

# The Mountain That Moves

*For Violin and Live Electronics*

**SHAUN BELLAMY**

Submitted in partial fulfillment of the requirements for  
the Master of Music degree in composition,  
University of Toronto April 2018.

Duration: 13:00 - 15:00

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## STATEMENT FOR MMUS JURY MEMBERS

*The Mountain that Moves* centres on one of the largest natural disasters in Canadian history. On April 29, 1903 the eastern edge of a mining town, Frank, was buried by a massive rockslide that killed at least 90 people and extended into the Crowsnest Valley. Written for solo violin and live electronics, this composition is based around my CGS-M SSHRC research on self contained performance systems for live electronic music. Utilizing my current prototype, this composition brings together the expressive mediums of acoustic and electronic music in a reliable and user-friendly interface.

The form of the composition initially follows a quasi theme and variations structure, where the initial folk melody is transformed through rhythmic deviations and separated by contrasting interludes. However, the conclusion of the folk tune is obstructed in m.106 by the pressure scratch in the violin and, ultimately, prevents any definite resolution for the initial theme. Instead, the concept of rhythmic variation becomes the new thematic focus for the composition, undergoing its own transformation in different metrical contexts (mm.109 - 235) in combination with the electronics. Following this development, we return to altered elaborations of the initial folk melody that culminates in its final presentation in a harmonically richer setting (mm.236 – 253). This fleeting moment foreshadows the imminent climax of the composition where, within one hundred seconds (mm.307 – end), the sound of the violin is buried within an immense mass of sonic energy. Within this environment, the initial spirit of the folk melody is beaten into submission and the gestures in the violin become a struggle to rise above the overwhelming force of the electronics, ultimately ending in failure.

## PROGRAM NOTE


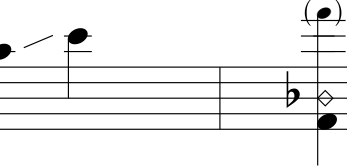
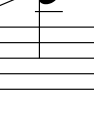




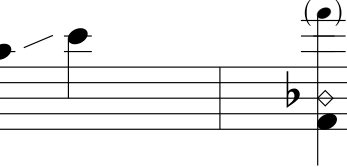
*The Mountain that Moves* centres on one of the largest natural disasters in Canadian history. On April 29, 1903 the eastern edge of a mining town, Frank, was buried by a massive rockslide that killed at least 90 people and extended into the Crowsnest Valley. Setting the scene with a western Canadian folk melody, a bustling town is eclipsed by an eerie calm. The humanizing folk tune decays into a guttural rhythmicity, embracing the heartbeat of the mountain as we move away from the town of Frank. Stirring in the shadow of the “Turtle Mountain”, we brace for the inevitable collapse of the cliff-side and the burial of the town. In its aftermath, we determine whether the spirit of this mining survives or if its tune has been sundered by the rock.

## PERFORMANCE NOTE

Following the narrative implications in *The Mountain That Moves*, the violin combines folk performance idioms with various extended techniques, illustrating the shift from peace to chaos. By following this model, the violinist will introduces new techniques into the composition which each new one presenting adding intensity to the impending disaster. In particular, the pressure scratch has the most expressive capability, ranging from a light distortion to deafening noise. Therefore, early uses of the pressure scratch should exercise restraint and allow it to evolve as the composition progresses.

## EXPLANATION OF VIOLIN NOTATION

Figure 1.1 - *Notation and Descriptors for Pitched Fixed Electronics*

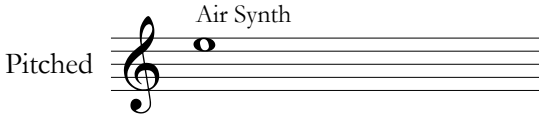
Normal (Norm.)	Pressure Scratch (P.S.)	Bow Behind the Bridge	<i>tr</i>		
					
Apply over-pressure to the notated pitch, adjusting its intensity as on the dynamic level. Normal indicates a return to standard bow pressure.	Bow behind the bridge on the notated string.	Trill upward to the nearest diatonic pitch.	Slide between two pitches. Within folk-like sections exaggerated bends are ideal.	Natural and artificial harmonics.	

## EXPLANATION OF FIXED ELECTRONICS

The fixed electronic track is comprised of various sonic collections created by combining pre-recorded and synthesized audio samples. These sonic collections are described by using three broad classifications of sound including (1) pitched, (2) sustained, and (3) rhythmic. Although all sounds have varying degrees of these attributes, the following information focuses on the most prominent characteristic of each sonic collection and how it is translated into musical notation. To limit the amount of unique note heads, they are accompanied with descriptors that identifies with their most prominent characteristic. It is important to note that vertical placement of note heads in the sustained and rhythmic staves are meant to indicate relative pitch relationships between musical materials, while the pitched staff indicates absolute pitch relationships.







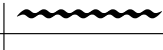
### PITCHED

Figure 2.1 - *Notation and Descriptors for Pitched Fixed Electronics*

NOTATION	DESCRIPTORS
	<ul style="list-style-type: none"> <li>Noisy Air Synth</li> <li>Distorted Air Synth</li> <li>Air Choir and Violin</li> <li>Screaching Air Synth</li> </ul>









### SUSTAINED

Figure 2.2 - *Notation and Descriptors for Sustained Fixed Electronics*

						
<ul style="list-style-type: none"> <li>- Train</li> <li>- Train Chugging</li> <li>- Train Chugging with Bell</li> </ul>	<ul style="list-style-type: none"> <li>- Feedbacking Metal Hits</li> </ul>	<ul style="list-style-type: none"> <li>- Steam Whistle (S.W.)</li> </ul>	<ul style="list-style-type: none"> <li>- Low Drone</li> <li>- Rise</li> </ul>	<ul style="list-style-type: none"> <li>- Squeaking</li> <li>- Squeaking and Chimes</li> <li>- Bending Whistles</li> <li>- Reversed Chimes</li> <li>- Reversed Whistle</li> <li>- Reversed Bells</li> <li>- Rise</li> <li>- Reversed Rise</li> <li>- Airy</li> </ul>	<ul style="list-style-type: none"> <li>- Bending Whistles and Hiss</li> <li>- Delayed Metal Hits (↓ths)</li> <li>- Asynchronously Delayed Metal Hits</li> <li>- Rise</li> </ul>	<ul style="list-style-type: none"> <li>- Shifting Rocks</li> </ul>

### RHYTHMIC

Figure 2.3 - *Notation and Descriptors for Rhythmic Fixed Electronics*

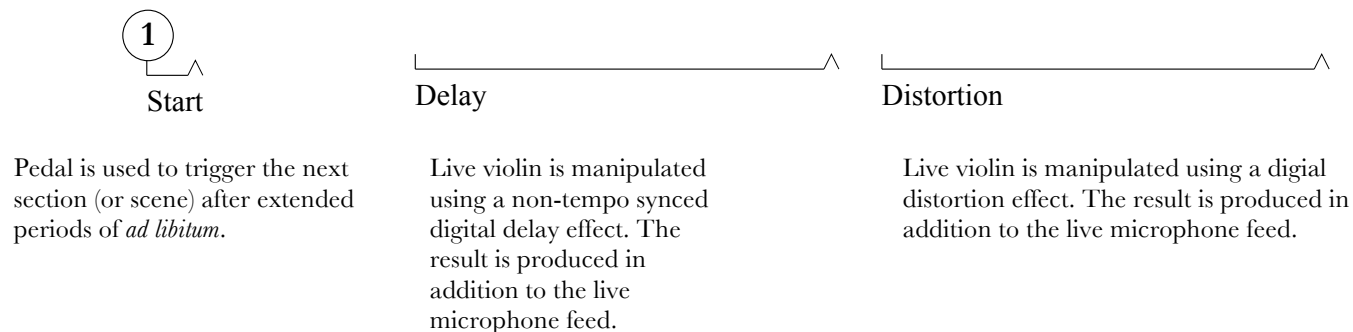
							
<ul style="list-style-type: none"> <li>- Snare Drum (S.D.)</li> <li>- Bass Drum (B.D.)</li> </ul>	<ul style="list-style-type: none"> <li>- Log Drum</li> <li>- Low Drums</li> <li>- Tom-tom</li> <li>- Train Chugging</li> </ul>	<ul style="list-style-type: none"> <li>- High Bells</li> <li>- Low Bell</li> <li>- Pressure Scratch</li> </ul>	<ul style="list-style-type: none"> <li>- Metal Hits</li> <li>- Bending Metal Hits</li> </ul>	<ul style="list-style-type: none"> <li>- Cow Bell</li> </ul>	<ul style="list-style-type: none"> <li>- Rock Buzz</li> </ul>		

## EXPLANATION OF LIVE ELECTRONICS

In combination with a self-contained performance system (see p.4), the live electronics are all controlled by a standard piano expression pedal and that acts as a simple footswitch. The sounds are taken from the on-stage microphone and processed in real-time, allowing one-to-one manipulation of the violin. It is important to note that the pedal is not fixed to one particular effect; rather it selects the appropriate effect based on the time-code of the fixed electronic track. While this may be seen as a restrictive attribute, it reduces the amount of technical management required during performance.

### PEDAL NOTATION

Figure 3.1 – *Pedal Notation for Live Electronics*



### CLICK TRACK

The click track, embedded in the fixed electronic track, is synced to the composition. Division of the beat is based on the respective time signature and follows the classical division of strong and weak beats. On occasion, the click track drops out for *ad libitum* sections to give the performer more freedom in execution (marked “Click Ends”). The click track returns by either (1) being triggered by the piano expression pedal, thus beginning a new section, or (2) counting itself back in (marked as “Four Clicks”).

## OPERATION OF SELF-CONTAINED PERFORMANCE SYSTEM

### OVERVIEW

The self-contained performance system is designed to manipulate the sound of the violin while controlling the accompanying fixed audio track. In addition, the device allows the performer to mix their audio output without an external audio interface and, therefore, can be connected directly to a stereo pair of active speakers. Additional equipment includes (1) a microphone, (2) a digital piano expression pedal, and (3) headphones/in-ear monitors. In rehearsal, the scene selector allows the performer to quickly select portions of the piece with the playback, live manipulation, and click track remaining in-sync. During performance, the device is useful in providing a minimal setup that is streamlined for the composition.

### SETUP

1. Connect device to power using a 12V AC adapter (do not use USB to power the device). Once plugged in, it will boot automatically and load all the programming for the composition
2. Connect a dynamic microphone to the XLR “Microphone Input 1”, monitoring headphones to the 3.5mm “Headphone Jack”, and a digital piano expression pedal to the “Pedal Input”.
3. Position the dynamic microphone above the violin, pointing it down towards the strings.
4. Connect the “Stereo Output” to either (1) a stereo channel mixer, panning the channel to 100% left, or (2) directly into a pair of active speakers, either panning as previously described or by splitting the audio output into a mono left and right (plug in only the left channel).
5. Use the control interface to adjust your microphone input, reverb, headphone output, and main output. Optimal procedure includes...
  - a. Turn all knobs fully to the left and slide the “Balance” slider fully to the right.
  - b. Begin playback of fixed electronic track by pressing the “Start” button.
  - c. Gradually turn up the “Master” dial until the fixed electronic track is at a moderately high volume.
  - d. Slide the “Balance” slider fully to the left and adjust gain of the microphone using the “Mic In” dial, aim for a similar volume as heard when adjusting the “Master” dial
  - e. Use the “Balance” slider to crossfade between the electronics and the microphone input until an appropriate mix is achieved. During this time, also adjust the “Reverb” dial to blend the sounds together.
  - f. Finally, use the “HP Vol” dial to adjust the volume of the monitor mix in your headphones and the “Click” dial to adjust the level of the click track.

## CONTROLS

### SCENE SELECTOR

Select playback position corresponding to rehearsal numbers in the score (numbered 1 – 9). Red light illuminates when scene is selected and green light illuminates during playback. Scene 0 begins playback at the start of the composition.

### PLAY

Begin playback at selected scene.

### STOP

Immediately stop playback.

### PEDAL

Activates various live audio effects when pressed, based on the playback position of the score. Also used to trigger the fixed audio track after *ad libitum* sections in the score.

### MIC IN

Adjust gain for microphone input

### REVERB

Adjust the reverb wet/dry ratio on the microphone input.

### CLICK

Adjust the volume of the click track in the headphones.

### BALANCE

Crossfade balance between the microphone input and the electronics

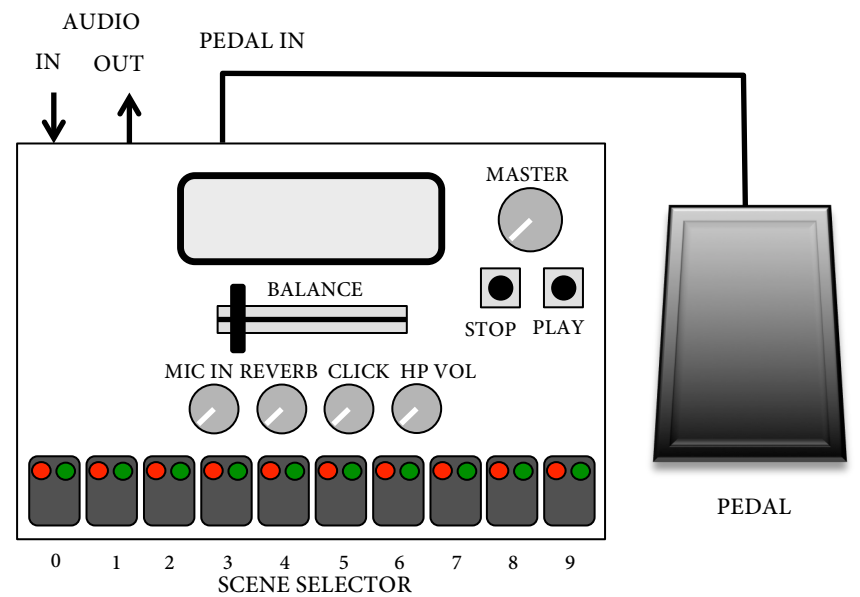
### HEADPHONE VOLUME

Adjust the output volume for the headphones.

### MASTER VOLUME

Adjust the output volume for the speakers.

Figure 4.1 - Self-Contained Performance System Control Surface, Overhead View



## CONNECTIONS

### DC POWER

12V connection for AC power adapter

### STEREO IN

Stereo 1/4 Inch input for microphone.

### STEREO OUT

Stereo 1/4 Inch output for speakers. Left channel contains the audio mix and the right channel contains the click track.

### MICROPHONE IN 1

Mono XLR audio connection for microphone

### MICROPHONE IN 2

Mono XLR audio connection for microphone

### HEADPHONE JACK

Stereo 3.5mm connection for monitoring headphones

### PEDAL IN

Mono 1/4 inch input for digital piano expression pedal

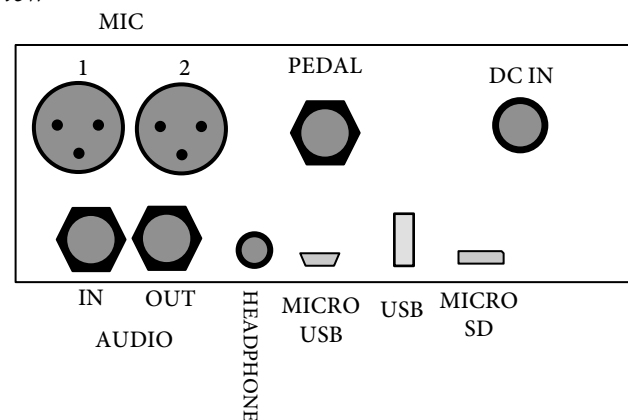
### MICRO USB

Connection for PC firmware (N/A)

### MICRO SD

Slot for micro SD removable storage. Contains the code for the Axoloti microcontroller and the fixed audio track for playback

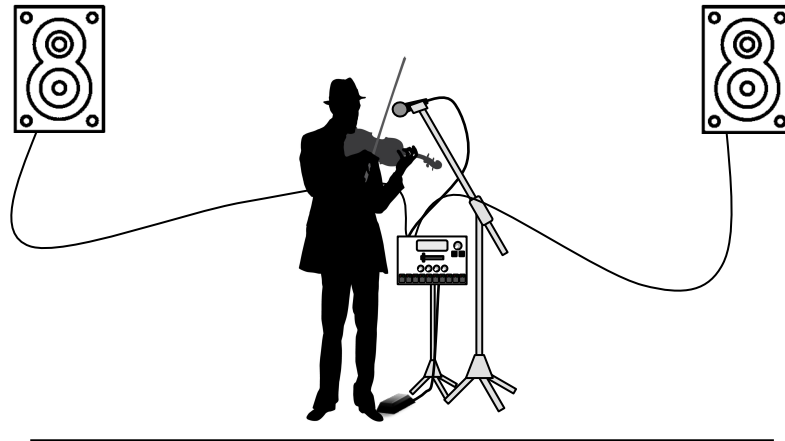
Figure 3.2 - Self-Contained Performance System Connection Plate, Rear View



## PERFORMANCE SETUP

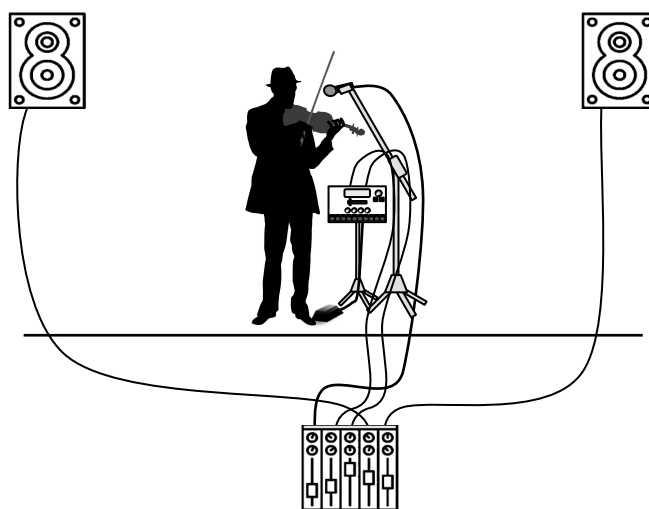
### OPTION 1

This setup is designed for situations with minimal equipment and utilizes the self-contained performance system as a basic mixer, in addition to its audio manipulation capabilities. This relies on the performer's ability to manage their own audio mix on-stage and is ideal for small venues. In addition to the self-contained performance system, the equipment required includes (1) two speakers, (2) one dynamic microphone, (3) appropriate connection cables.



### OPTION 2

This setup is designed for situations where there is a dedicated mixing engineer available and they desire greater control over the audio-mix. This eases the responsibilities of the performer and requires more connections from the self-contained performance system. Maintaining the required equipment in Option 1, it adds (1) a direct connection from the microphone to the mixer, (2) a line output connection of the microphone to the input of the self-contained performance system, and (3) a stereo line output from the self-contained performance system to the mixer.







# The Mountain That Moves

For Violin and Live Electronics

Shaun Bellamy

0 Folk-Like ♩ = 120

Violin

Pitched

Sustained

Rhythmic

mf *espress.*

*p*

Metal Plate

Train

Steam Whistle (S.W.)

High Bells

*p*

*mf*

*f*

*n*

Air Synth

15<sup>ma</sup>

*ppp*

Low Bell

*mp*

Vn.

Pitch.

Sus.

Rhy.

6

*mp*

*n*

Delay

*p*

15<sup>ma</sup>

*poco a poco cres.*

S.W.

*mp*

*mf*

*n*

S.W.

*mf*

Low Drone

Low Bell

*mf*

*mp*

Vn.

Pitch.

Sus.

Rhy.

12

*n*

15<sup>ma</sup>

*mf*

*f*

*f*

*pp*

Bending Metal Hits

Log Drum

*mf*

*pp*

1

17

Vn. *mf con spirito*

Sus. Train Chugging *p*

Rhy. Rock Buzz

22

Vn.

Sus. *pp* *p* Squeaking *pp* Rise

27

Vn. *tempo ad lib.* *mp espress.* *p* *mp* *p* *a tempo* *mp con spirito* *mf* Start

Sus. Squeaking and Shuffling Rocks *mp* *n* Metal Hits

Rhy. Log Drum *mp*

33

Vn. *mp* *mf* *mp*

Sus. Train Chugging With Bell *pp*

Rhy. Cowbell (C.B.) Snare Drum (S.D.)

39

Vn. *p* *pp* *mp*

Pitch. Air Synth *15<sup>ma</sup>* *pp* *poco a poco cres.*

Sus. Bending Whistles *mf* Reversed Chimes

Rhy. *mf*

44

Vn. *mf* *con moto*

Pitch. (*15<sup>ma</sup>*) *mp* *n*

Sus. S.W. *f* Reversed Chimes *mp*

Rhy. Low Drums *mf*

48

Vn. *sul G*

Sus. Train *mf* Reversed Bells *n* *p*

Rhy.

This musical score is for the piece "The Mountain That Moves" and spans measures 53 to 62. It is arranged for Violin (Vn.), Suspended Cymbal (Sus.), Rhythm (Rhy.), and Pitch.

- Measures 53-58:** The Violin part (Vn.) begins with a melody marked *mp*. The Suspended Cymbal (Sus.) part features a melodic line marked *mf* with the instruction "Reversed Chimes". The Rhythm (Rhy.) part consists of a complex pattern of hits, with dynamics ranging from *f* to *mf*. Specific techniques are labeled as "S.D." and "C.B.".
- Measures 59-62:** The Violin part (Vn.) continues with a melody marked *mp*. The Suspended Cymbal (Sus.) part has a melodic line marked *mf* with "Reversed Chimes". The Rhythm (Rhy.) part continues with hits, marked *mp* and *mf*. The Pitch part (Pitch) is introduced, featuring a melodic line marked *mp* with "Air Synth" and "Delayed Metal Hits (4ths)". A section labeled "Shifting Rocks" is marked *mp*. A circled "3" indicates a triplet.

The score includes various musical notations such as dynamics (*f*, *mp*, *mf*), articulation (accents, slurs), and performance instructions (e.g., "Reversed Chimes", "Air Synth", "Delayed Metal Hits").

67

Vn.

Pitch.

Sus.

Rhy.

*f*

Distorted Air Synth

*mf*

*n*

71

Vn.

Sus.

Rhy.

*mp*

*p*

*mf*

Feedbacking Metal Hits

Reversed Chimes

*mf*

*n*

76

Vn.

Sus.

*p espress.*

*pp*

*p*

3

Squeaking

Shifting Rocks

*p*

*n*

4

Jig-Like (♩=♩)

82

Vn. *mp con moto*

Sus. *p* *mf*

Rhy. *mp*

Low Drums

Rise

87

Vn.

Rhy. *p*

92

Vn. *mf*

Rhy. *p* *mf*

S.D. C.B.

97

Vn. *f espress.*

Sus. *pp*

Rhy. *f*

Pressure Scratch

Airy *pp*

Shifting Rocks *p*

102 Normal P.S. Norm. P.S.

Vn. *mp* *f*

Sus. *mp* *mf*

108 Gritty

Vn. *p* *p agitato*

Pitch. Noisy Air Synth *p* *poco a poco cres.*

Sus. Bending Whistles and Hiss *p* Shifting Rocks *pp*

115

Vn. *mp*

Pitch. *mp* *poco a poco dim.*

Sus. *mf* *p*

121

Vn. *p* *mp*

Pitch.

Sus. *mp* *p*

Train *p*

126

Vn.

Pitch.

Sus.

130

Vn.

Pitch.

Sus.

Rhy.

Norm.

P.S.

*mf*

*p*

Squeaking

Shifting Rocks

133

Vn.

Pitch.

Sus.

Rhy.

Norm.

P.S.

Norm.

P.S.

*mp*

*mf*

mp poco a poco dim.

mf

*f*

Bass Drum (B.D.)

Screeching Air Synth



137

Vn. Norm. P.S. *mf*

Pitch.

Sus. Reversed Whistle *mp* Metal Hits *p* *mf*

Rhy.

141

Vn. Norm. P.S. Norm. P.S. *mf* *p* *mf* *p* *mf*

Pitch. *pp*

Sus. *p* *mp*

Rhy.

144

Vn. P.S. Norm. *p* *mf* *p*

Pitch.

Sus. *p* *pp*

Rhy.

148

6

Vn. *p* *f* Norm. PS.

Pitch. *mf*

Sus. Airy *p* *f* *mf*

Rhy. Tom-tom *mf*

152

Vn. Norm. PS. Norm. *mp*

Pitch. *mp*

Sus.

Rhy. *mp*

156

Vn. *mf* PS. Norm. PS. Norm. PS. Norm.

Pitch. *mp*

Rhy.

161

Vn. *p* *mf* PS. Norm. PS. Norm. PS. Norm. PS.

Pitch. *mf*

Sus.

Rhy. Pressure Scratch

166

Vn. Norm. PS. Norm. PS. Norm. PS. Norm. PS.

Pitch.

Rhy. S.D. *f*

171

Vn. Norm. PS. Norm. PS. Norm. PS. Norm.

Pitch.

Sus. Shifting Rocks *mp*

Rhy. Low Drone *mf* Low Drums

177 P.S. Norm. P.S. Norm.

Vn. *mp*

Pitch.

Sus. *p* *poco a poco cres. - - - - -*

Train

181 *tempo ad lib.*

Vn. *espress.* *p* *pp*

Pitch.

Sus. *mp* *p*

7 Start *a tempo*

Vn. *mp* *p agitato* *pp* *mp*

Sus. *pp* Airy

193 P.S.

Vn. *p* *mp*

Sus. *mp* Asynchronously Delayed Metal Hits

*p*

198 Norm. PS. Norm. PS. Norm. PS.

Vn.

Sus.

Shifting Rocks *p* *mp*

203 Norm. PS.

Vn.

Sus.

Rhy.

Pressure Scratch S.D. *mp*

208 *accel.* Norm. PS. *accel.* Norm.

Vn.

Sus.

Rhy.

Shifting Rocks *p* *mp* *p* Reversed Chimes *p*

Train *mf* *mf*

Low Bell *mf* *mp* *mf*

213 PS. Norm.

Vn.

Sus.

Rhy.

Squeaking *mf*

Pressure Scratch *mf*

*accl.* **Frenzied** ♩ = 160

217 P.S. Norm. P.S. Norm. P.S. Norm. P.S. Norm. P.S. Norm. P.S. Norm. P.S. Norm. P.S. Norm.

Vn. *mf*

Sus. *n*

Rhy. B.D. *mp* *mf*

222 P.S. Norm. P.S. Norm. P.S. Norm. P.S. Norm. P.S. Norm. P.S. Norm. P.S. Norm. P.S. Norm. P.S. Norm.

Vn.

Sus. Shifting Rocks *p*

Rhy.

227 *f* *p* *f* *mp* *f*

Vn. P.S. Norm.

Sus. Low Drone *mf* *p*

Rhy. *f*

231 P.S. Norm. P.S. Norm. P.S. Norm. P.S. Norm.

Vn. *p*

Sus. Squeaking and Chimes Train Low Drone *mf* *p* *f* *p*

Rhy. *mf* *f* *mp* Low Drums

236 *mf con spirito* P.S.

Vn.

Rhy. S.D. *mf*

240 Norm. *mp* *mf*

Vn.

Rhy. Pressure Scratch *mp* *mf*

244 P.S. *agitato* *f*

Vn.

Rhy. *f*

248 rit. Norm. P.S. *mp* *p*

Vn.

Sus. Hiss Low Drone *mf* *mp*

Rhy. Metal Hits

8 Airy ♩ = 68

Vn. *Norm.*  
*mp espress.* *p*

Sus. *Airy* *Squeaking* *Reversed Bells*  
*mf* *p* *S.W.* *mp*

Vn. *mf* *f* *n*

Sus. *S.W.* *f* *pp* *Low Drone*

Rhy. *f* *Low Drums*

Vn. *mp dolce* *mf* *subito p*

Pitch. *Air Choir and Violin* *mp* *mf* *p* *8va*

Sus. *Bending Whistles* *pp* *n*

Vn. *mp* *pp* *Bow Behind the Bridge*

Pitch. *(8va)* *pp* *mp* *n*

Sus. *Rise* *n* *mp* *pp* *n*



280  $\text{♩} = 82$

Vn.  $\frac{7}{16}$  *p* *misterioso* *pp*

Sus.  $\frac{7}{16}$  Rise *mp* Train *p* Shifting Rocks *mp* Reversed Bells *mf*

287

Vn. *p* *mp*

Sus. *pp* Hiss *ppp* Low Drone *pp*

294

Vn.

Sus. *mf*

299

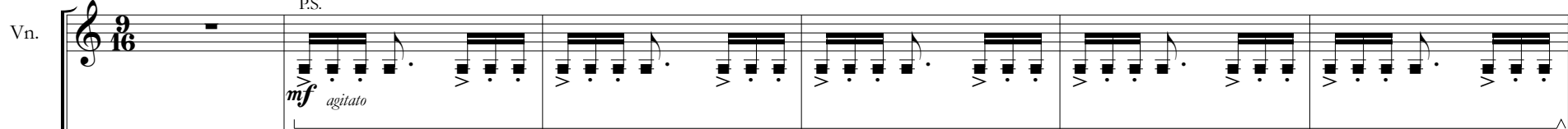
Vn. *pp* *p* *pp*  $\frac{9}{16}$

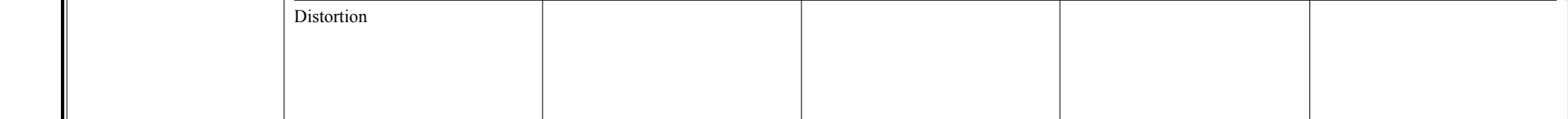
Sus. *mf*  $\frac{9}{16}$  *n*

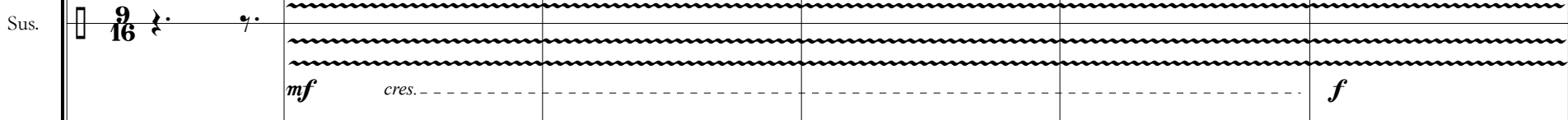
9

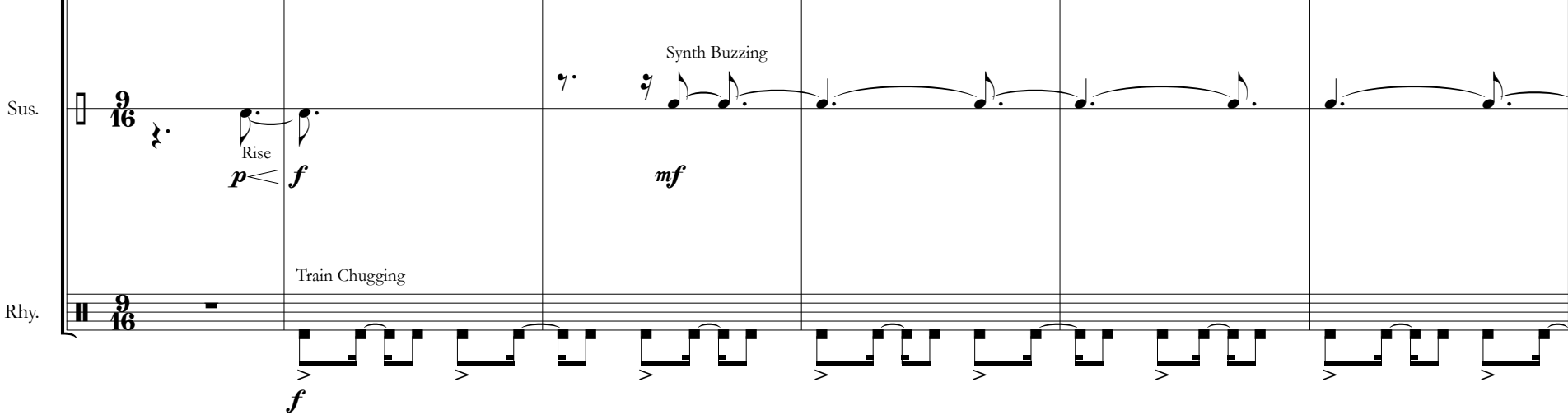
Aggressively Erratic ♩. = 192


P.S.


Vn. 

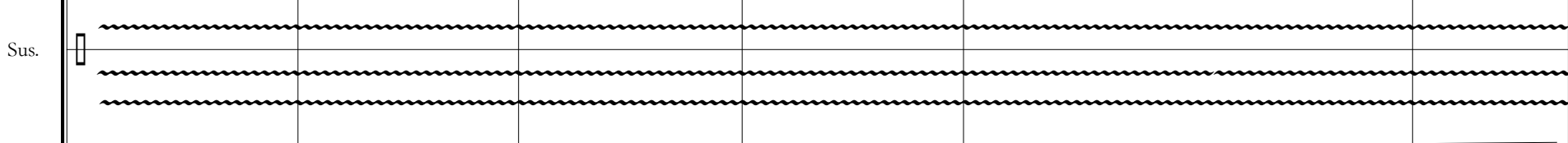
Sus. 

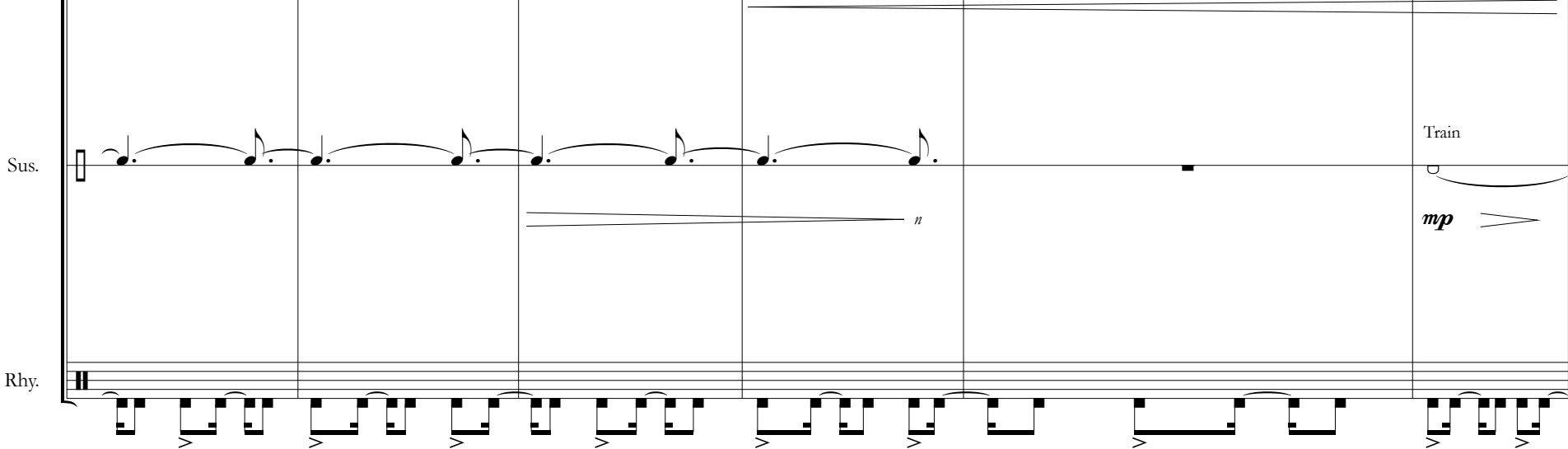
Sus. 

Rhy. 

Vn. 

Sus. 

Sus. 

Rhy. 

319 *tempo ad lib.*  
(Click Ends)

Vn. P.S. *f* Distortion

(Bell Cue) P.S. Distortion

Sus. *ff*

Sus. *mf*

Rhy.

324

Vn. Norm. *f* *ff* P.S. Norm. *f* *ff*

Sus. *mf*

Sus. Low Bells *mf* Hiss *p* *mf p*

330

Vn. P.S. *ff* *fff* P.S. Norm. *ff* *fff*

Sus.

Sus. *mf* *p* *mf*

