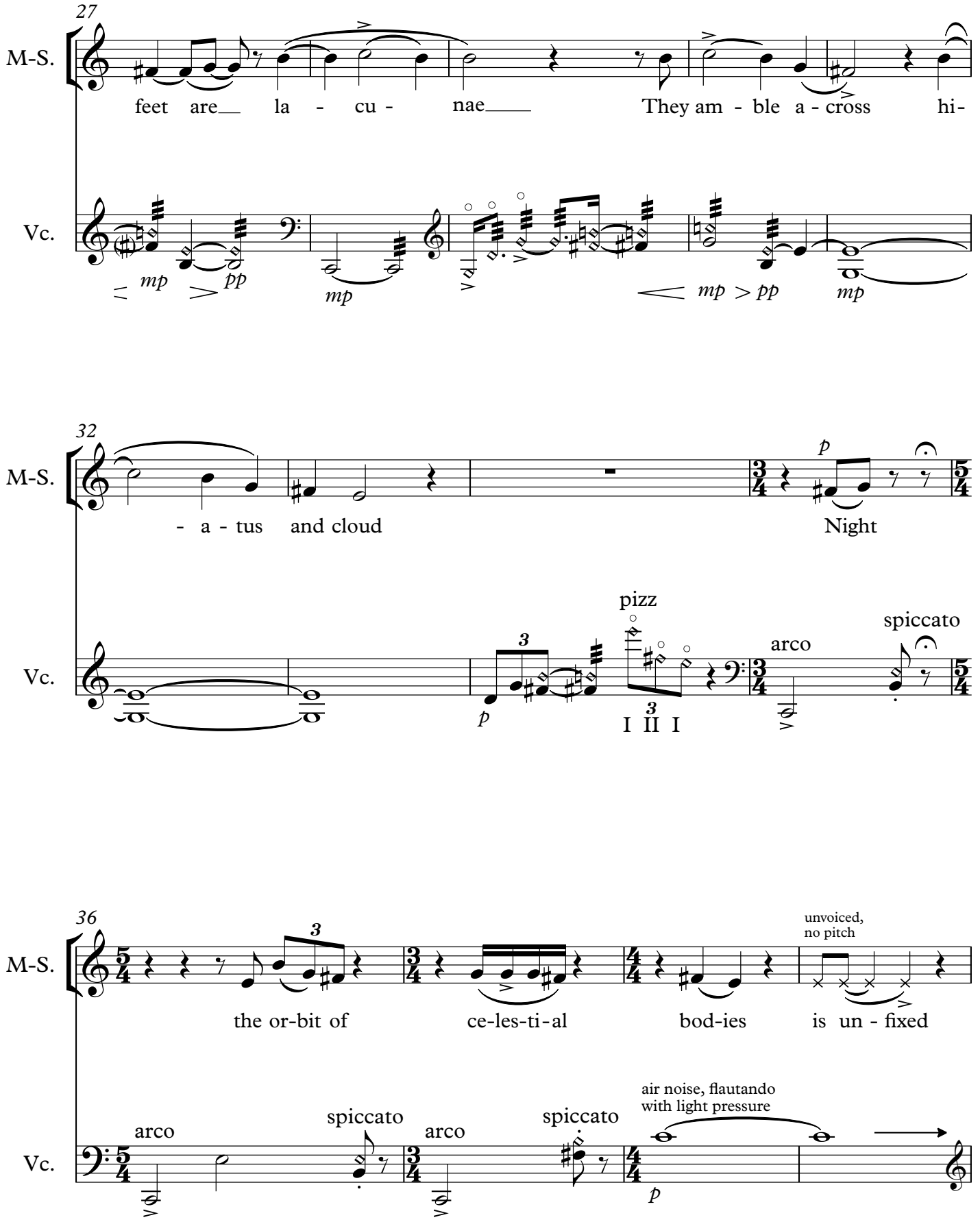

65
S. Solo
A. Fl.
Vc.
Pno.
mf
mp
sweetly
mp
in gen - tle li - quid
I am washed
pp
p
pp
p
ppp
3
p
mp
mp
Ped.

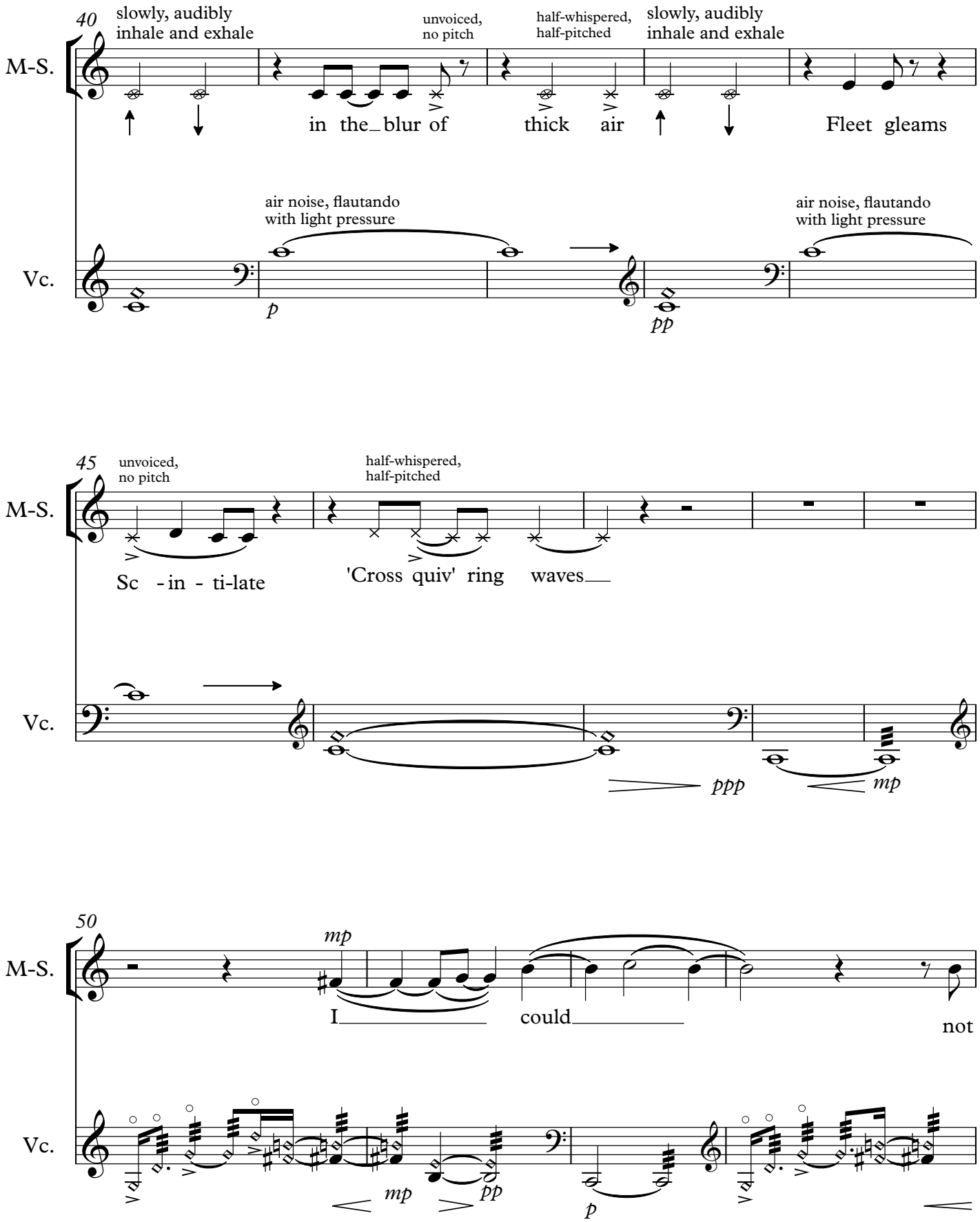

73
S. Solo
Pno.
mf
mp
of his - tor - ry
p

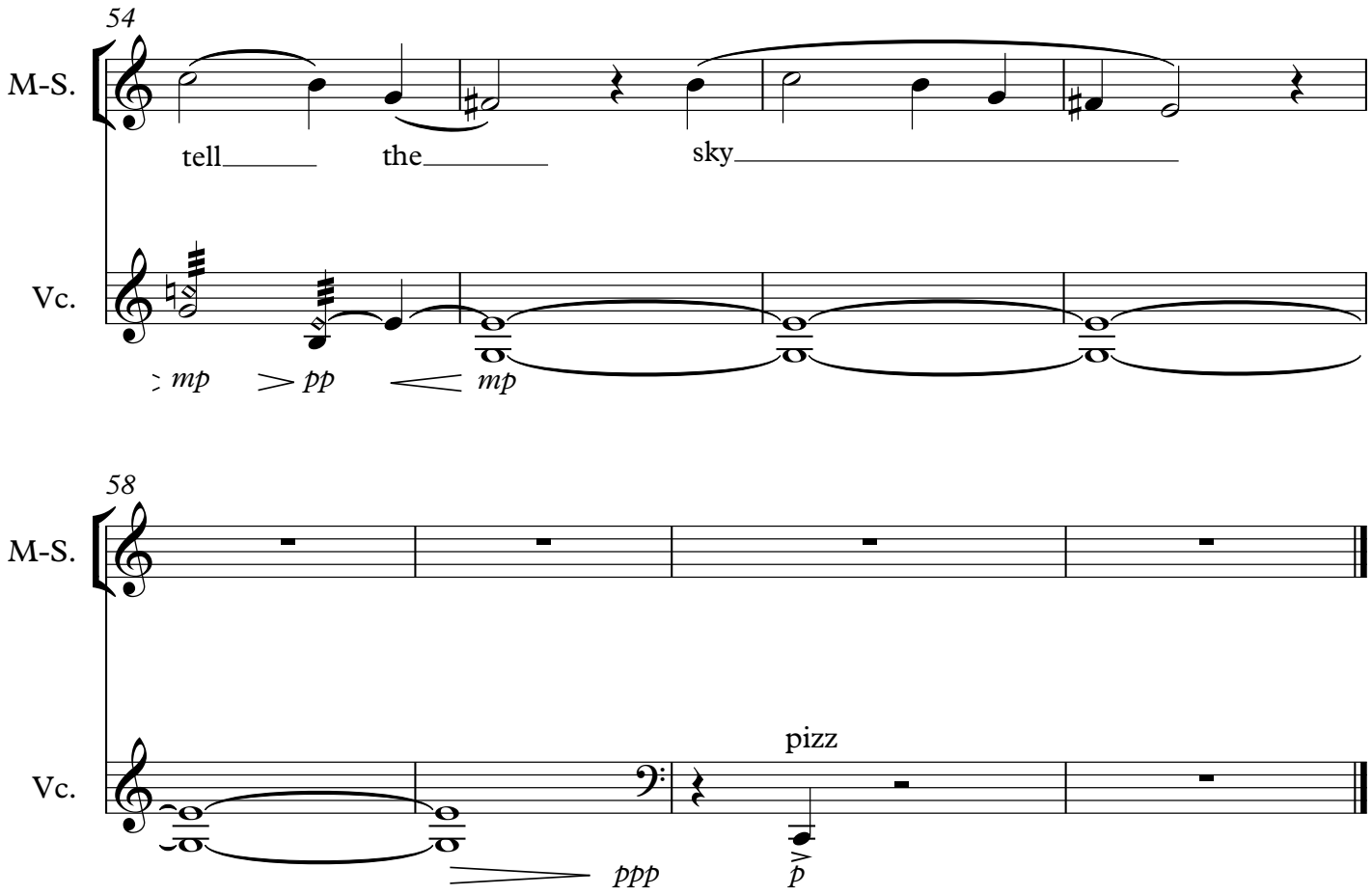
III. Thick Air




12
M-S.
Vc.
the sea dis-solves
be-neath a
co-coon of
mi - sss - t
unvoiced,
no pitch
arco
spiccato
arco
spiccato
air noise, flautando
with light pressure
p
16
slowly, audibly
inhale and exhale
unvoiced,
no pitch
unvoiced,
no pitch
half-whispered,
half-pitched
a s - o - ft
mute
else - where.
Veiled.
Hu-
air noise, flautando
with light pressure
air noise, flautando
with light pressure
p
pp
Trigger
Sample 1
unvoiced,
no pitch
half-whispered,
half-pitched
pp
mp
sh - ed
Ab - sent
My
pp
ppp
p


27
M-S.
feet are la - cu - nae They am - ble a - cross hi-
Vc.
mp pp mp mp > pp mp
32
M-S.
- a - tus and cloud Night
p
Vc.
pizz
arco
spiccato
p
I II I
36
M-S.
the or-bit of ce-les-ti-al bod-ies is un - fixed
unvoiced,
no pitch
Vc.
arco
spiccato
arco
spiccato
air noise, flautando
with light pressure
p


40
slowly, audibly
inhale and exhale
unvoiced,
no pitch
half-whispered,
half-pitched
slowly, audibly
inhale and exhale
M-S.
in the_ blur of
thick air
Fleet gleams
air noise, flautando
with light pressure
air noise, flautando
with light pressure
Vc.
p
pp
45
unvoiced,
no pitch
half-whispered,
half-pitched
M-S.
Sc - in - ti-late
'Cross quiv' ring waves__
Vc.
ppp
mp
50
mp
M-S.
I_____
could_____
not
Vc.
mp
pp
p

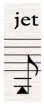

54
M-S.
tell
the
sky
Vc.
mp
pp
mp
58
M-S.
Vc.
pizz
ppp
p

IV. The Distance BetweenVacant Seas

For Flute:

tongue pizz:
syllable to be articulated: 

aeolian/air sounds: 

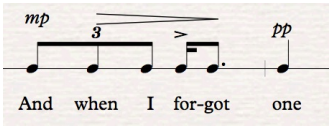
jet whistle: 

For Mezzo-Soprano:

audibly inhale: 

Unless otherwise indicated, all text should be spoken in a whisper and with a minimum of voiced content.
The voice should be toneless, unpitched, and breathy throughout. If pitch must be introduced, allow the pitches should rise and fall inaccordance with the natural patterns and melodic shape of spoken speech. Absolutely avoid monotone.

Rhythms are indicated with standard notation in combination with a single line staff:

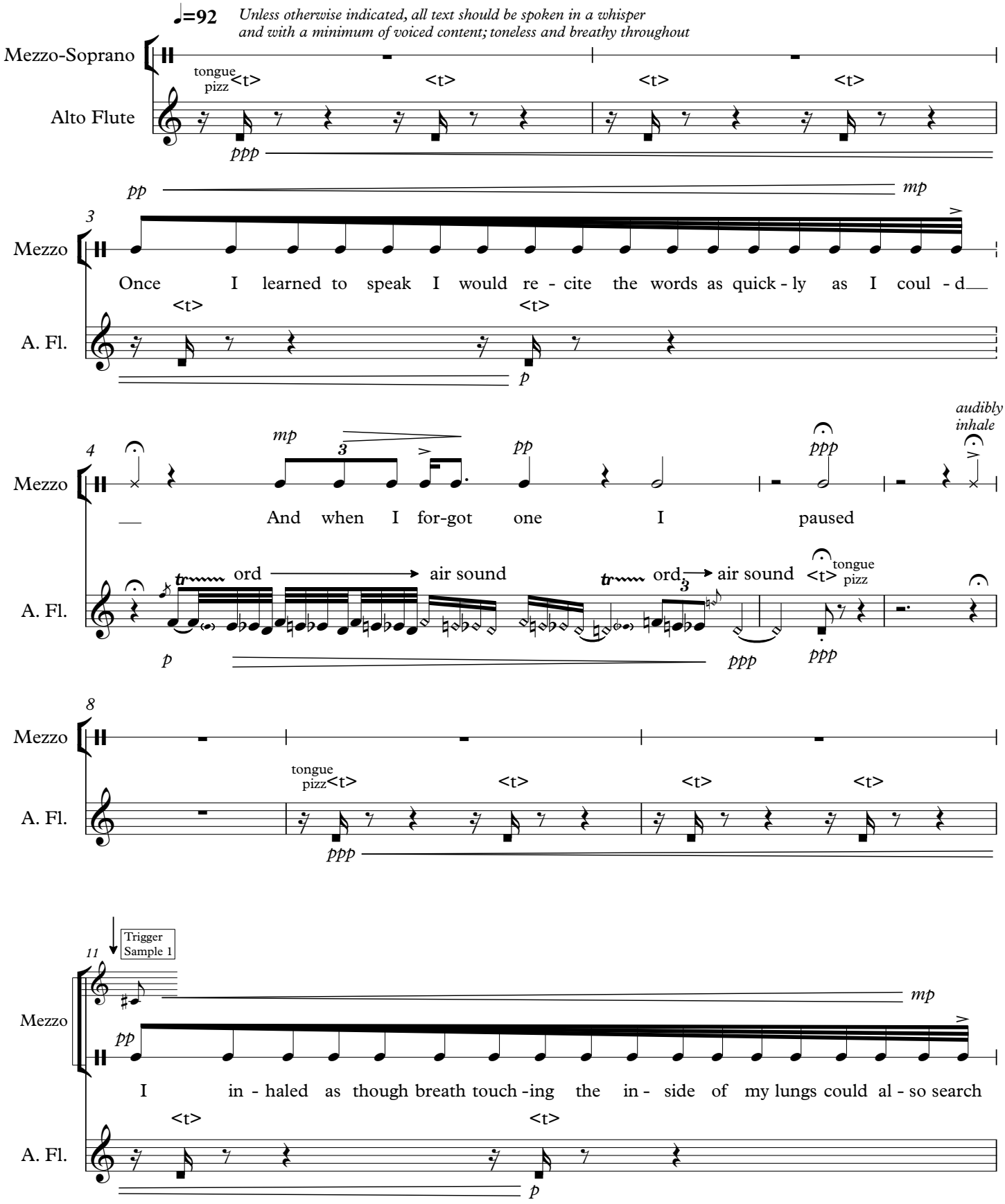


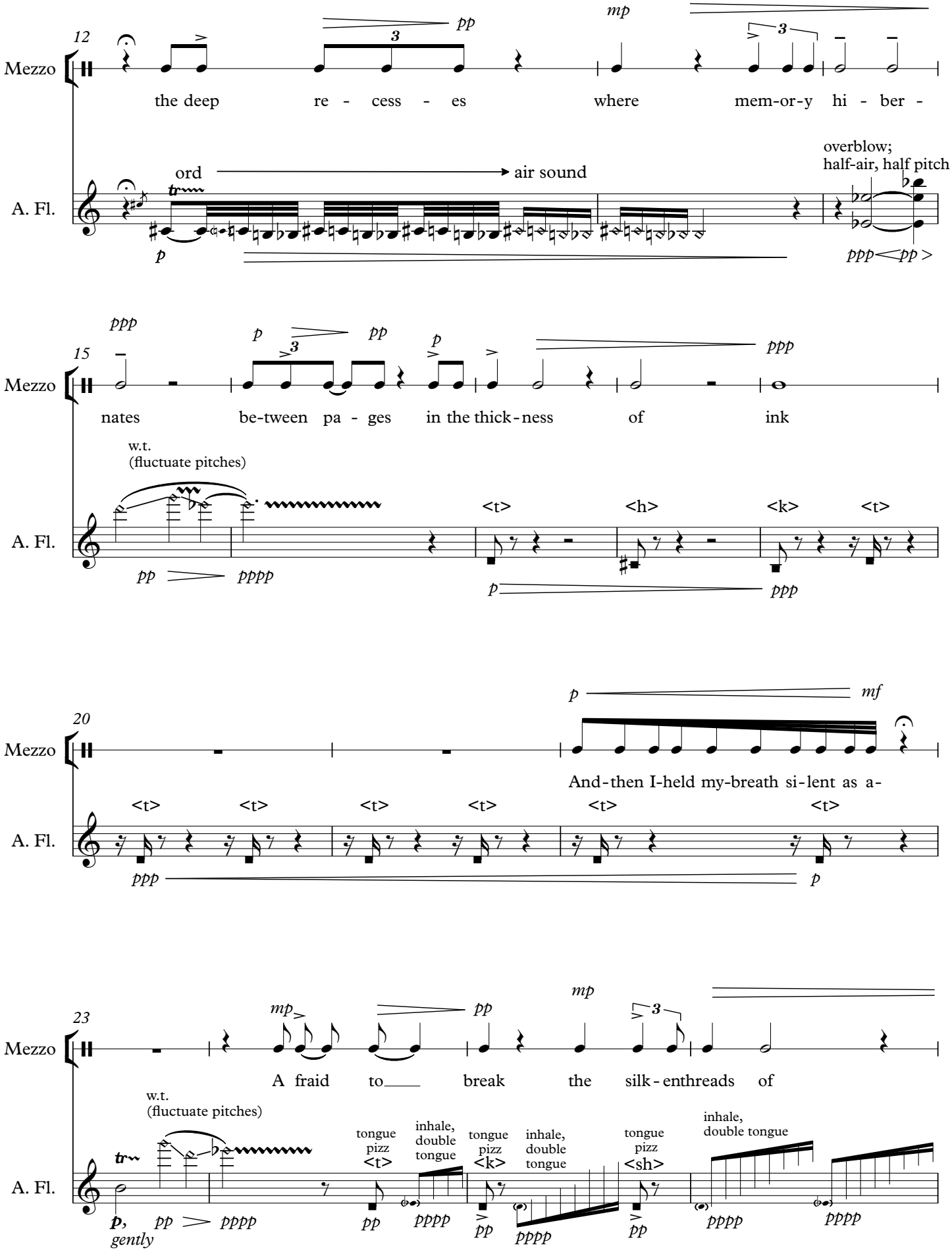
Electronics:
Laptop with Ableton Live 9
Audio Interface
Stereo or 5.1 Surround Playback System
Two octave MIDI Keyboard

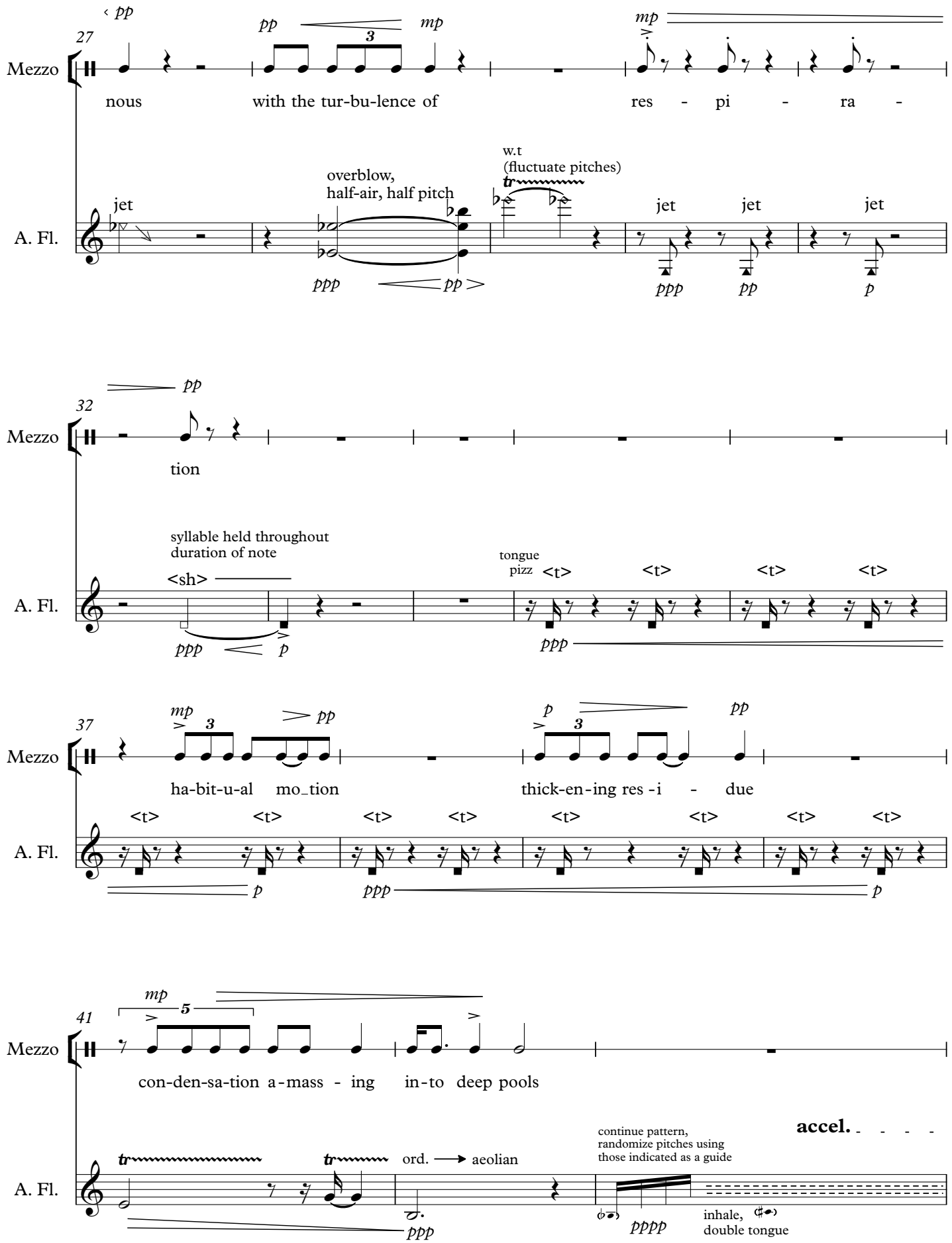
Requires a two octave MIDI Keyboard in order to trigger the playback of two audio samples: at measures 11 and 48 . Sample 1 is triggered by C#3 (61), Sample 2 by D#3 (63). Sample triggering and playback are handled by the Ableton Live set created to accompny the piece.

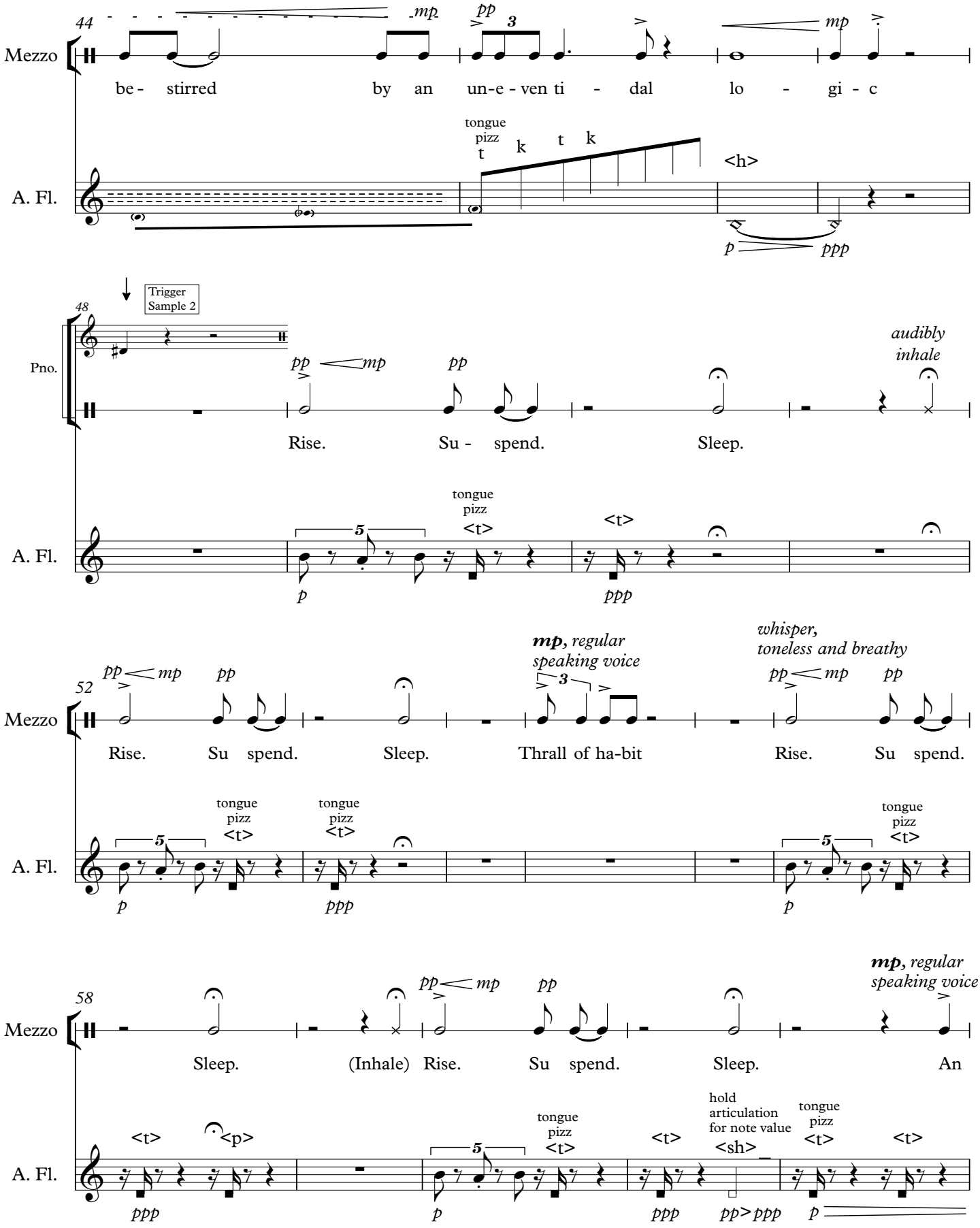
Note for the Sound Engineer:
Both the voice and flute require substantial amplification in order to ensure the extremely quiet gestures that occur throughout this movement are audible. The volume of the voice and flute should be equal. Both voice and flute should remain clearly audible during sample playback.

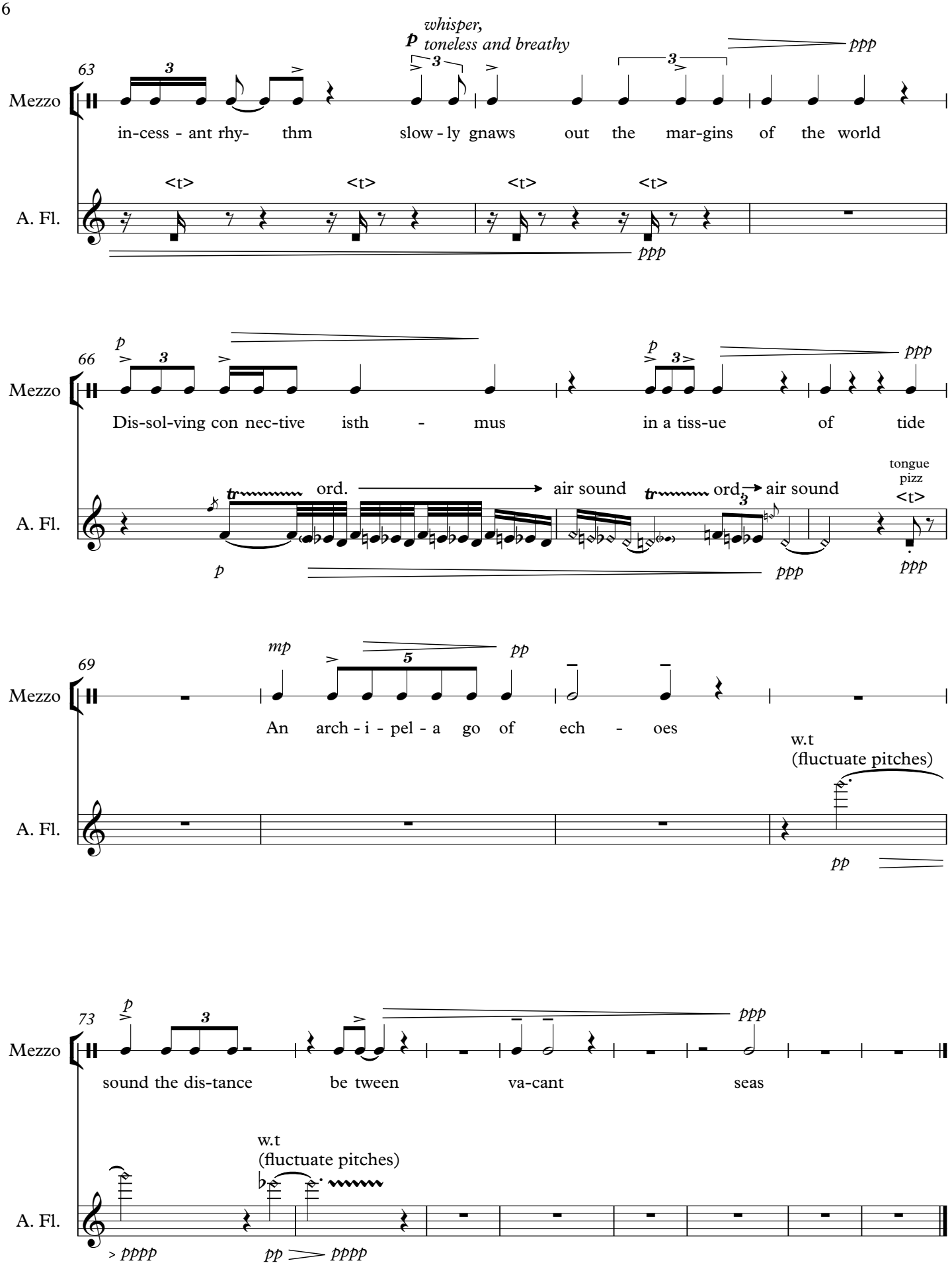
IV. The Distance Between Vacant Seas




12
Mezzo
pp
mp
the deep re - cess - es where mem-or-y hi - ber -
A. Fl.
ord
air sound
overblow;
half-air, half pitch
p
ppp < pp >
15
Mezzo
ppp
p
pp
p
ppp
nates be-tween pa - ges in the thick-ness of ink
w.t.
(fluctuate pitches)
A. Fl.
<t>
<h>
<k>
<t>
pp
pppp
p
ppp
20
Mezzo
p
mf
And-then I-held my-breath si-lent as a-
A. Fl.
<t>
<t>
<t>
<t>
<t>
<t>
ppp
p
23
Mezzo
mp
pp
mp
A fraid to break the silk-enthreads of
w.t.
(fluctuate pitches)
A. Fl.
tongue pizz
<t>
inhale, double tongue
tongue pizz
<k>
inhale, double tongue
tongue pizz
<sh>
inhale, double tongue
p, gently
pp
pppp
pp
pppp
pp
pppp
pppp
pppp

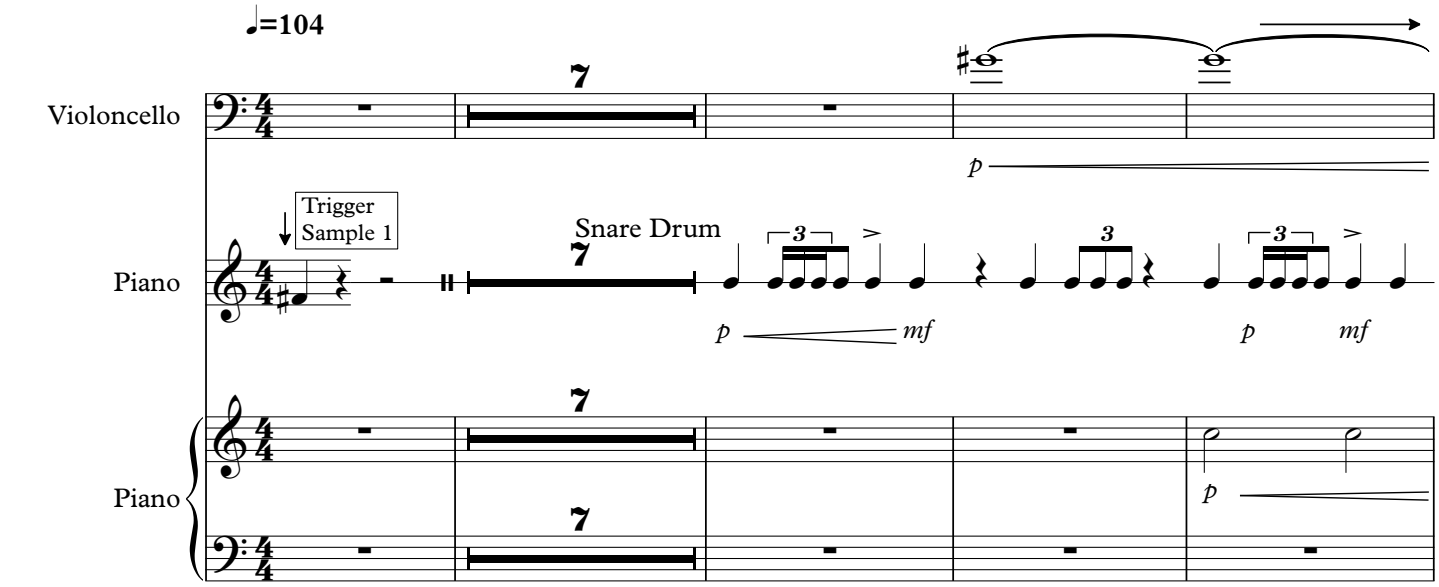

27
Mezzo
pp
pp
mp
mp
nous
with the tur-bu-lence of
res - pi - ra -
A. Fl.
jet
overblow,
half-air, half pitch
w.t
(fluctuate pitches)
tr
jet
jet
jet
ppp
pp
ppp
pp
p
32
Mezzo
pp
tion
A. Fl.
syllable held throughout
duration of note
<sh>
tongue
pizz
<t>
<t>
<t>
<t>
ppp
p
ppp
37
Mezzo
mp
pp
p
pp
ha-bit-u-al mo_tion
thick-en-ing res - i - due
A. Fl.
<t>
p
ppp
p
41
Mezzo
mp
con-den-sa-tion a-mass - ing
in-to deep pools
A. Fl.
tr
tr
ord. → aeolian
ppp
continue pattern,
randomize pitches using
those indicated as a guide
pppp
accel.
inhale,
double tongue

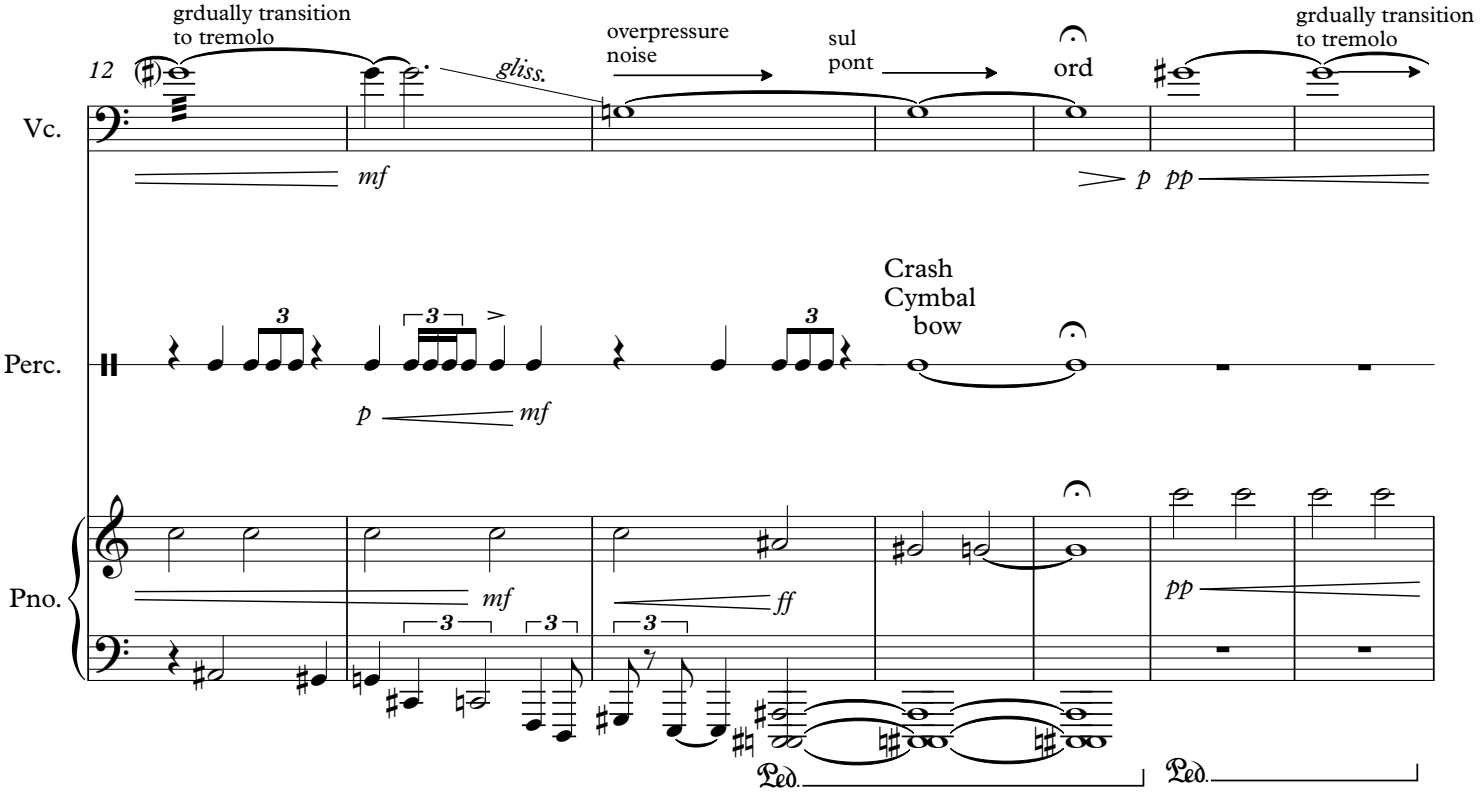

44
Mezzo
A. Fl.
Pno.
Trigger Sample 2
48
52
58
be - stirred by an un-e - ven ti - dal lo - gi - c
tongue pizz
t k t k
<h>
Rise. Su - spend. Sleep.
audibly inhale
<t>
<p>
<sh>
hold articulation for note value
Rise. Su spend. Sleep. Thrall of ha-bit Rise. Su spend.
mp, regular speaking voice
whisper, toneless and breathy
Sleep. (Inhale) Rise. Su spend. Sleep. An

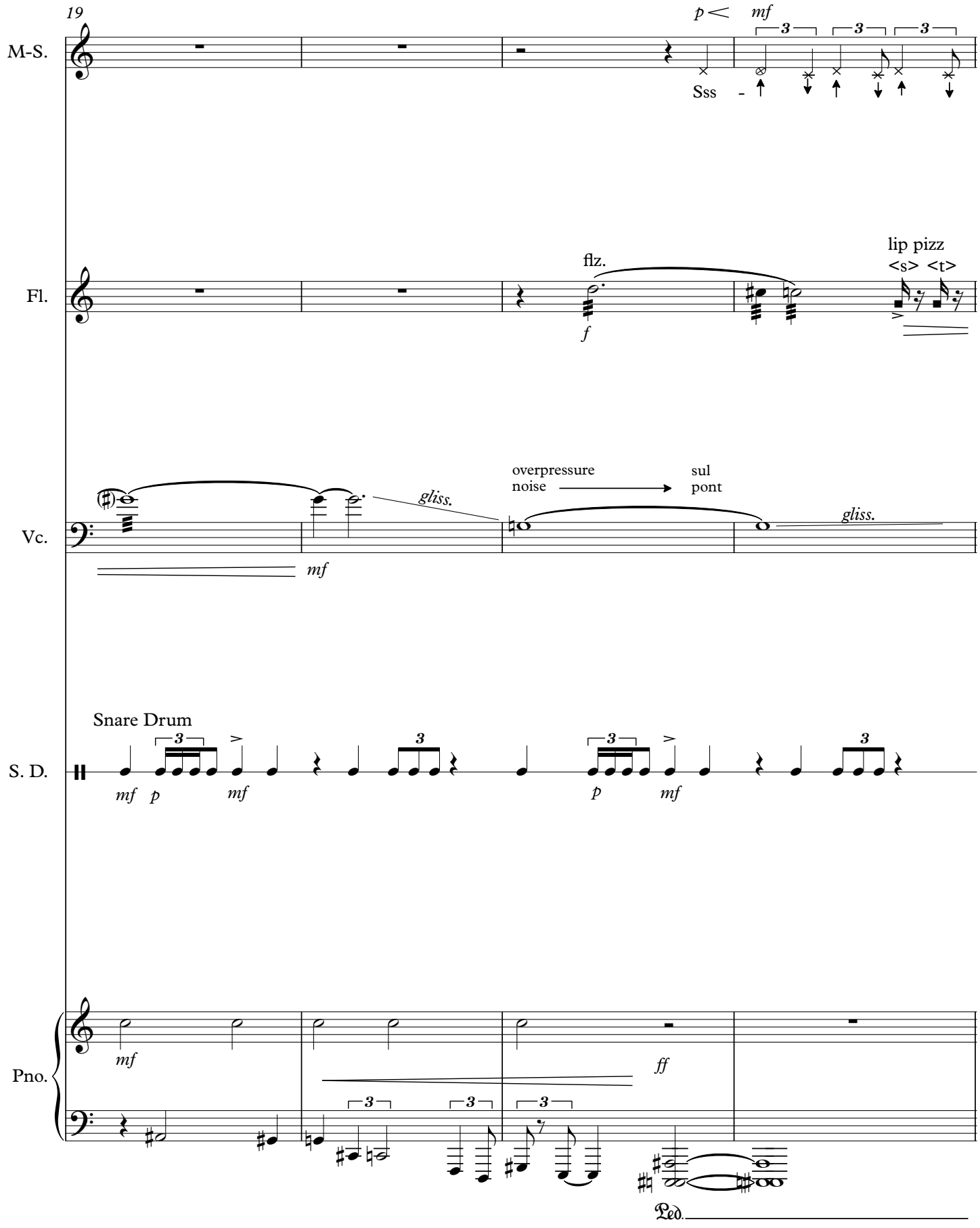

63
Mezzo
p whisper, toneless and breathy
ppp
in-cess - ant rhy- thm slow - ly gnaws out the mar-gins of the world
A. Fl.
<t> <t> <t> <t>
ppp
66
Mezzo
p
ppp
Dis-sol-ving con nec-tive isth - mus in a tiss-ue of tide
A. Fl.
ord. air sound ord. air sound
tongue pizz
<t>
p
ppp
ppp
69
Mezzo
mp
pp
An arch - i - pel - a go of ech - oes
A. Fl.
w.t
(fluctuate pitches)
pp
73
Mezzo
p
ppp
sound the dis-tance be tween va-cant seas
A. Fl.
w.t
(fluctuate pitches)
> pppp
pp pppp

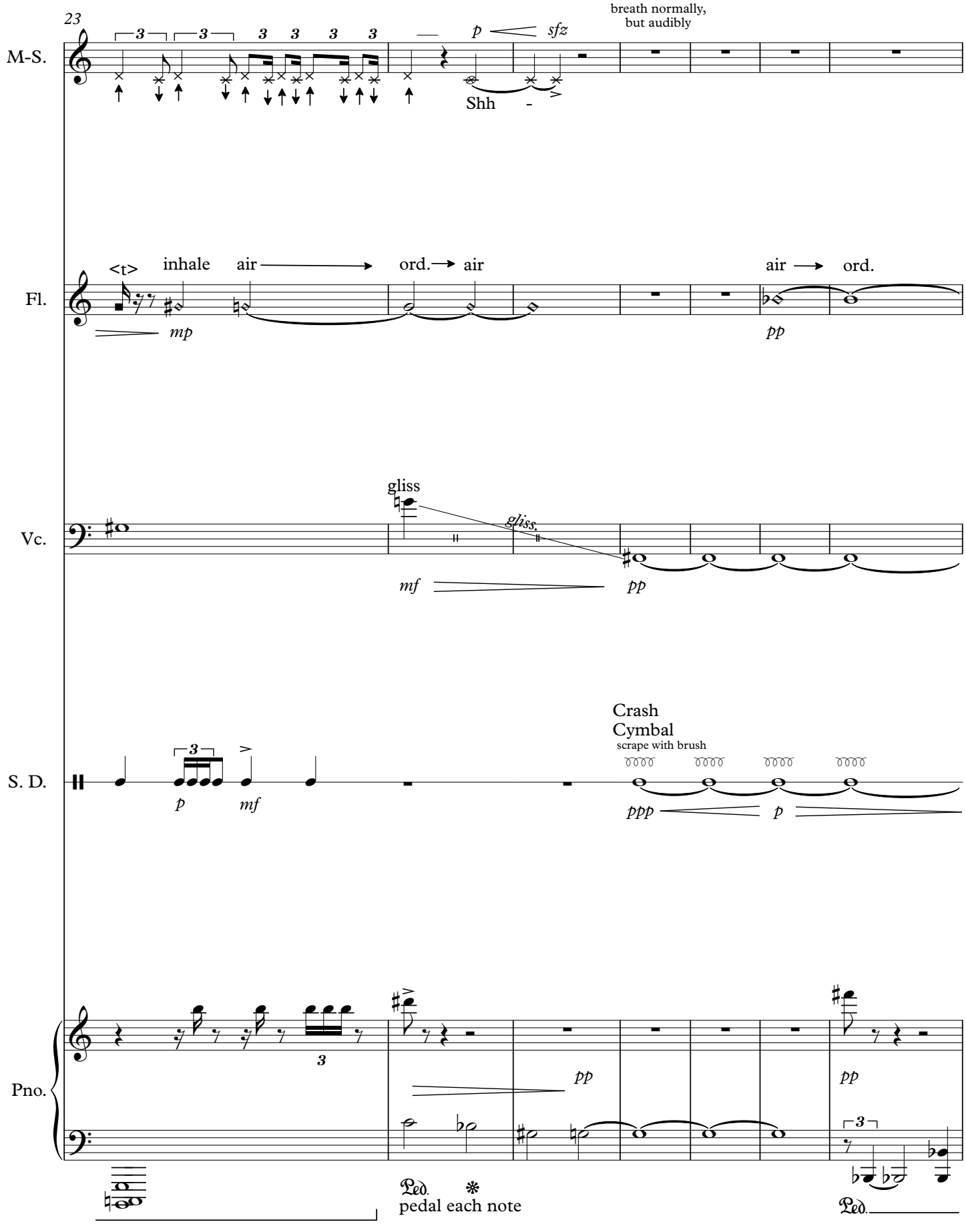
Full Score

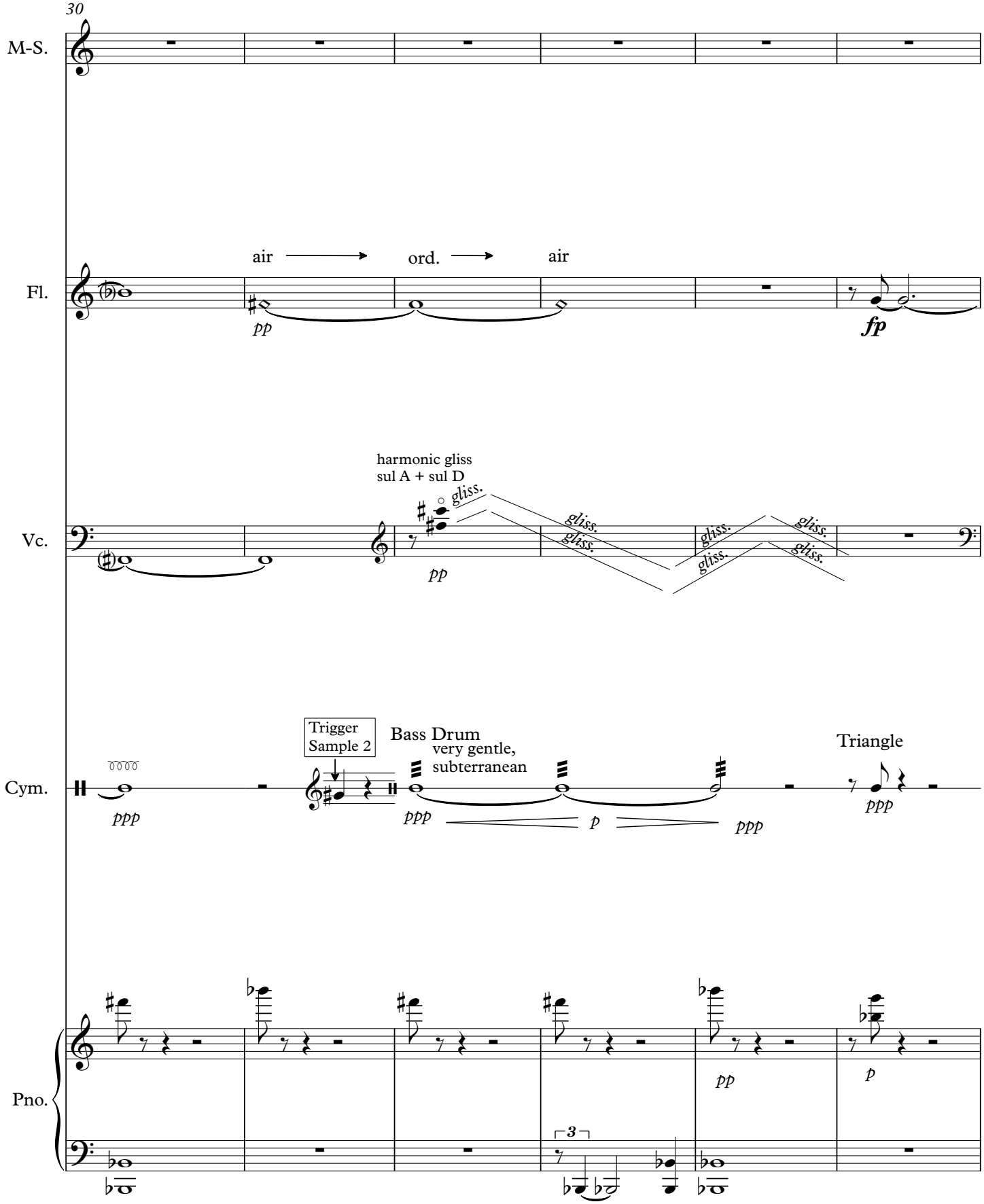
V. Rupture

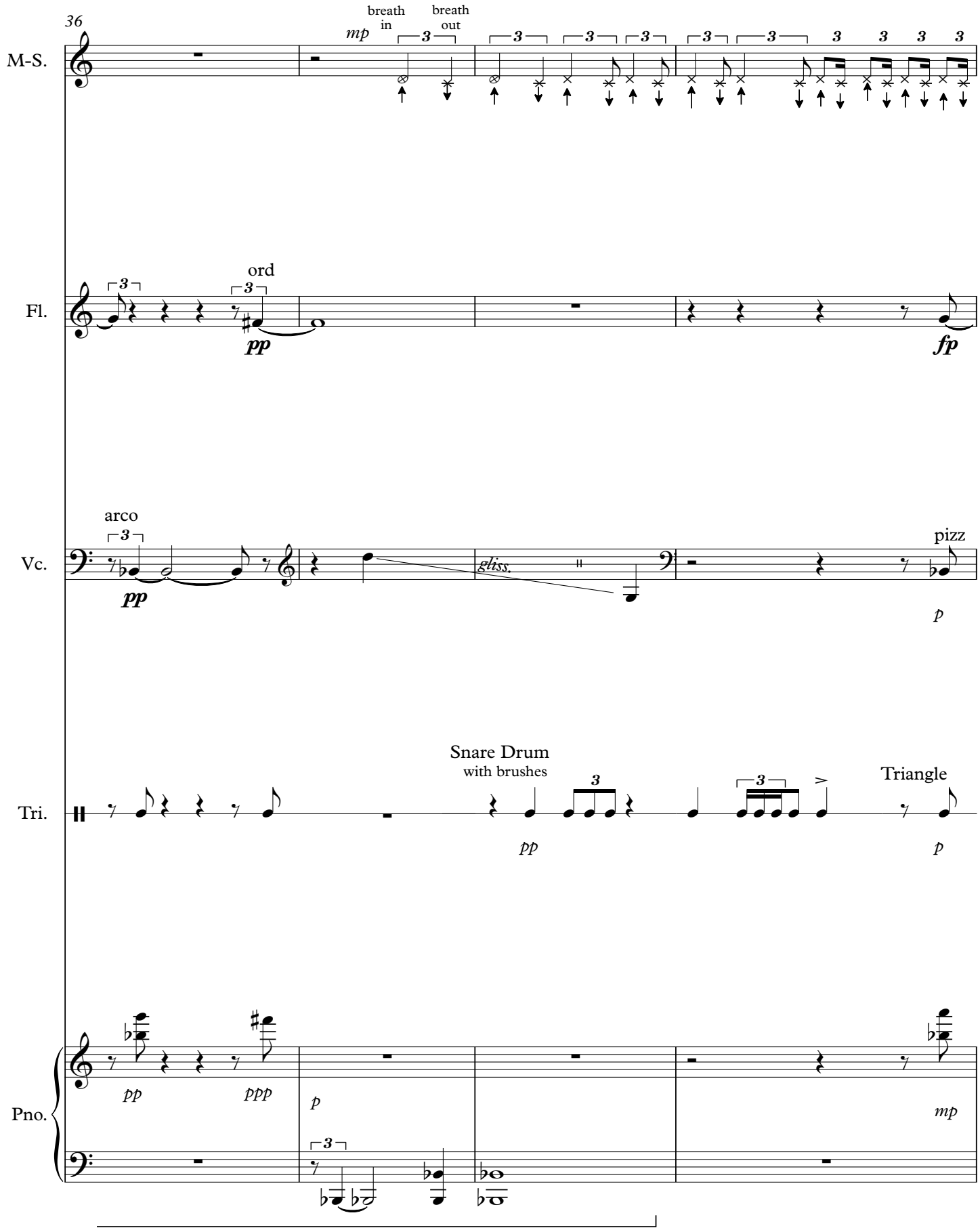


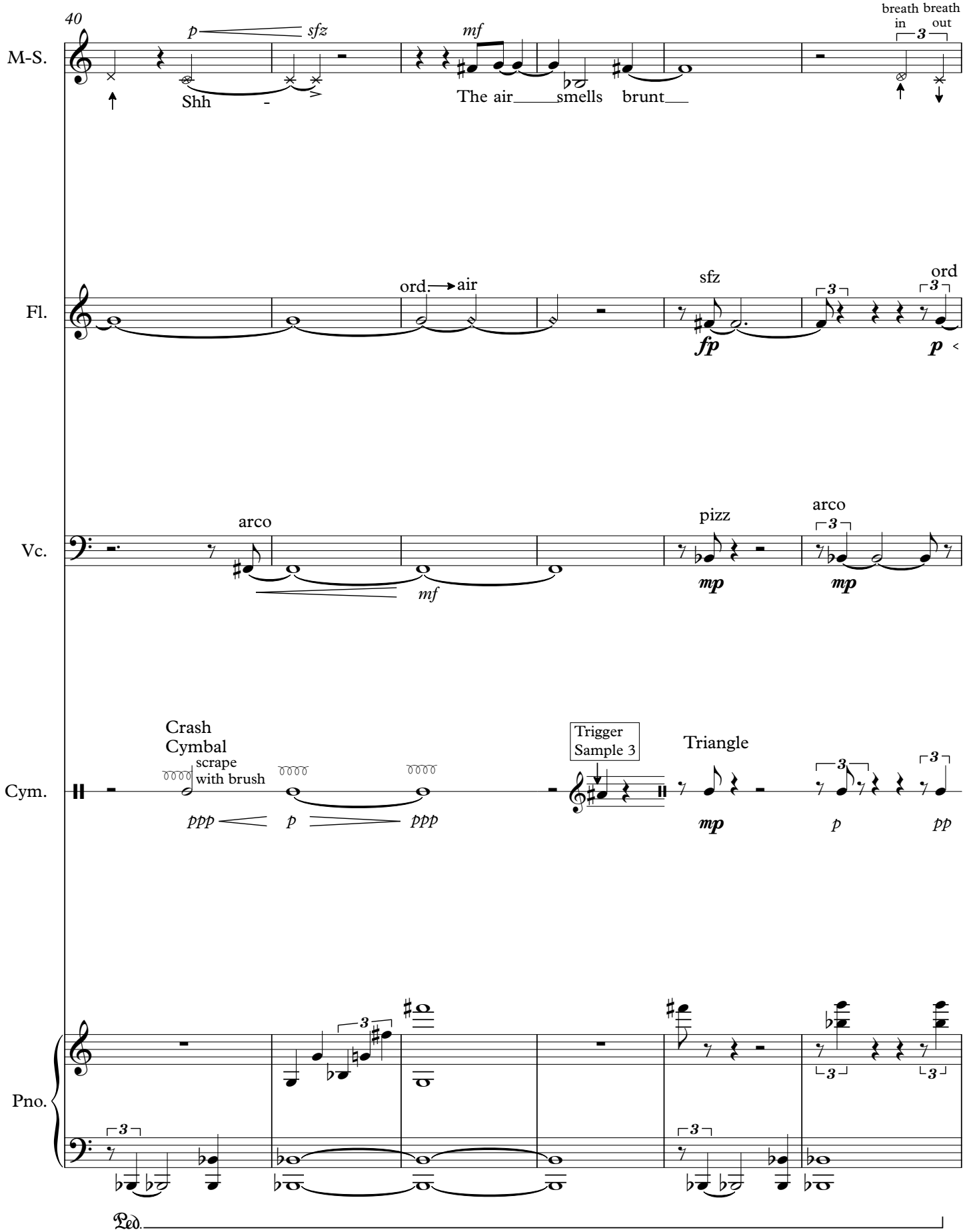


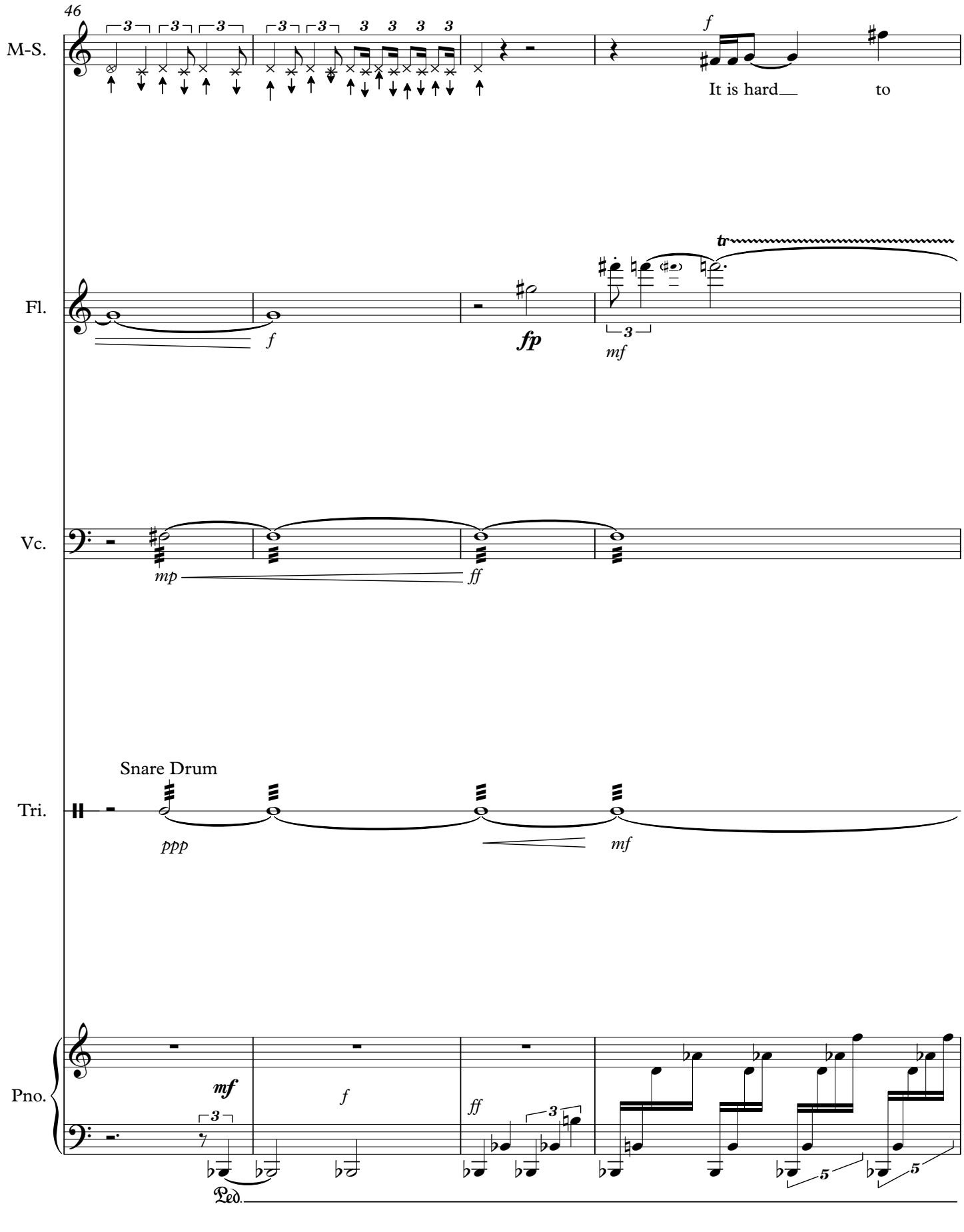

19
M-S.
p <
mf
3
3
3
Sss -
Fl.
flz.
f
lip pizz
<s> <t>
Vc.
overpressure noise
sul pont
gliss.
gliss.
mf
Snare Drum
S. D.
mf p
mf
p
mf
Pno.
mf
ff
Ped.

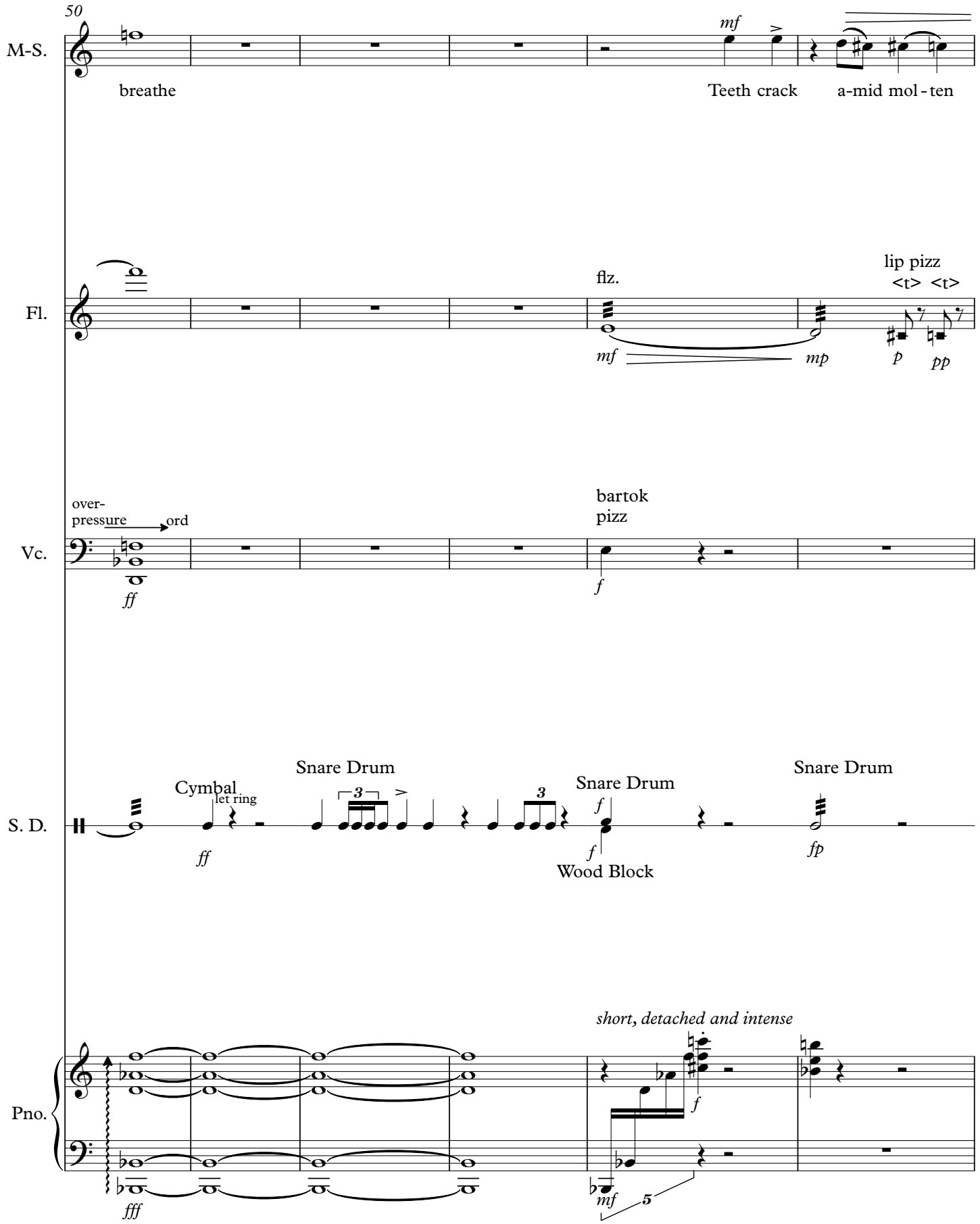

23
M-S.
p
sfz
breath normally,
but audibly
Shh -
Fl.
<t>
inhale
air
ord.
air
air
ord.
mp
pp
Vc.
gliss
gliss.
mf
pp
S. D.
p
mf
Crash
Cymbal
scrape with brush
ppp
p
Pno.
pp
pp
Ped.
pedal each note
Ped.

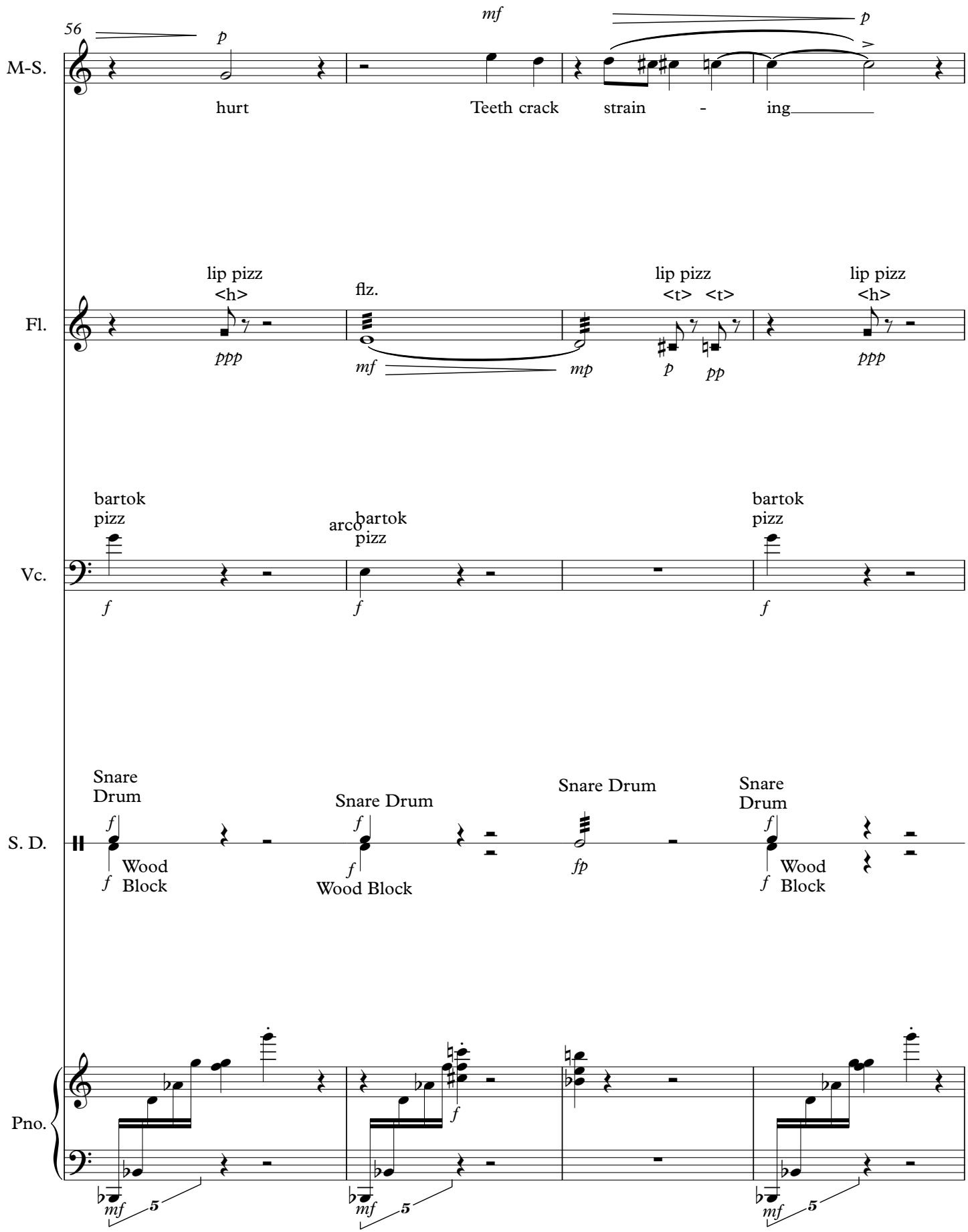

30
M-S.
Fl.
air
ord.
air
pp
fp
Vc.
harmonic gliss
sul A + sul D
gliss.
pp
Cym.
Trigger
Sample 2
Bass Drum
very gentle,
subterranean
Triangle
ppp
p
Pno.
3

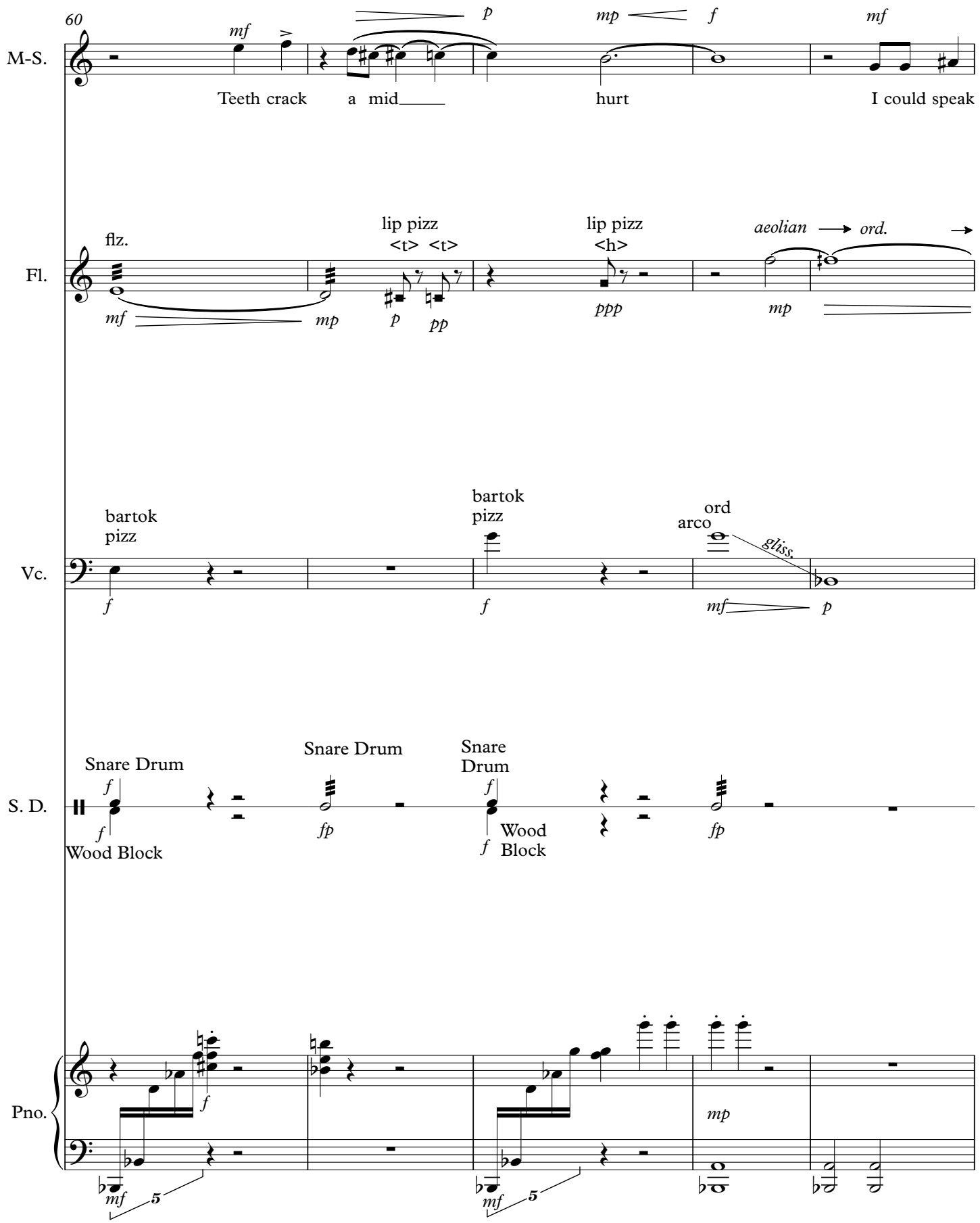

36
M-S.
mp
breath in
breath out
Fl.
ord
pp
fp
Vc.
arco
pp
gliss.
pizz
p
Tri.
Snare Drum
with brushes
pp
Triangle
p
Pno.
pp
ppp
p
mp

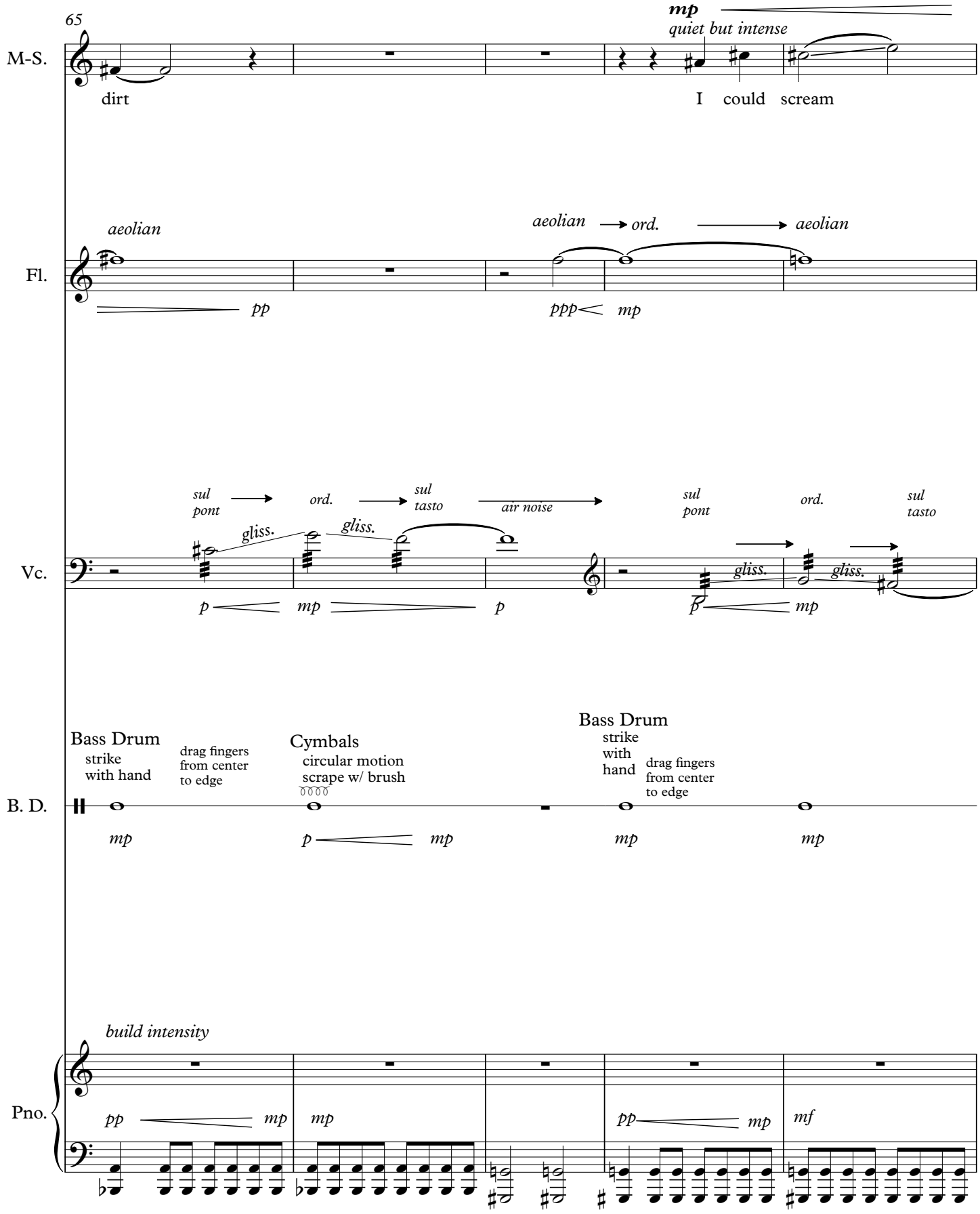

40
M-S.
p
sfz
mf
Shh
-
The air
smells
brunt
breath
in
breath
out
3
Fl.
ord.
air
sfz
fp
3
ord
p
Vc.
arco
mf
pizz
mp
arco
3
mp
Cym.
Crash
Cymbal
scrape
with brush
ppp
p
ppp
Trigger
Sample 3
Triangle
mp
3
p
3
pp
Pno.
3
3
3
3
3
Ped.

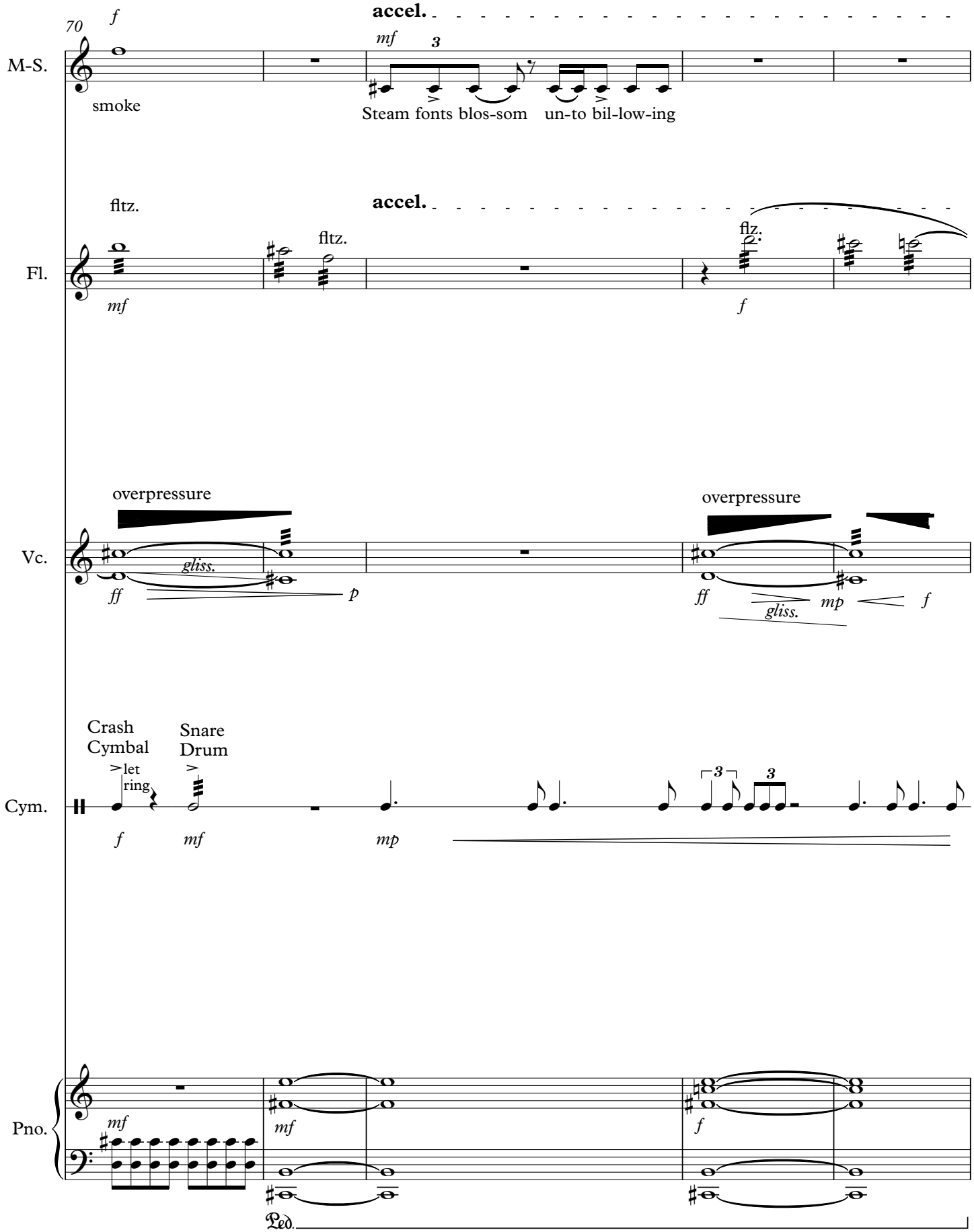

46
M-S.
It is hard to
Fl.
Vc.
Tri.
Snare Drum
Pno.
Ped.

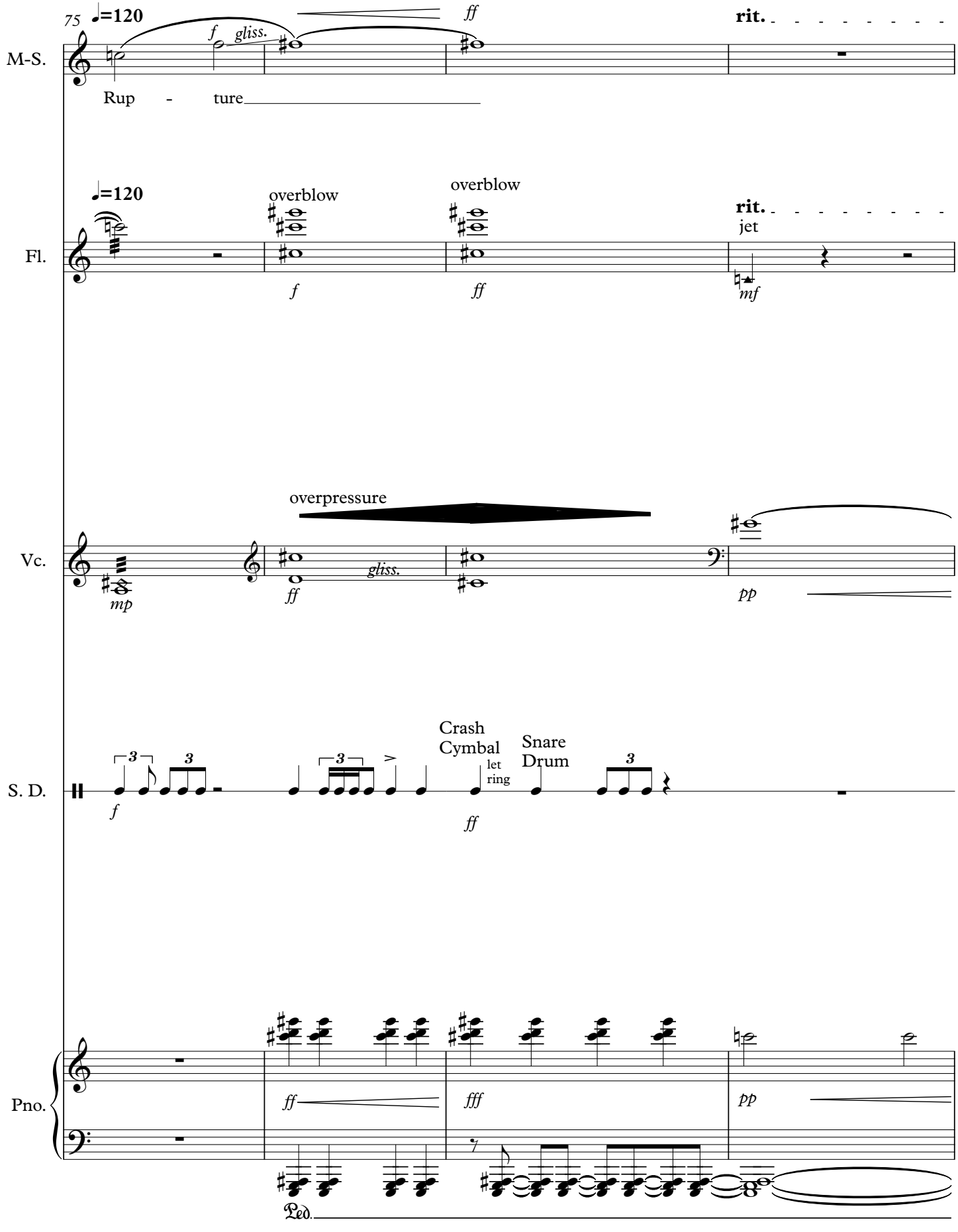

50
M-S.
breathe
mf
Teeth crack
a-mid mol - ten
Fl.
flz.
mf
mp
lip pizz
<t> <t>
p
pp
Vc.
over-
pressure
ord
ff
bartok
pizz
f
S. D.
Cymbal
let ring
ff
Snare Drum
3
3
Snare Drum
f
f
Wood Block
Snare Drum
fp
Pno.
short, detached and intense
f
fff
mf
5

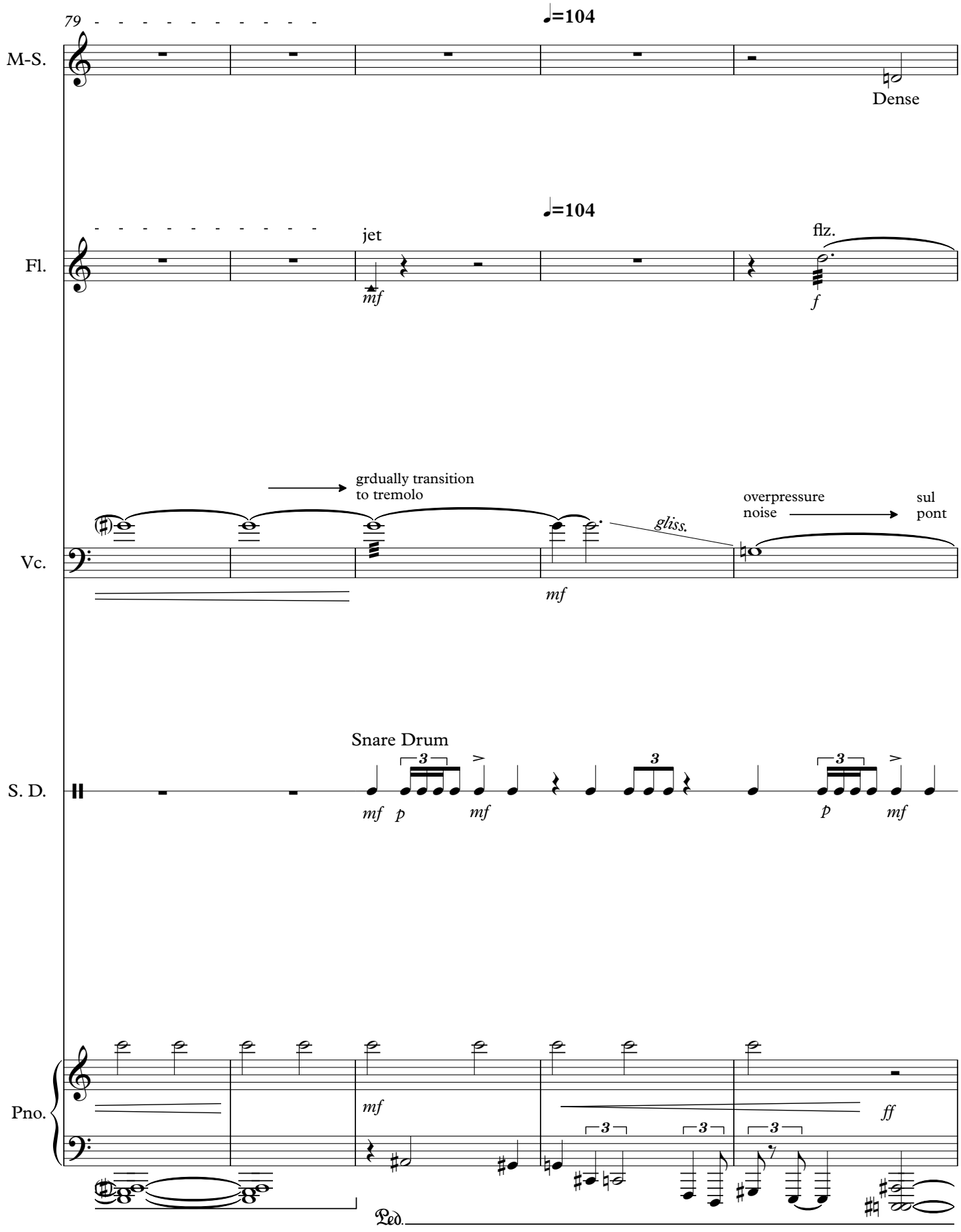

56
M-S.
p
mf
p
hurt
Teeth crack
strain - ing
Fl.
lip pizz
<h>
ppp
flz.
mf
mp
lip pizz
<t> <t>
p
pp
lip pizz
<h>
ppp
Vc.
bartok
pizz
f
arco
bartok
pizz
f
bartok
pizz
f
S. D.
Snare
Drum
f
Wood
Block
f
Snare Drum
f
Wood Block
f
Snare Drum
fp
Snare
Drum
f
Wood
Block
f
Pno.
mf
5
f
mf
5
mf
5

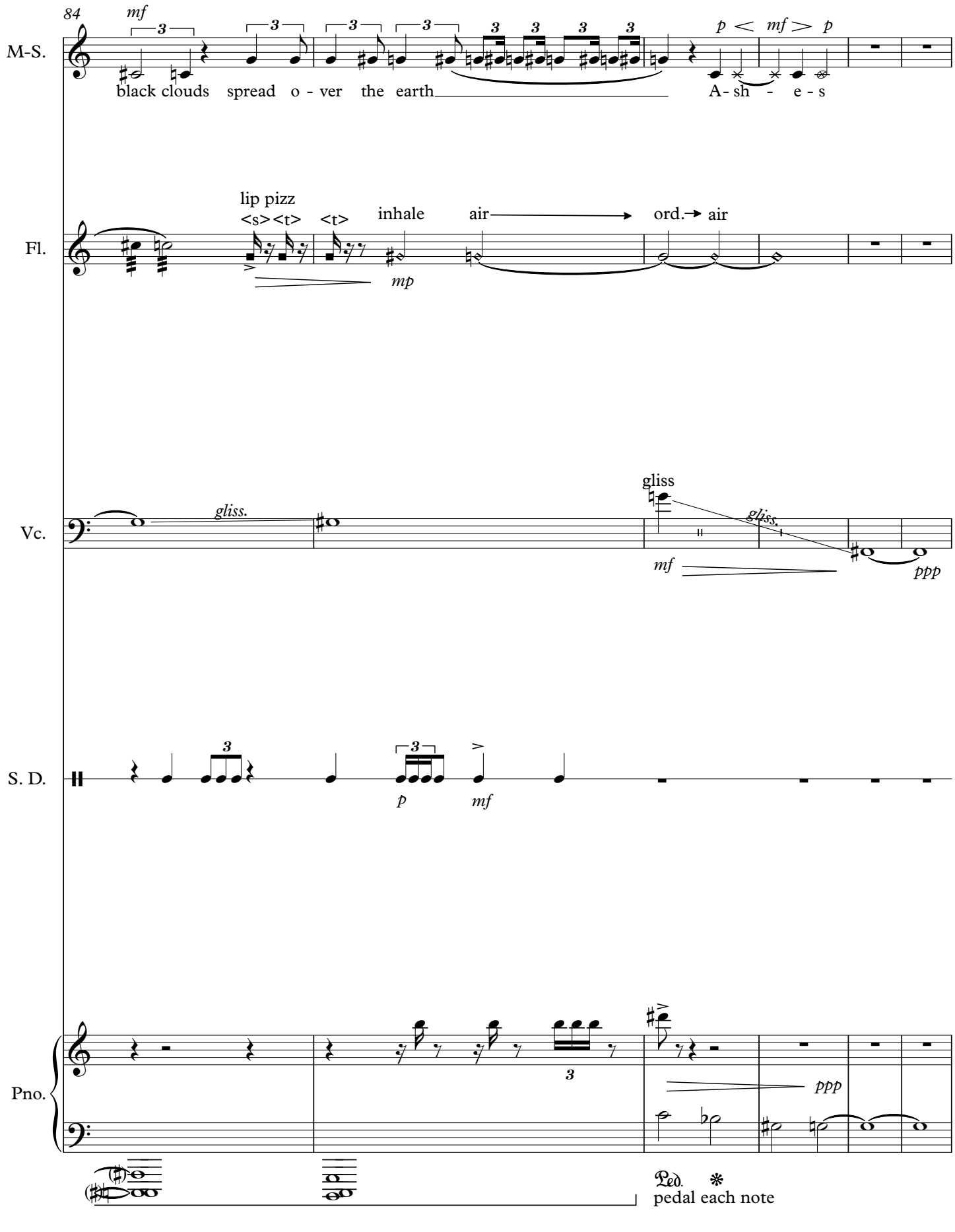

60
M-S.
mf
p
mp
f
mf
Teeth crack
a mid
hurt
I could speak
Fl.
flz.
mf
mp
lip pizz
<t> <t>
p
pp
lip pizz
<h>
ppp
aeolian
ord.
mp
Vc.
bartok
pizz
f
bartok
pizz
f
ord
arco
gliss.
mf
p
S. D.
Snare Drum
f
f
Wood Block
Snare Drum
fp
Snare
Drum
f
f
Wood
Block
fp
Pno.
f
mf
5
mp
mf
5

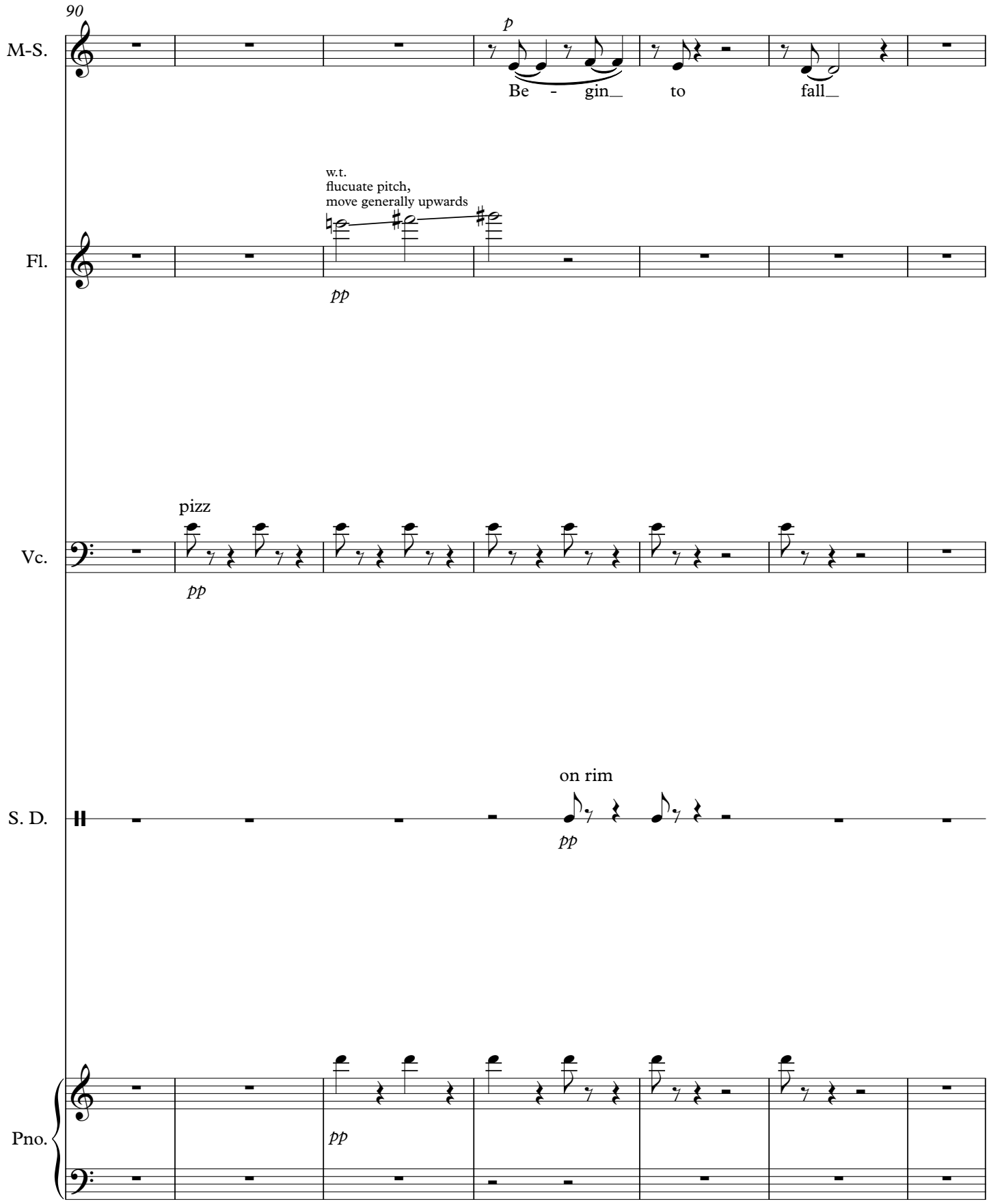

65
M-S.
mp
quiet but intense
dirt
I could scream
Fl.
aeolian
pp
aeolian
ord.
aeolian
ppp
mp
Vc.
sul pont
gliss.
ord.
gliss.
sul tasto
p
mp
air noise
p
sul pont
gliss.
p
ord.
gliss.
mp
sul tasto
B. D.
Bass Drum
strike with hand
drag fingers from center to edge
mp
Cymbals
circular motion
scrape w/ brush
p
mp
Bass Drum
strike with hand
drag fingers from center to edge
mp
mp
Pno.
build intensity
pp
mp
mp
pp
mp
mf

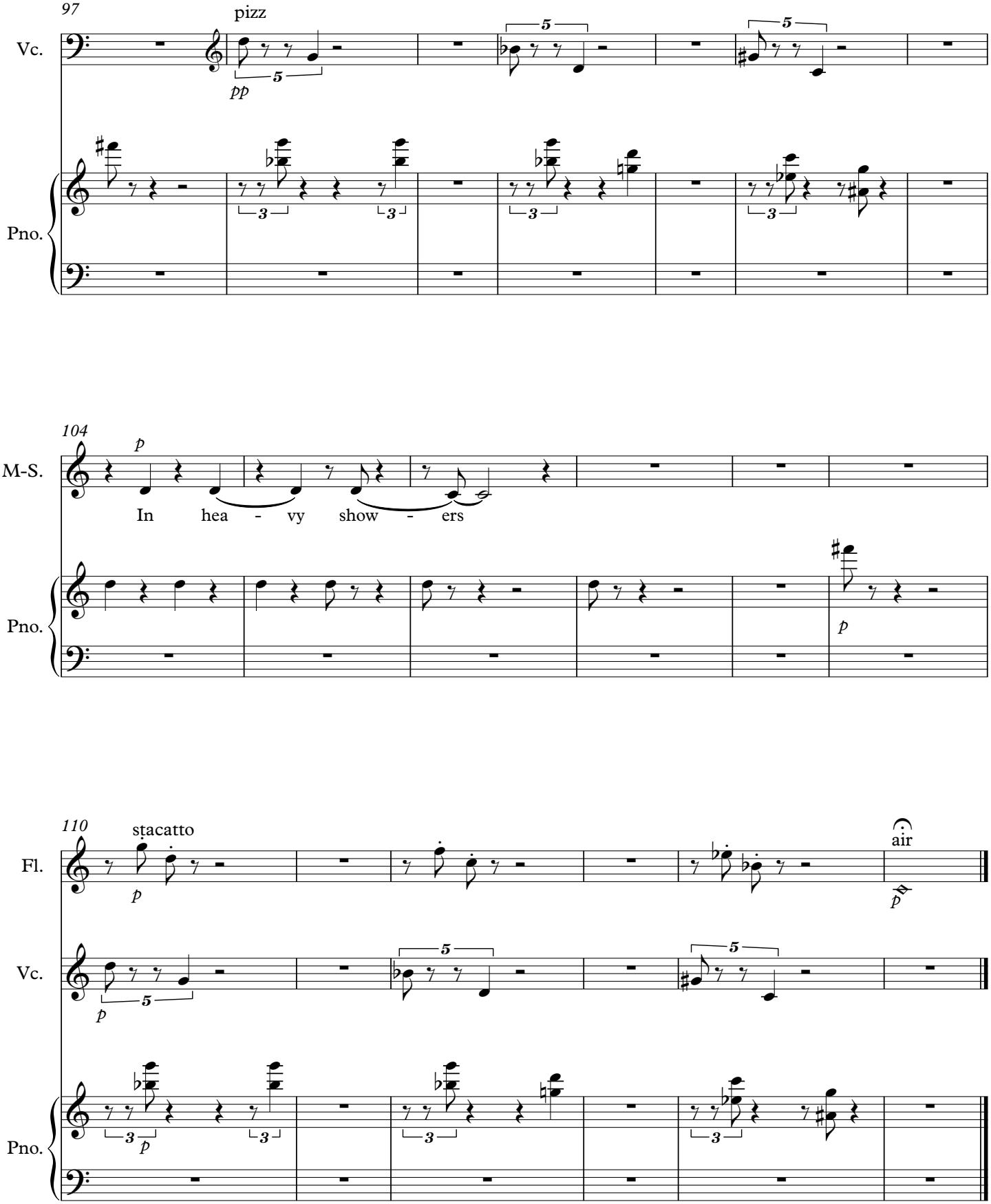

70
f
accel.
mf
3
M-S.
smoke
Steam fonts blos-som un-to bil-low-ing
fltz.
accel.
fltz.
flz.
Fl.
mf
f
overpressure
overpressure
Vc.
gliss.
ff
p
ff
mp
f
gliss.
Crash Cymbal
let ring
Snare Drum
Cym.
f
mf
mp
3
3
Pno.
mf
mf
f
Ped.


75
♩=120
f
gliss.
ff
rit.
M-S.
Rup - ture
♩=120
overblow
overblow
rit.
jet
Fl.
f
ff
mf
overpressure
Vc.
mp
ff
gliss.
pp
Crash Cymbal
let ring
Snare Drum
S. D.
f
ff
Pno.
ff
fff
pp
Ped.

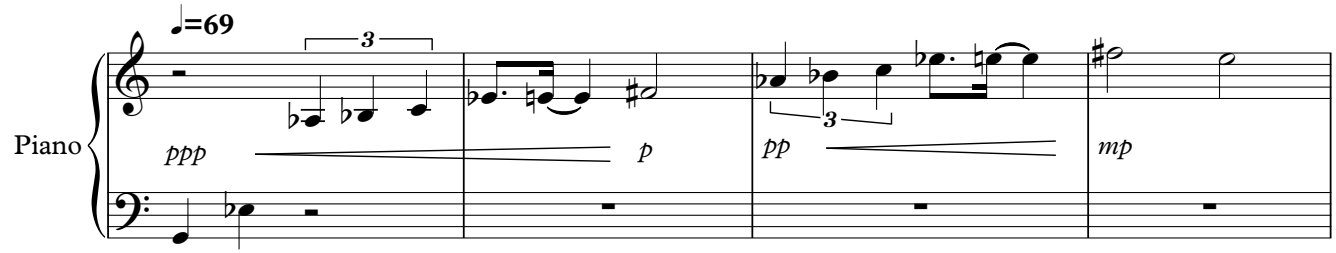

79
♩=104
M-S.
Dense
♩=104
jet
flz.
Fl.
mf
f
grdually transition
to tremolo
overpressure
noise
sul
pont
gliss.
Vc.
mf
Snare Drum
S. D.
mf p mf
p mf
Pno.
mf
ff
Ped.

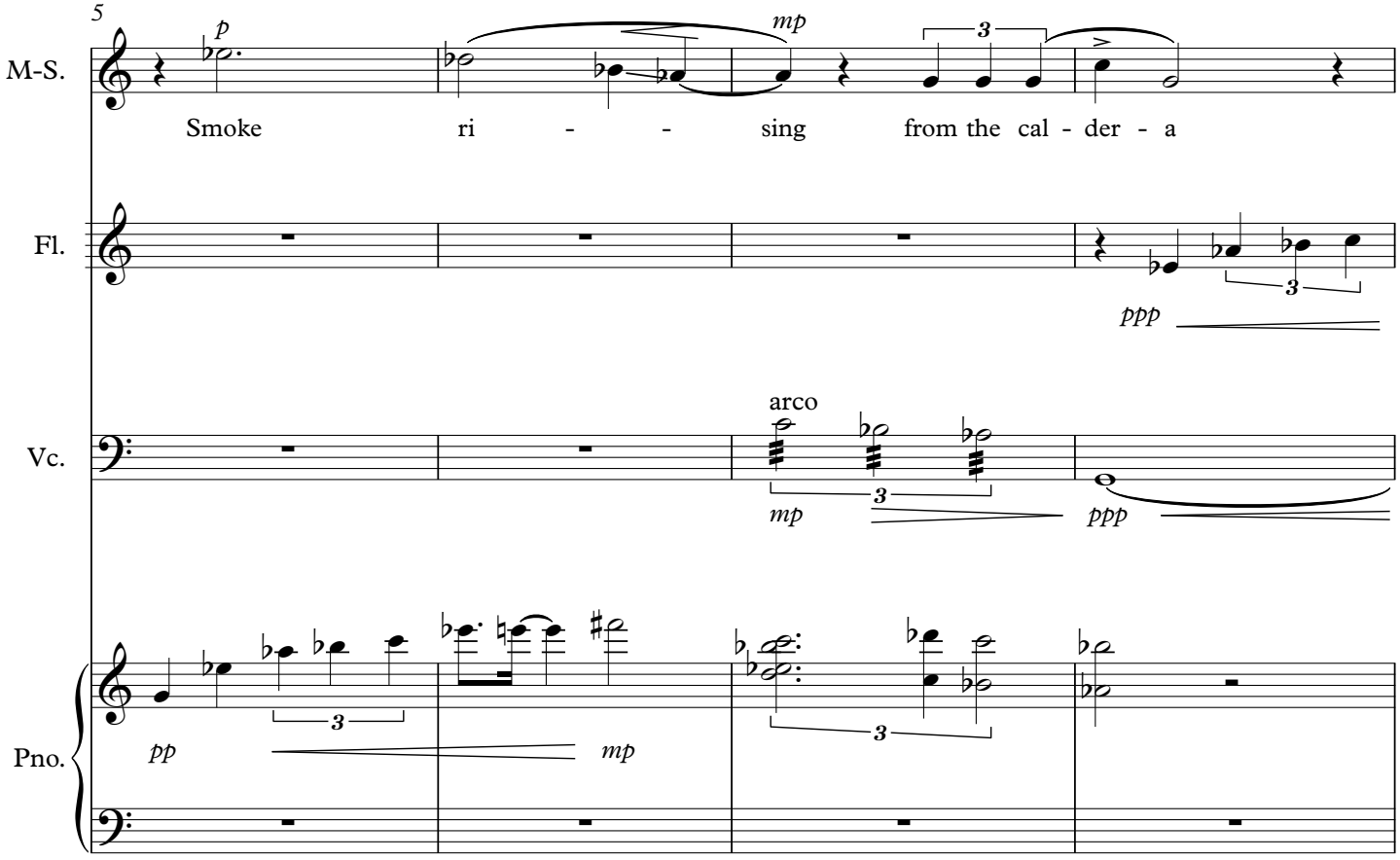

84
mf
M-S.
black clouds spread o - ver the earth
p < mf > p
A- sh - e - s
Fl.
lip pizz
<s> <t>
<t>
inhale
air
ord. air
mp
Vc.
gliss.
gliss
gliss.
mf
ppp
S. D.
p
mf
Pno.
ppp
Ped.
pedal each note

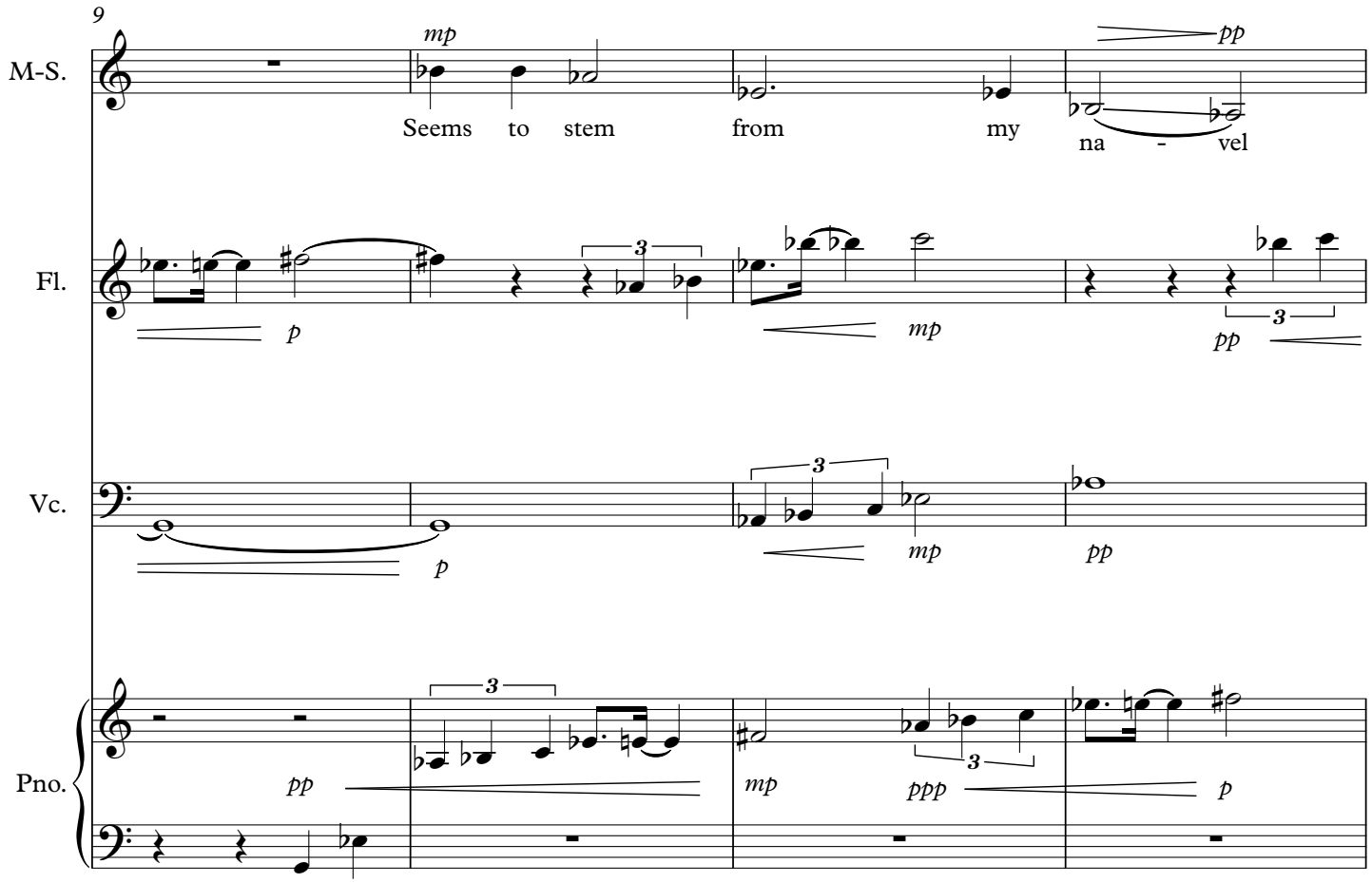

90
M-S.
p
Be - gin_ to fall_
w.t.
flucuate pitch,
move generally upwards
Fl.
pp
pizz
Vc.
pp
on rim
S. D.
pp
Pno.
pp

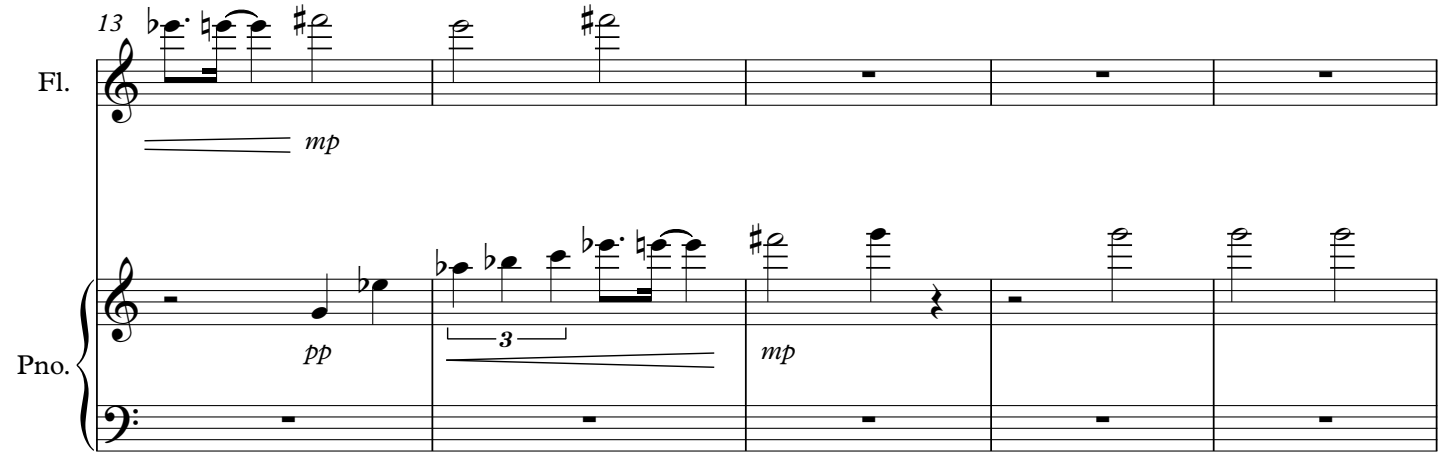

97
pizz
Vc.
pp
Pno.
104
M-S.
p
In hea - vy show - ers
Pno.
p
110
Fl.
stacatto
p
air
Vc.
p
Pno.
p

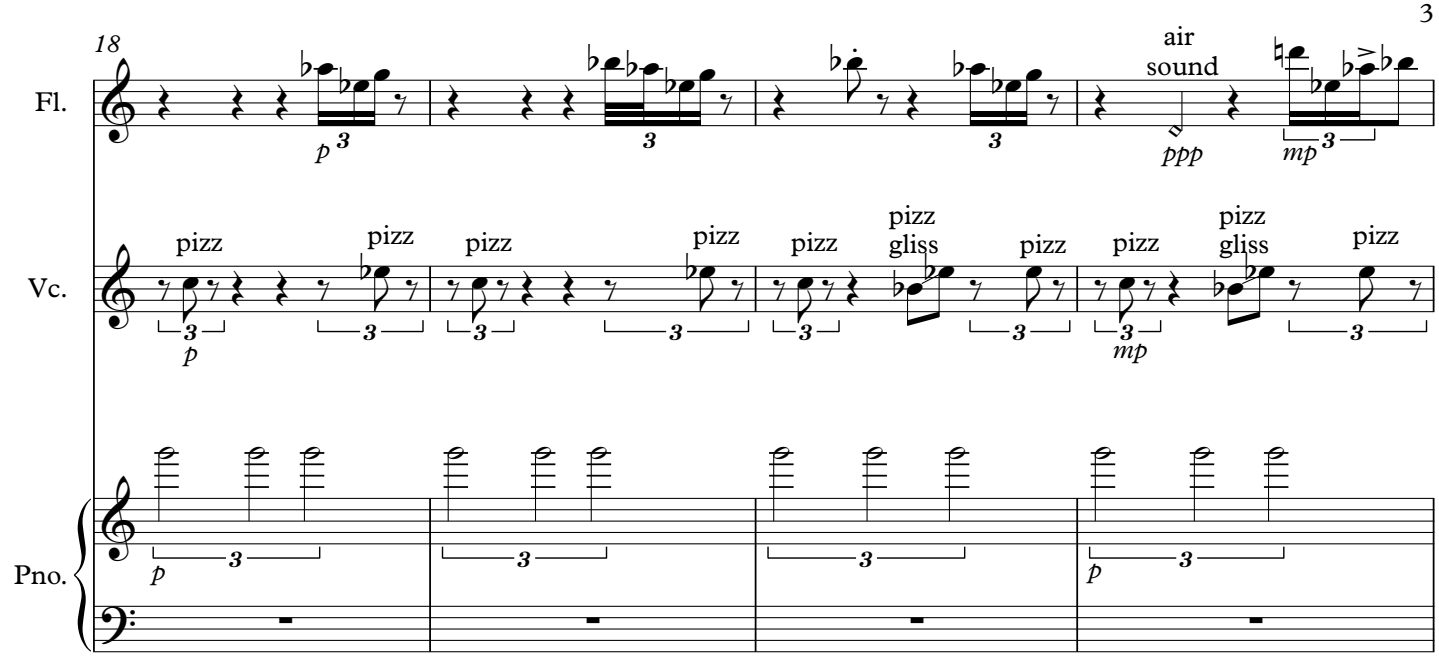
VI. Smoke rising from the caldera,
seemed to stem from my navel.

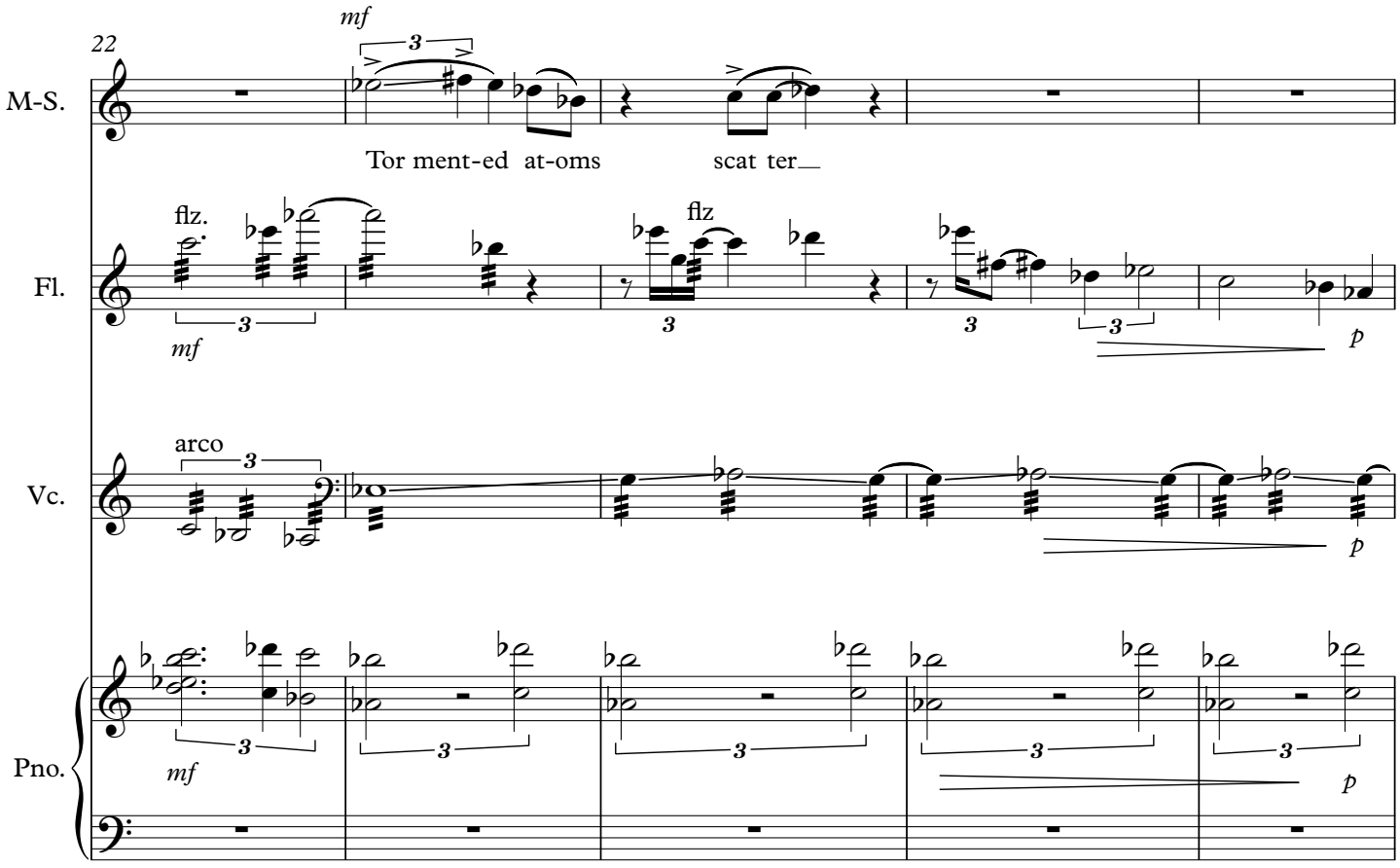


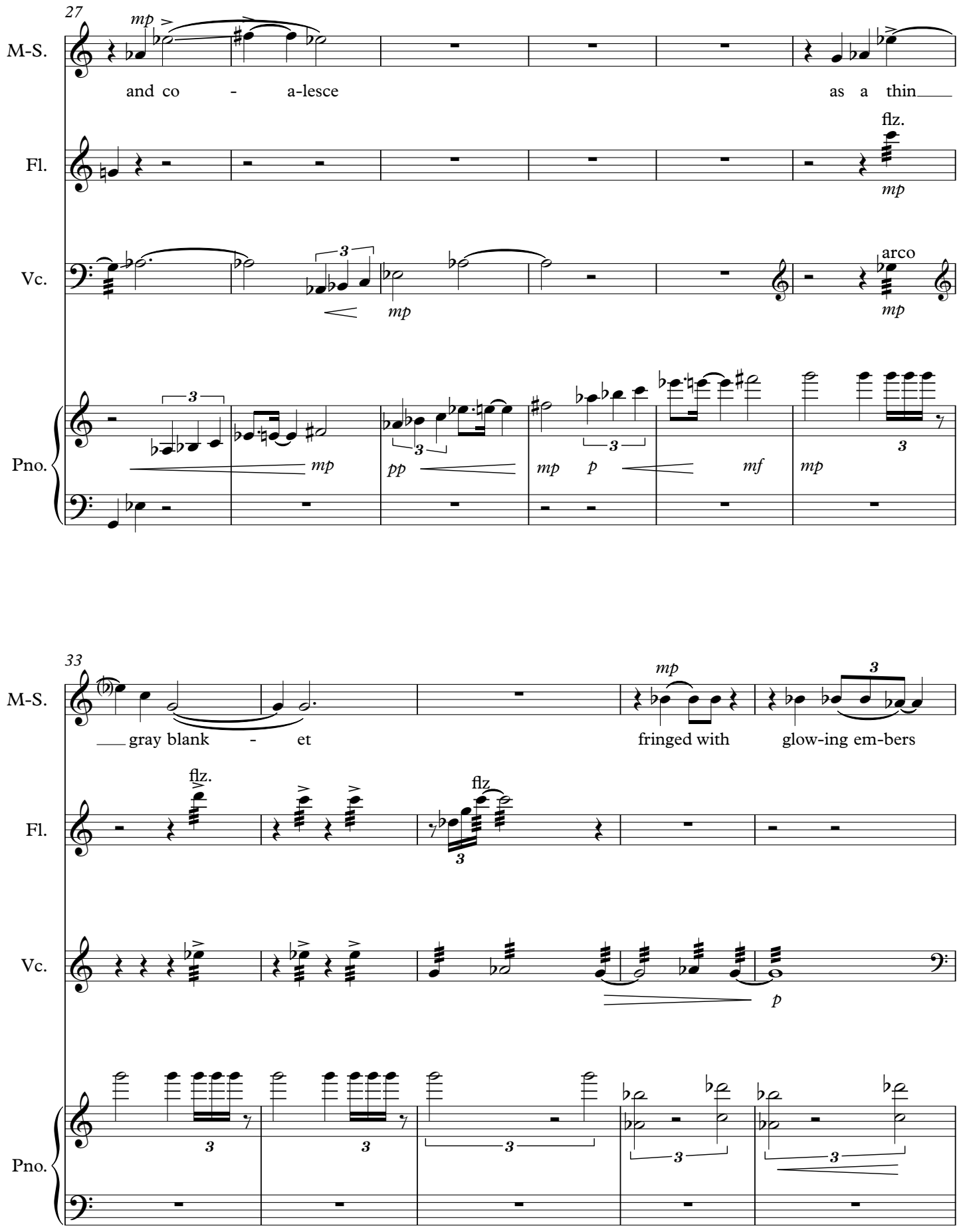


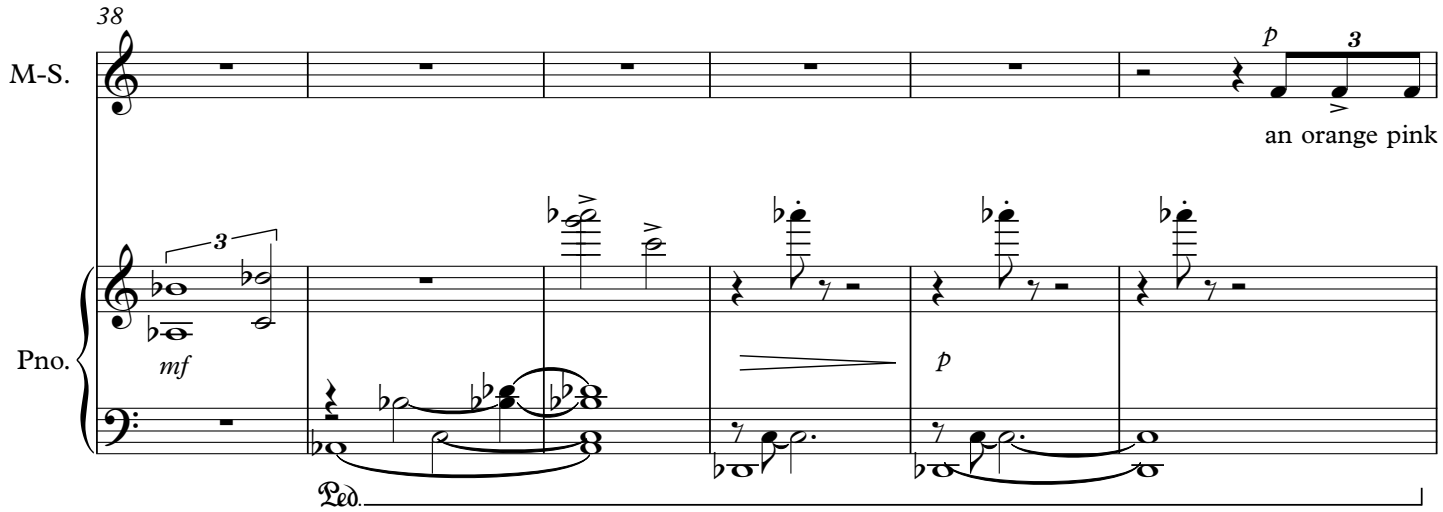

9
M-S.
mp
pp
Seems to stem from my na - vel
Fl.
p
mp
pp
Vc.
p
mp
pp
Pno.
pp
mp
ppp
p

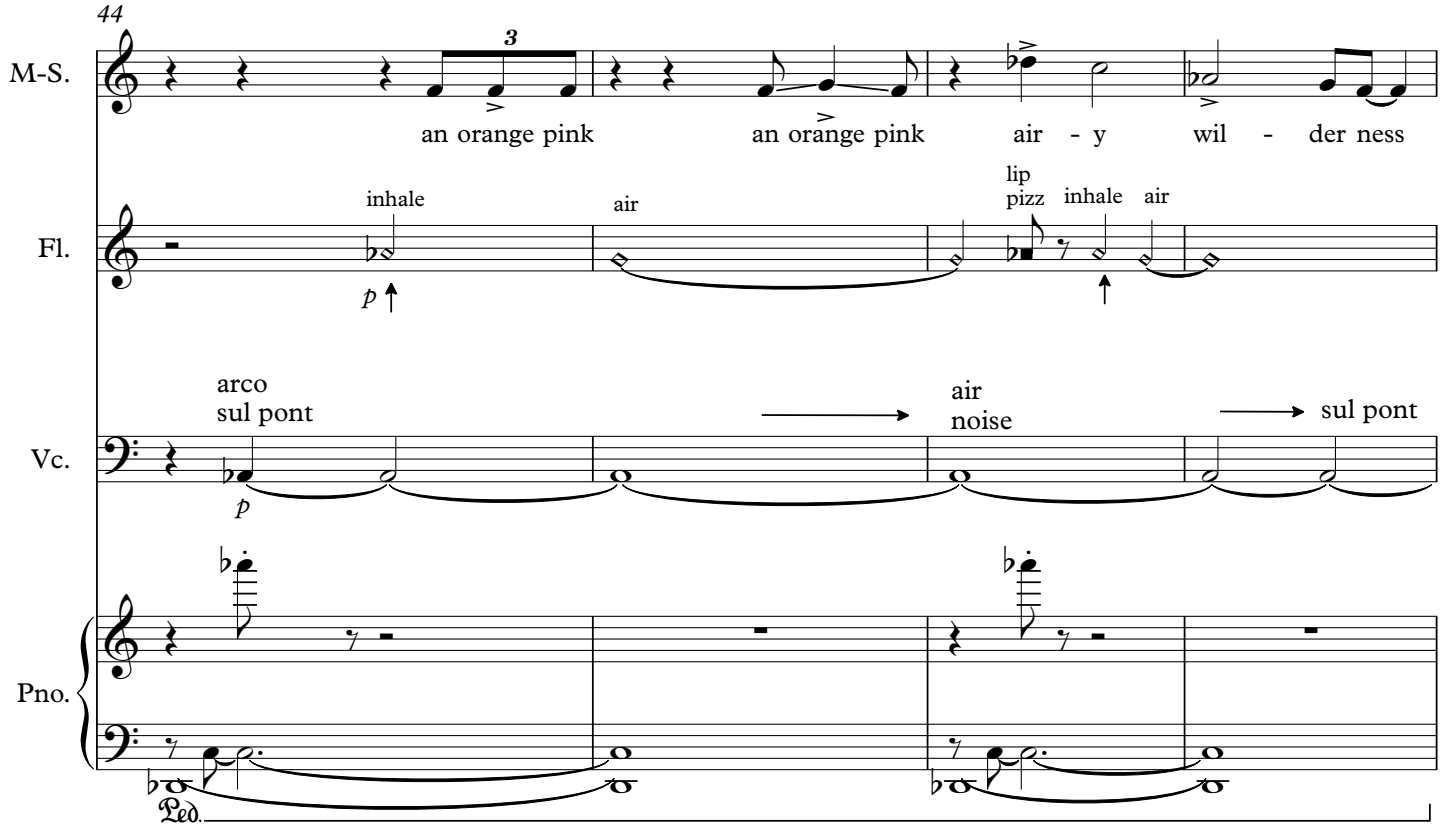

13
Fl.
mp
Pno.
pp
mp

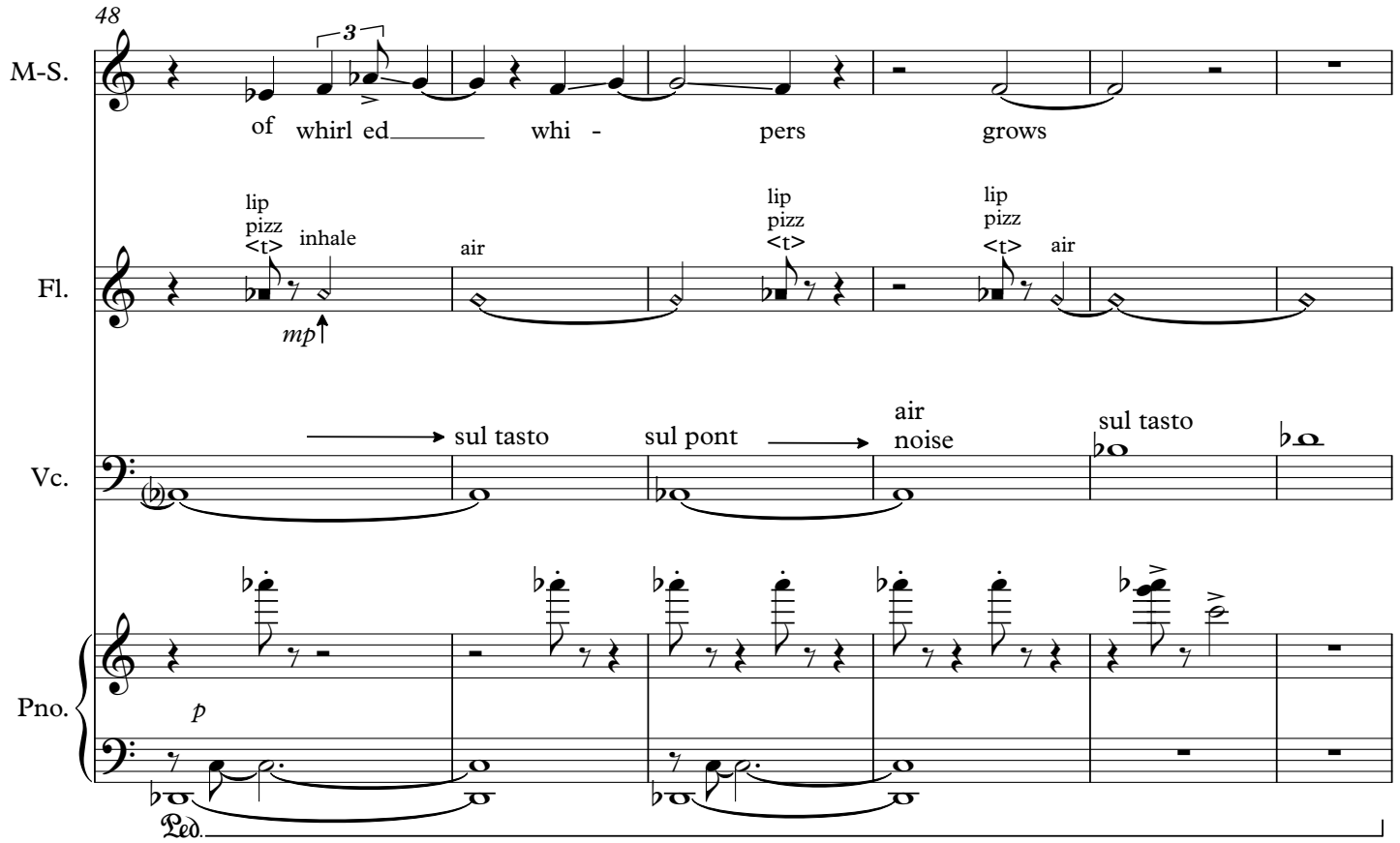

18
Fl.
Vc.
Pno.
air
sound
pizz
gliss
ppp
mp
p

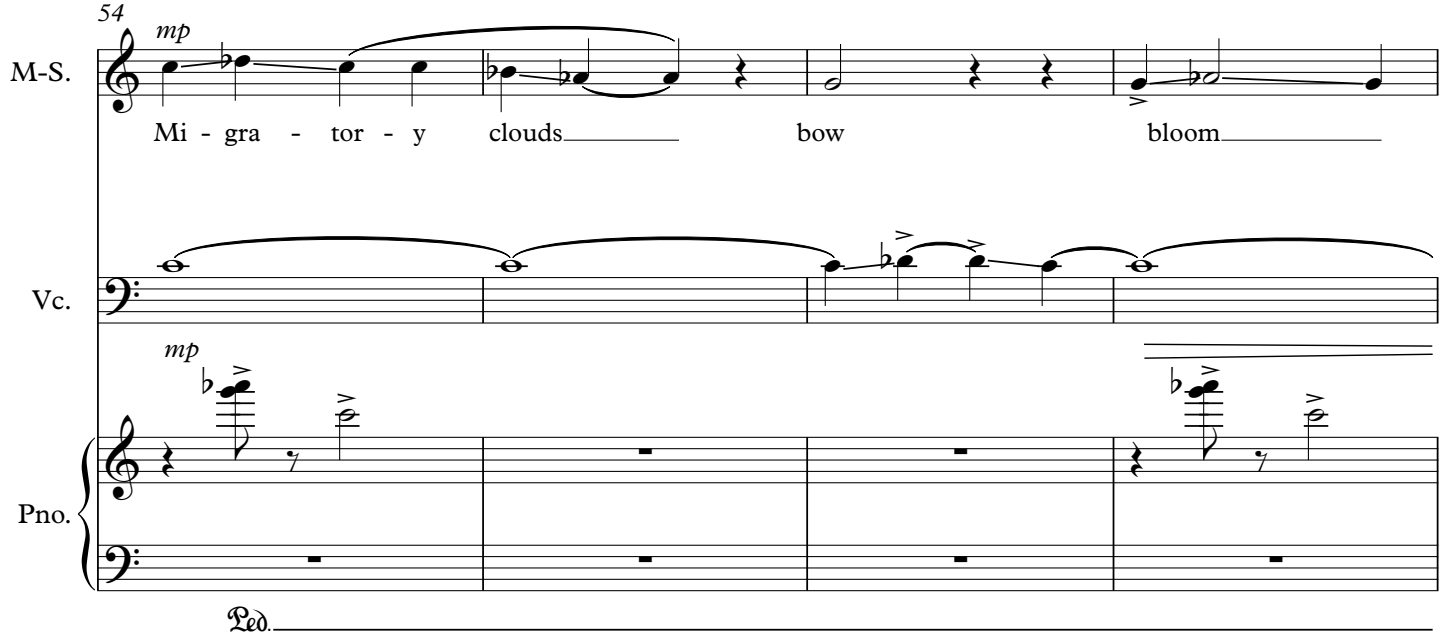

22
M-S.
Fl.
Vc.
Pno.
mf
Tor ment-ed at-oms
scat ter
flz.
flz
arco
p

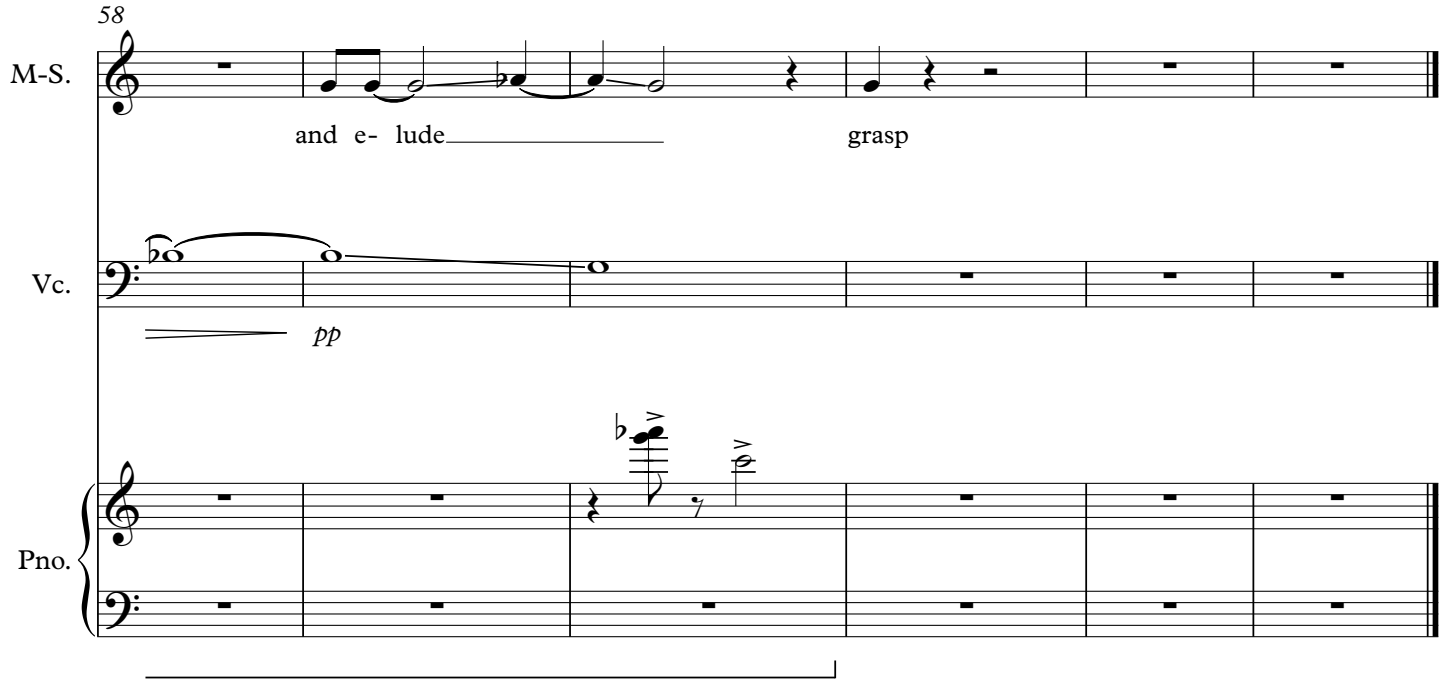

27
M-S.
mp
and co - a-lesce
as a thin
Fl.
flz.
mp
Vc.
arco
mp
mp
Pno.
mp
pp
mp
p
mf
mp
33
M-S.
mp
gray blank - et
fringed with
glow-ing em-bers
Fl.
flz.
flz
Vc.
p
Pno.


38
M-S.
p
3
an orange pink
Pno.
3
mf
p
Ped.

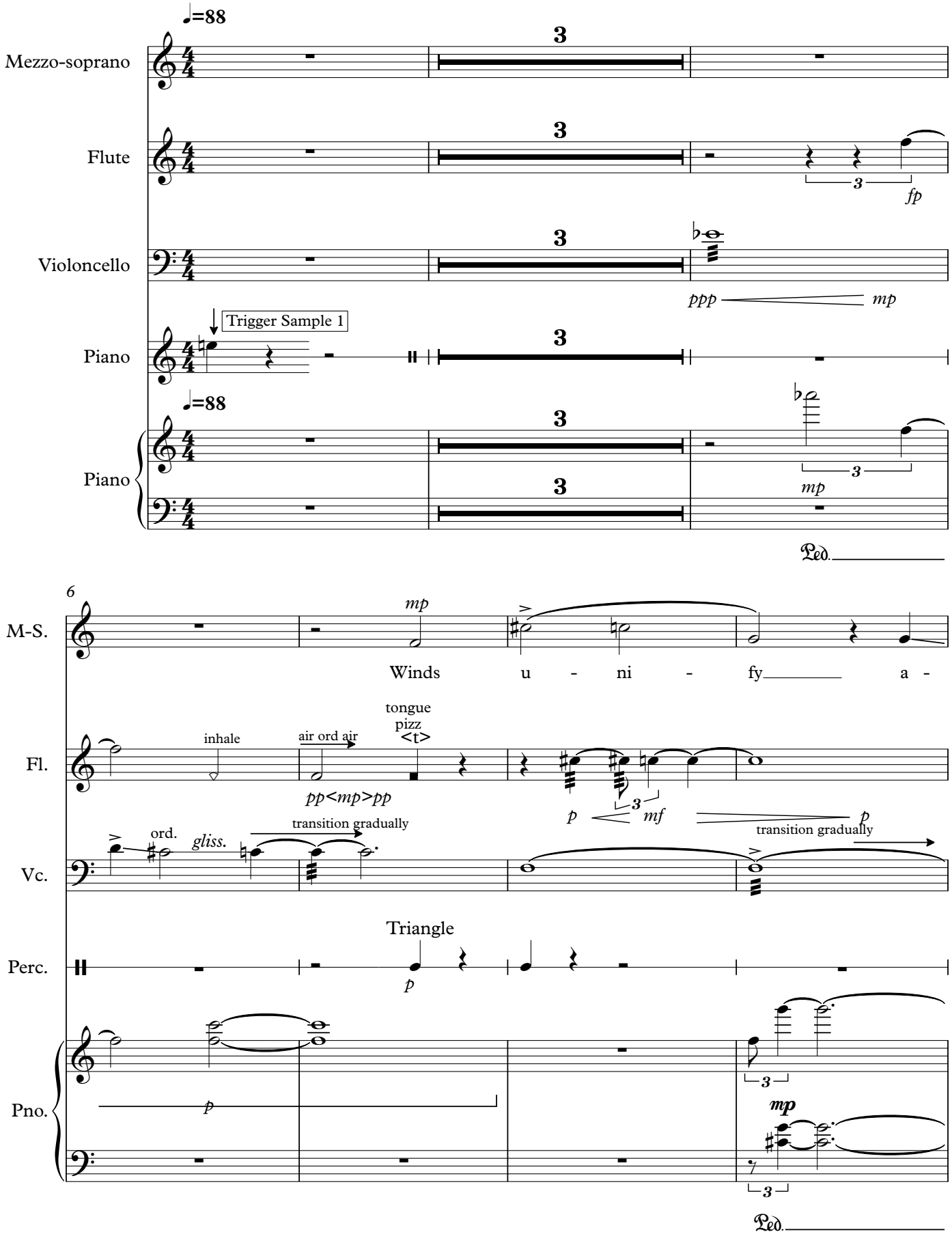

44
M-S.
3
an orange pink
an orange pink
air - y
wil - der ness
Fl.
inhale
air
lip pizz
inhale
air
p
Vc.
arco
sul pont
air
noise
sul pont
p
Pno.
Ped.

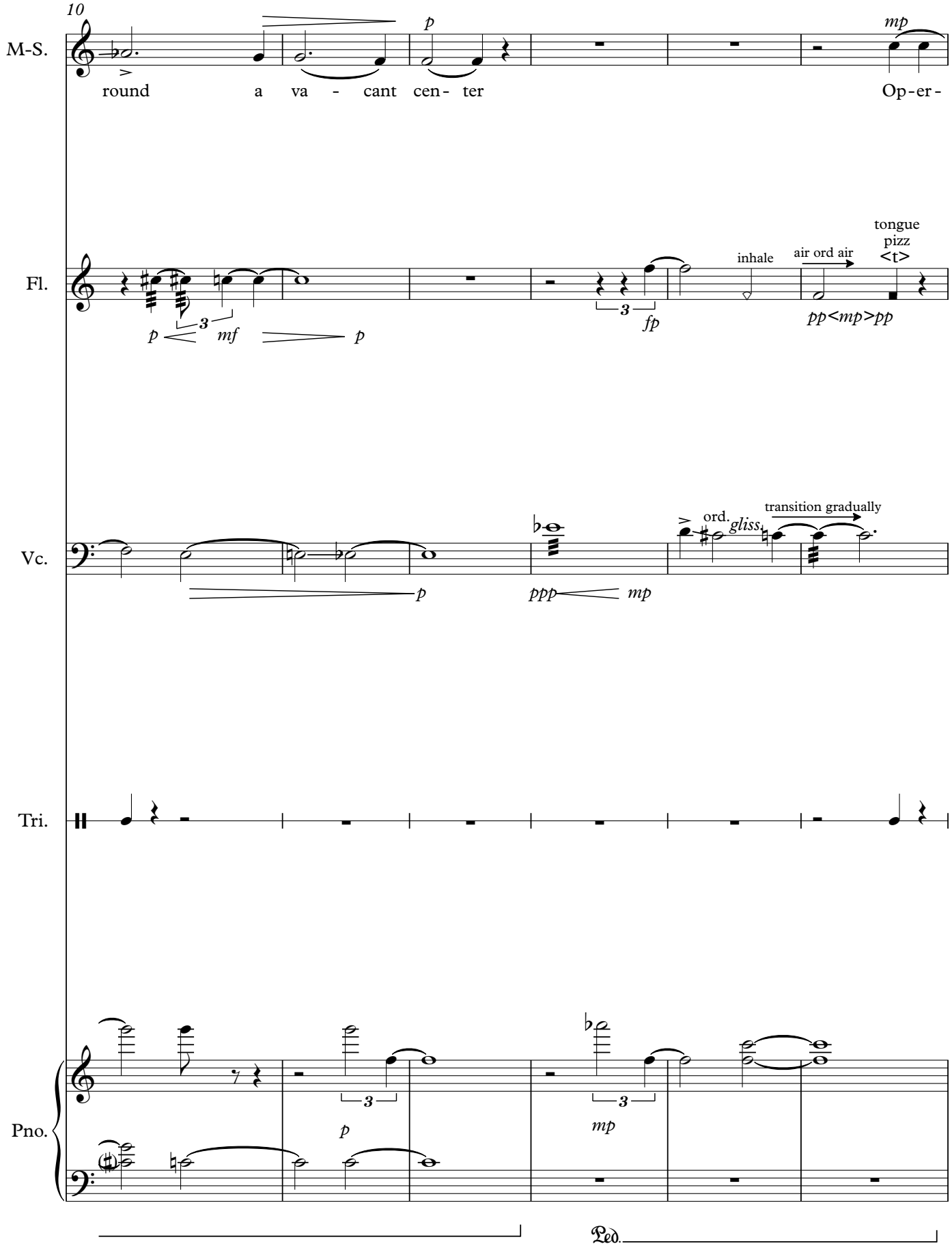

48
M-S.
3
of whirl ed whi - pers grows
Fl.
lip pizz <t>
inhale
mp
air
lip pizz <t>
lip pizz <t>
air
Vc.
sul tasto
sul pont
air noise
sul tasto
Pno.
p
Ped.

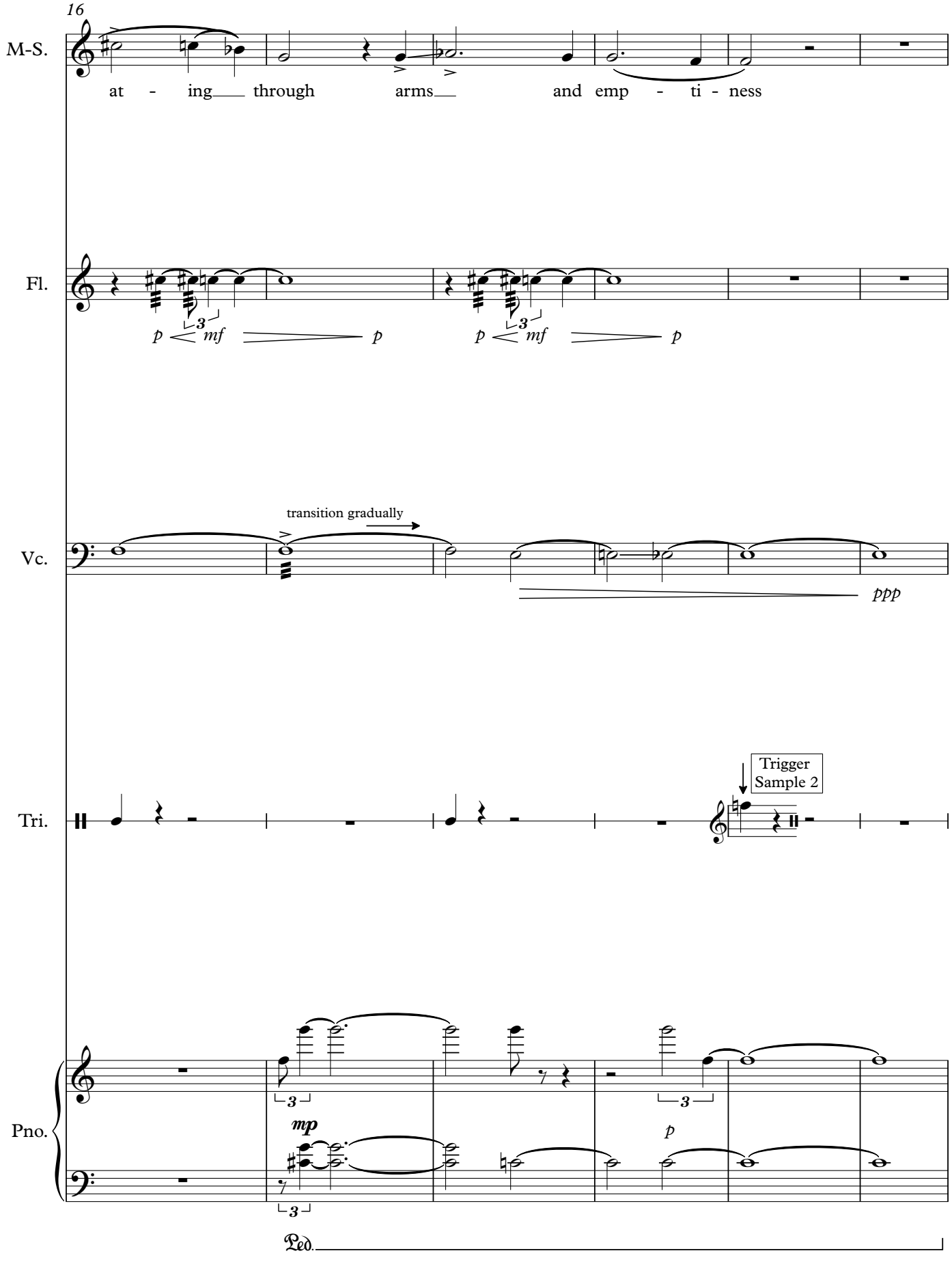

54
M-S.
mp
Mi - gra - tor - y clouds bow bloom
Vc.
Pno.
mp
Ped.

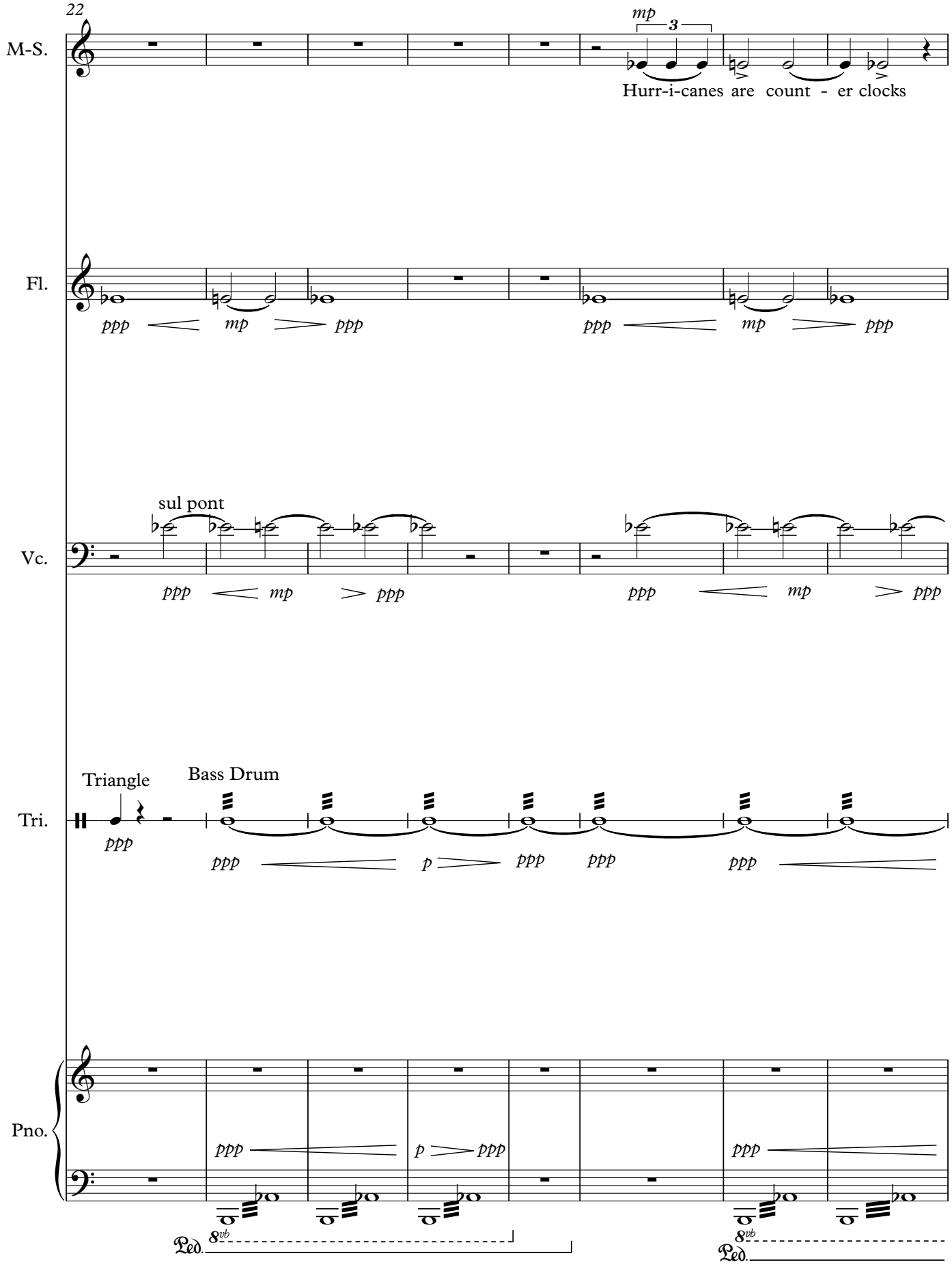

58
M-S.
and e- lude
grasp
Vc.
pp
Pno.

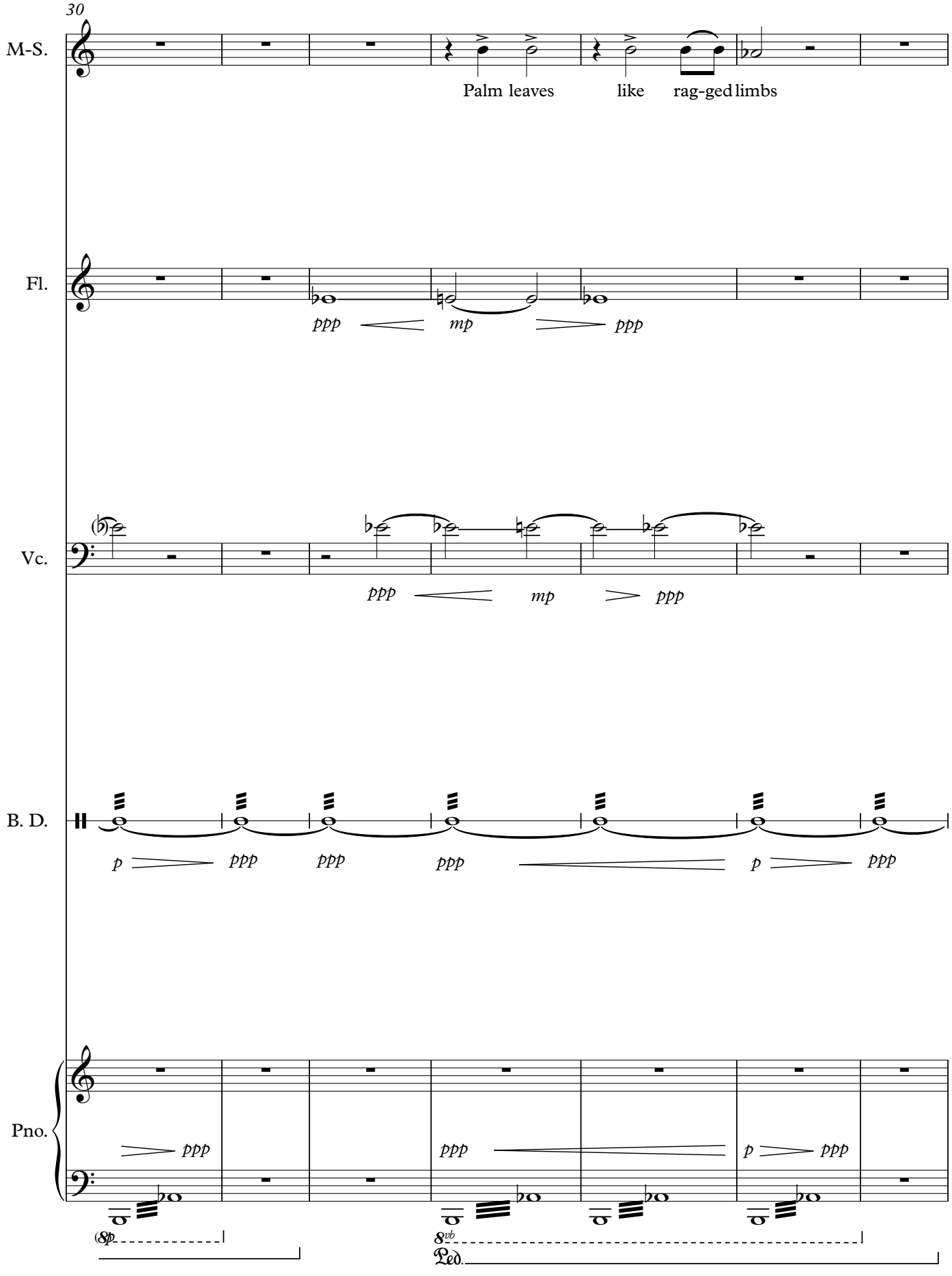
VII. Man Will Not Outlive the Weather

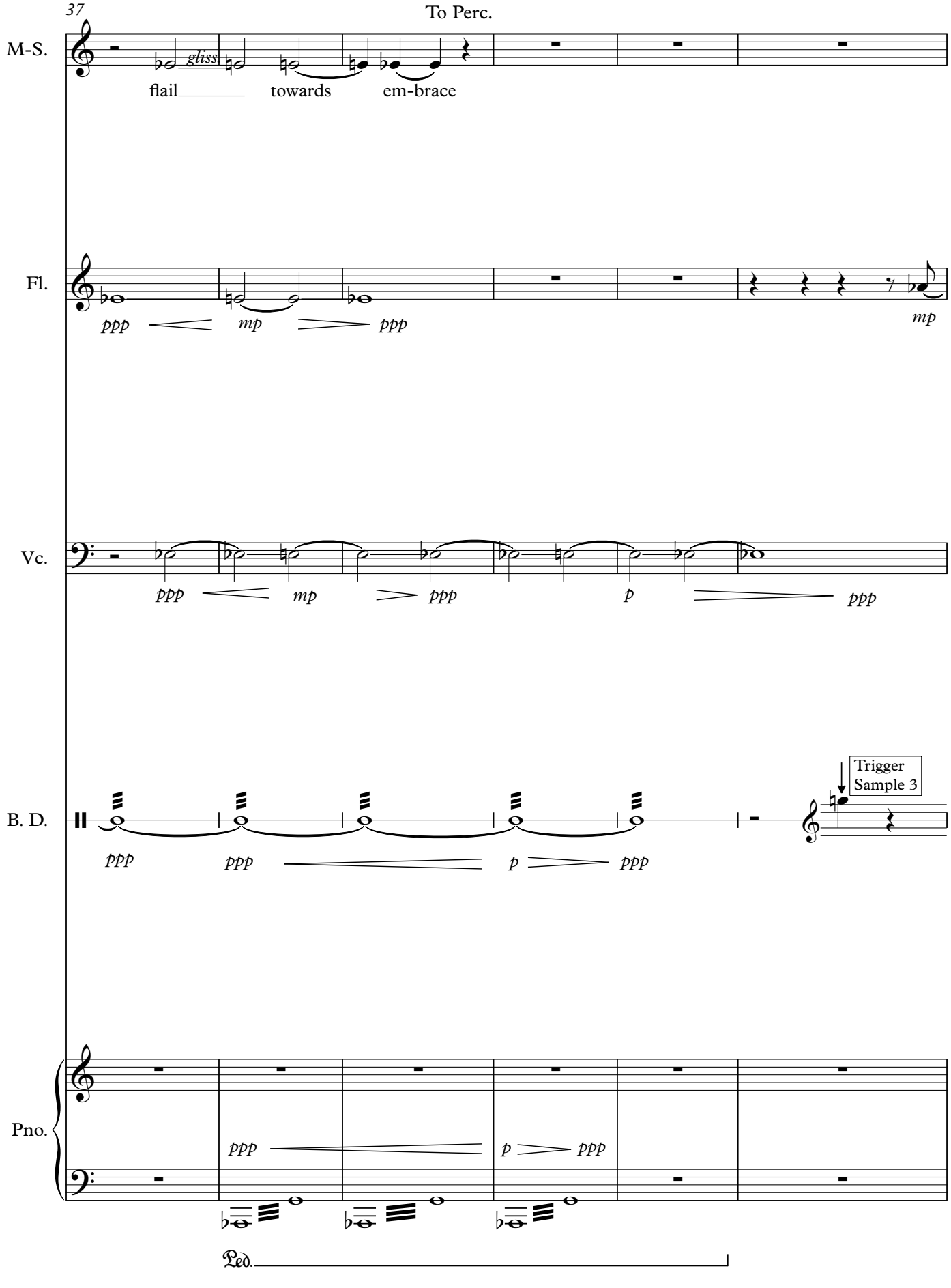


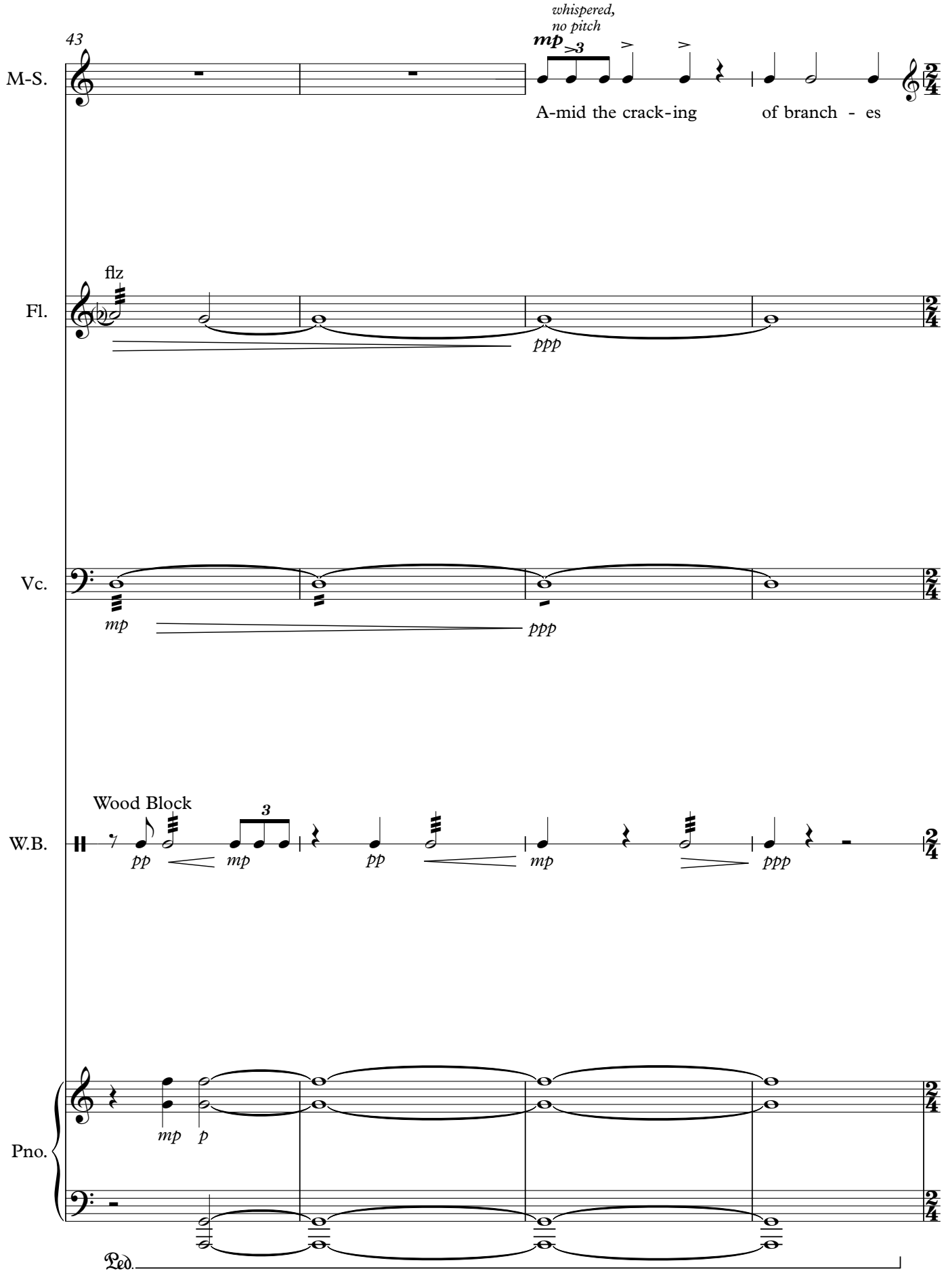

10
M-S.
round a va - cant cen- ter
Op-er-
Fl.
inhale
air ord air
tongue
pizz
Vc.
ord.
gliss.
transition gradually
Tri.
Pno.
Ped.

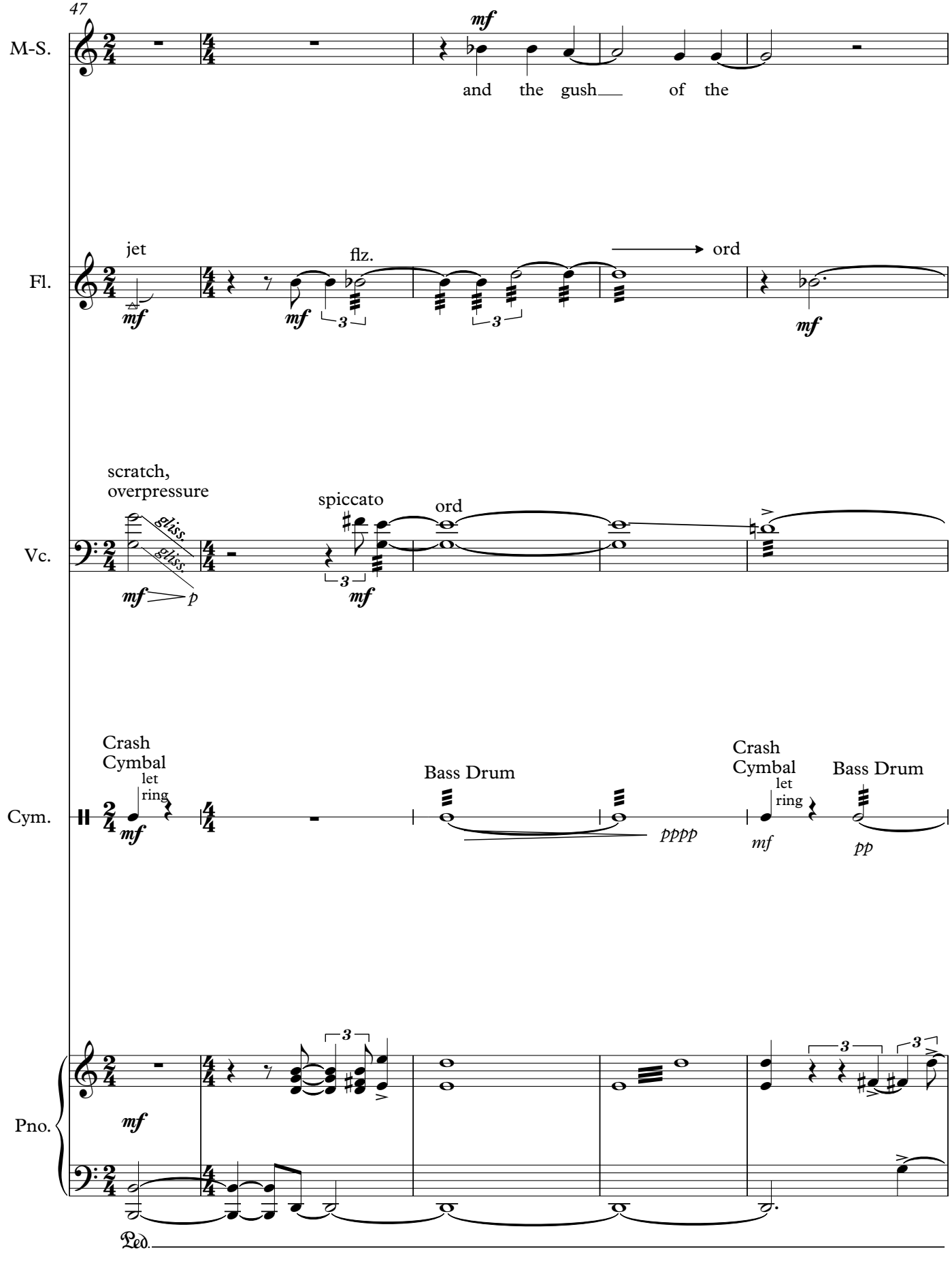

16
M-S.
at - ing through arms and emp - ti - ness
Fl.
p mf p
p mf p
Vc.
transition gradually
ppp
Tri.
Trigger
Sample 2
Pno.
mp
p
Ped.

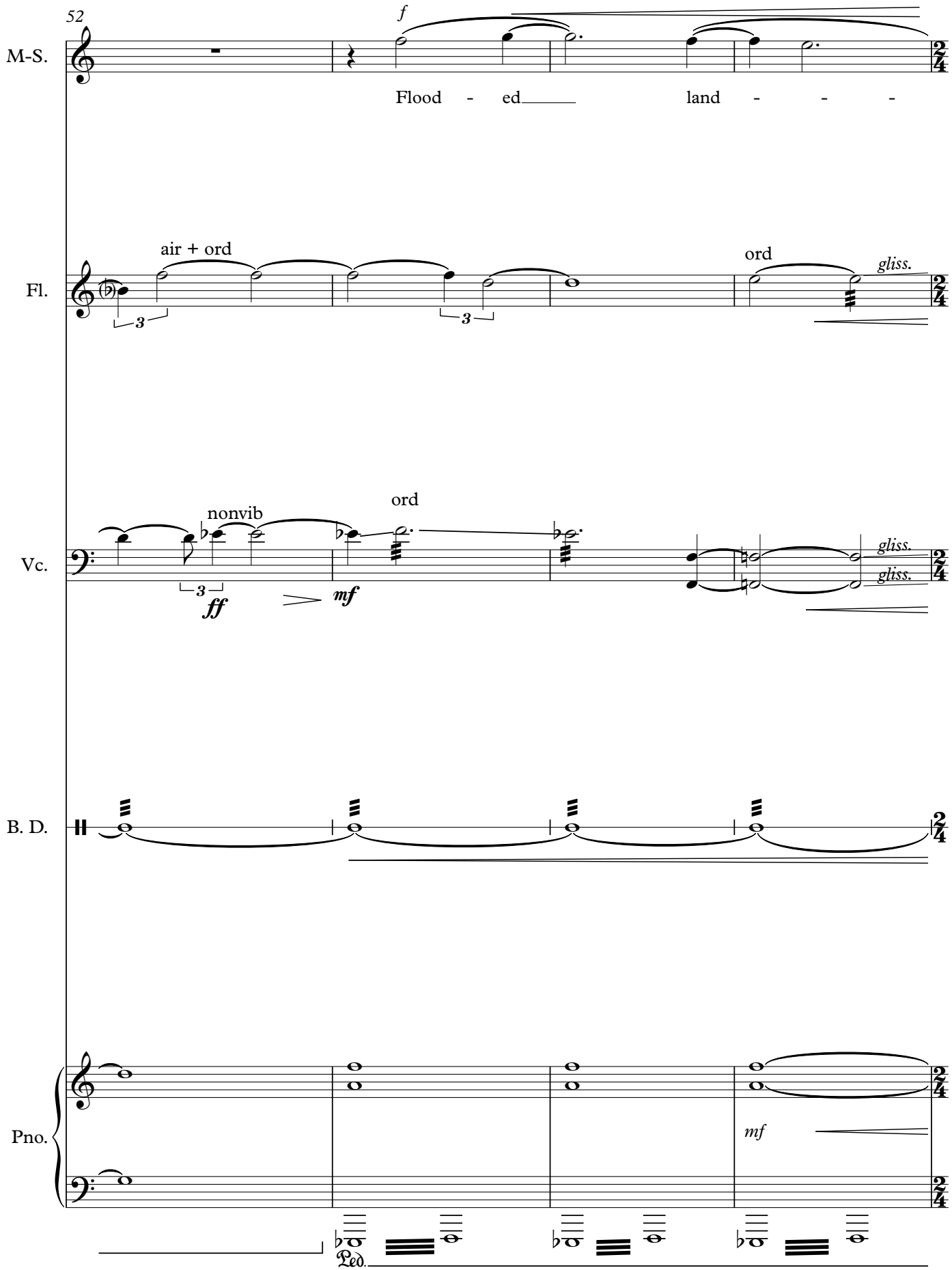

22
M-S.
mp
3
Hurr-i-canes are count - er clocks
Fl.
ppp
mp
ppp
Vc.
sul pont
Tri.
Triangle
Bass Drum
p
Pno.
Ped.
8vb

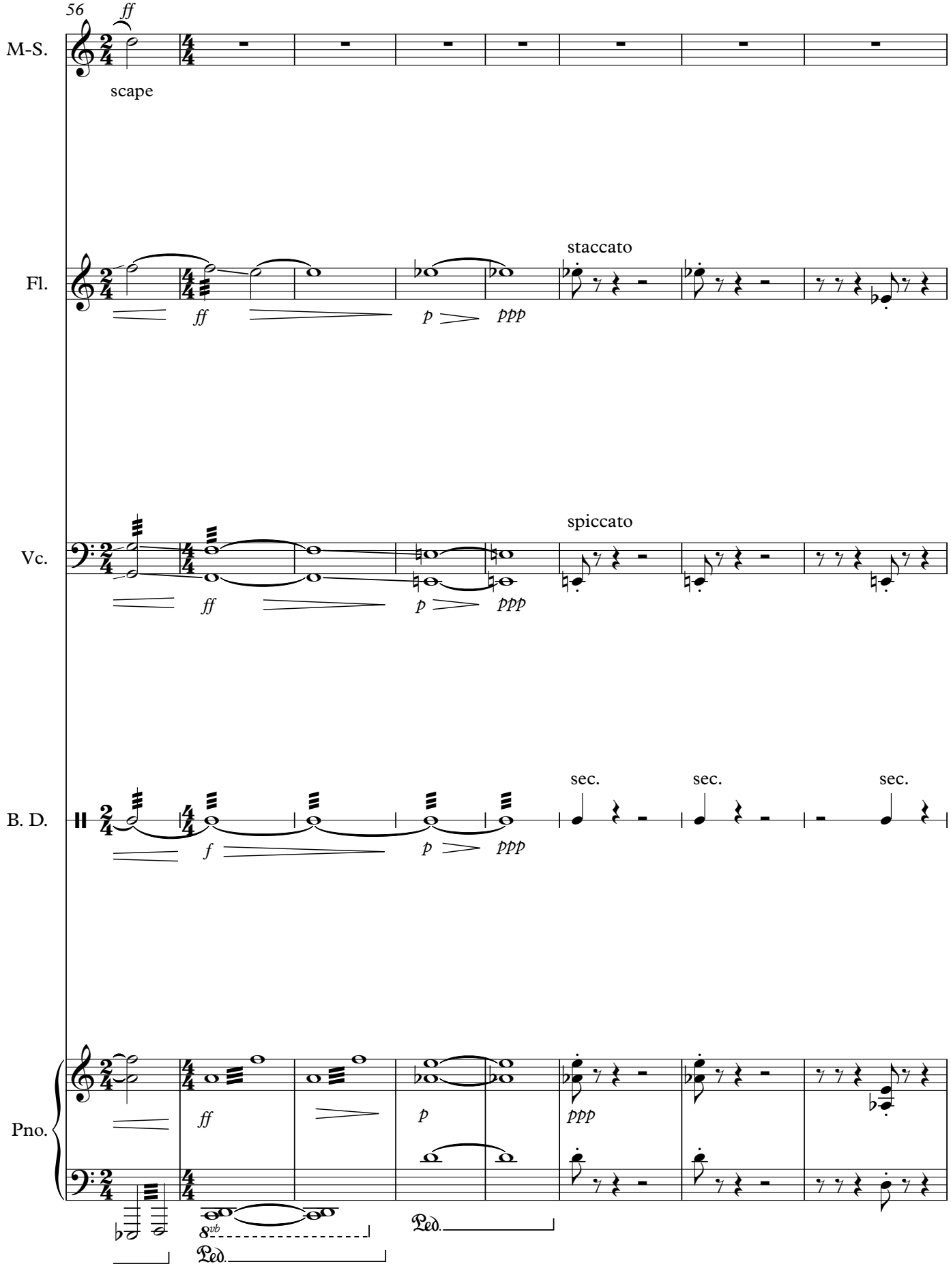

30
M-S.
Palm leaves
like
rag-ged limbs
Fl.
ppp
mp
ppp
Vc.
ppp
mp
ppp
B. D.
p
ppp
ppp
ppp
p
ppp
Pno.
ppp
ppp
p
ppp
(8vb)
8vb
Ped.

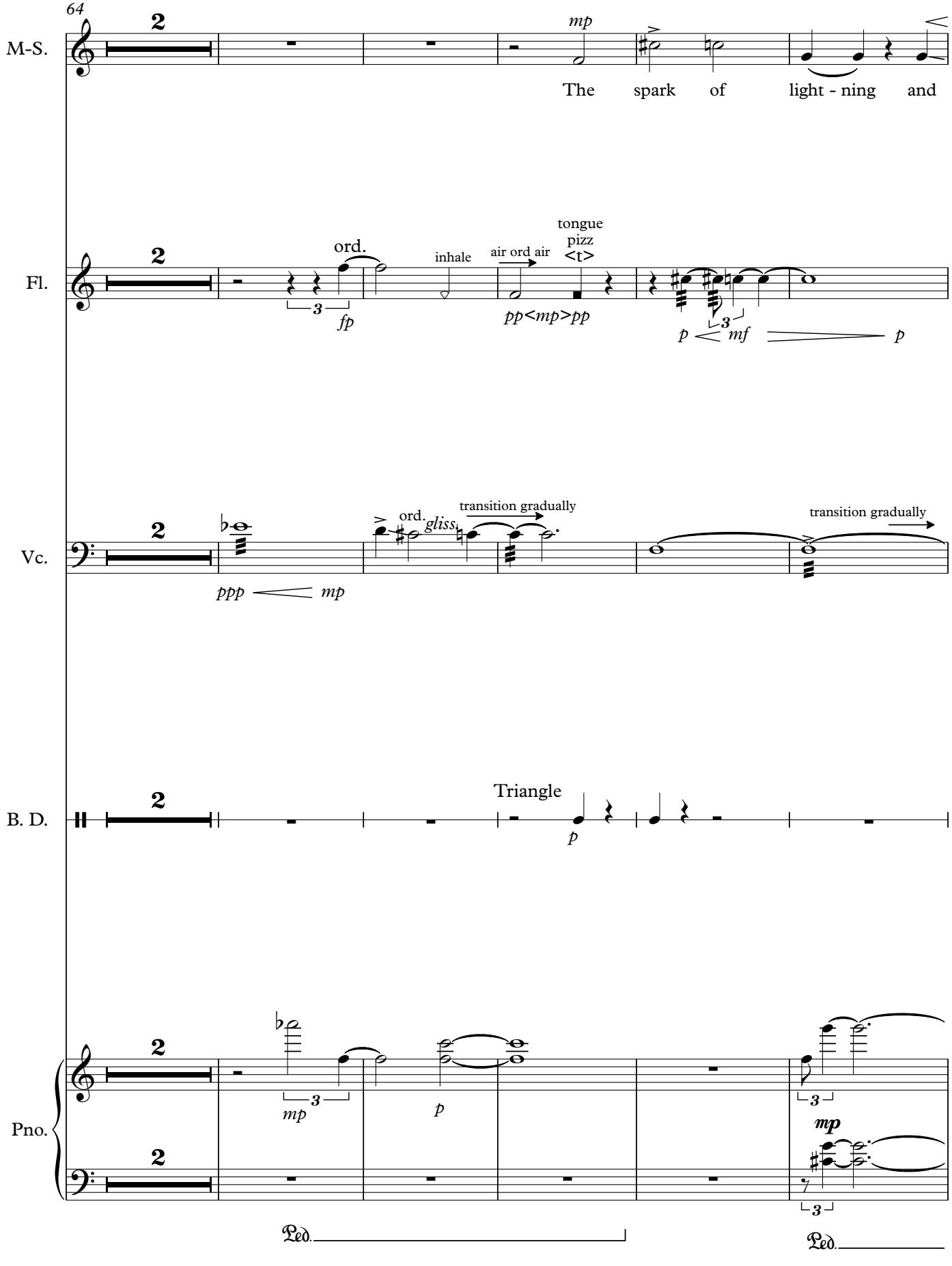

37
To Perc.
M-S.
gliss
flail towards em-brace
Fl.
ppp mp ppp
mp
Vc.
ppp mp ppp p ppp
B. D.
Trigger
Sample 3
ppp ppp p ppp
Pno.
ppp p ppp
Ped.

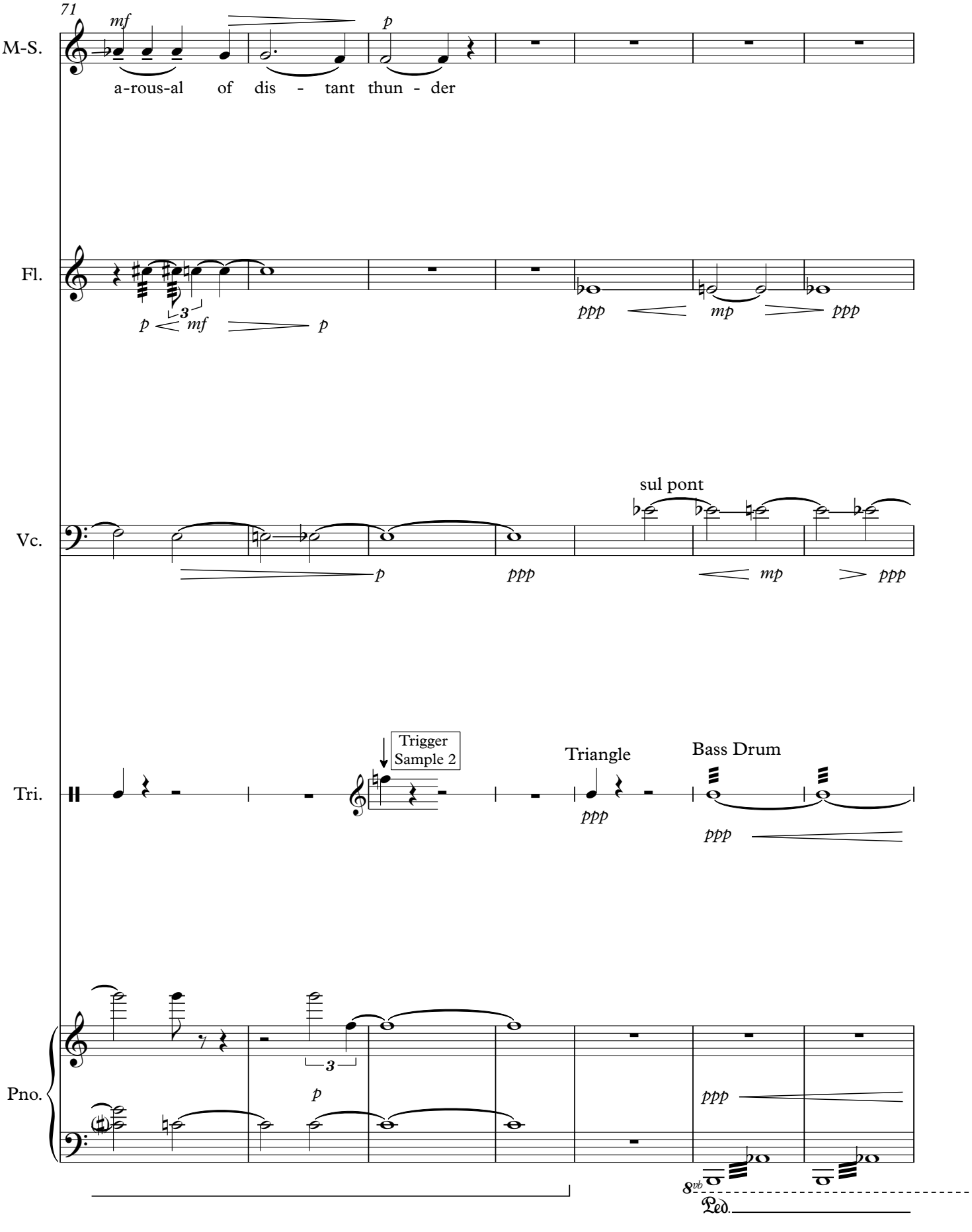

43
whispered,
no pitch
mp
A-mid the crack-ing of branch - es
M-S.
flz
Fl.
ppp
Vc.
mp
ppp
Wood Block
W.B.
pp
mp
pp
mp
ppp
Pno.
mp
p
Ped.

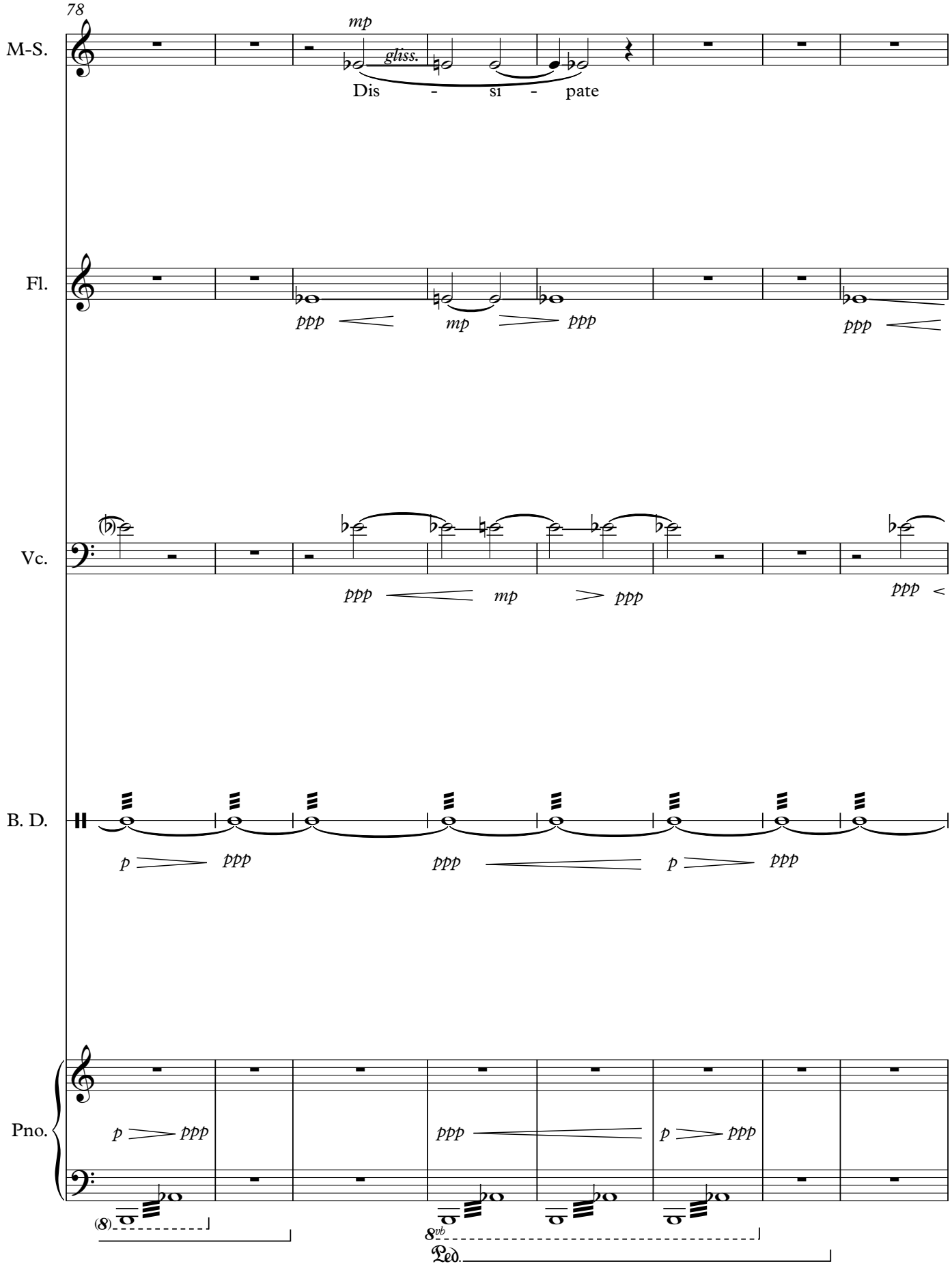

47
M-S.
mf
and the gush of the
Fl.
jet
mf
flz.
mf
ord
mf
Vc.
scratch,
overpressure
gliss.
gliss.
mf
p
spiccato
mf
ord
Cym.
Crash
Cymbal
let
ring
mf
Bass Drum
pppp
Crash
Cymbal
let
ring
mf
Bass Drum
pp
Pno.
mf
Ped.

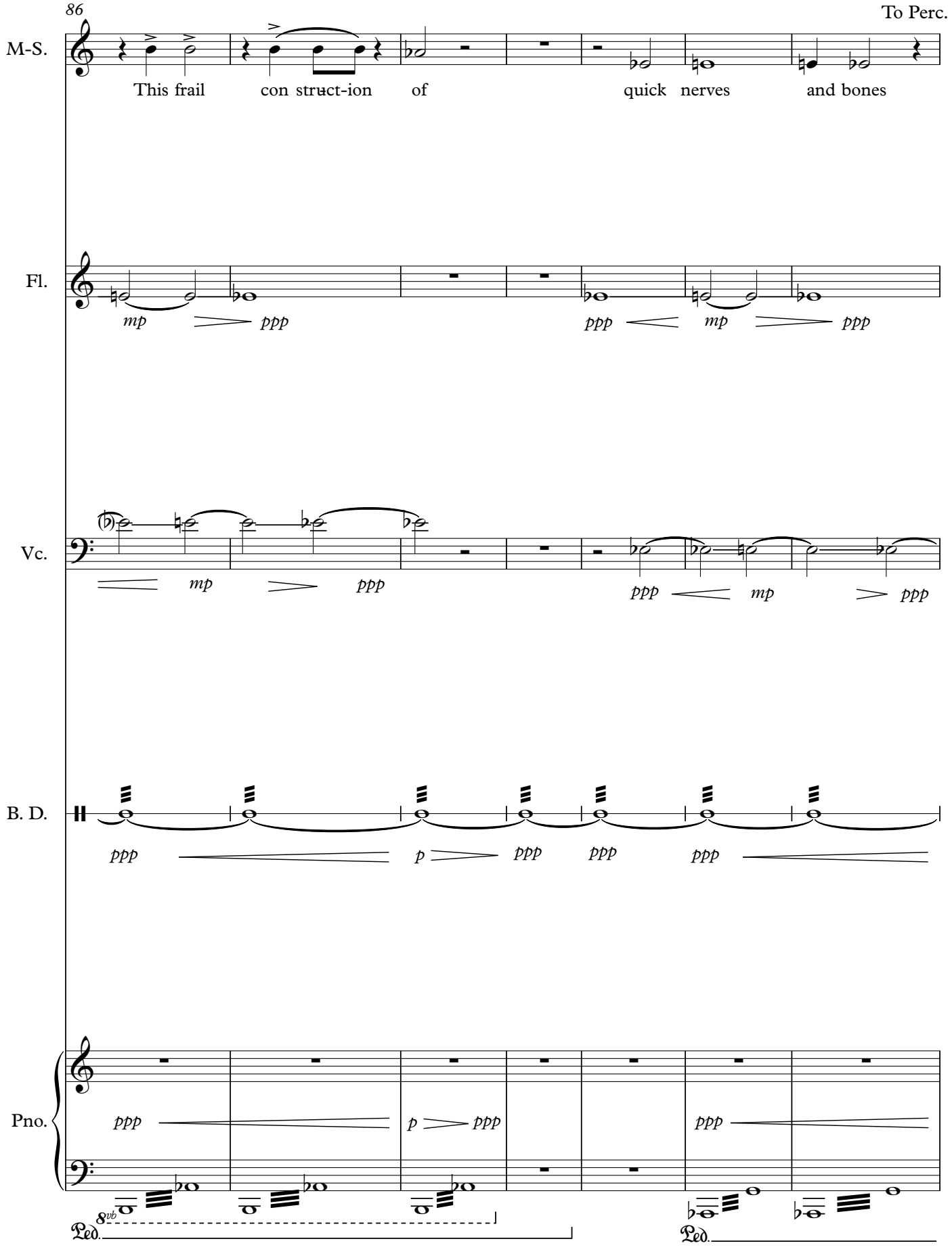

52
f
M-S.
Flood - ed land - - -
Fl.
air + ord
ord
gliss.
Vc.
nonvib
ord
ff
mf
gliss.
gliss.
B. D.
Pno.
mf
Ped.

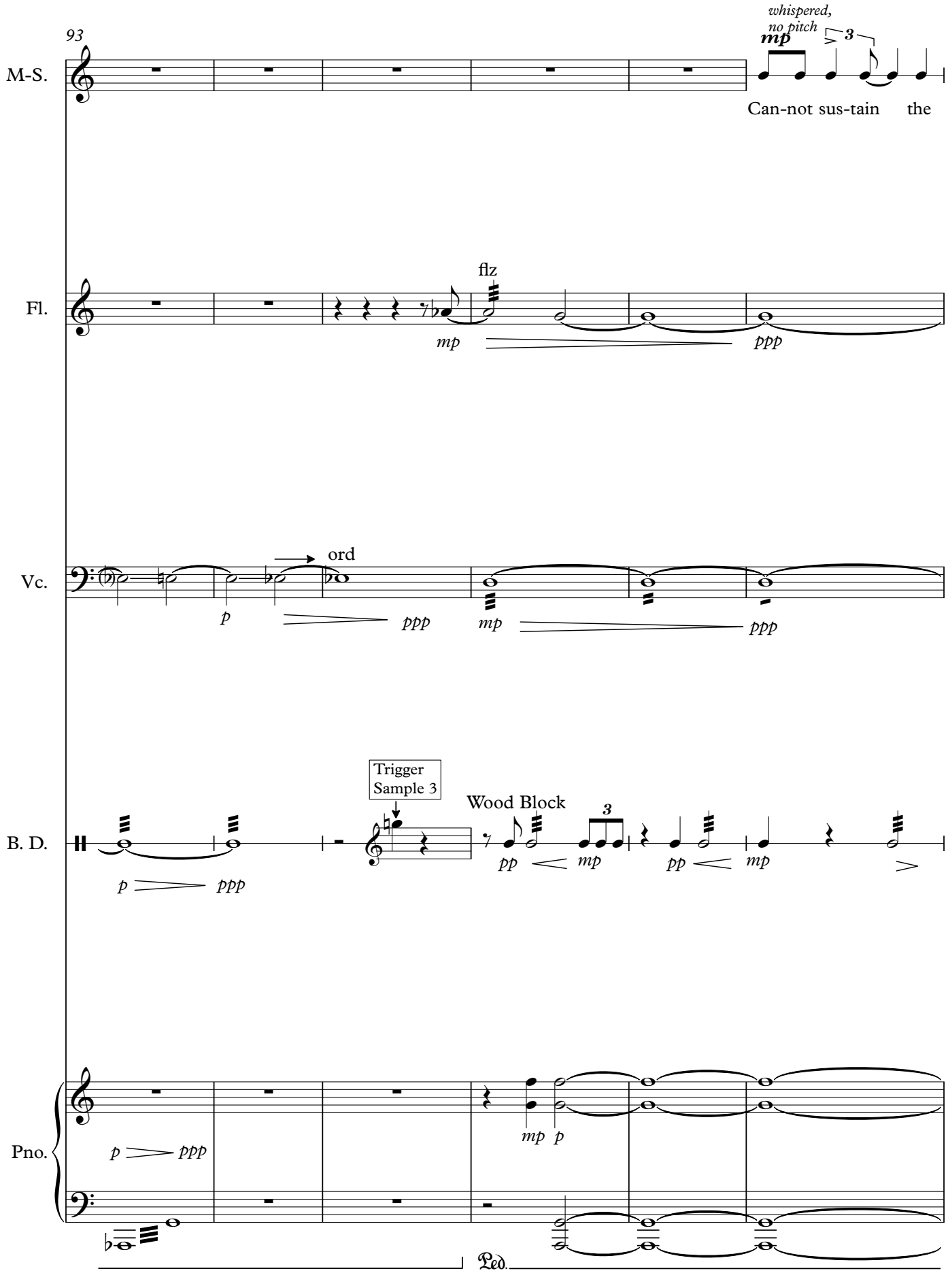

56
ff
M-S.
scape
Fl.
staccato
ff
p
ppp
Vc.
spiccato
ff
p
ppp
B. D.
sec.
sec.
sec.
f
p
ppp
Pno.
ff
p
ppp
8vb
Ped.
Ped.

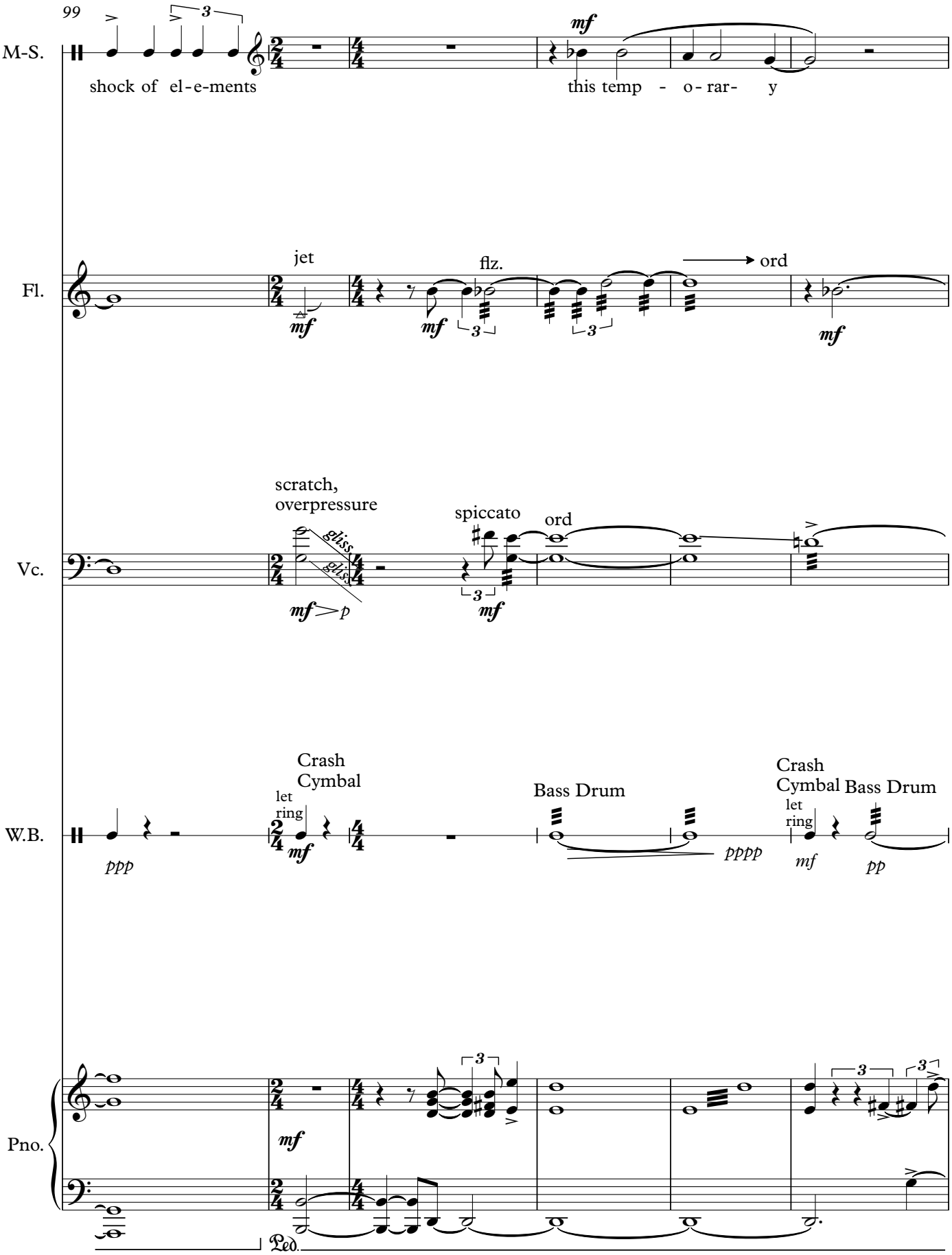

64
M-S.
mp
The spark of light - ning and
Fl.
ord.
inhale
air ord air
tongue
pizz
<t>
fp
pp<mp>pp
p
mf
p
Vc.
ord.
gliss.
transition gradually
transition gradually
ppp
mp
B. D.
Triangle
p
Pno.
mp
p
mp
Ped.
Ped.

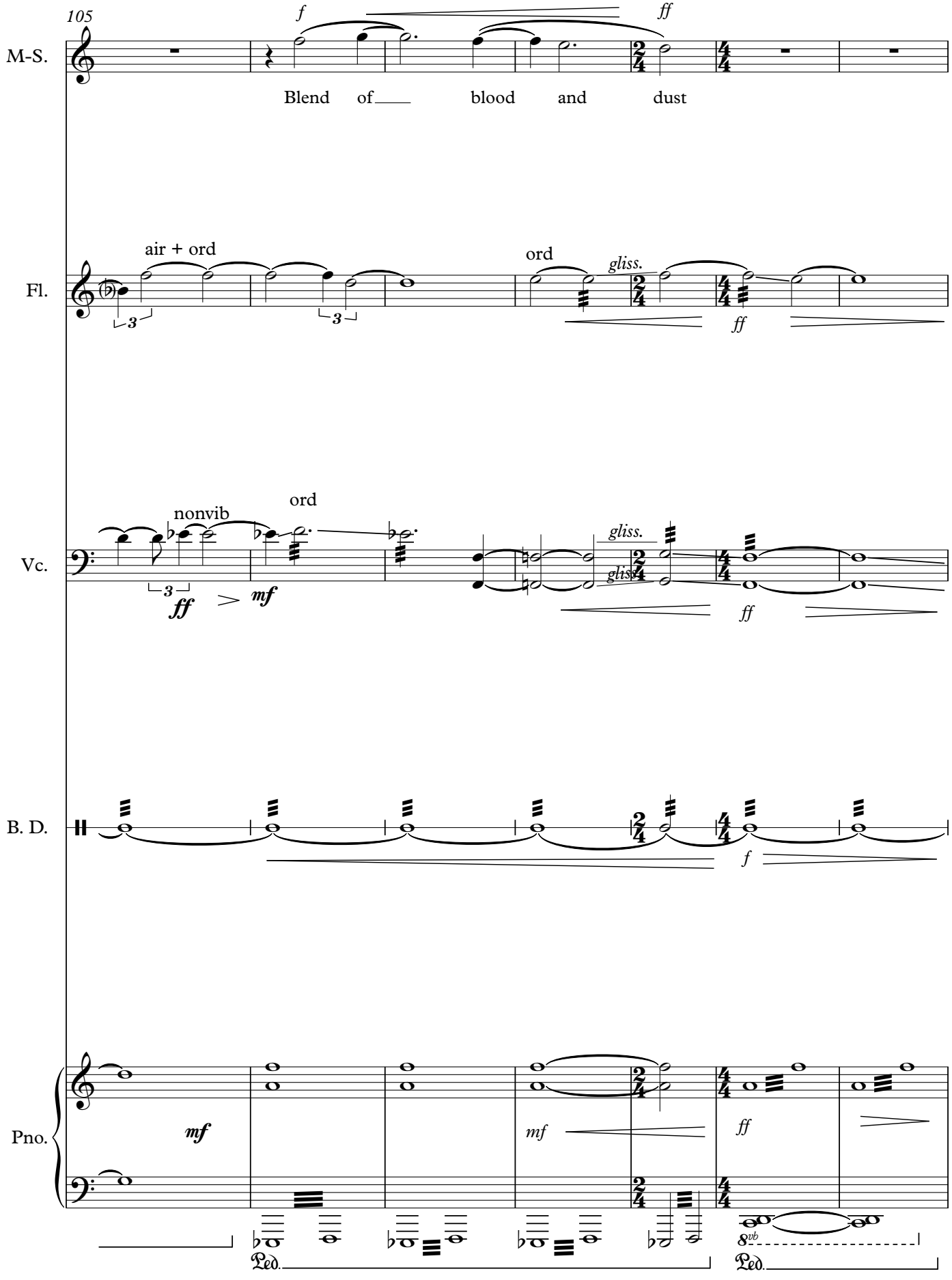

71
M-S.
mf
p
a-rous-al of dis - tant thun - der
Fl.
p
mf
p
ppp
mp
ppp
Vc.
sul pont
p
ppp
mp
ppp
Tri.
Trigger
Sample 2
Triangle
Bass Drum
ppp
ppp
Pno.
p
ppp
8vb
Ped.

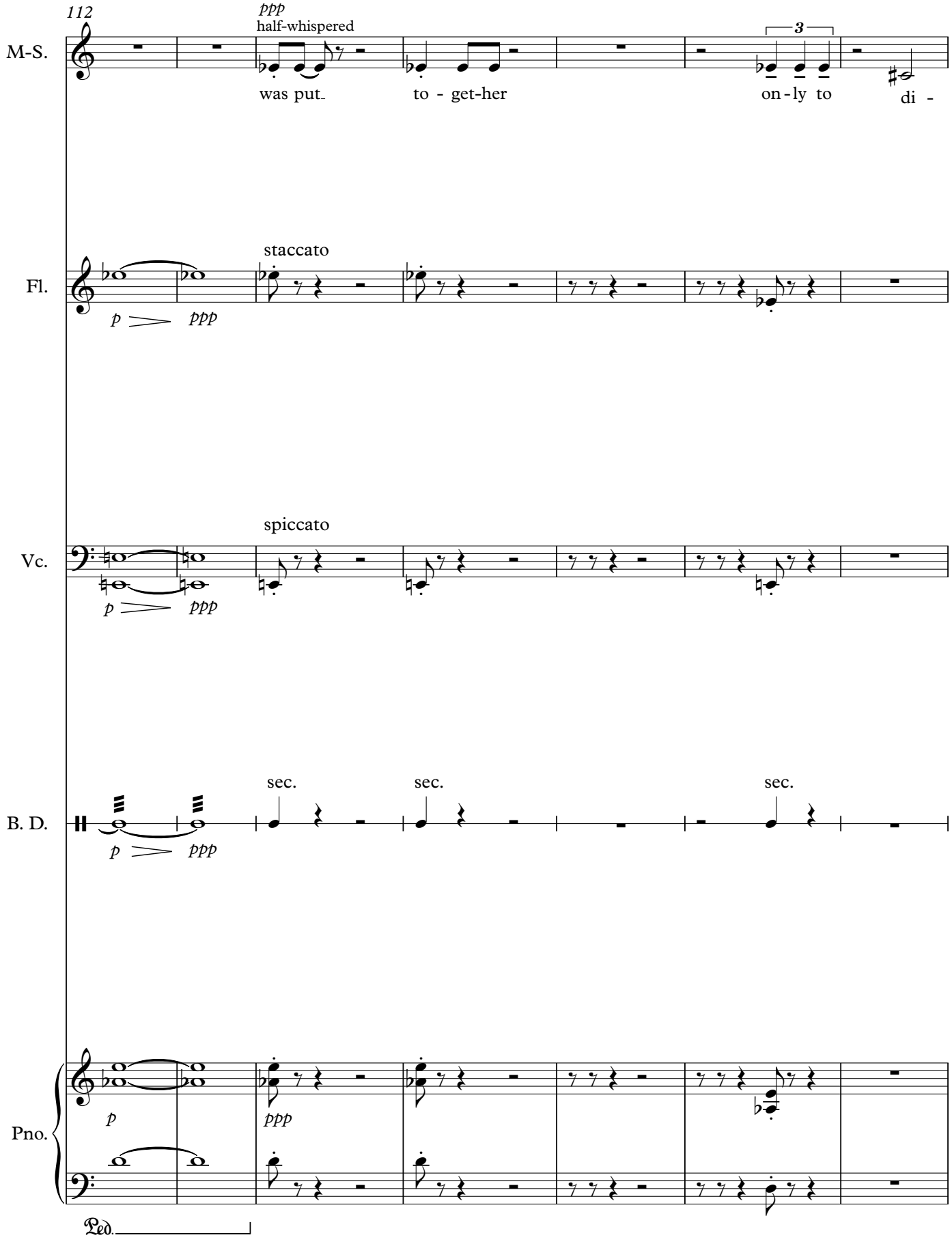

78
M-S.
mp
gliss.
Dis - si - pate
Fl.
ppp
mp
ppp
ppp
Vc.
ppp
mp
ppp
ppp
B. D.
p
ppp
ppp
p
ppp
Pno.
p
ppp
ppp
p
ppp
(8)
8vb
Ped.

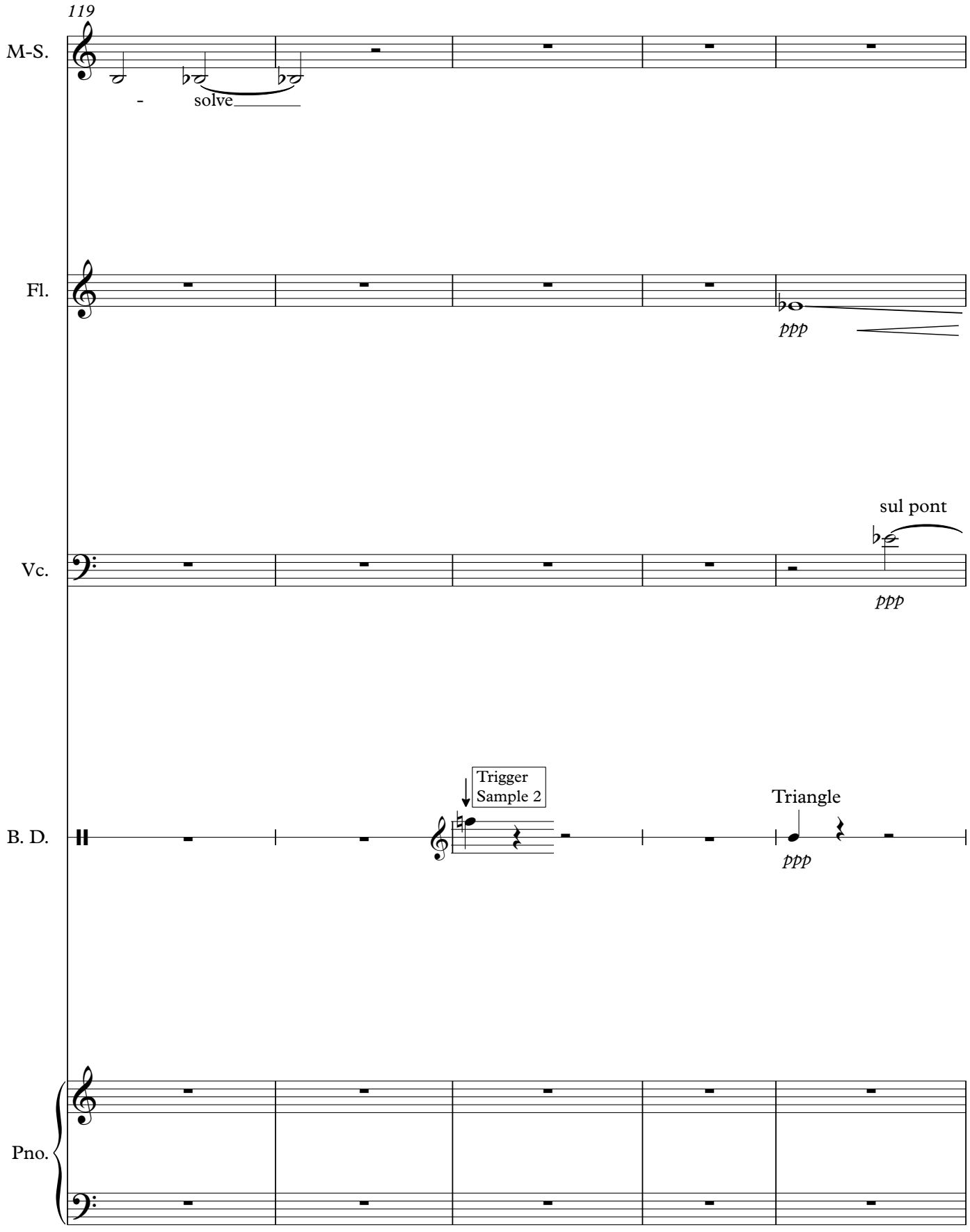

86
To Perc.
M-S.
This frail con struct-ion of quick nerves and bones
Fl.
mp ppp ppp mp ppp
Vc.
mp ppp ppp mp ppp
B. D.
ppp p ppp ppp ppp
Pno.
ppp p ppp ppp
8vb
Ped.
Ped.

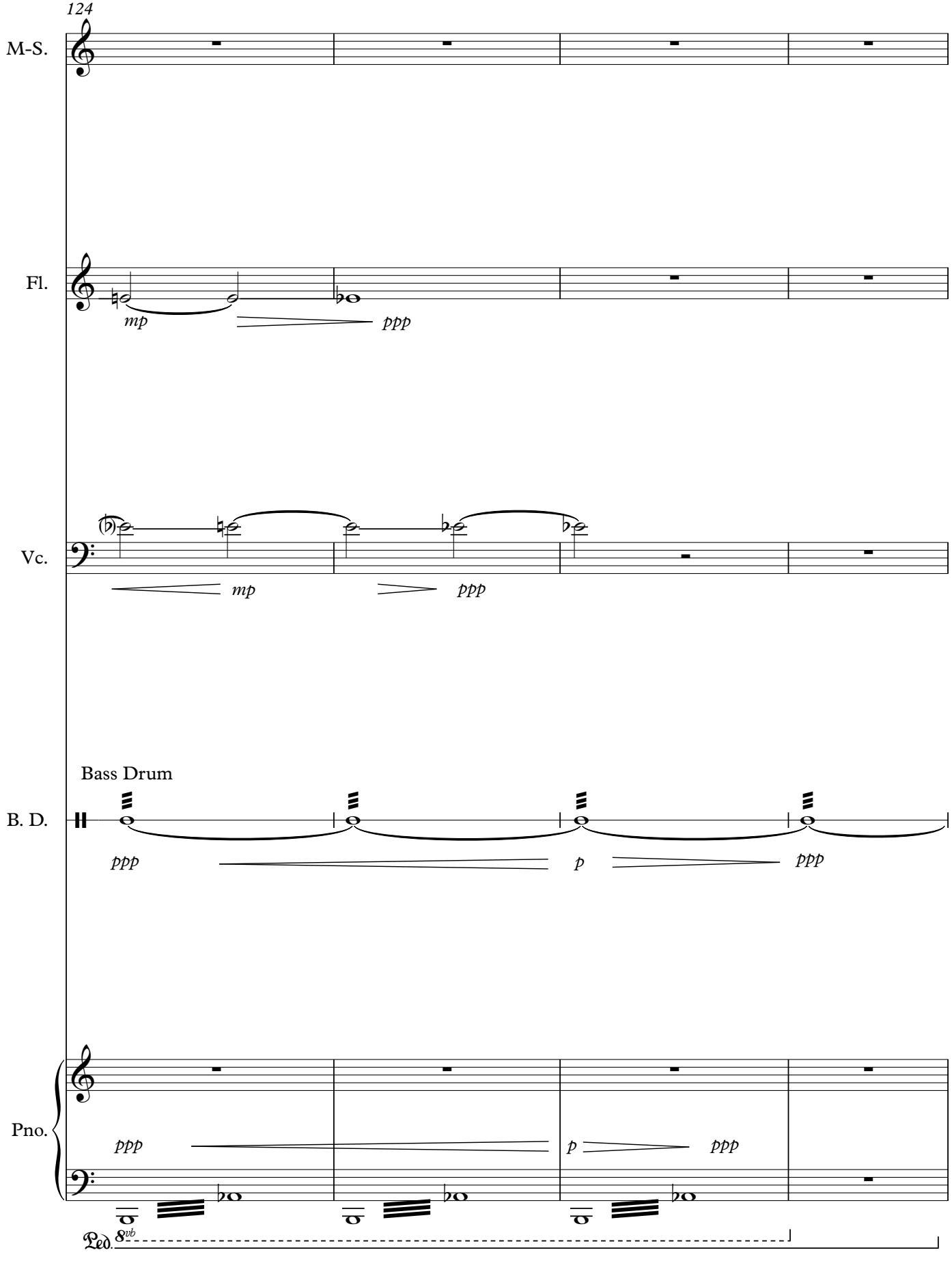

93
M-S.
whispered,
no pitch
mp
3
Can-not sus-tain the
Fl.
flz
mp
ppp
Vc.
ord
p
ppp
mp
ppp
B. D.
Trigger
Sample 3
Wood Block
3
p
ppp
pp
mp
pp
mp
Pno.
p
ppp
mp
p
Ped.

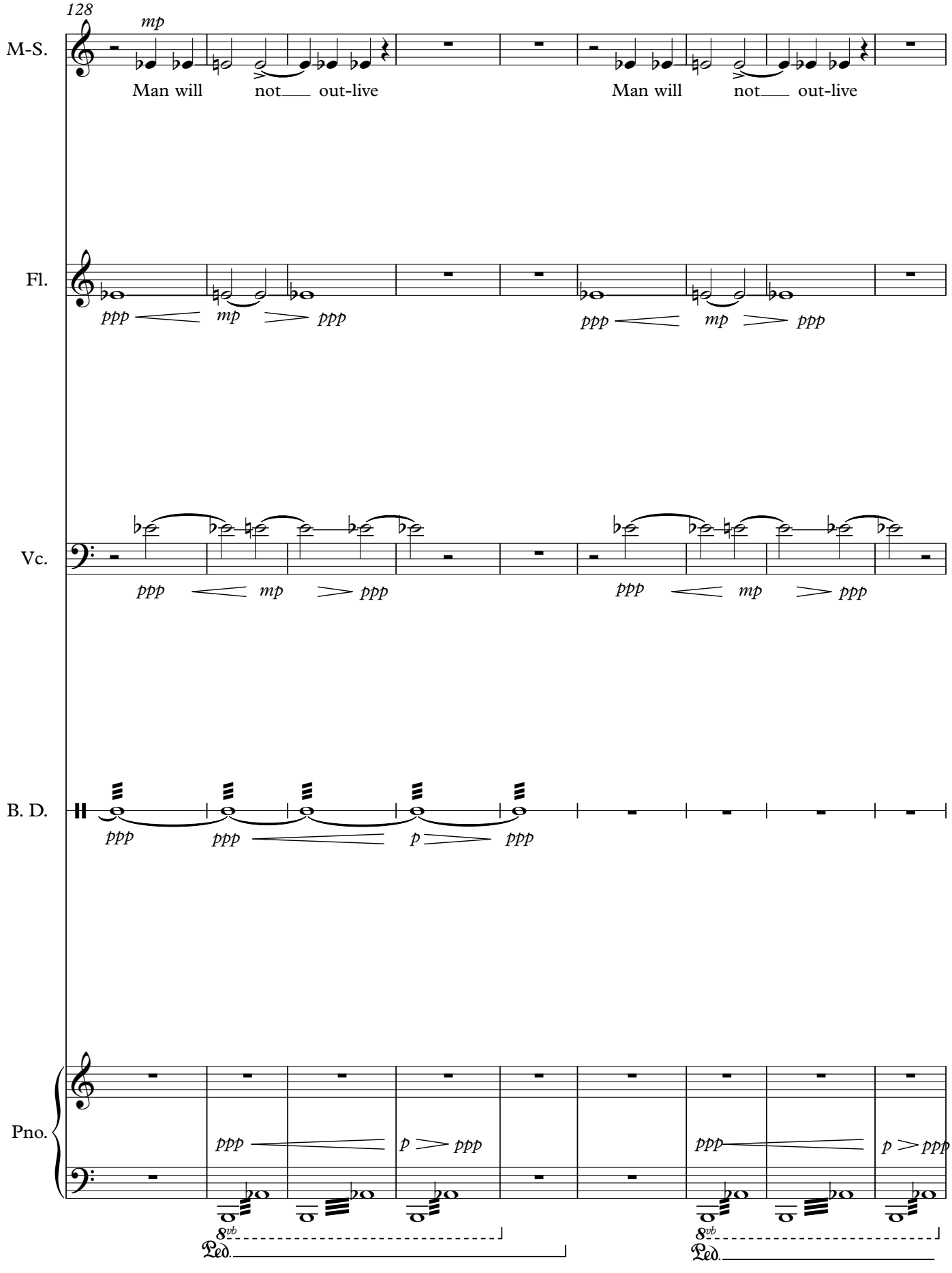

99
M-S.
shock of el-e-ments
this temp - o-rar- y
Fl.
jet
flz.
ord
Vc.
scratch,
overpressure
spiccato
ord
W.B.
Crash
Cymbal
let
ring
Bass Drum
Crash
Cymbal
Bass Drum
Pno.
Ped.

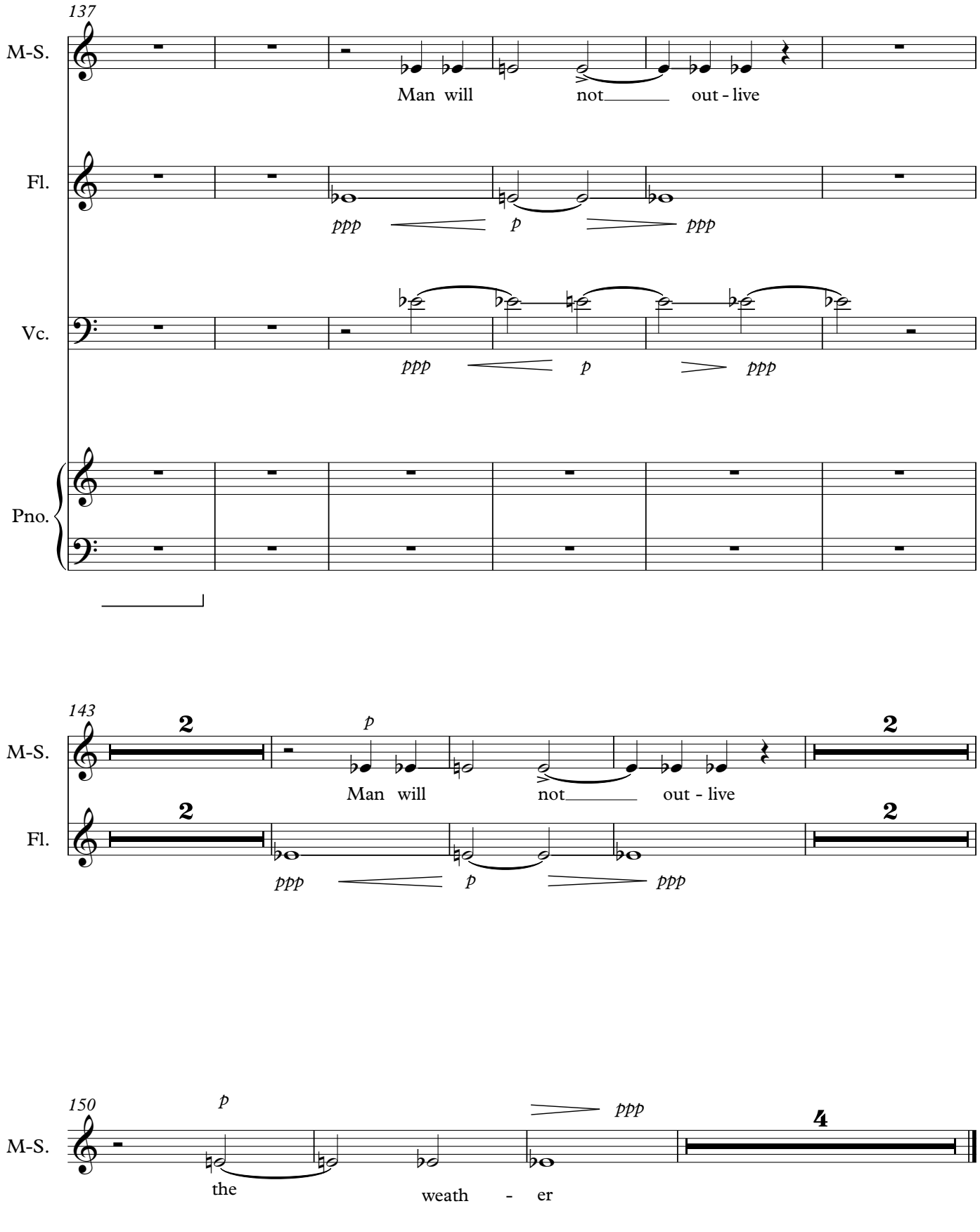

105
M-S.
f
ff
Blend of blood and dust
Fl.
air + ord
ord
gliss.
ff
Vc.
nonvib
ord
ff
mf
gliss.
gliss.
ff
B. D.
f
Pno.
mf
mf
ff
8vb
Ped.
Ped.


112
ppp
half-whispered
M-S.
was put_
to - get-her
3
on - ly to
di -
staccato
Fl.
p
ppp
spiccato
Vc.
p
ppp
sec.
sec.
sec.
B. D.
p
ppp
Pno.
p
ppp
Ped.


119
M-S.
-
solve
Fl.
ppp
sul pont
Vc.
ppp
Trigger
Sample 2
Triangle
B. D.
ppp
Pno.


124
M-S.
Fl.
mp
ppp
Vc.
mp
ppp
Bass Drum
B. D.
ppp
p
ppp
Pno.
ppp
p
ppp
Ped.
8vb


128
mp
M-S.
Man will not out-live
Man will not out-live
Fl.
ppp
mp
ppp
Vc.
B. D.
p
Pno.
8vb
Ped.


137
M-S.
Man will not out - live
Fl.
ppp p ppp
Vc.
ppp p ppp
Pno.
143
M-S.
2
p
2
Man will not out - live
Fl.
2
2
ppp p ppp
150
M-S.
p
ppp
4
the weath - er