

ALTERNATIVE ANALYSES OF THREE MULTIPLE PERCUSSION WORKS

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Alternative Analyses of Three Multiple Percussion Works

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**DOCTOR OF MUSICAL ARTS**

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## ABSTRACT

The goal of this research document is to provide a flexible analysis that is directly applicable to multiple percussion performance and will inform a performer about the nature of decisions in specific circumstances without discouraging new explorations or interpretations. These analyses attempt to organize music components into four groups: dynamics, timbre, note density, and articulations and ornaments. Each of these groups can change in levels of importance within a hierarchy for each phrase, which provides information for performance practice. This information can theoretically reveal the most important components of a phrase, including the most significant mistakes of composers and performers. Emphasizing certain groups during a performance can mean the difference between a phrase enhancement and a confusing effect. These analyses ignore complicated mathematics, complex compositional features, metaphysics, historic performance practice, and the intentions of composers in favor of basic repetition patterns, unexpected changes, and deductive reasoning. The multiple percussion works selected for analysis are *Cold Pressed* (1990, revised 1994) by Dave Hollinden, *Rebonds* (1987-1989) by Iannis Xenakis, and *Bone Alphabet* (1991-1992) by Brian Ferneyhough. Results indicate that *Cold Pressed* utilizes a variety of complementary hierarchy types with a minor number of discrepancies; however, this often deviates with the phrasing indicated in the score. *Rebonds* utilizes a more consistent set of hierarchies without significant support from dynamics. *Bone Alphabet* utilizes complex detail with clear phrases that match the analysis in a variety of hierarchies; however, the rhythmic tension lacks the drive found in the other works. Performance suggestions are presented for each work.

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## 1. INTRODUCTION

Works for multiple percussion instruments can often consist of graphic notation, non-specific pitches, and mathematic principles. The lack of harmony prevents traditional Roman numeral analysis from being useful. In addition to these challenges, logical support for *phrase* boundaries falls onto other music components such as dynamics, directions from the composer, timbre, articulations, aleatoric characteristics, meter, and pitch patterns. Therefore, an alternative analysis is needed to reveal relationships between *phrases* and components to inform a musician about the consequences of performance decisions.

The goal of this research document is to provide analyses that are flexible and directly applicable to music performances of *Cold Pressed* by Dave Hollinden, *Rebonds* by Iannis Xenakis, and *Bone Alphabet* by Brian Ferneyhough. These analyses are applicable because they inform a performer about the nature of decisions in specific circumstances without discouraging new explorations or interpretations. These analyses will be ignoring complicated mathematics, complex compositional features, metaphysics, historic performance practice, and the intentions of composers in favor of basic repetition patterns, unexpected changes, and deductive reasoning. This method is applied to three multiple percussion works by organizing all music components within each *phrase* into four categories, which are placed in a hierarchy. Once a hierarchy is established for each *phrase*, the musician will theoretically be more informed about performance effects because of the relationship between the different *elements* within a *phrase*.

Special terms will only be italicized in the introduction. All music components are organized into four *elements*: *timbre*, *note density*, *dynamics* and the final *element* of *articulations and ornaments*. This method differs from other analysis methods through the use of

*elements* in an adaptable hierarchy that can change the order of importance for *elements* in every *phrase*. The hierarchy is represented by different orders of the four abbreviations of each *element*. The analysis describes the relationships that exist within, and between, *elements* at the *phrase* level while taking note of anomalies. The *element* called *timbre* consists of harmony, *timbre melody*, *timbre harmony*, *timbre monophony*, *timbre polyphony*, instrumentation, melody, and general pitch pattern directions. *Note density* consists of tempo, metric modulations, note bases, complicated rhythms, *rhythmic lines*, polyrhythms, *rhythmic monophony* (single mallet at a time), *rhythmic polyphony* (two or more mallets at a time), instrument density, and similar components. *Dynamics* consist of crescendos, decrescendos, and a variety of written instructions. *Articulations and ornaments* consist of rolls, trills, flams, accents, tremolos, and other techniques.

Since every music component of each *element* is not necessarily relevant in specific contexts, emphasizing important patterns is a crucial issue. Important patterns in each *element* are compared to the previous *phrase* for contrast and pattern accuracy; these significant distinctions represent different roles of importance in the hierarchy. The greatest distinction from the previous *phrase* is simultaneously the *climax*, first *phrase* boundary, and primary *element*. The end *phrase* boundary, or the secondary *element*, provides a strong distinction from the previous *phrase* and does not illustrate a *climax*. The third and fourth *elements* are often determined by levels of support to the primary and secondary *elements* of each *phrase*; the definitions of the third and fourth designations can vary greatly with each context. However, once the detailed patterns within a *phrase* are perceived, the resulting hierarchy will reveal *elements* and patterns that are to be emphasized by the performer; this process also indicates



which *elements* and patterns should not be emphasized as well as the negative cascade effects if decisions are neglected. By illuminating important relationships, this analysis will theoretically provide relevant performance solutions and inform performers, studio instructors, analysts, and composers for a satisfied listener.

### 1.1. The method of elements

Each *phrase* is identified by deduction through the various music components that are involved. Once boundaries are established for *phrases*, the various *element* behaviors are identified and then put into a hierarchy. In order to perceive this process, first the *elements* must be expressed through different music components, then they can be organized into a hierarchy, and finally the *phrase* components can surface from that hierarchy.

*Timbre* can be organized into music components such as instrument materials (e.g., heads, wood, metal, stone, ceramic), pitch pattern directions, and frequency of instrument usage. This information can reveal whether *timbre* will contain *timbre monophony*, *timbre melody*, *timbre polyphony*, *timbre harmony*, or abstract pitch patterns. *Timbre monophony* is the use of one mallet after another in any pattern on one or more instruments. *Timbre melody* is a specific *timbre monophony* in which the form must be linear (seemingly melodic) rather than abstract. *Timbre polyphony* is the harmonic effect when multiple instruments are struck simultaneously. *Timbre harmony* refers to the sense of having a tonic and subsequent harmony with unspecified pitches. *Timbre* will be listed as the abbreviation “T.”

*Note density* is the summation of note attacks within a chosen time duration, which provides the amount of tension within a *phrase* or *section*. This *note density* can provide contrasting material and drive tension into the next *phrase*. Simple rhythmic patterns, note

clusters, *rhythmic polyphony*, *rhythmic monophony*, *rhythmic lines*, repeated rhythms, polyrhythmic density, tempos, and other components comprise *note density*. *Rhythmic polyphony* refers to the use of multiple mallets on multiple instruments simultaneously; this creates dyads, three-note rolls, quad strikes, and other combinations with the focus on *note density* rather than *timbre*. *Rhythmic monophony* refers to the use of one mallet at a time either in a linear or abstract form with the focus on *note density* rather than *timbre*. *Rhythmic lines* refer to the number of written lines in the score that contain separate rhythms. A detailed analysis of *note density* could unintentionally allow a work to be reconstructed, so most *note densities* will typically be referenced with a much lower resolution; in other words, density would not be analyzed by counting notes at an eighth-note level, but rather described generally with the score in hand. Therefore, rhythmically complex works can potentially utilize higher resolutions (such as *Bone Alphabet*) with relative safety from reconstruction attempts. *Note density* will be listed as the abbreviation “N.”

*Dynamics*, depending on the work, can be relatively straightforward such as in *Cold Pressed*, or quite complex, such as in *Bone Alphabet*. Complex networks of dynamics can be analyzed with a lower resolution to gain a better perspective of the general flow of dynamic strength: low levels encompass dynamic levels at piano or lower, high levels indicate dynamics at forte or above, and medium levels present dynamics between the other categories. Crescendos and decrescendos can be important components capable of leading into other *phrases*. *Dynamics* will be listed as the abbreviation “D.”

*Articulations and ornaments* encompass rolls, tremolos, flams, grace notes, accent varieties, and other techniques. These components can distinguish *phrases* by utilizing

uncommon techniques and may create climaxes with accents. Rolls and flams may enhance a dynamic emphasis or provide contrasting material that leads into the next *phrase*. *Articulations and ornaments* will be listed as the abbreviation “A.”

## 1.2. The method of hierarchies

Each of the four *elements* combine into a hierarchy, which is based on contrast and surprise compared to the previous *phrase*. Combinations of the four *element* abbreviations will be listed later as a matter of convenience during an analysis; the *elements* can be rearranged to indicate different hierarchy positions while using the same four terms. Organizing a hierarchy can be tricky, as even constant contrast can be perceived as monotonous under the right circumstances. The *element* which can provide the most noticeable change near the beginning of a *phrase* (a *climax*) is often the primary *element*, and the *element* that can provide the best silhouette of *phrase* boundaries is often the secondary *element*. Once a primary *element* is established, the *climax* of a *phrase* (greatest point of interest or contrast) should be apparent. The secondary *element* will often support the primary *element* and should provide information about *phrase* or *section* boundaries. The tertiary *element* will typically support the primary *element* from a weaker position, or it may support the secondary *element* with hints to *phrase* and *section* parameters. The quaternary *element* will often be the trouble maker, as it often contrasts with the goals of other *elements* and provides confusing results if emphasized. Despite the change in *element* order between different *phrases*, all *elements* are subordinate to the primary *element*. The degree and type of complementary behavior between *elements* ultimately depends on the specific circumstance. In other words, as *elements* become less complementary, a more confusing *phrase* or *section* is the result. As complementary behavior increases, idealized clarity

is approached. The manipulation, or emphasis, of complementary *elements* within a *phrase* of music can enhance the interpretation of a performance.

### 1.3. The method of phrases

As a hierarchy is formed, *phrase* characteristics can be revealed. These *phrase* components, such as *transitions*, *climaxes*, and *themes*, can be described by *element* behaviors within the hierarchy.

A *climax* in this research document refers to the highest point of contrast that diverges from the previous *phrase* or an established pattern and usually occurs at (or near) the beginning of a *phrase* as a boundary. The *climax* justifies the existence of a new *phrase* to the listener, which should also theoretically be the greatest surprise. This *climax* can form from many different contrasting phenomena, such as an abrupt introduction of loud dynamics (compared to a previous *phrase*), a contrasting timbre pattern (often when dynamics are unchanging), a diverging frequency of note occurrence (*note density*), or distinct techniques that contrast behavior when compared to the preceding *phrase* (*articulations and ornaments*). The primary *element* of the hierarchy must be responsible for the *climax*, even if that *element* does not establish the final boundary for the *phrase* or *section*.

A *theme* is the collection of behaviors for all *elements*, serves as the beginning material of a *phrase*, and also contains the *climax*. A *theme* must be a distinction (or repetition) from the previous *phrase*, but it does not necessarily transition into the next *phrase*.

A *transition* is a significant amount of material added to the end of a *theme*; the transition contrasts with thematic material but not enough to warrant a new *phrase*. The *transition* functions by leading into the next *phrase*. Examples of *element* behavior that contribute to the

existence of *transitions* include dynamics crescendoing into the following *phrase*, notes becoming more dense to add tension and drive into a new *phrase*, differing instrumentation or melodies that provide contrasting material, or contrasting *articulations and ornaments* which diverge from the original *theme*. Strange behavior may appear in the *transition* if all *elements* comprising a *phrase* or *section* are almost completely non-complementary, but such issues are infrequent in these analyses. Multiple *transitions* can be applied to a single *phrase* if enough contrasting material is present, but this is a rare phenomenon.

A *phrase* refers to a partition of music that contains a *climax* and a *theme*. One or more *transitions* can be used to provide a drive into the next *phrase*, but these additions are not essential. *Phrases* will always contain all four *elements* in a hierarchy, even if *articulations and ornaments* are absent from a *phrase*; this absence is still a distinction when compared to other *phrases*. The ability of each *phrase* to have a different hierarchy represents adaptability.

A *section* in this document only refers to *Rebonds B*, where short motivic variations are patched together to a significant size (like a mosaic) that are too lengthy to resemble *phrases*. These *sections* will contain all other properties of a *phrase*.

It is important to note the dependency of *phrases* and hierarchies on prior *phrases*. For example, whether a music statement is first or last can determine *thematic* or *transitional* behavior, which is aligned with the borders of other *phrases* (typically without overlapping). In other words, an isolated *phrase* may have a completely different interpretation when placed in the middle of a different segment of music, to the extreme example of being completely absorbed into the surrounding *phrases* as different components.

## 2. ANALYSIS OF *COLD PRESSED*

### 2.1. Results

The most interesting discovery of this analysis is the variety of hierarchies in *Cold Pressed*. Table 1 (on the following page of this document) represents the hierarchies from the analysis with corresponding measures, along with the phrase markings in the score (and elisions removed in parentheses). The majority of the hierarchies conform to D.T.N.A. The second highest result is T.N.A.D. The third most common hierarchy in *Cold Pressed* is A.N.T.D., primarily due to measures 122 through 196. Measures one through thirty-three, forty-eight through fifty, seventy through seventy-one, eighty-eight through ninety, ninety-seven through ninety-eight, 103 through 110, 210 through 211, phrases within 235, 275 through 277, and 283 through 288 utilize the hierarchy D.T.N.A. This hierarchy is unchallenged as the most common distribution of elements in *Cold Pressed*.

Table 1. Hierarchy list comparison with analysis phrases and score phrase marks in *Cold Pressed*.

<u>Hierarchy</u>	<u>Analysis</u>	<u>Score Marks (w/out elision)</u>	<u>Hierarchy</u>	<u>Analysis</u>	<u>Score Marks (w/out elision)</u>
D.T.N.A.	1-4	1-4	A.N.T.D.	144-147	114-115
D.T.N.A.	5-9	5-11 (-10)	A.N.T.D.	148-152	116-121
D.T.N.A.	10-14	12-16 (-15)	A.N.T.D.	153-158	122-204
D.T.N.A.	15-16	16-20 (-19)	A.N.T.D.	159-170	205-210 (-209)
D.T.N.A.	17-18	20-24 (-23)	A.N.T.D.	171-175	210-212 (-211)
D.T.N.A.	19-23	24-28	A.N.T.D.	176-183	212-214 (-213)
D.T.N.A.	24-28	29-30	A.N.T.D.	184-185	214-217 (-216)
D.T.N.A.	29-30	31-32	A.N.T.D.	186-187	217-219 (-218)
D.T.N.A.	31-32	33	A.N.T.D.	188-196	219-223
D.T.N.A.	33	34	N.T.A.D.	197-204	224-228 (-227)
T.N.A.D.	34-36	35-36 (35)	N.A.D.T.	205-209	228-231 (-230)
T.N.A.D.	37-39	36-37 (36)	D.T.N.A.	210-211	235
N.T.D.A.	40-44	38-40 (-39)	A.T.N.D.	212-213	-
T.N.A.D.	45-47	40-43 (-42)	A.D.N.T.	214-216	-
D.T.N.A.	48-50	43-45 (-44)	D.N.A.T.	217-223	-
T.N.A.D.	51-54	45-50	A.N.T.D.	224-227	-
T.N.A.D.	55-58	51-55 (-54)	T.N.A.D.	228-230	-
T.N.A.D.	59-62	55-59 (-58)	T.N.D.A.	235	-
T.N.A.D.	63-69	59-63 (-62)	D.T.N.A.	235	-
D.T.N.A.	70-71	63-72 (-71)	D.T.N.A.	235	236-239
T.N.D.A.	72-75	72-75	T.N.D.A.	235	240-243
T.N.A.D.	76-77	76-77 (76, 77)	T.N.D.A.	235	244-247
T.N.A.D.	78-79	77-78 (78, 79)	D.T.N.A.	235	248-252 (-251)
T.N.A.D.	80-82	78, 79-80	D.T.N.A.	235	252
T.N.A.D.	83-86	80-81	D.T.N.A.	235	253-254
T.N.D.A.	87-88	81-83 (-82)	D.T.N.A.	235	254-255
D.T.N.A.	88-90	83-84 (83)	N.T.D.A.	236-239	256-258 (-257)
T.N.A.D.	91-94	84-86, 86	N.T.D.A.	240-243	258-259
T.N.D.A.	95-96	87-88	T.N.D.A.	244-247	259-261 (-260)
D.T.N.A.	97-98	89-90	N.T.A.D.	248-251	261-265 (-264)
T.N.A.D.	99-102	91-94 (-93)	D.N.A.T.	252-270	265-272 (-/1), 272
D.T.N.A.	103-106	94, 95-98 (-97)	T.N.D.A.	271-274	273-278 (-277)
D.T.N.A.	107-110	99-100 (98, 99-100)	D.T.N.A.	275-277	278-279
D.T.N.A.	111-113	100-103 (-102)	T.N.D.A.	278-282	280-281, 282
T.D.N.A.	114-115	103-105	D.T.N.A.	283-285	283-285 (-284)
T.N.D.A.	116-121	105-107 (-106)	D.T.N.A.	286-288	285-287 (-286)
A.N.T.D.	122-128	107-109, 109 (-108)	A.N.T.D.	289-296	287-297 (-296)
A.N.T.D.	129-136	110-111 (109, 110)	T.N.A.D.	297-298	297-298
A.N.T.D.	137-143	111-113			

## 2.2. Analysis

David Hollinden received degrees in composition at Indiana University and the University of Michigan.<sup>1</sup> He has created numerous percussion compositions and has a background in rock music.<sup>2</sup> *Cold Pressed* is a work by David Hollinden that was composed 1990 and revised in 1994.<sup>3</sup> This composition was commissioned by Nachiko Maekana, whom premiered the work in Tokyo, Japan in 1990.<sup>4</sup> *Cold Pressed* utilizes a variety of hierarchies and straightforward phrases. Each phrase will be analyzed and presented in the order of each hierarchy element as it is used.

### 2.2.1. Phrase one

The first phrase utilizes a hierarchy of D.T.N.A. and extends from measures one through four. The phrase begins with dynamic levels at a fortissimo climax. The transition contains a change in dynamics occurring at the subito pianissimo in measure three and a crescendo in measure four.

The secondary role is timbre. The instrumentation remains fairly consistent until the fourth measure. The timbre framework of the first phrase serves as a common recurrence throughout the piece. The initial part of the phrase uses consistent instruments while a different set of instruments is utilized in the transition.

The tertiary role is note density. Phrase one contains an increase of tension in each measure for a short moment with a longer period of tension in the transition that begins on beat four of measure three to the end of the phrase.

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1. Dave Hollinden, "Bio," <http://www.davehollinden.com/bio.html> (accessed April 29, 2013).

2. Ibid.

3. Dave Hollinden, *Cold Pressed* ([United States]: McClaren Publications, 1994).

4. Dave Hollinden, "Compositions: Cold Pressed," <http://www.davehollinden.com/cold.html> (accessed April 29, 2013).



The quaternary role belongs to the accents, which emphasize a recurring rhythmic motive until the transition. Accents from the third beat of measure three until the end of the phrase emphasize changes in timbre.

### **2.2.2. Phrase two**

The second phrase utilizes a hierarchy of D.T.N.A. and consists of measures five through nine. Dynamics begin with a fortissimo climax and remain unchanged until the subito pianissimo in measure six. The last beat of measure six is the beginning of a transition, which adds a crescendo in the following three measures.

The timbre resembles the same framework as the first phrase. The transition portion at the end of the second phrase is extended when compared to the first phrase.

The note density is similar to the first phrase; small sections of increased tension occur in measures five and six while the transition, beginning near the end of measure six, increases tension until the next phrase.

Accents embellish initial rhythms and bass drum notes for the first two measures and then alternate the emphasis of timbre changes and downbeats during the transition. This behavior is very similar to the first phrase.

### **2.2.3. Phrase three**

The third phrase utilizes a hierarchy of D.T.N.A. and consists of measures ten through fourteen. The transition begins with measure twelve. This phrase begins with a fortissimo climax, which quickly decrescendos in the following measure. A crescendo follows the static, unchanging dynamic level in measure fourteen toward the next phrase.

The timbre of measure ten resembles the previous three measures. Measures eleven to the end of the phrase gradually expand the use of instruments until the next phrase, especially at the transition. Minor changes in instrumentation complement the dynamic direction of the phrase.

Measure ten contains an average of about four notes per quarter note, a rate that decreases in measure eleven and gradually returns to the original rate throughout the phrase toward measure fourteen.

Accents in measure ten and eleven emphasize the meter. No accents occur again until measure fifteen.

#### **2.2.4. Phrase four**

The fourth phrase utilizes a hierarchy of D.T.N.A. and consists of measures fifteen through sixteen. The transition is measure sixteen in this phrase. The forte climax occurs on the initial beat of the phrase and is followed in the next measure with a subito piano that crescendos into the next phrase.

The instrumentation rises in pitch as these two measures progress; the initial phrase statement is represented by the three lowest instruments while different instruments are utilized in the following measure as a transition into the next phrase.

The note density of measure fifteen is sparse, which contrasts greatly with the sixteenth notes of the following measure. Measure fifteen contains accents that emphasize the meter while measure sixteen contains fewer accents and bisects the meter.

#### **2.2.5. Phrase five**

The fifth phrase utilizes a hierarchy of D.T.N.A. and consists of measures seventeen and eighteen. The transition is measure eighteen in this phrase. Dynamics in this phrase are identical

to the previous phrase. The instrumentation of measure seventeen is similar to measure fifteen with an additional high bongo. The instrumentation for measure eighteen is identical to measure sixteen. The triplets in measure seventeen contrast with the sixteenth notes in the following measure. Accents in this phrase emphasize the meter. Phrase five, regarding all four elements, is an embellished version of phrase four.

#### **2.2.6. Phrase six**

The sixth phrase utilizes a hierarchy of D.T.N.A. and consists of measures nineteen through twenty-three. The first transition consists of measures twenty and twenty-one while the second transition begins at measure twenty-two. The forte climax is located on the initial beat of measure nineteen. Although the dynamics of phrase six are similar to the previous two phrases, the subito piano of measure twenty is followed by an extended crescendo that covers measures twenty through twenty-three. The written forte at measure twenty-two (the second transition) continues to crescendo into the next phrase.

The instrumentation of measure nineteen and twenty is identical to phrase five. Measure twenty-one adds the bass drum but retains the character of the previous measure. Measure twenty-two (the second transition) begins on the high bongo and descends each instrument until measure twenty-three, which prepares the timbre for the initial measure of the next phrase.

Measure nineteen contains sixteenth notes, which become broken in measure twenty to prepare for the metric modulation into triplets in measure twenty-one. The tension increases with complete triplet figures in measure twenty-two, which augment in measure twenty-three; this is preparation for the metric modulation that begins in the next phrase.

Measures nineteen and twenty have accents that prepare the metric modulation at measure twenty-one, which results in meter emphasis during the following two measures. Measure twenty-three contains accents that assist the transition into the metric modulation of the next phrase.

### **2.2.7. Phrase seven**

The seventh phrase utilizes a hierarchy of D.T.N.A. and consists of measures twenty-four through twenty-eight. The first transition is measure twenty-six while the second transition consists of measures twenty-seven through twenty-eight. The fortissimo climax occurs on beat one and maintains that dynamic level until the end of the phrase. The contrasting amount of rest in measures twenty-eight, thirty, and thirty-two segregate phrases despite the repetitious nature of the written music.

The instrumentation of measures twenty-four and twenty-five are similar except for the additional bongo notes at the end of measure twenty-five. The high tom and snare notes in measure twenty-six (the transition) are grouped into threes; measure twenty-seven (the second transition) produces a variation of this upward pitch trend. Measure twenty-eight ends the phrase with one note and is also followed by two eighth-note rests; despite the repetitions in the next few measures, the rest adds an asymmetrical and unexpected change in the pattern. This change creates separations in measures twenty-eight and thirty, which establishes separate phrases. If these rests did not exist, all the repetitions would be considered part of phrase seven.

Measure twenty-four is identical to measure one. Measure twenty-five adds extra sextuplets that lead into the transitional measures that follow. Measure twenty-six and twenty-seven contain sextuplets, which increases in tension toward the end of the phrase.

Accents in measures twenty-four and twenty-five emphasize the initial rhythmic motive of beat one. Measure twenty-six contains accents that emphasize changes in timbre. Measure twenty-seven contains accents that enhance the beginning of a repetitious motive within the measure.

#### **2.2.8. Phrase eight**

Measures twenty-nine and thirty are identical to measures twenty-seven and twenty-eight and utilize a hierarchy of D.T.N.A.

#### **2.2.9. Phrase nine**

The ninth phrase utilizes a hierarchy of D.T.N.A. and consists of measures thirty-one and thirty-two. Measure thirty-one is identical to measures twenty-seven and twenty-nine. Measure thirty-two is similar to measures twenty-eight and thirty with an additional extended period of rest.

#### **2.2.10. Phrase ten**

The tenth phrase utilizes a hierarchy of D.T.N.A. and consists of measure thirty-three. This phrase begins with a fortissimo on the initial beat followed by a decrescendo to piano. Measure thirty-three begins with bass drum strikes succeeded by high temple block notes. Beat one of this short phrase averages three notes and has a lower average for the rest of the measure. A single accent emphasizes the initial beat.

#### **2.2.11. Phrase eleven**

The eleventh phrase utilizes a hierarchy of T.N.A.D. and consists of measures thirty-four through thirty-six. The transition is measure thirty-six. The instrumentation of measures thirty-

four and thirty-five is similar with the addition of the low woodblock. The following measure retains the bass drum and low woodblock while adding the medium cowbell and tambourine.

Measures thirty-four through thirty-six show a steady increase in note density with four thirty-second notes applying tension into the next measure. As the phrase progresses, the tension increases proportionally to the changes in instrumentation; as a result, the note density supports the timbre.

The accents in measures thirty-four and thirty-five emphasize the bass drum entrances, and accents in measure thirty-six support the initial rhythmic figure and bass drum entrance.

Measure thirty-four begins with two dynamic levels: the high temple block enters at piano while the lower pitched instruments begin at forte. In measure thirty-five the upper voice crescendos to forte while the lower voice maintains forte. This dynamic level is already within the expected range; therefore, beat one of measure thirty-six is merely supporting the beginning of a transition and cannot tenably be considered a climax.

#### **2.2.12. Phrase twelve**

The twelfth phrase utilizes a hierarchy of T.N.A.D. and consists of measures thirty-seven through thirty-nine. The transition consists of measures thirty-eight and thirty-nine. Measure thirty-seven retains the bass drum while abandoning all other instruments for the snare drum. Measure thirty-eight adds the high wood block and low tom-tom, an instrumentation that remains until the next phrase.

Measure thirty-seven lowers the tension into measure thirty-eight. Measure thirty-eight (the transition) establishes a sixteenth-note note density. Measure thirty-nine contains a burst of thirty-second notes that lead into the next phrase.

Accents in measure thirty-seven emphasize the bass drum while flams embellish all other notes. An accent in measure thirty-eight emphasizes the first beat and is followed by an accented flam in measure thirty-nine that emphasizes the fourth beat on the snare drum. Articulations and ornaments support the theme but drop to minimal levels during the transition.

The forte dynamic continues until the subito piano crescendo in measure thirty-eight, which continues until a return to forte on the last sixteenth note of the third beat in measure thirty-nine.

### **2.2.13. Phrase thirteen**

The thirteenth phrase utilizes a hierarchy of N.T.D.A. and consists of measures forty through forty-four. The transition consists of measures forty-two through forty-four. Measure forty and forty-one are identical, but these measures are also similar to the first and second measure of *Cold Pressed* with additional sextuplets that increase the tension into each following measure. The note density drops momentarily in measure forty-two but increases in sextuplets with each succeeding measure within the transition.

Measures forty and forty-one have a rising trend in instrumentation with a peak at the high bongo notes in measure forty-two (the transition). Measure forty-two, the beginning measure of the transition, is the only measure in this phrase lacking an ascending pitch trend. The dynamic level of forte persists from measures forty through forty-four.

Accents in measures forty and forty-one imitate the first and second measures of the piece by supporting the opening rhythmic motive. Accents in measure forty-two emphasize beats one and three. Accents bisect measure forty-three after the motive while measure forty-four contains accents that emphasize the meter.

#### **2.2.14. Phrase fourteen**

The fourteenth phrase utilizes a hierarchy of T.N.A.D. and consists of measures forty-five through forty-seven. The transition is measure forty-seven. The climax of this phrase is the change in timbre to an arch pattern that begins with the bass drum. This rising and falling pattern continues through measure forty-six until the transition mimics behavior found in measure eight.

The note density of the theme (measures forty-five and forty-six) produces similar tension comparable to the first two measures of *Cold Pressed*. The transition increases the tension in a manner similar to measure eight.

A single accent in measure forty-five emphasizes the climax on the initial beat, while measure forty-seven contains accents that emphasize the meter and increase tension in the last beat with four accented sixteenth notes.

The initial forte on the first beat of this phrase is expected; however, the subito piano that follows it seems awkward compared to previous similar phrases. The crescendo that begins halfway through measure forty-six comes early to support the transition and too late to support the theme effectively.

#### **2.2.15. Phrase fifteen**

The fifteenth phrase utilizes a hierarchy of D.T.N.A. and consists of measures forty-eight through fifty. Due to the rising sextuplets at the end of measure forty-eight, no significant contrasting material is presented in the next measure. No dynamic level at the beginning of measure forty-eight is marked in the score. Based on the dynamics behavior of the first page, it



seems as though the dynamic level should be fortissimo to match phrases one and seven. The dynamic level that theoretically originates in measure forty-eight is maintained until the end of the phrase.

The timbre complements the dynamics; a rising pattern is repeated halfway from measures forty-eight through the end of the phrase. The sextuplet figures increase the tension until the last note of the phrase even though the rhythmic motives are repeated. The accents in measure forty-eight imitate the behavior of the first measure of the piece. Accents in measure forty-nine emphasize the beginning of each repeated, ascending motive.

#### **2.2.16. Phrase sixteen**

The sixteenth phrase utilizes a hierarchy of T.N.A.D. and consists of measures fifty-one through fifty-four. The transition is measure fifty-four. Measure fifty-one utilizes the snare drum, bass drum, ride cymbal, and crash cymbal. The crash cymbal on the initial beat signifies the climax of the phrase. This simple pattern of instrumentation (reminiscent of a drumset) continues without the crash cymbal for the next two measures. Measure fifty-four, the transition, contrasts with the use of the high bongo and a single bass drum note.

The note density of this phrase is fairly balanced, which averages from four to six notes per quarter note of time. Despite the nearly homogeneous nature of the tension, it does give a small silhouette of shape due to the note consistency in measure fifty-four.

The single accent on beat one of measure fifty-one emphasizes the climax of the phrase. The three accents that project the meter in measure fifty-four help establish a boundary with the next phrase. The forte dynamic remains consistent for the entire phrase and is theoretically likely to be a lower level than the previous phrase.

### **2.2.17. Phrase seventeen**

The seventeenth phrase utilizes a hierarchy of T.N.A.D. and consists of measures fifty-five through fifty-eight. The timbre of the first three measures is identical to the first three measures of the previous phrase. The transition, measure fifty-eight, is distinct from measure fifty-four, which utilizes a descending instrumentation pattern that contrasts with the surrounding material. The climax of this phrase is, like measure fifty-one, the initial beat of the phrase marked with the crash cymbal.

The note density of the first three measures is nearly identical to the previous phrase counterparts; measure fifty-five is missing a snare drum strike on the first beat possibly due to the anticipation of a particular sticking. The note density of measure fifty-eight is very similar to measure fifty-four.

The only accent in the phrase emphasizes the climax on the first beat of the beginning measure. The dynamic level of forte remains throughout this phrase.

### **2.2.18. Phrase eighteen**

The eighteenth phrase utilizes a hierarchy of T.N.A.D. and consists of measures fifty-nine through sixty-two. Measures fifty-nine and sixty are identical to measures fifty-five and fifty-six. The next measure follows nearly identically, as expected, until a small variation begins on beat three of measure sixty-one. The transition is measure sixty-two, which focuses on the sixteenth-note rhythms of the bongos and the additional emphasis of individual bass drum notes.

The note density appears in a familiar fashion until the transition material in measure sixty-two; the overall note density does not change significantly, but the note density of the bass drum and bongos increase individually.

The initial accent on beat one of measure fifty-nine emphasizes the climax, which is marked by the crash cymbal. The accents found in measure sixty-two, the transition, emphasize instrumentation changes in the bongos and support the bass drum notes. The dynamic level of forte remains throughout this phrase.

### **2.2.19. Phrase nineteen**

The nineteenth phrase utilizes a hierarchy of T.N.A.D. and consists of measures sixty-three through sixty-nine. The transition extends from measures sixty-seven through sixty-nine. Measures sixty-three and sixty-four are identical to the first two measures of the prior two phrases. The climax is located on the same beat with the same instrumentation. Measure sixty-five alters the rhythm of the theme that follows after the climax, which prepares for the transition material in measure sixty-six. Measure sixty-six is very close to being a separate transition, but all other element behavior remains similar. A distinct contrast occurs with the removal of metal and wood timbres in measures sixty-seven through sixty-nine (the transition) along with the rise-and-fall pattern that leads into the bass drum note of the next phrase.

The note density of the first two measures of phrase nineteen is familiar; however, the next two measures provide higher and lower density fluctuations at the resolution of a quarter-note level. Measures sixty-seven through sixty-nine significantly reduce the tension, especially in regard to measure sixty-nine. The metric modulation that occurs in measure sixty-seven continues the rhythmic pattern that was formed in the previous measure.

The accent in measure sixty-three emphasizes the crash cymbal climax. The accents in measures sixty-seven through sixty-eight project the meter, while the accents in measure sixty-

nine aid the metric modulation that occurs in the next phrase. The dynamics remain consistent until the crescendo of the transition that leads into the next phrase.

#### **2.2.20. Phrase twenty**

The twentieth phrase utilizes a hierarchy of D.T.N.A. and consists of measures seventy and seventy-one. The crescendo from the previous phrase leads into the fortissimo climax on the initial beat of this phrase. This dynamic level continues until the end of the phrase.

The bass drum and splash cymbal notes constitute a kind of theme that overlaps with the transitional function of the large tom-tom notes. The tension increases from measure seventy to the first two beats of measure seventy-one; however, the tension is reduced at the end of measure seventy-one. Every note in this phrase is accented except for the splash cymbal that occurs on the climax of the phrase.

#### **2.2.21. Phrase twenty-one**

The twenty-first phrase utilizes a hierarchy of T.N.D.A. and consists of measures seventy-two through seventy-five. The transition is measure seventy-five. The instrumentation reminiscent of a drumset (similar to measure fifty-two) is enhanced by the tambourine and high temple block for the first three measures of this phrase (the theme). Measure seventy-five utilizes a variety of instruments in a timbre melody effect, which establishes enough contrast to function as transition material.

The note density of measures seventy-two through seventy-four is repetitive, while the rhythmic monophony in measure seventy-five (the transition) contrasts with the prior measures of the phrase. This rhythmically monophonic behavior accompanies a significant drop in note density.

The forte initiated at the beginning of this phrase is unexpected, but not extremely effective due to the fortissimo from the previous phrase. Therefore, the dynamics accompany the timbre without forming a climax. The forte remains consistent until the end of the phrase. One accent exists in this phrase, which embellishes a minor shaping of the linear behavior found in measure seventy-five.

#### **2.2.22. Phrase twenty-two**

The twenty-second phrase utilizes a hierarchy of T.N.A.D. and consists of measures seventy-six and seventy-seven. The transition is measure seventy-seven. The instrumentation for measure seventy-six has wide leaps while the following measure consistently presents the low tom-tom to provide contrasting material. The note density increases as the phrase progresses. An accented rim shot is introduced into beat four of the first measure of the phrase along with three accents in the following measure. The dynamic level of forte is maintained throughout the phrase.

#### **2.2.23. Phrase twenty-three**

The twenty-third phrase utilizes a hierarchy of T.N.A.D. and consists of measures seventy-eight and seventy-nine. The timbre contains a lower pitch pattern that ends in a greater repetition of eighth notes on the low wood block in measure seventy-eight; however, measure seventy-nine correlates with an opposite pattern by using a high pitched instrumentation that ends on the snare drum. The second measure of this phrase contains a slight increase in tension. Three accents emphasize the meter in the first measure of this phrase while a single accent is presented in the second measure with flams to embellish the end of the phrase. The dynamic level of forte is maintained throughout the phrase.

#### **2.2.24. Phrase twenty-four**

The twenty-fourth phrase utilizes a hierarchy of T.N.A.D. and consists of measures eighty through eighty-two. The transition begins halfway through measure eighty-one and finishes at the end of the phrase. The timbre of measure eighty correlates with an arch, which ends with a downward fall in pitch. Measures eighty-one and eighty-two use the bongos more consistently; the transition presents this repetitive behavior halfway through measure eighty-one. The tension increases halfway through measure eighty-one, the transition, with the incorporation of sixteenth notes. Accents in measure eighty-two accompany the bass drum notes and changes between bongo notes. The subito piano initiates the dynamic level of the phrase, which is followed by a crescendo in measure eighty-one and reaches fortissimo in measure eighty-two.

#### **2.2.25. Phrase twenty-five**

Phrase twenty-five utilizes a hierarchy of T.N.A.D. and consists of measures eighty-three through eighty-six. The transition consists of measures eighty-four through eighty-six. The timbre of measure eighty-three begins with wide leaps but quickly reduces to low tom-tom and snare monophony (timbre monophony). Measure eighty-four, the transition, begins a repeated, syncopated rhythm that rises and ends during the first beat of measure eighty-six. Dyads are found on the first beat of the phrase and in larger numbers at the end of measure eighty-six.

Sixteenth-note patterns proliferate the phrase, which heighten the importance of dyads when increasing the tension in measure eighty-six. Accents in measure eighty-three emphasize the initial climax on the first beat as well as changes in timbre. Accents in measure eighty-four and eighty-five embellish the syncopated rhythm formed by the timbre. Six accents are located in

measure eighty-six, most of which emphasize changes in timbre between dyads. The forte, a lower dynamic than the previous phrase, continues throughout phrase twenty-five.

#### **2.2.26. Phrase twenty-six**

The twenty-sixth phrase utilizes a hierarchy of T.N.D.A. and consists of measure eighty-seven and beat one of eighty-eight. The instrumentation of this phrase correlates with the shape of a melody that rises in pitch. This phrase ends on beat one of measure eighty-eight; the amount of contrasting material after this point is significant enough to constitute another phrase. Small groups of sixteenth notes increase the tension to a minor extent as this short phrase progresses. The subito piano is unexpected but is also a much lower dynamic level than the forte of the previous phrase. No articulations or embellishments are present in this phrase.

#### **2.2.27. Phrase twenty-seven**

The twenty-seventh phrase utilizes a hierarchy of D.T.N.A. and consists of measures eighty-eight through ninety. The transition begins on the fourth beat of measure eighty-nine. The subito fortissimo on the second beat in measure eighty-eight is the climax and beginning of the phrase. This dynamic level continues until the end of the phrase. The timbre reveals an arch shape for the theme while a separate arch begins on the first beat of the transition (beat four of measure eighty-nine). The theme of this phrase contains dyads and the transition is purely linear (rhythmic monophony); the tension of this phrase is relatively equivalent except for the dyad distinction. Accents embellish rhythmic aspects of the theme, but no accents are present in the transition.

### **2.2.28. Phrase twenty-eight**

The twenty-eighth phrase utilizes a hierarchy of T.N.A.D. and consists of measures ninety-one through ninety-four. The first transition is measure ninety-three while the second transition is measure ninety-four. The instrumentation reminiscent of a drumset returns in measures ninety-one and ninety-two. The frequency of use for each instrument increases in measure ninety-three, but a completely new instrumentation is presented in measure ninety-four. Measure ninety-four resembles an enhanced version of measure eighty-seven without the unexpected dynamics, which correlates with a melody that ascends; this behavior is similar to phrase twenty-one (measures seventy-two through seventy-five). The tension increases in the first transition, measure ninety-three, and drops slightly when the second transition is reached at measure ninety-four. Accents embellish the metric division of the first transition in measure ninety-three. Accents in measure ninety-four, the second transition, project the meter. The forte dynamic level remains until the end of the phrase.

### **2.2.29. Phrase twenty-nine**

The twenty-ninth phrase utilizes a hierarchy of T.N.D.A. and consists of measures ninety-five and ninety-six. The transition is measure ninety-six. Measure ninety-five opens with dyads and then ascends in a linear pattern without dyads. The transition at measure ninety-six contains mostly dyads utilized in a non-melodic, repetitive fashion. The climax begins on the first beat of this phrase with the timbre behavior being similar to the first phrase of the piece. The eighth-note rest in measure ninety-four aids the aural perception of the beginning of this phrase.



The note density increases significantly within the transition (measure ninety-six), mostly due to the increased use of dyads. The dynamic level begins at forte with beat four at a subito piano. The crescendo in measure ninety-six leads into the next phrase.

Accents in measure ninety-five embellish the rhythmic motive on beat one as well as an upbeat that bisects the meter. Measure ninety-six embellishes the familiar rhythmic motive in the first three beats of the meter.

### **2.2.30. Phrase thirty**

The thirtieth phrase utilizes a hierarchy of D.T.N.A. and consists of measures ninety-seven and ninety-eight. The transition is measure ninety-eight. The initial dynamic level of fortissimo forms the climax on the first beat of the phrase. The decrescendo in measure ninety-eight reveals the transition segment of the phrase. The timbre begins with a simple linear melodic shape (timbre melody); however, the transition repeats tambourine notes, an instrument not encountered elsewhere in this phrase. The tension is halved by the fourth beat of measure ninety-seven while the transition halves the note density again. Accents emphasize rhythmic figures in measure ninety-seven, but only a single accent marks the first beat of the following measure.

### **2.2.31. Phrase thirty-one**

The thirty-first phrase utilizes a hierarchy of T.N.A.D. and consists of measures ninety-nine through 102. The instrumentation reveals a melody with wide leaps until the transition that begins on the last beat of measure 100. The timbre becomes repetitive and localized to low pitches in the transition.

The tension increases and then decreases quickly within the first two beats of measure 100 and the transition increases tension in measure 102. The ruff at the beginning of measure

ninety-nine is technically present in the previous measure if the downbeat is considered the beginning of a measure; however, due to the proximity of this embellishment, the function enhances the initial note of measure ninety-nine, which supports the initiation of a new phrase. The piano dynamic level begins, and remains, throughout the phrase until the crescendo in measure 102 and leads into the next phrase.

### **2.2.32. Phrase thirty-two**

The thirty-second phrase utilizes a hierarchy of D.T.N.A. and consists of measures 103 through 106. The transition begins on the fourth beat of measure 105 and finishes at the end of measure 106. The phrase begins with a mezzo forte climax, which maintains until the fourth beat of measure 105 (the transition). The transition begins with a crescendo into the next phrase.

The theme of the phrase utilizes the mid-range of instrumentation while the transition makes use of the upper pitch range. Minor fluctuations in tension mark the end of the theme, which separates the theme and transition with rest. The transition is identified by the repetitive rhythm that occurs in measure 106, a behavior not found in the theme.

An accent embellishes the beginning of the phrase in measure 103. Accents in measures 104 and 105 embellish rhythmic figures while accents in the transition emphasize the repetition of timbre patterns.

### **2.2.33. Phrase thirty-three**

The thirty-third phrase utilizes a hierarchy of D.T.N.A. and consists of measures 107 through 110. The transition consists of measures 109 and 110. The phrase begins with a climax at a fortissimo level. This dynamic level is maintained until the short groups of sixteenth notes in measure 110 when a subito piano crescendos into the next phrase.

The abstract timbre in the theme is marked by wide leaps, frequent use of the bass drum, occasional dyads, and broken sixteenth-note patterns. The timbre melody rises in pitch in measure 109, the transition, only to fall slightly in measure 110. This arch pattern (timbre melody) diverges from the theme and provides significant contrast as a transition.

The tension rises slightly due to the use of dyads in measures 108 and 109. The note density increases more consistently for the short transition in measure 110. Accents in this phrase emphasize a few rhythmic figures and support the meters.

#### **2.2.34. Phrase thirty-four**

The thirty-fourth phrase utilizes a hierarchy of D.T.N.A. and consists of measures 111 through 113. The transition is measure 113. The initial climax is at a forte level, which decrescendos until a subito forte in the transition. The rhythm reminiscent of a drumset is revealed in a variation due to the incorporation of the tambourine and high tom-tom.

The theme has many fluctuations in tension due to the repetitive nature of the rhythmic motives in measures 111 and 112. The transition begins with high tension and ends with a single note. A single accent embellishes the first beat of the transition.

#### **2.2.35. Phrase thirty-five**

The thirty-fifth phrase utilizes a hierarchy of T.D.N.A. and consists of measures 114 and 115. The transition is measure 115. This phrase is nearly identical to the previous two measures with two snare notes and a quarter rest added to the end of the transition. The initial dynamics are no longer a surprise; therefore, the reminiscent drumset figure (timbre) is the greatest distinction from the transition material of the prior phrase.

### **2.2.36. Phrase thirty-six**

The thirty-sixth phrase utilizes a hierarchy of T.N.D.A. and consists of measures 116 through 121. The figure reminiscent of a drumset returns in measure 116 and is repeated in measure 117. This figuration of timbre represents the theme while the transition begins at measure 118. The instrumentation of this phrase is consistent except for the absence of the tambourine in the transition. The climax is the first beat of the phrase due to the instrumentation rather than the dynamics. The transition material contains a gradual, deteriorating note density with tiered dynamics (contrasting with the decrescendo in the theme). There are no articulations or ornaments in this phrase.

### **2.2.37. Phrase thirty-seven**

The thirty-seventh phrase utilizes a hierarchy of A.N.T.D. and consists of measures 122 through 128. The transition consists of measures 126 through 128. The initial note is the climax of the phrase. The accents and rim shots increase in frequency at measure 126 through the end of the phrase; this segment of the phrase functions as the transition. The note density increases at the transition due to the greater number of rimshots and bass drum notes. The bass drum enhances accent and rim shot strikes and also projects the meters. The fortissimo dynamic level remains throughout the entire phrase.

### **2.2.38. Phrase thirty-eight**

The thirty-eighth phrase utilizes a hierarchy of A.N.T.D. and consists of measures 129 through 136. This phrase is similar to the previous phrase. The climax is located at the first beat of the phrase while the transition begins at measure 132.

### **2.2.39. Phrase thirty-nine**

The thirty-ninth phrase utilizes a hierarchy of A.N.T.D. and consists of measures 137 through 143. The initial note of the phrase is the climax. The accents and rimshots increase in frequency at measure 140, which is the beginning of the transition. The note density increases by the introduction of sextuplets and a greater frequency of dyads at the transition. The bass drum notes support the accents and rimshots, which project the meters. The fortissimo dynamic level remains throughout the phrase.

### **2.2.40. Phrase forty**

The fortieth phrase utilizes a hierarchy of A.N.T.D. and consists of measures 144 through 147. This phrase is similar to phrase thirty-seven. The climax begins on the first note of the phrase while the transition begins at measure 146.

### **2.2.41. Phrase forty-one**

The forty-first phrase utilizes a hierarchy of A.N.T.D. and consists of measures 148 through 152. This phrase is similar to the previous phrase. The climax begins on the first note of the phrase while the transition begins at measure 150.

### **2.2.42. Phrase forty-two**

The forty-second phrase utilizes a hierarchy of A.N.T.D. and consists of measures 153 through 158. This phrase is similar to the previous phrase. The climax begins on the first note of the phrase while the transition begins at measure 156.

### **2.2.43. Phrase forty-three**

The forty-third phrase utilizes a hierarchy of A.N.T.D. and consists of measures 159 through 170. The initial note of the phrase is the climax. The accents and rimshots increase in

frequency at measure 162 (the beginning of the first transition) and measure 166 (the beginning of the second transition). An increased frequency of dyads occurs at each transition. The bass drum notes support the accents and rimshots, which project the meters. The fortissimo dynamic level remains throughout the phrase.

#### **2.2.44. Phrase forty-four**

The forty-fourth phrase utilizes a hierarchy of A.N.T.D. and consists of measures 171 through 175. This phrase is similar to phrase thirty-nine with added sextuplets and a different meter placed in each measure. The initial beat of the phrase is the climax while the transition begins at measure 173. The extra sextuplets increase tension and embellish the initial note of each meter; however, this does not significantly alter the analysis.

#### **2.2.45. Phrase forty-five**

The forty-fifth phrase utilizes a hierarchy of A.N.T.D. and consists of measures of measures 176 through 183. This phrase is similar to phrase forty-three except that extra sextuplets and a different meter have been added to the theme (measures 176 through 178). The first transition begins at measure 179 and the second transition begins at measure 182.

#### **2.2.46. Phrase forty-six**

The forty-sixth phrase utilizes a hierarchy of A.N.T.D. and consists of measures 184 and 185. This phrase is similar to phrase thirty-seven. The transition is measure 185. The climax begins on the first beat of the phrase.

#### **2.2.47. Phrase forty-seven**

The forty-seventh phrase utilizes a hierarchy of A.N.T.D. and consists of measures 186 and 187. This phrase is similar to the previous phrase. The climax begins on the first beat. The transition is measure 187.

#### **2.2.48. Phrase forty-eight**

The forty-eighth phrase utilizes a hierarchy of A.N.T.D. and consists of measures 188 through 196. This phrase is similar to phrase forty-three with an additional transition. The climax begins at the initial beat of the phrase. The first transition begins at measure 191, the second transition begins at 193, and the third transition begins at 195.

#### **2.2.49. Phrase forty-nine**

The forty-ninth phrase utilizes a hierarchy of N.T.A.D. and consists of measures 197 through 204. The note density decreases at measures 202 and 204, which marks the beginning of each transition. The climax is the initial beat of the phrase while the first transition occurs at measure 202. The second transition is measure 204, which prepares for the hemiola pattern in the next phrase. The number of snare notes reduces by a single note with each transition. The accents support the bass drum while projecting the meter. The fortissimo dynamic level remains consistent throughout the phrase.

#### **2.2.50. Phrase fifty**

The fiftieth phrase utilizes a hierarchy of N.A.D.T. and consists of measures 205 through 209. The transition consists of measures 208 and 209. The note density has minor alterations that still establish phrase parameters. Measures 205 to 207 are repeated measures with small variances. Measure 205 begins with a weak climax supported with the static and expected

dynamic. Measure 206 adds a single note while measure 207 removes a single note. The tension becomes consistent during the transition at measure 208.

The accents in measures 205 through 207 emphasize the initial beat of each measure while accents in the transition bisect the meter in preparation for the metric modulation of the next phrase. The initial fortissimo at the beginning of measure 205 supports the climax on the initial beat; however, the dynamics alone do not constitute a climax due to the lack of dynamic change for eighty-three measures. The timbre remains homogeneous throughout the phrase despite irregularities in the number of individual notes each instrument reveals per measure.

#### **2.2.51. Phrase fifty-one**

The fifty-first phrase utilizes a hierarchy of D.T.N.A. and consists of measures 210 and 211. The transition begins on the upbeat of beat three in measure 210. The initial dynamic level of fortissimo represents the climax of the phrase.

The initial climax is embellished with a crash cymbal strike. The transition is comprised only of low tom-tom notes, which begins at the upbeat of beat three in measure 210.

Tension varies within the short theme; however, the transition contains a consistent set of sixteenth notes with the exception of a sextuplet flourish at the end, which leads into the next phrase. A rooftop accent and other accents embellish rhythmic figures of the theme; however, the transition contains accents in a triplet formation similar to the transition of the first phrase of *Cold Pressed*.

#### **2.2.52. Phrase fifty-two**

The fifty-second phrase utilizes a hierarchy of A.T.N.D. and consists of measures 212 and 213. Although this phrase is a repetition of the prior phrase, there is no crash cymbal or a



crescendo to lead into a dynamic climax; instead, the rooftop accent, supported by the fortissimo dynamic level on the initial beat of the phrase, is the climax. The transition begins on the upbeat of beat three in measure 212. The accents of the theme embellish rhythmic figures while accents in the transition are grouped into threes.

The theme contains low tom-tom and snare notes while the transition only utilizes low tom-tom notes. The tension varies within the theme, becomes a consistent set of sixteenth notes for the transition, and then adds sextuplets at the end of the transition that lead into the next phrase. The fortissimo dynamic level supports the strength of accents but is not a surprise. Dynamics in this phrase are significantly less important than within the prior phrase.

### **2.2.53. Phrase fifty-three**

The fifty-third phrase utilizes a hierarchy of A.D.N.T. and consists of measures 214 through 216. The rooftop accent is the climax on the initial note of the phrase. The accents emphasize rhythmic figurations in the theme while the fourth beat of measure 215 indicates the beginning of the transition. The two accents in measure 216, along with the rimshot, emphasize the meter.

The initial dynamic level of fortissimo supports the initial climax, and the subito piano initiates the transition. The crescendo in measure 216 leads into the next phrase.

The theme presents fluctuating groups of tension while the transition initiates a constant set of sixteenth notes until the last two beats of the phrase. This phrase only uses the low tom-tom and snare.

#### **2.2.54. Phrase fifty-four**

The fifty-fourth phrase utilizes a hierarchy of D.N.A.T. and consists of measures 217 through 223. The first transition begins at measure 219 while the second transition begins at measure 222. The initial dynamic of fortissimo establishes the climax on the first beat of the phrase. This dynamic level remains consistent until the end of the phrase.

The tension fluctuates between groups of low and high note density in the theme. The first transition, which begins at measure 219, creates a regular pattern of tension; the rhythms are repeated at measures 219 and 220 but become varied at measure 221. This behavior is similar to previous transitions (measures 211 and 213) on a larger scale. The second transition begins at measure 222, which marks an initial drop in tension that eventually increases to a peak on the downbeat of measure 223. Afterward, the tension relaxes to fewer notes by the end of the phrase.

A rooftop accent embellishes the initial climax of the phrase. Accents in measures 217 and 218 enhance rhythmic figures while accents in measure 219 and 220 embellish a broken hemiola pattern in the transition. The accented hemiola condenses into an accented projection of the meter as a variation into the next transition. Accents in measure 222 (the second transition) project the meter while accents in the final measure of the phrase are straightforward with a group of notes embellished by flams and rimshots. The timbre remains homogeneous for the entire phrase until the addition of two bass drum notes in measure 223.

#### **2.2.55. Phrase fifty-five**

The fifty-fifth phrase utilizes a hierarchy of A.N.T.D. and consists of measures 224 through 227. The transition is measure 227. The rooftop accent in measure 224 represents the climax of the phrase and is located on the first beat. The rooftop accents in measures 225 and 226

are present whenever the rhythmic motive returns. The accents in measures 224 through 226 occur during specific rhythmic figurations; however, measure 225 contains an extended variant, and measure 226 lacks the second rhythmic figure entirely. Measure 227 is the transition, which repeats an accented figure that correlates with the transition of phrase fifty-one.

Dense note configurations accompany the rooftop accents in this phrase. The first (normal) accent, after the rooftop accents, occurs in the same way each successive time due to repeated motives in measures 224 through 226. The two final accents of measures 224 and 225 are both preceded and succeeded by a sixteenth note. Measure 227, the transition, breaks the repetitious rhythmic patterns of the theme with contrasting material.

The timbre remains consistent throughout the entire phrase. In addition, the low tom-tom enhances all rooftop accents, and the snare drum enhances all of the (normal) accents in the phrase. The dynamic level of fortissimo remains throughout the phrase.

#### **2.2.56. Phrase fifty-six**

The fifty-sixth phrase utilizes a hierarchy of T.N.A.D. and consists of measures 228 through 230. The timbre of the opening rhythm is the same instrumentation as the opening motive of the piece. The sextuplet group begins on the low cowbell instead of the low temple block like the first phrase. Measure 230 alters the pattern of repetition with an ascending variation at the end of the measure and is the only measure in this phrase to use bongo notes. This ascending variation is not a significant contrast, which yields no transition.

The tension in the theme is represented by the sextuplet groups while less dense sixteenth notes occur at the end of the phrase. Accents emphasize the opening rhythmic motive throughout the entire phrase. The fortissimo dynamic level is consistent throughout this phrase.

### **2.2.57. Phrase fifty-seven**

The fifty-seventh phrase utilizes a hierarchy of T.N.D.A. and consists of measures 231 through 234. The first transition consists of measures 232 and 233 while the second transition is measure 234. The theme of this phrase is represented by the low and medium cowbells in measure 231. Two splash cymbal notes indicate the first transition as measures 232 and 233. The ride cymbal notes in measure 234 represent the second transition.

The metronome marking slows from a quarter note at 128 beats per minute to 40 beats per minute in anticipation of the next phrase. In addition, each consecutive section of the phrase reduces tension by moving from eighth notes in the theme, changing to quarter notes in the first transition, and finally altering to triplet quarter notes in the last half of the second transition.

The fortissimo dynamic level is maintained until the decrescendo in the second transition. The first transition, consisting of two notes, is the only area with accents in this phrase.

### **2.2.58. Phrase fifty-eight through sixty-six**

Phrases fifty-eight through sixty-six are written as a single, unmeasured passage that is marked as measure 235 and utilizes many hierarchies. Despite the lack of segmentation, small phrases are discerned by the low and medium cowbells occurring in eighth notes, often at the beginning of phrases, as well as ride cymbal strikes that form transitions at the end of each phrase. Most phrases begin with a higher note density than at the end of the transition; this behavior probably aids the “dark, ritualistic” effect indicated in the score.<sup>5</sup>

The measure fragment on page seven contains four phrases: T.N.D.A., D.T.N.A., D.T.N.A., and T.N.D.A., respectively. The first phrase contains the low and medium cowbells motive, begins at the piano dynamic level, and ends on the ride cymbal. The second phrase

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5. Dave Hollinen, *Cold Pressed* ([United States]: McClaren Publications, 1994).

begins at mezzo piano and decrescendos at the ride cymbal transition. The third phrase begins at mezzo forte, reduces tension, and then ends on a single ride cymbal note. The fourth phrase begins with the cowbell motive at piano, reduces tension at the transition with an over-emphasized mezzo forte on the ride cymbal, and decrescendos to the end of the phrase.

The measure fragment on page eight contains five phrases: T.N.D.A., and four D.T.N.A. hierarchies, respectively. The first phrase begins with two inverted arches of pitch emphasized by a swell in dynamics to forte and back to piano for the ride cymbal transition. The second phrase begins at mezzo forte and then decrescendos with an increase in note density into the ride cymbal transition. The third phrase begins at mezzo forte and then decrescendos with a release of tension (reducing note density) as the transition begins with the ride cymbal. The overlapping fourth phrase begins with the low and medium cowbell motive at mezzo piano and is followed by a decrescendo into the ride cymbal transition. The final phrase of this unmeasured system begins with the high woodblock and descends in pitch until it reaches the low temple block, where the initial mezzo forte descends to pianissimo after making contact with the low temple block. The tempo is reduced to half again in this phrase and is followed by a fermata to partition the unmeasured measure 235 from the next phrase.

### **2.2.59. Phrase sixty-seven**

The sixty-seventh phrase utilizes a hierarchy of N.T.D.A. and consists of measures 236 through 239. The theme is represented by a repeated rhythmic figure found in measure 236. The note density momentarily increases a small amount at the end of each repetition of the theme. There is no significant contrasting material and therefore no transition. The bongos are the consistent instruments of the theme and a variant adds the low tom-tom, high tom-tom, and

tambourine in measure 239. The phrase opens at the pianississimo level, which is lower than the previous phrase despite a fermata between phrases. No articulations or ornaments are present in this phrase.

#### **2.2.60. Phrase sixty-eight**

The sixty-eighth phrase utilizes a hierarchy of N.T.D.A. and consists of measures 240 through 243. The slower notes of the theme are enhanced by dyads compared to the previous phrase. The variation in measure 243 incorporates sixteenth notes that lead the tension into the next phrase. There is no significant contrasting material and therefore no transition. The theme acquires high tom-tom notes in every measure in comparison to the previous phrase, which is an alteration that began with the transition of the previous phrase. The instrumentation is homogeneous for each measure of this phrase. The pianississimo dynamic level is maintained throughout the phrase, and no articulations or ornaments are present.

#### **2.2.61. Phrase sixty-nine**

The sixty-ninth phrase utilizes a hierarchy of T.N.D.A. and consists of measures 244 through 247. The repetitious timbre pattern in the bongos is enhanced with bass drum notes, which vary in measure 247 by sextuplets that increase note density into the next phrase. No significant contrasting material exists to produce a transition in this phrase. A crescendo that extends over several measures begins with this phrase but does not achieve a climax until after the next phrase. No articulations or ornaments are presented in this phrase.

#### **2.2.62. Phrase seventy**

The seventieth phrase utilizes a hierarchy of N.T.A.D. and consists of measures 248 through 251. The transition is measure 251. The initial climax of this measure is the relative drop

in note density in comparison to the transition of the previous phrase. Measures 248 through 250 resemble the opening of the previous phrase. The motive in the bongos is further enhanced with the ride cymbal and bass drum, which adds complexity to the dyads and tension. Measure 251 has contrasting material of sextuplets primarily on the low bongo, which form a transition. The enhanced instrumentation of measures 248 through 250 remains consistent; however, the transition lacks the ride cymbal. Six accents and a flam embellish the transition into the next phrase. The crescendo that began in the previous phrase reaches its climax at the beginning of the next phrase.

### **2.2.63. Phrase seventy-one**

The seventy-first phrase utilizes a hierarchy of D.N.A.T. and consists of measures 252 through 270. The first transition begins at measure 261 while the second transition begins at measure 267. This phrase resembles the sections found in *Rebonds*; small motivic discrepancies (at the eighth-note level) can be found as a kind of mosaic with little distinction between motives. This large phrase begins with a fortississimo climax and maintains that dynamic level throughout the phrase.

The note density does not change significantly throughout the theme and barely peaks at measure 254. The variation that begins on the second beat of measure 260 initiates a more consistent treatment of tension. The transition, beginning at measure 26, goes through many variations that do not deviate significantly in note density or timbre until the second transition at measure 267. The note density of the second transition changes by removing a note from the repetitive motive and the instrumentation is altered to the low and medium cowbells with an added splash cymbal. These alterations are minor, but combined, they are enough to establish

significant contrasting material. Accents appear in both transitions to emphasize meter subdivisions.

The timbre remains fairly homogeneous until the second transition at measure 267. A few notable anomalies are the peak appearances of each instrument in the theme; however, these anomalies are not strong (or coherent) enough to formulate a timbre harmony. The snare drum is prominent in measures 253, 255, and 258. The bass drum is prominent in measure 252. The snare drum and bass drum share equal dominance in measures 254, 259, and nearly equal dominance in measure 256. The high crotale is an extreme minority in measures 257, 258, and is not present at all in measure 260. The first transition shares the same timbre with the theme. The second transition switches the role of the crotales with the low and medium cowbells and adds the splash cymbal.

#### **2.2.64. Phrase seventy-two**

The seventy-second phrase utilizes a hierarchy of T.N.D.A. and consists of measures 271 through 274. The transition consists of measures 273 and 274. The theme is similar to the third phrase of *Cold Pressed*. The bass drum note embellishes the climax on the first beat of this phrase. The bongos continue until the theme changes to the low tom-tom and low woodblock in measure 272. The transition adds the high tom-tom in a repetitive rhythm at measure 273 (the transition). The note density drops significantly at the end of the theme in measure 272 and establishes a stable pattern in the transition. The fortississimo descends with a decrescendo in measure 272. The piano dynamic level precedes a crescendo in the transition, which leads into the next phrase. Accents in measure 271 project the meter, and the final accent of measure 272 occurs on the theme variation.



### **2.2.65. Phrase seventy-three**

The seventy-third phrase utilizes a hierarchy of D.T.N.A. and consists of measures 275 through 277. The first transition is measure 276 while the second transition is measure 277. The phrase climax begins on the first beat at fortissimo. This dynamic continues until the end of the phrase. The timbre changes significantly with each measure. Note density is determinate in measure 275, indeterminate (due to the rolls) in measure 276, and nearly returns to the tension found in the first measure of this phrase during measure 277. The accents of the theme present a four-over-three pattern with the bass drum. Accents in the first transition project the meter of the pattern of three that was found in the bass drum of the previous measure. Accents in the second transition also project the meter but utilize the pattern of four found in the accents of the theme. Deadstrokes and rolls are present in the first transition.

### **2.2.66. Phrase seventy-four**

The seventy-fourth phrase utilizes the hierarchy of T.N.D.A. and consists of measures 278 through 282. The transition is measure 282. Measures 278 and 279 imitate the opening measure in terms of the pitch directions and rhythm. Measures 280 and 281 are an additional variation of the same motive. The transition is marked by the high tom-tom, tambourine, and bass drum in measure 282.

Additional rest is placed between the tension of sextuplets and each motive in comparison to the first phrase. The transition brings a consistent four-over-three pattern that leads into the next phrase. The first part of the theme is at fortissimo while the repetition begins

at pianissimo. The transition contains a crescendo into the next phrase. Accents emphasize the rhythmic motive on the first beat of measures 278 and 280; however, no accents are found in the transition.

#### **2.2.67. Phrase seventy-five**

The seventy-fifth phrase utilizes the hierarchy D.T.N.A. and consists of measures 283 through 285. This phrase is a variation of the second phrase in *Cold Pressed*. The climax of the phrase occurs on the first beat at a fortissimo dynamic level. The transition begins on the fifth beat of measure 284 at the subito pianissimo. The next measure contains a crescendo into the following phrase.

The instrumentation of the theme varies until the transition utilizes the low cowbell, medium cowbell, and the bass drum. Pitch patterns in this phrase are similar to the second phrase of the piece.

The theme of this phrase is rhythmically identical to the second phrase of the work. The transition is significantly reduced in comparison to the second phrase, but additional dyads support the end of the transition.

Accents in measure 283 and the beginning of measure 284 embellish the opening rhythmic motive while the remaining accent in measure 284 emphasizes the bass drum. All accents in measure 285 embellish the bass drum.

#### **2.2.68. Phrase seventy-six**

The seventy-sixth phrase utilizes a hierarchy of D.T.N.A. and consists of measures 286 through 288. The transition consists of measures 287 and 288. The opening climax is on the first beat at a fortississimo dynamic level, a level maintained throughout the phrase.

The pitch pattern ascends in measure 286 (the theme) and then descends for the rest of the phrase. Notes are repeated within the transition (measure 288) in a smooth, linear descent. The additional bass drum notes enhance the descent into the transition.

A metric modulation keeps the note density similar throughout the theme with dyads assisting the descent into the transition. A group of sixteenth notes pushes the tension into the next phrase during the last beat of the transition.

The accents in measure 287, along with the first accent of measure 288, emphasize the bass drum notes to support meter projection. The remaining four accents in the transition enforce the meter and instrumentation changes.

### **2.2.69. Phrase seventy-seven**

The seventy-seventh phrase utilizes a hierarchy of A.N.T.D. and consists of measures 289 through 296. The first transition is measure 291 while the second transition begins at measure 292. This phrase resembles the behavior found on page six (phrase thirty-seven through phrase forty-nine). The accents and rimshots increase in frequency as the meter is condensed (note density). The first contraction begins on the first transition (measure 291), and another contraction occurs on the second transition (measure 292). The unaccented note density remains consistent except for the slight increase in dyads that enhance the proliferated accent pattern through each transition. The snare drum is the driving force of the instrumentation and the bass drum enhances accents. The fortississimo dynamic level remains consistent throughout this phrase.

### **2.2.70. Phrase seventy-eight**

The seventy-eighth phrase utilizes a hierarchy of T.N.A.D. and consists of measures 297 through 298. The bass drum mostly projects the meter while the medium cowbell and high tom-tom trade for the low tom-tom in the last measure. There is no transition. The rhythmic pattern increases in note density until the very end primarily due to the dyads. Accents in measure 297 project the meter while accents in measure 298 embellish the rhythmic motive that is very similar to the first beat of *Cold Pressed*. The fortississimo dynamic level is maintained until the end of the piece.

### **2.3. Discussion**

The analysis of *Cold Pressed* presents phrase patterns that do not coincide well with the intended phrase markings in the score. When comparing the two phrase schemes, patterns alternate between alignment and divergence. This behavior may be explained by phrases that have been composed of mental relationships, rather than basic elements that influence the sound directly. A few of the divergences which represent problems for the analysis are important to review for specific performance tactics and general strategies.

The initial phrase of *Cold Pressed* utilizes dynamics as the most important feature in the hierarchy; however, the fortississimo at the end of the phrase in measure four seems to arrive too early. If the loudest dynamic were placed at the beginning of measure five, then the dynamics would lead into the second phrase with more drive and purpose. The same problem occurs with the fortississimo in measure ten, as the phrase marks in the score intend for the third phrase to extend into measure eleven. The timbre of the lower voices project a greater contrast in measure eleven, and the low tom-tom has greater projecting sound power than the bongos for a climax.

Ideally, my personal interpretation would have the crescendo to lead through measure ten until the climax (beat one) of measure eleven, as the bongos do not have enough sound power potential for the climax in measure ten to strongly materialize. Measure 216 is a similar situation, since the fortissimo arrives a bit early (or is marked behind the initial intended climax on the first beat of measure 217).

Measures thirty-three through forty-seven contain several issues. The piano and forte levels in measure thirty-four are presented as theme material, despite a possible intention (based on the phrase marks in the score) of introductory material into the downbeat of measure thirty-six. The crescendo in measure thirty-five, thirty-second notes in measures thirty-six and thirty-nine, and an unusual dynamic goal location in measure thirty-nine (a crescendo into forte at the last sixteenth note of beat three) obscure the phrasing indicated in the score. Perhaps the rhythmic motive found on the first beat of the piece was intended to have a more powerful effect in this phrase. In any case, the message appears to be obfuscated.

Measures seventy-six through eighty-two are each indicated in the score as individual or overlapping phrases; the timbres in measures seventy-seven, eighty-one, and eighty-two seem transitory (transition material), despite the intention of forming individual phrases. In other words, the behavior within these measures do not constitute enough contrasting material to merit separate phrases when the timbre and dynamics conflict. The crescendo to fortissimo in measure eighty-two obscures both the hierarchy and the phrase markings in the score.

Measures seventy-two, eighty, eighty-three, and eighty-seven begin phrases at a lower dynamic level than prior respective phrases. This type of phrase can be difficult to perceive if the dynamics are not contrasted immediately for clarity. If these measures are executed poorly, the

dynamics (which can take a single note to initiate a climax) may overtake the timbre (which typically requires time to establish without interference from the dynamics) as the primary function of the hierarchy. This would produce even more confusing results.

Measures 122 through 204 contain no phrase markings in the score. Both the accents and bass drum occur at different rates due to the meter. As a result, phrases will form from the perceived increase in accent occurrence as a form of tension, which lead into measures with fewer accents as relaxation.

Measures 252 through 272 contain many small parts indicated by phrase markings in the score. The homogeneous behavior of these measures make effective interpretation difficult. If the crotales are not slightly muted, contrasting material will be limited to the snare and bass drum. Note density variations at the eighth-note level are not effective in measures 252 through 259. The timbre does not significantly change until measure 267. Due to the interference of the drums, the variations of the motive (found in measure 236) will be obscured in measures 252 through 260. If the phrase partitions in the score are to be utilized, then a heavy use of dynamic swelling would provide support. If the score phrasing is not utilized, then the likely result would be one large phrase rather than multiple smaller phrases. Measure 271 follows the phrasing interpreted at measure ten but utilizes the bass drum for sound power.

Aside from specific tactics, general performing strategies also exist. In this work, the dynamics will theoretically be most often perceived as the element that constructs climaxes; therefore, as a particular phrase interpretation is chosen for performance preparation, minor

swells of dynamics should be a more effective shaping tool than other elements. This also suggests the most grievous errors made during a performance, within reason, belong to the dynamics element.

Overall, this hierarchy analysis reveals discrepancies in minor areas and potential interpretation issues during unusual phrases. Regardless of a musician's performance preferences, detailed information revealed in this analysis can provide valuable tactical and strategic methods for an enhanced performance interpretation.

### 3. ANALYSIS OF *REBONDS*

#### 3.1. Results

The first movement in this document refers to *Rebonds A* and the second movement refers to *Rebonds B*, even though a performer may reverse the order of the two movements (without a break).<sup>6</sup> Both movements of *Rebonds* contain accents that reveal timbre correlations. The following tables represent statistics gathered about these articulations and ornaments as well as the timbre harmony and timbre tonic(s) that theoretically result from the accents.

Tables 2 and 3 (on the following pages) represent the accents and corresponding instruments for each measure of the first movement. The persistent low gran cassa accents provide a sense of timbre tonic during the first half of the movement within a seven-instrument harmonic scale. However, the sense of timbre tonic modulates when the gran cassa is not persistent, such as measures six through seven, twenty-one through twenty-three, and twenty-nine through forty-two. The high bongo becomes more prominent in measures thirty through fifty-nine with minor gaps and a rejoining of the gran cassa dominance in measures forty-three through fifty.

Accents project the timbre to the point of harmonic perception (timbre harmony); in other words, the drums with accents form a kind of harmony due to their prominence with seven drums for the first movement.

Tables 4 and 5 represent, from the first movement, the variety of points of interest at different levels; polyrhythms initiated by accents are the most significant while accents preceded by a small note cluster (of a faster note base) are the least significant. Double accents enhance each point of interest even more than regular accents. These points of interest exist

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6. Iannis Xenakis, *Rebonds* (Paris: Éditions Salabert, 1991).



Table 2. Accents, and double accents (\*), on corresponding instruments for *Rebonds A* (measures one through thirty).

Measure:	High Bongo	Low Bongo	High Tom	Med. Tom	Low Tom	High Gr. C.	Low Gr. C.	Timbre Harmony Dominance:
1	3	.	.	.	.	.	1	Low Gr. C.
2	.	.	.	1	.	.	2	Low Gr. C.
3	.	1	1	.	.	.	2	Low Gr. C.
4	1	.	.	.	.	1	2	Low Gr. C.
5	.	.	.	2	.	.	1	Low Gr. C.
6	3	.	.	.	.	.	.	?
7	.	.	1	1	.	2	.	?
8	.	.	2	.	.	.	2	Low Gr. C.
9	.	1	.	1	.	.	1	Low Gr. C.
10	.	.	.	1	1	1	1	Low Gr. C.
11	.	.	1	1	1	.	1	Low Gr. C.
12	1	1	.	.	.	.	1	Low Gr. C.
13	.	.	.	.	1	1	2	Low Gr. C.
14	.	.	1	1	.	.	1	Low Gr. C.
15	1	1	.	.	.	.	1	Low Gr. C.
16	.	1	.	.	1	.	1	Low Gr. C.
17	1	.	1	1	.	.	1	Low Gr. C.
18	1	.	.	.	.	.	1	Low Gr. C.
19	1	.	.	.	.	1	1	Low Gr. C.
20	.	1	.	.	1	.	2	Low Gr. C.
21	.	1	.	.	.	2	.	?
22	.	.	.	2	.	2	.	?
23	.	.	1	2	1*	.	.	?
24	.	.	.	3	1	.	1	Low Gr. C.
25	.	.	.	.	.	.	2	Low Gr. C.
26	.	.	.	.	1	.	3	Low Gr. C.
27	.	.	.	.	.	.	2	Low Gr. C.
28	.	.	.	.	.	.	4	Low Gr. C.
29	.	.	1	.	1	1	.	?
30	1	.	1	.	.	1	.	?

within a continuous flow of melody. The high point of activity occurs on page five. Accents occurring in the middle of a polyrhythm have been omitted from the tables, as their effects are insignificant due to the reduced sense of surprise and change.

Table 3. Accents, and double accents (\*), on corresponding instruments for *Rebonds A* (measures thirty-one through sixty).

Measure:	High Bongo	Low Bongo	High Tom	Med. Tom	Low Tom	High Gr. C.	Low Gr. C.	Timbre Harmony Dominance:
31	1	1	.	1	.	.	.	?
32	.	1	1	1	.	.	.	?
33	.	.	1	2	.	1	.	?
34	1*	.	2	1*	.	.	.	?
35	1	.	1	.	.	.	.	?
36	1	.	.	1	1	.	.	?
37	.	.	2	1	.	.	.	?
38	1	.	.	1+2*	.	.	.	?
39	.	.	1	1	1	1	.	?
40	1	1	.	1	1+1*	.	.	?
41	2	.	1	1	2*	.	1	?
42	1	1	.	3*	1	.	.	?
43	1	1	1	1	.	.	1*	Low Gr. C.
44	.	1	2	1	.	.	2*	Low Gr. C.
45	3	.	1	1	1	.	2*	Low G. and High B.
46	1	.	1	1	2	1	2*	Low G. and High B.
47	1	.	.	.	2	1	2+2*	Low G. and High B.
48	1	1	.	.	2	1	2+2*	Low G. and High B.
49	1	1	.	2	.	1	1+1*	Low G. and High B.
50	3	1	1	2	2	.	3	Low G. and High B.
51	.	.	.	.	.	.	.	?
52	.	.	.	.	.	.	.	?
53	1	.	.	.	.	.	2	High Bongo
54	1	.	.	.	.	.	.	High Bongo
55	4	.	.	.	.	.	.	High Bongo
56	1	.	.	.	.	.	.	High Bongo
57	1	.	.	.	.	.	.	High Bongo
58	.	.	.	.	.	.	.	?
59	1	.	.	.	.	.	.	?
60	.	.	.	.	.	.	.	?

Accents that initiate polyrhythms are the strongest points of interest while double accents preceded by polyrhythms are considered less significant. A lower tier comprised of regular accents and note density combinations is also presented.

Table 4. Accents, and double accents (\*), regarding points of interest for *Rebonds A* (measures one through thirty).

Measure:	Dense cluster before accent	Dense cluster on accent	Stranded double accent	Polyrhythm before accent	Polyrhythm on accent
1	.	.	.	.	.
2	.	.	.	.	.
3	.	.	.	.	.
4	.	.	.	.	.
5	.	.	.	.	.
6	.	.	.	.	.
7	.	2	.	.	.
8	.	.	.	1	.
9	.	1	.	.	.
10	.	.	.	.	.
11	.	2	.	.	.
12	1	.	.	.	.
13	.	.	.	1	1
14	.	.	.	1	.
15	.	.	.	1	.
16	1	1	.	.	.
17	1	.	.	.	1
18	1	1	.	.	.
19	.	.	.	.	.
20	3	1	.	.	.
21	.	2	.	.	1
22	3	1	.	.	.
23	2	.	1*	.	.
24	3	1	.	.	.
25	2	.	.	.	.
26	4	.	.	.	.
27	2	.	.	.	.
28	2	.	.	.	.
29	.	3	.	.	.
30	1	2	.	.	.

Table 5. Accents, and double accents (\*), regarding points of interest for *Rebonds A* (measures thirty-one through sixty).

Measure:	Dense cluster before accent	Dense cluster on accent	Stranded double accent	Polyrhythm before accent	Polyrhythm on accent
31	1	2	.	.	.
32	1	2	.	.	.
33	.	4	.	.	.
34	2*+1	.	.	.	.
35	2	.	.	.	.
36	2	1	.	.	.
37	3	.	.	.	.
38	2*	.	.	.	1
39	2	1	.	1	.
40	1	2	1*	.	.
41	1*+1	1	.	1*	.
42	1*+1	1*	.	1*	.
43	1	1	.	1*	.
44	1*+1	1*	.	.	.
45	2*+2	1	.	.	.
46	1*+2	1*+1	.	.	.
47	2*+1	2	.	.	.
48	2*	1	.	2	.
49	1*	.	.	3	.
50	1	1	.	1	2
51	.	.	.	.	.
52	.	.	.	.	.
53	1	.	.	.	.
54	.	.	.	.	.
55	.	.	.	.	.
56	.	.	.	.	.
57	.	.	.	.	.
58	.	.	.	.	.
59	.	.	.	.	.
60	.	.	.	.	.

Tables 6, 7, and 8 (on the following pages) represent the combinations of accents, ruffs, and double accents that correspond with each instrument in the second movement (*Rebonds B*). Due to the double accents, the tom reigns as the timbre tonic mostly within measures one through forty-three. Measures forty-seven through sixty-three provide contrast with an atonal

Table 6. Accents, ruffs (r), and double accents (\*), regarding points of interest for *Rebonds B* (measures one through thirty-nine).

Measure:	High Bongo	Low Bongo	Tumba	Tom	Gr. C.	Wood Block
1	2	1r	.	1*r+1*	.	.
2	1	1	.	1*	.	.
3	1	1	.	1*	.	.
4	2	2	.	1*r	.	.
5	2	1	.	2*	.	.
6	2	1	.	1*	.	.
7	1	2	.	1*r	.	.
8	.	1	.	2*	.	.
9	1	1	.	1*	.	.
10	2	1	.	1*	.	.
11	2	1r+1	.	1*	.	.
12	2	1	.	1*	.	.
13	2	1	.	1*	.	.
14	2	1	.	2*	.	.
15	2	2	.	1*	.	.
16	1	1	1*	.	.	.
17	.	1	.	1*	.	.
18	1	1	.	2*	.	.
19	2	1	.	1*	.	.
20	2	1r+1	.	1*r	.	.
21	1	1	.	1*	.	.
22	2	2	.	2*	.	.
23	2	1	.	2*	.	.
24	2	2	.	1*	.	.
25	2	1	.	1*	.	.
26	1	1	.	2*	.	.
27	2	2	.	1*	.	.
28	3	1	.	1*	.	.
29	3	1	.	1*	.	.
30	2	1	.	2*	.	.
31	.	.	.	.	.	.
32	.	.	.	.	.	.
33	.	.	.	.	.	.
34	.	.	.	.	.	.
35	1	.	.	1*r	.	.
36	2	2	.	1*	.	.
37	2	2	.	.	.	.
38	2	1	.	1*	.	.
39	2	2	.	1*	.	.

Table 7. Accents, ruffs (r), and double accents (\*), regarding points of interest for *Rebonds B* (measures forty through sixty-nine).

Measure:	High Bongo	Low Bongo	Tumba	Tom	Gr. C.	Wood Block
40	3	1	.	2*	.	.
41	1	1	.	.	1*	.
42	.	2	.	.	1*	.
43	.	1	.	1*	.	.
44	.	.	.	.	.	.
45	.	.	.	.	.	.
46	.	.	.	.	.	.
47	.	.	.	1*	.	.
48	(2*r)	.	1*	.	.	.
49	(1*r)	.	1*r	1*	.	.
50	.	.	1*	1*	.	.
51	.	1*	.	.	1*	.
52	.	.	1*	.	1*	.
53	.	.	.	1*	.	.
54	.	1*	.	1*	.	.
55	.	3*	.	.	.	.
56	.	.	1*	.	1*	.
57	.	.	.	.	.	.
58	2*r	1*	1*	.	.	.
59	3*r+1*	1*	1*	1*	.	.
60	3*r	1*	2*	1*	.	.
61	3*r	1*r+1*	1*r+2*	.	.	.
62	5*r	1*r	1*r	1*r	2*r	.
63	3*r	.	1*r	1*r	.	.
64	.	.	.	.	.	.
65	.	.	.	.	.	.
66	.	.	.	.	.	.
67	.	.	.	.	.	.
68	.	.	.	.	.	1*r
69	.	.	.	.	.	.

sense of timbre harmony that loosely resembles the visual pattern formed when tables 1 and 2 are combined. Measures sixty-four to the end of the movement reveal no significant points of interest except on the high woodblock in measure sixty-eight.

Table 8. Accents, ruffs (r), and double accents (\*), regarding points of interest for *Rebonds B* (measures seventy through eighty-seven).

Measure:	High Bongo	Low Bongo	Tumba	Tom	Gr. C.	Wood Block
70	.	.	.	.	.	.
71	.	.	.	.	.	.
72	.	.	.	.	.	.
73	.	.	.	.	.	.
74	.	.	.	.	.	.
75	.	.	.	.	.	.
76	.	.	.	.	.	.
77	.	.	.	.	.	.
78	.	.	.	.	.	.
79	.	.	.	.	.	.
80	.	.	.	.	.	.
81	.	.	.	.	.	.
82	.	.	.	.	.	.
83	.	.	.	.	.	.
84	.	.	.	.	.	.
85	.	.	.	.	.	.
86	.	.	.	.	.	.
87	.	.	.	.	.	.

As double accents with ruffs appear in the second movement, points of interest are produced. Less effective points of interest are created with other combinations or isolated examples of accents, ruffs, and double accents. In particular, the double accents accompanied by ruffs segregate important sections by the contrasting strength of points of interest when compared to other sections within the second movement.

### 3.2. Analysis of movement *A*

Iannis Xenakis led an interesting life with political turmoil, architectural creation, and also music assistance by Olivier Messiaen.<sup>7</sup> He also obtained a fascination with music and

7. A.S. Barthel-Calvet, “Biography: Chronology,” <http://www.iannis-xenakis.org/xen/bio/bio.html> (accessed April 30, 2013).

mathematics, which can clearly be seen in his book entitled *Formalized Music*.<sup>8</sup> *Rebonds* was written during 1987-1989<sup>9</sup>, with Sylvio Gualda premiering the work during the Roma Europa Festival.<sup>10</sup>

*Rebonds A* is, from an aural perspective, a mosaic comprised of a flowing melody. This movement utilizes drums with heads, frequent accents (with occasional double accents), a variety of note bases, polyrhythms, sparse dynamics, and some flams.<sup>11</sup>

Due to the flowing timbre and lack of a typical segmented phrase structure, the general features of this movement will be described by page instead of dissecting each small fragment.

Most of the movement utilizes the hierarchy A.T.N.D. Accents are frequent and are the only element that can definitively reveal points of interest with varying levels of additional support. Climaxes will be called points of interest since climaxes imply a sectional structure as opposed to a continuous flow of melody. Double accents are less common but produce a significant effect compared to unadorned regular accents. The timbre affects the pitch center (timbre tonic) of timbre harmony, similar to a harmonic key with non-specific pitches with accents as well as pitch directions of the flowing melody. The note density exists as note bases that cause tension within dense clusters of a linear nature. Polyrhythms increase the effect of climaxes significantly while dense clusters of notes (monophonic) have a similar, deluded effect. The dynamics are monotonous until a major contrast near the end of the movement.

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8. Iannis Xenakis, *Formalized Music: Thought and Mathematics in Composition* (Bloomington: Indiana University Press, 1971).

9. Iannis Xenakis, *Rebonds* (Paris: Éditions Salabert, 1991).

10. A.S. Barthel-Calvet, "Biography: Chronology," <http://www.iannis-xenakis.org/xen/bio/bio.html> (accessed April 30, 2013).

11. Iannis Xenakis, *Rebonds* (Paris: Éditions Salabert, 1991).



The timbre of the accents form a timbre harmony, similar to a tonic-dominant harmony in tonal music; in other words, this behavior produces the similar effect of a tonic within a key using instruments without specific pitches. Measures one through five maintain a persistent low gran cassa accent pulse interjected with other drums (high bongo, high tom, medium tom, and high gran cassa) in measures six and seven. The low gran cassa returns to a prominent, persistent role within measures eight through twenty. This dominance is interrupted again by a timbre modulation through the high gran cassa, medium tom, and low tom in measures twenty-one through twenty-three. The low gran cassa returns as the timbre tonic in measures twenty-four through twenty-eight. Measures twenty-nine through forty-two appear to be a series of timbre modulations from the high bongo, high tom, medium tom, and low tom; these instruments often have either two accents in a measure, or double accents. The high bongo, high tom, and medium tom are the most persistent instruments until measure thirty-nine, where the low tom supports the instruments, and the high tom nearly disappears in measures forty through forty-two. Measures forty-three through fifty maintain a strong persistence of accents on the high bongo and low gran cassa; however, the low gran cassa is now the only instrument with double accents, which maintains a stronger presence than the high bongo. Measures fifty-one and fifty-two have no accents while the high bongo remains persistent until the end of the movement but without accents in measures fifty-eight and sixty.

Each page will be analyzed and presented in the order of each hierarchy element as it is used.

### **3.2.1. Page one**

This page utilizes the hierarchy A.T.N.D. The first five measures of this movement eventually fills the broken sixteenth-note pulse initiated from the beginning; this task is completed by the third beat of measure five. Measure six introduces the first polyrhythm that involves faster rhythms than sixteenth notes.

Measure seven contains two groups of notes that provide unexpected thirty-second notes that occur immediately on the accents. These points of interest on the high tom and high gran cassa are followed by a climax in measure eight, a polyrhythm preceding an accent on the low gran cassa. Another point of interest in measure nine decreases the intensity of the previous measure by utilizing a small group of thirty-second notes immediately on a middle tom accent. Rhythmically, measure ten almost appears as an inverse representation of the prior measure without the point of interest.

Measure eleven yields two small groups of thirty-second notes that occur immediately on accents located on the high tom and middle tom. Measure twelve contains a group of thirty-second notes that precede the high bongo accent, a minor point of interest.

Measure thirteen contains an accent on the high gran cassa preceded by a polyrhythm as well as another accent that produces greater interest due to the low gran cassa accent located directly on the polyrhythm. This climax is followed by another accent preceded by a polyrhythm in measure fourteen.

### **3.2.2. Page two**

The second page also utilizes the hierarchy A.T.N.D. Measure fifteen contains a low gran cassa accent preceded by the first 4:3 polyrhythm. Measure sixteen contains two points of

interest; the first low gran cassa accent has a small group of thirty-second notes preceding it while a low bongo accent begins immediately on the group of thirty-second notes. Measure seventeen contains a low gran cassa accent preceded by a thirty-second note group and is followed by a polyrhythm that occurs immediately on a high bongo accent. Measure eighteen is similar to measure sixteen; a group of forty-eighth notes precedes a low gran cassa accent while a group of twenty-fourth notes occurs on the high bongo accent. Measure eighteen is also the first measure in which every accent is a point of interest. Measure nineteen maintains the tension of rhythmic activity in comparison with the previous two measures; however, no points of interest are revealed.

Measure twenty is the second measure where all accents are a point of interest. The first low gran cassa accent is an eighth note preceded by a sixteenth note from the previous measure; this is then followed by a low tom accent with a group of preceding sixty-fourth notes. Another low gran cassa accent is preceded by an eighth note, which makes the accent an immediate point of interest despite being on a sixteenth note. This is followed by a low bongo accent that has a group of thirty-second notes preceding it. Measure twenty-one contains a low bongo accent that initiates a 5:3 polyrhythm, a significant point of interest. This point of interest is followed by an accent on the high gran cassa preceded by an eighth note and initiates a group of sixteenth notes. This point of interest is followed by a high gran cassa accent that initiates a group of sixty-fourth notes. Measure twenty-two begins with a high gran cassa accent preceded by a group of sixty-fourth notes from the previous measure. Another high gran cassa accent initiates a small group of thirty-second notes. A medium tom accent is preceded by a small group of thirty-second notes and is followed by another medium tom accent preceded by forty-eighth notes.

### 3.2.3. Page three

Page three utilizes the hierarchy of A.T.N.D. Measure twenty-three contains a medium tom accent preceded by a group of sixty-fourth notes, which is followed by the first appearance of a double accent. Another medium tom accent precedes a group of thirty-second accents. Measure twenty-four begins with a medium tom accent preceded by forty-eighth notes, which is followed by a low gran cassa accent that initiates a small group of thirty-second notes. Another medium tom accent is preceded by a group of forty-eighth notes and is followed by a low tom accent that has a small group of thirty-second notes before it. Measure twenty-five contains two low gran cassa accents that are each preceded by a small group of thirty-second notes. Measure twenty-six begins with a low gran cassa accent preceded by forty-eighth notes in the previous measure. An accent on the low tom is preceded by a group of forty-eighth notes while another low gran cassa accent with preceding forty-eighth notes follows it. A final low gran cassa accent with sixty-fourth notes preceding it finishes the measure. Measure twenty-seven contains two low gran cassa accents; the former accent is preceded by thirty-second notes while the latter accent is preceded by sixty-fourth notes. Measure twenty-eight also contains two low gran cassa accents, each of which are preceded by a group of forty-eighth notes.

Measure twenty-nine contains three accents that each initiate a group of forty-eighth notes. The first accent occurs on a low tom, the second on the high tom, and the final accent on the high gran cassa. Measure thirty contains a high bongo accent that initiates a group of sixty-fourth notes, a high gran cassa accent preceded by forty-eighth notes, and a high tom accent that initiates forty-eighth notes.

#### **3.2.4. Page four**

The fourth page utilizes the hierarchy A.T.N.D. Measure thirty-one begins with an accent on the medium tom preceded by a group of sixty-fourth notes in the previous measure. The high bongo initiates a group of forty-eighth notes and is followed by a low bongo accent that also initiates a group of forty-eighth notes. Measure thirty-two begins with a low bongo that initiates a group of fortieth notes, which are followed by a medium tom accent preceded by forty-eighth notes, and a high tom accent initiating a group of sixty-fourth notes toward the end of the measure.

Measure thirty-three begins with a high tom accent that initiates thirty-second notes, which is followed by a medium tom accent that initiates forty-eighth notes. A high gran cassa accent initiates a group of sixty-fourth notes followed by a medium tom accent that initiates a group of sixty-fourth notes.

Measure thirty-four contains a double accent preceded by a group of forty-eighth notes; this double accent is followed by another on the medium tom preceded by thirty-second notes. A final accent on the high tom is preceded by a group of sixty-fourth notes. Measure thirty-five contains a high bongo accent preceded by a group of thirty-second notes and ends with a high tom accent preceded by forty-eighth notes. Measure thirty-six contains a medium tom accent preceded by thirty-second notes, which is followed by a low tom accent preceded by forty-eighth notes. The high bongo accent is the final point of interest in this measure, which initiates a group

of forty-eighth notes. Measure thirty-seven contains three accents: the first accent is on the medium tom and is preceded by a group of forty-eighth notes, the second accent occurs on the high tom and is preceded by a group of sixty-fourth notes, and the final accent is on the high tom and is preceded by a group of thirty-second notes.

Measure thirty-eight contains a double accent on the medium tom preceded by thirty-second notes, which is followed by an accented medium tom that initiates a polyrhythm. This measure ends with a double accent on the medium tom preceded by thirty-second notes.

### **3.2.5. Page five**

The fifth page utilizes the hierarchy A.T.N.D. Measure thirty-nine contains an accent on the low tom preceded by a polyrhythm; this accent is followed by a medium tom accent preceded by forty-eighth notes. A high tom accent preceded by sixty-fourth notes is followed by a high gran cassa accent that initiates sixty-fourth notes. Measure forty begins with a low tom accent initiating sixty-fourth notes, which is followed by a medium tom accent initiating thirty-second notes. After an isolated double accent, the low bongo accent preceded by sixty-fourth notes is the final point of interest in the measure.

Measure forty-one begins with a double accent on the low tom preceded by forty-eighth notes from the previous measure. The next double accent occurs on the low tom preceded by a polyrhythm. A high bongo accent initiates a small group of thirty-second notes while a low gran cassa accent, preceded by sixty-fourth notes, is the final point of interest in the measure. Measure forty-two begins with a double accent on the medium tom preceded by a polyrhythm; the polyrhythmic aspect is a stronger point of interest than the sixty-fourth notes that are initiated by the same double accent. A low tom accent initiates a small group of thirty-second notes while a

double accent on the medium tom also initiates a small group of thirty-second notes. The final double accent on the medium tom is preceded by a group of forty-eighth notes. Measure forty-three contains a low bongo accent that initiates a group of sixty-fourth notes. A double accent on the low gran cassa is preceded by a polyrhythm while the final accent on the high tom is preceded by sixty-fourth notes. Measure forty-four begins with a double accent on the low gran cassa preceded by forty-eighth notes from the previous measure. An accent on the low bongo is preceded by thirty-second notes while the final point of interest is a low gran cassa accent that initiates sixty-fourth notes. Measure forty-five contains a double accent on the low gran cassa preceded by forty-eighth notes. An accent on the high tom is preceded by sixty-fourth notes while a nearby accent on the high bongo is preceded by thirty-second notes. A double accent on the low gran cassa is preceded by thirty-second notes while the final point of interest is an accent on the high bongo that initiates a group of sixty-fourth notes. Measure forty-six begins on a high tom accent preceded by thirty-second notes from the previous measure. A double accent on the low gran cassa initiates sixty-fourth notes while a high gran cassa accent is preceded by sixty-fourth notes. A medium tom accent initiates forty-eighth notes while the final point of interest is a double accent on the low gran cassa with a preceding group of sixty-fourth notes.

### **3.2.6. Page six**

The sixth page mostly utilizes the hierarchy A.T.N.D. with two exceptions noted below. Measure forty-seven begins with a double accent on the low gran cassa preceded by thirty-second notes from the previous measure. An accent on the high gran cassa initiates a small group

of thirty-second notes while a double accent on the low gran cassa is preceded by thirty-second notes. Another accent on the low gran cassa initiates a small group of thirty-second notes while the final point of interest is a high bongo accent preceded by sixty-fourth notes.

Measure forty-eight contains a double accent on the low gran cassa preceded by forty-eighth notes. Another low gran cassa accent initiates forty-eighth notes while a low bongo accent is preceded by a polyrhythm. A double accent on the low gran cassa is nearby, which is preceded by a small group of forty-eighth notes. The final accent occurs on the high gran cassa preceded by a polyrhythm. Measure forty-nine contains a double accent on the low gran cassa preceded by forty-eighth notes. A medium tom accent is preceded by a polyrhythm, and a low gran cassa accent is also preceded by a polyrhythm. The final accent on a medium tom is preceded by a polyrhythm.

Measure fifty contains a medium tom accent that initiates a polyrhythm and an accent on the low tom that immediately follows the prior polyrhythm. A high tom accent initiates a polyrhythm while a low gran cassa accent initiates thirty-second notes. The final point of interest is an accent on the medium tom, which initiates forty-eighth notes.

Measures fifty-one and fifty-two finally break the sixteenth-note pulse while incorporating polyrhythms; however, no points of interest are located in these measures. These two measures follow the hierarchy of N.T.D.A. due to the absence of articulations, ornaments, and changing dynamics. Measure fifty-one incorporates a release of tension (lower note density) on the initial polyrhythm followed by an increase of tension in measure fifty-two due to the



forty-eighth notes and polyrhythm. Measure fifty-three utilizes a hierarchy of A.T.N.D. and contains an accent on the low gran cassa preceded by forty-eighth notes from the previous measure.

Measure fifty-four contains a single flammed bongo accent. The timbre is homogeneous up to this point, and the note density is fragmented with the same forte since the beginning of the work. Therefore, the hierarchy is A.T.N.D.

Measure fifty-five is homogeneous except for the initial change in dynamics to fortississimo, which utilizes a decrescendo into the next measure. The hierarchy is D.A.T.N. Measures fifty-six through sixty reclaim the A.T.N.D. hierarchy with points of interest at every flammed high bongo accent.

### **3.3. Analysis of movement *B***

The second movement of *Rebonds* is a sectional work with changing motives, flowing melodies (on woodblocks and instruments with heads), and segments with rolls. Each section maintains specific characteristics, which are often accompanied by small motives that are varied with each repetition. Instead of describing the analysis by each motivic variation, each section will be discussed as a whole. Each section will be analyzed and presented in the order of each hierarchy element as it is used.

#### **3.3.1. Section one**

The first section utilizes the hierarchy of A.T.N.D. and consists of measures one through nine. A consistent sixteenth-note pulse is initiated on the high bongo. The timbre of the other drums are variations on the initial motive, enhanced by accents and ruffs.

Accents are the only element that can provide lesser points of interest. In this particular section, regular accents always occur on the low bongo with one or two accents on the high bongo in each measure until the transition that begins on beat one of measure eight. Double accents occur on every tom, which establish major points of interest in this section. Ruffs that accompany every double accent are also significant points of interest in this section and are located in measures one, four, and seven. As the double accents provide a strong sense of timbre harmony (with the tom as a timbre tonic), the double accents with ruffs are the highest points of interest in this section.

The timbre pattern appears as variations on the original motive in the first measure; this provides a source of interest. Each perceived variation can be considered a part of the section but are individually too brief to be considered a phrase. The transition that begins on beat one of measure eight mimics the original motive pattern with all drums except the high bongo.

Most note density significance is attributed to ruff ornaments and a gran cassa note that precedes the double accents on the tom. The dynamic level remains at forte until much later in the movement; however, the initial climax at the beginning is unmistakably due to the double accent on the tom.

### **3.3.2. Section two**

The second section utilizes a hierarchy of A.T.N.D. and consists of measures nine through eighteen. This section begins on the second beat of measure nine and has similar characteristics to the previous section. The persistent tension from the high bongo is initiated and followed by variations of the original motive found in measure one.

Accents are found on the low bongo, and double accents are found on the tom. One or two accents are found on the high bongo in each measure. These traits are maintained until the transition begins on the third beat of measure sixteen; the only exception is the double accent on the tumba within beat three of measure sixteen. The transition is another imitation of the original timbre motive from the first measure.

This section contains an accent on the low bongo accompanied by the ruff ornament in measure eleven; all other points of interest are initiated by the double accents on the tom.

The timbre motive continues through variations in this section with the tom being the established timbre tonic by the timbre harmony of the accents and double accents. The note density falls on the additional isolated ruffs on the high bongo rather than supporting the accents; this makes the entire section less strong (or assertive) than the prior section and contains ornaments supporting accents for points of interest. The dynamics have remained consistent since the beginning of the movement.

### **3.3.3. Section three**

The third section utilizes the hierarchy A.T.N.D. and consists of measures eighteen through thirty-five. The third section is another variation of the prior sections. The persistent pulse from the high bongo is initiated, and the original motive is put through various alterations in rhythmic placement similar to the previous sections.

In a similar behavior to the previous sections, accents are located on the low bongo, double accents are found on the tom, and a range of one to three accents are found on the high bongo in each measure until the transition. The transition begins within beat four of measure

thirty and consists of a woodblock passage and high bongo roll that lead into the next section. The next section begins on the second beat of measure thirty-five.

The only double accent accompanied by a ruff is found in measure twenty. Similarly, the only accent accompanied by a ruff is also found in measure twenty. The transition contains no accents or ruffs.

The timbre motive continues through rhythmic variations until the beginning of the transition. The double accents remain with the tom, which present the timbre tonic of the timbre harmony. An isolated woodblock note is found in measure eighteen. The transition contains a passage of thirty-second notes on woodblocks, comprised of motive variations found from the first beat of measure thirty-one. The high bongo roll in measure thirty-five leads into the next section.

The note density of the ruff ornaments provide support to the accents only in measure twenty while the thirty-second notes of the transition demonstrate contrasting material with an increase of tension. Due to the lack of ornament support (ruffs) for the accents, this section is not as strong as the initial section. A courtesy forte is marked in the score when the woodblock transition appears; however, the dynamic level has remained consistent since the beginning of the movement.

#### **3.3.4. Section four**

The fourth section utilizes a hierarchy of A.T.N.D. and consists of measures thirty-five through forty-eight. The fourth section initiates the persistent high bongo pulse with a range of accents from zero to three per measure until the transition. Accents typically fall on the low bongo while double accents occur on the tom. However, this section is not as consistent as the

previous three; not all low bongo notes are accented, nor are all double accents on the tom.

Measures forty-one and forty-two contain double accents on the gran cassa while measure thirty-seven contains no double accents at all despite the presence of a tom note.

The beginning double accent on the tom is accompanied by a ruff, the only appearance of such a combination in the entire section. Double accents remain the primary points of interest while regular accents are secondary. The wavering consistency of the double accent as it is applied to the gran cassa (instead of the tom) in measures forty-one and forty-two foreshadow a timbre modulation in the next section. The transition (beginning within beat four of measure forty-three) contains no accents except for the last tom strike in measure forty-seven.

The timbre pattern presented in this section undergoes significant rhythmic variations and bears little semblance to the motive found in measure one. Although the tom remains the primary timbre tonic, a deviation to the gran cassa in measures forty-one and forty-two is revealed. The transition is a drum passage producing the effect of a quick, linear timbre melody in thirty-second notes. The gran cassa roll in measures forty-six and forty-seven lead into a double-accented tom note, and a regular low bongo note before the characteristic high bongo sixteenth notes begin anew in the next section.

The ruffs do not compliment the accents well in this section, which adds to the phrasing confusion within a significant amount of variation. Ruffs appear more frequently toward the end of the theme in this section. No accents or ruffs are located in the transition, but the thirty-second notes bring additional tension that lead into the next section. The rolls in measures forty-six and forty-seven enhance the increase of tension into the next section. The dynamic level has remained consistent since the beginning of the movement.

### 3.3.5. Section five

The fifth section utilizes a hierarchy of A.T.N.D. and consists of measures forty-eight through fifty-eight. The first transition begins at measure fifty-four while the second transition begins within beat two of measure fifty-six. The fifth section introduces a timbre motive that undergoes variation under the consistent pulse of the high bongo while all regular accents have disappeared. The timbre motive is easier to follow than within the previous section since the timbre pitch directions maintain recognizable patterns for a longer period. The transition begins at measure fifty-four while the second transition is marked by contrasting material that begins on the second beat of measure fifty-six. The next section begins within the first beat of measure fifty-eight.

The dynamic levels alternate fortississimo and mezzo forte in measures forty-eight and forty-nine; these components foreshadow the accented high bongo notes found in the next section. Only a single double accent on the tumba in measure forty-nine is accompanied by a ruff. The remaining significant points of interest are double accents that are found on all drums except the high bongo. The first transition utilizes the same drums without the high bongo pulse in a series of rolls. The second transition in measure fifty-six establishes a thirty-second note passage with the same instrumentation. The first transition utilizes double accents and rolls, but the second transition contains no ornamentation.

The timbre is treated with a plethora of double accents on multiple drums. The overall effect is ambiguous and nearly atonal from a timbre harmony perspective. This behavior, along with the ruffs from previous sections, gives each section since the beginning of the work an increasingly destabilized effect.

The note density increases during the first transition (with rolls), but the second transition relaxes tension with a passage of thirty-second notes. The number of ruffs in each measure maintains similar tension found in measures forty-one through forty-three. Despite using dynamics to represent accent behavior at the beginning of the section, the original dynamic essentially remains undisturbed since the beginning of the movement.

### **3.3.6. Section six**

The sixth section utilizes a hierarchy of A.T.N.D. and consists of measures fifty-eight through sixty-eight. This section begins with a low bongo note and an ornamented high bongo note on the first beat of measure fifty-eight. Only double accents exist, most often accompanied by ruffs when located on the high bongo. The high bongo pulse is absent until the fourth beat of measure fifty-nine. The pulse fragments in measure sixty-one and returns on the fourth beat of measure sixty-three, which is the same moment double accents disappear. The transition begins on the woodblock notes at the upbeat of beat two in measure sixty-five. The next section begins within the first beat of measure sixty-eight when the high woodblock receives the same persistent pulse seen on the high bongo in prior sections of the movement.

Double accents occur more frequently in this section. Ruffs accompany nearly every double accent on the high bongo until measure sixty-one. At this point, ruffs accompany nearly every note until the return of the high bongo pulse on the last beat of measure sixty-three. Due to the high number of ruffs accompanying double accents, this section (specifically measure sixty-two) is the climax of the movement. The double accents disappear in the first transition while no ornaments remain in the second transition.

The timbre of the drums underneath the pitch of the high bongo varies until returning to the exact motive of the first measure in an embellished form; this embellished motive is located in measures sixty-two through sixty-five. The transition utilizes rolls on the woodblocks, which foreshadows future behavior in other sections (measures seventy-seven, seventy-eight, eighty-one, eighty-two, eighty-six, and eighty-seven).

As ruffs accompany more double accents, the note density increases. Tension peaks during the rolls on the woodblocks during the transition but at a much lower dynamic level than the theme.

The dynamic level of forte finally changes during the transition. Two swells and a crescendo into the next section provide dynamic interest and contrast compared to previous material.

### **3.3.7. Section seven**

The seventh section utilizes a hierarchy of A.T.N.D. and consists of measures sixty-eight through seventy-four. The first transition begins on the fourth beat of measure seventy while the second transition begins on the upbeat of beat three in measure seventy-one. This section utilizes the familiar, persistent pulse on the high woodblock found in previous sections on the high bongo. The lower woodblocks initiate a rolled version of the timbre motives that were once found in the lower drums; however, the pattern in measure sixty-nine appears to be an inversed variation of the original motive in measure one, followed shortly by the first transition on the fourth beat of measure seventy. The second transition begins on the rolls within beat three of measure seventy-one. The next section begins on measure seventy-five.



The final double accent of the movement is accompanied by a ruff and occurs on the high woodblock in measure sixty-eight. Ruffs embellish the high woodblock pulse while rolls articulate rhythms on the lower woodblocks.

The timbre of the woodblocks are drastically different than the drums in prior sections. The first transition is also performed on woodblocks while the second transition begins on the woodblocks and quickly transfers to the drums.

The note density contrasts significantly between the thirty-second notes of the first transition and the second transition, which contains a further increase of tension within the rolls. The thirty-second notes on beat four of measure seventy-four combine the drums and woodblock passages with the timbre of the drums imitating the third and fourth beat of the first measure.

The dynamics begin with a piano level on the high woodblock and rolls on the lower woodblocks at pianissimo. The first transition begins at a shocking fortissimo and decrescendos shortly after the beginning of the second transition. The swelling behavior of measures seventy-two through seventy-four imitates the transition of the previous section (measures sixty-five through sixty-seven).

### **3.3.8. Section eight**

The eighth section utilizes a hierarchy of A.T.N.D. and consists of measures seventy-five through seventy-nine. The transition begins on the upbeat of beat two in measure seventy-seven. This section utilizes groups of thirty-second notes and ruffs. The transition begins with woodblock rolls in the second beat of measure seventy-seven. The end of the transition displays brief thirty-second note passages on the woodblock and drums. The next section begins within beat three of measure seventy-nine with the high bongo ruff and low bongo roll.

The ruffs embellish the initial part of the section in measures seventy-five and seventy-six; this is consistent behavior whenever new sections begin in this movement. Rolls articulate the majority of the transition. This section does not have the persistent pulse in the high bongo or high woodblock.

The timbre combines both woodblocks and drums in this section. The timbre pattern of the drums in measure seventy-six resembles measure thirty. The transition uses woodblock roll patterns that resemble the transition of section six. The thirty-second note passages that mark the end of the transition in measure seventy-nine resemble the timbre behavior found in measures thirty-one through thirty-three (woodblocks) as well as measures fifty-six and fifty-seven (drums).

The note density in this section resembles behavior found in section five; the first transition utilizes rolls, which change to thirty-second notes. The dynamic level of fortissimo remains consistent throughout this section.

### **3.3.9. Section nine**

The ninth section utilizes the hierarchy A.T.N.D. and consists of measures seventy-nine through eighty-two. This section begins within the third beat of measure seventy-nine. The transition begins on beat three in measure eighty-one and ends on the first eighth note of beat three in measure eighty-two.

The beginning theme of this section utilizes high bongo notes with ruffs. Rolls on the low bongo eventually spread into rolls that are located on all drums below the high bongo. Thirty-second note rolls on the woodblocks initiate the transition.

The timbre is comprised of the bongos and occasional high woodblock, which expands to all drums with the high woodblock. The transition utilizes all woodblocks. This is the last section to use the high bongo.

The note density is increased with more rolls during the transition despite the rolls and ruffs already within the theme. Dynamics remain at a fortissimo level.

### **3.3.10. Section ten**

The tenth section utilizes a hierarchy of A.T.N.D. and consists of measures eighty-two through eighty-seven. This section begins on the upbeat of beat three in measure eighty-two. The first transition begins on the upbeat of beat two in measure eighty-four. The second transition begins on beat two of measure eighty-six and continues until the end of the movement.

The ruffs on the high woodblock confirm the beginning of the section. The drum patterns below the high woodblock are articulated as rolls. The first transition is absent of ornamentation, but the second transition consists of rolls on every woodblock and drum except the high bongo.

The timbre utilizes all drums (except the high bongo) and the high woodblock for the theme. The first transition uses all drums and woodblocks except the high bongo; this instrumentation is manifested in descending, five-versus-four patterns. The second transition utilizes the same instrumentation as the first transition.

The note density begins with rolls and ruffs, but the first transition utilizes only thirty-second notes. The second transition utilizes split sixteenth note rolls, which change to split thirty-second note rolls in measure eighty-seven. The dynamics remain at a fortissimo level until the end of the movement.

### 3.4. Discussion

The hierarchies utilized within both movements of *Rebonds* primarily consist of A.T.N.D. The consistency of each movement strengthens the effects of each element within the hierarchy designation; in other words, the placement of ruffs, accents, double accents, and combinations therein form the most important general strategies (climax-creating elements) overall. This contrasts greatly with *Cold Pressed*, which utilizes dynamics as a primary vehicle of climactic behavior. Strong tactics are revealed in the timbre, especially in regard to a timbre tonic and points of interest. Certain sections that emphasize these components are theoretically more important than other sections. As a result, errors performed in certain sections of either movement may be perceived as less significant than other sections. This asymmetrical behavior between sections produces different levels of importance in regard to points of interest. An example would be the sixth section involving measures fifty-eight through sixty-eight, which contains an overwhelming number of double accents with ruffs. This section functions as the climax of the movement, and it also represents the significant effect that articulations and ornaments can provide during asymmetrical phenomena. Ruffs are always found near the beginning of all major sections of the second movement, and ornaments often play a heavy role when determining the boundaries of each section.

Overall, this hierarchy analysis reveals information that supports situations where elements should be emphasized. The results provide a general strategic focus (such as points of interest with articulations and ornaments) and asymmetrical behavior. Instrument choices provide important tactical information regarding the timbre harmony formed in both movements. The instrumentation demonstrates the importance of quality and character, especially the bass

drum, high bongo, and the shared tom between both movements. As a result of the strategies and tactics revealed by the analysis, an informed performer can theoretically augment performance practice.

## 4. ANALYSIS OF *BONE ALPHABET*

### 4.1. Results

The components that separate double bars in *Bone Alphabet* are rhythmic lines (simultaneously, up to four per measure), note density (occurring as an abstract collection of rhythms or rhythmic ostinatos in each separate measure), dynamics (with three segregated categories of ranges [low, medium, and high] revealing the general prevalence of each phrase), timbre (as isolated instrument usage, linear timbre melodies, abstract passages, or timbre polyphony as the use of dyads and other multiple strikes simultaneously), a plethora of articulations and ornaments (some that support other components, and others that only occur within specific phrases such as mordents), tempo changes, and written instructions.

Table 9 lists several possible errors and questionable material in the score. Table 10 represents the hierarchies of *Bone Alphabet*. Yet again, the dominant hierarchy is D.T.N.A., followed by T.D.N.A., T.N.D.A., and A.T.N.D. The hierarchy of D.T.N.A. is not nearly as numerous in *Bone Alphabet* as in *Cold Pressed*, but it occurs approximately twice as frequently as the next highest hierarchy.

Table 9. Possible *Bone Alphabet* errata, interpretation decisions, and questionable material.

Measure:	Possible issue
33	The top rhythmic line is missing a half rest. Transitions from rolls to trills are not assumed to require a new attack emphasis.
41	The top rhythmic line is possibly missing a sixteenth rest.
43	An extra quarter rest appears at the top line.
47	Different instruments may require alternative techniques (such as mallet or stick angles) to create articulation variety, such as in measure forty-seven, but it is unlikely that note duration will be specific in many circumstances. Instruments should not ring very long on their own.
62	Trills are assumed to continue across tied notes, unless a roll appears. Transitions from rolls and trills are not assumed to require a new attack emphasis.
63	Trills do not contain courtesy grace notes to confirm directions.
66, 67	Rolls that overlap are interpreted as a quick ripple roll to represent an increase in note density.
68	The double stop at the last note is assumed to be attributed to the thirty-second note within the bracket, as opposed to the rolled note.
75	The last note on the middle line is a bit misaligned.
80	Again, tied trills are assumed to cease into rolls on a single instrument.
84	Rolls are interpreted as being re-attacked (re-articulated).
111	Some brackets indicate the 7:4 ratio on the top rhythmic line, while others do not.
112	The lowest line contains notes that are misaligned.
113	Some brackets indicate the 5:4 ratio on the top rhythmic line, while others do not.
116	An eighth note rest is missing on the top rhythmic line, while a sixty-fourth rest is missing from the middle rhythmic line.
117	A dotted eighth rest is missing from the middle rhythmic line.
124, 126	Different grace notes are utilized.
128	The 6:7 ratio should be 7:6 (within two sixteenth notes of time). This measure contains a misaligned note at the end.
138	The 7:4 ratio is not indicated for the other bracket.
145	The 3:2 bracket is not indicated for all similar brackets. The top rhythmic voice contains, on the final two notes, a note which nearly appears to crescendo into another note (without rolls involved). This could actually be utilizing three notes in the process, like measure 148.
148	A sixteenth note near the end of the middle rhythmic line may require an additional rhythmic beam (turning it into a thirty-second note).
154	This measure contains a grace note hidden by a note head in the top rhythmic line.

Table 10. Hierarchies of *Bone Alphabet* with phrase numbers and measures.

Hierarchy	Measures	Phrase	Hierarchy	Measures	Phrase
D.T.A.N.	1-4	1	T.N.D.A.	85-88	26
D.T.N.A.	5-9	2	D.N.T.A.	89-97	27
T.A.N.D.	10-18	3	D.T.N.A.	98-101	28
D.T.A.N.	19	4	A.T.N.D.	102-105	29
T.D.N.A.	20-22	5	D.A.N.T.	106-111	30
T.D.N.A.	23	6	N.T.D.A.	112	31
A.D.T.N.	24	7	D.T.N.A.	113-115	32
D.T.N.A.	25-26	8	D.A.T.N.	116-117	33
A.T.N.D.	27-32	9	D.T.N.A.	118-123	34
D.N.A.T.	33	10	A.T.N.D.	124-126	35
T.N.D.A.	34-40	11	D.T.N.A.	127	36
A.N.D.T.	41-49	12	T.D.N.A.	128-136	37
D.T.N.A.	50-54	13	D.N.T.A.	137-139	38
N.T.D.A.	55	14	T.D.N.A.	140-142	39
D.N.A.T.	56-60	15	A.T.N.D.	143	40
D.N.A.T.	61-64	16	D.T.N.A.	144-146	41
D.N.A.T.	65	17	A.N.D.T.	147-149	42
A.T.D.N.	66-68	18	T.N.D.A.	150-151	43
D.T.N.A.	69-71	19	D.T.N.A.	152	44
T.N.D.A.	72-78	20	T.N.D.A.	153	[45]
D.T.N.A.	79	21	A.T.D.N.	154	[45]
A.T.N.D.	80	22	D.T.N.A.	155	[45]
D.T.N.A.	81	23	T.D.N.A.	156	[45]
T.D.N.A.	82	24	A.N.D.T.	157-158	46
D.T.A.N.	83-84	25			

## 4.2. Analysis

Brian Ferneyhough's music education includes the Birmingham School of Music, Royal Academy of Music, study in Amsterdam (with Ton de Leeuw), and the Basel Conservatoire (with Klaus Huber).<sup>12</sup> He has received many awards, provided numerous guest lectures and appearances, taught at the Freiburger Musikhochschule, and taught at the University of

12. Fabrice Fitch, *Brian Ferneyhough: New Music 2013* (New York: Edition Peters, 2011).



California at San Diego.<sup>13</sup> *Bone Alphabet* was written in 1991 and premiered by Steve Schick at the University of California in 1992.<sup>14</sup>

*Bone Alphabet* is a rhythmically complex work with dynamic changes on individual notes, various numbers of polyrhythmic layers, multiple articulation techniques, changing tempos, and occasional repeated rhythms within a measure. Due to the great amount of detail, each phrase boundary is apparent on paper and may contain distinct characteristics; as a result, phrases are more apparent during analysis than *Cold Pressed*.

The dynamics in *Bone Alphabet* are diverse. The extreme range has been organized into three categories: low, medium, and high. This lower-resolution analysis reveals a silhouette of the general effects of dynamics. The low category contains all dynamic levels at piano and below. The high category contains all dynamic levels at forte and above. The medium category covers all dynamic levels that fit between the other categories.

The timbre of *Bone Alphabet* can be comprised of almost any instrumentation except for the material composition of adjacent instruments.<sup>15</sup> With the exception of roll durations, initial attacks are of greater importance than the duration of sound for each instrument. The range of instruments will be referred to as “instrument one” or “first instrument” (the highest instrument) through “instrument seven” or “seventh instrument” (the lowest instrument).

Articulations and ornaments can provide distinctions between phrases, lengths of phrase parts, embellishments, and climaxes; as a result, articulations and ornaments are very important in *Bone Alphabet*.

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13. Fabrice Fitch, *Brian Ferneyhough: New Music 2013* (New York: Edition Peters, 2011).

14. Ibid.

15. Brian Ferneyhough, *Bone Alphabet* (London: Edition Peters, 1995).

The note density is less significant in this work. Compared to *Rebonds*, *Bone Alphabet* is far more segmented in phrase construction. Elements in *Bone Alphabet* often have an isolated effect rather than using tension (note density) to lead into the next phrase with a transition. This compartmentalization removes a great deal of tension, drive, and expectation from the work as a whole. Multiple layers of rhythmic lines often contrast in number between phrases frequently for complex polyrhythms.

Double bars partition *Bone Alphabet* into most phrases. Unlike *Cold Pressed*, this work aligns well with phrase boundaries in the analysis; phrase forty-five is the only exception. Each phrase will be analyzed and presented in the order of each hierarchy element.

#### **4.2.1. Phrase one**

This phrase utilizes a hierarchy of D.T.A.N. and consists of measures one through four. This phrase begins with a fortississimo climax, which drops to fortissimo levels in the second and third measures. Measure four functions as a transition into the next phrase due to the crescendo to fortissississimo.

The timbre is abstract in the first measure. The timbre focuses around the first instrument almost as a kind of timbre tonic, moves to the first and seventh instrument in the second measure, and follows the fourth instrument during measure three. The transitional fourth measure begins with the first instrument and transfers to the seventh, which prepares for the next phrase.

The accents emphasize the timbre in the instruments specified earlier. These articulations enhance the sense of a timbre tonic, which does not stabilize through the phrase.

The note density is at a moderate level. The tension increases a minor amount in the second measure; otherwise, note density does not support other elements significantly. A repeated rhythmic figure aids the transition on instrument seven but does not significantly increase the tension into the next phrase.

#### **4.2.2. Phrase two**

The second phrase utilizes a hierarchy of D.T.N.A. and consists of measures five through nine. The dynamics begin with an accented fortississimo; in this case, it is assumed the accented dynamic level is slightly louder than an unaccented fortississimo from the previous measure. The dynamics lead measure five into measure six as well as measure seven into measure eight. Measure nine tapers to pianissimo toward the next phrase but does not provide enough contrasting material for a transition.

The timbre is volatile due to the number of rhythmic lines and nearly abstract despite the repetitions on similar instruments. Except for a fall in pitch during measure seven and a rise in pitch in measure eight, there are no overt timbre tendencies that would suggest a timbre tonic or timbre melody. Repeated notes on selected instruments do not change the timbre effects.

The note density supports the dynamics in measures seven and eight but does not utilize tension to lead into the next phrase. The tempo decreases in comparison to the previous phrase; however, this does not significantly affect the note density increase throughout the phrase. Accents, flams, and other articulations mostly emphasize rhythms. Accents do not enhance a timbre harmony with a timbre tonic or embellish dynamic directions. With the elements of this phrase diverging in multiple goal directions, the music interpretation result becomes isolated and confusing.

### 4.2.3. Phrase three

The third phrase utilizes a hierarchy of T.A.N.D. and consists of measures ten through eighteen. The transition is comprised of measures fifteen through eighteen. This phrase is comprised of rolls and produces one of the largest phrases in *Bone Alphabet*. Although the initial rolls are unexpected, the primary function of this hierarchy is the timbre, which utilizes two rolls at the same time. This is the first time in *Bone Alphabet* that this dyadic behavior has been revealed and embellished with rolls. The timbre utilizes dyads in measures ten through thirteen in a manner similar to a melody. Measure eleven focuses on the seventh instrument while measure fourteen focuses on the third instrument. Measures fifteen through eighteen produce a structure of timbre polyphony with overlapping rolls, which consists of dyads and triads (three notes rolled simultaneously). Measures fifteen through eighteen form contrasting material as a transition into the next phrase.

The rolls often directly support the timbre melody in the form of dyads while the flams in measure fourteen lead into the transition. Rolls that overlap yield dyads and other polyphonic effects. These articulations provide an overt set of boundaries for this phrase even though it is not the climactic element.

The note density remains modest until the increase of tension in the first three measures of the transition, and then it tapers at the final measure. The tempo decreases in comparison to the previous phrase but does not significantly alter the note density analysis for this phrase. A *rallentando* in measure eighteen allows the roll to slow into nothing, which provides a separation from the next phrase.

The dynamics remain low until the last three sixteenth notes' worth of time in measure fourteen, which lead into the transition. Measures seventeen and eighteen reveal dynamic swells that taper at the end of the transition. The tapering effect isolates this phrase as opposed to utilizing tension to lead into measure nineteen.

#### **4.2.4. Phrase four**

The fourth phrase utilizes a hierarchy of D.T.A.N. and consists of measure nineteen. This isolated measure utilizes radical dynamics (e.g., fortississimo), which surprises the listener with contrast in comparison to the prior phrase. The climax begins on the initial beat. The timbre functions like a linear pattern with occasional dyads and wide leaps similar to the first measure of the work. Accents emphasize the dynamics, rhythms, and occasionally the dyads (timbre); however, the timbre is more significant due to the homogeneous rhythms and sparse density. The note density provides tension similar to the first measure of *Bone Alphabet* but does not provide much support to the other elements, which fails to provide a connection to the next phrase. The tempo increases at this measure but leaves the analysis unaltered.

#### **4.2.5. Phrase five**

The fifth phrase utilizes a hierarchy of T.D.N.A. and consists of measures twenty through twenty-two. The transition is measure twenty-two. This phrase contains a sparse timbre melody with a few wide leaps accompanied by a transition into the next phrase (measure twenty-two). The timbre forms an almost constant timbre melody (in contrast to the dyads in the previous phrase) complemented by dynamics and note density. The melody is quiet and simple in measure twenty; however, this behavior is followed by increased dynamic levels and note density by

measure twenty-one. Measure twenty-two provides repetitive and linear contrasting materials that serve as a transition into the next phrase.

The dynamics increase as the timbre melody becomes slightly more dense and complex. The swell in the transition is followed by a crescendo into the next phrase.

The note density increases with each passing measure, especially the last seven sixteenth notes' worth of time in measure twenty-two. This complements the timbre and dynamics while adding tension toward the next phrase. The tempo increases slightly at this phrase; however, this does not alter the analysis. Accents in measure twenty-one emphasize rhythms while accents in measure twenty-two enhance a dynamic swell. The accents do not support the crescendo that lead into the next phrase.

#### **4.2.6. Phrase six**

The sixth phrase utilizes a hierarchy of T.D.N.A. and consists of measure twenty-three. The timbre holds a great deal of contrast in this phrase and provides a repetitious entrance on instrument one followed by abstract patterns; this contrasts with the linear, melodic behavior of the previous phrase. Timbre is the primary element in this phrase despite repetitive notes on the same instrument and wide leaps that are occasional features from the timbre of the previous phrase. In general, dense timbre melodies that have wide leaps can be difficult to distinguish from abstract timbre segments during a performance.

The dynamics highlight note density (rhythms) with a crescendo to forte and a decrescendo from fortississimo. This dynamic behavior gives the entire phrase an arch shape, which supports the phrase boundaries. In addition, the dynamics tend to get louder as instrument leaps widen, and reduce as the range becomes smaller. When compared to the transition of the

previous phrase, the note density is reduced due to the slower tempo. The rhythms follow the dynamics but do not provide significant distinctions in comparison to the previous phrase despite the difference in rhythmic lines. Accents and flams clearly embellish the rhythms rather than dynamics or timbre.

#### **4.2.7. Phrase seven**

The seventh phrase utilizes a hierarchy of A.D.T.N. and consists of measure twenty-four. This measure utilizes rolls on the initial beat, which has not been present since measure twenty-two. The trill is followed by another roll in an arch structure. The flams are persistent and deviate to other instruments during the trill.

The dynamics emphasize and enhance the articulation and ornaments; however, dynamic distinctions are not present during the detailed changes of rolls and flams. A dynamic swell follows the rolls and trill.

The timbre is homogeneous until the trill is present (which merely expands the instruments out by one place). After the trill is reverted to a roll, the timbre homogenizes once again. This behavior supports the articulations and ornaments but is not accurately reflected in the dynamics.

The note density remains nearly as homogeneous as the timbre, except less information is presented in support; there is not enough material to surpass the significance of the timbre in this phrase. The tempo is reduced when compared to the previous phrase; however, this reduction does not alter the analysis due to the masking effect of rolls and trills.

#### **4.2.8. Phrase eight**

The eighth phrase utilizes a hierarchy of D.T.N.A. and consists of measures twenty-five and twenty-six. The transition is measure twenty-six. The phrase opens with a sforzando and gradually crescendos into measure twenty-six, which consists of fortississimo notes that lead into the next phrase without an increase in note density. The dynamics and timbre material contrast significantly in measure twenty-six and create a transition into the next measure.

The timbre begins as linear timbre melodies that eventually combine into notes on one instrument in measure twenty-five. Measure twenty-six maintains a persistent series of notes on the first instrument; however, individual accented notes present a separate timbre melody that travels to instrument five and back to the second and third instrument.

The note density remains fairly homogeneous but on a different scale than the prior phrase; individual notes are used with repetitive rhythms as opposed to the rolls of the previous measure. The tempo is greatly increased when compared to the previous phrase; however, this contrast is obscured by the rolls and trills of the previous phrase. In addition, the note density does not establish a major distinction between theme and transition in this phrase. The accents emphasize the rhythms (a subsection of note density) in this phrase, which also emphasizes a timbre melody in the transition on instruments two through five.

#### **4.2.9. Phrase nine**

The ninth phrase utilizes a hierarchy of A.T.N.D. and consists of measures twenty-seven through thirty-two. The initial mordent presents the greatest change from the previous phrase and is therefore the climax of this phrase. Mordents make a first appearance in significant quantity during this phrase. These ornaments create surprises and distinctions metaphorically similar to a



dialect; as a result, the mordents are also a significant component that establishes the end boundary of the phrase, not merely the climax at the beginning (the first boundary). Sporadic accents appear and are only occasionally supported by the note density.

The timbre appears as clusters separated by wide leaps. This behavior is distinct from the rest of the work thus far and supports the boundaries of the phrase. These condensed timbre melodies are often located on instrumentation extremities (i.e., instruments one and two versus instruments six and seven).

The note density does not appear to significantly support the other elements; however, clusters occasionally appear around mordents. The tempo drops dramatically in comparison to the previous phrase, which may give the dense clusters of notes the impression of increasing the tempo; this is followed by lengthy rests separating the clusters that give the contradictory impression of a reduction in tempo. In other words, the tempo change is likely to produce confusion in this phrase if the rests are not given the proper duration during a performance. The dynamics typically support the note density with a loud attack followed by a decrescendo or a quick dynamic drop with a crescendo.

#### **4.2.10. Phrase ten**

The tenth phrase utilizes a hierarchy of D.N.A.T. and consists of measure thirty-three. The dynamics give the initial climax at fortissississimo, which drops significantly at the rolls and trills found from the fourth sixteenth note's worth of time until the end of the measure. These rolls and trills are extensive and would be labeled as a transition if they occurred in the same measure.

The note density is compact for individual notes, which then lengthens considerably for the rest of the measure. The tempo increases dramatically at this phrase and provides a major distinction in comparison to the prior phrase. The *rallentando sempre* slows the note density, but this is a difficult perception once the rolls and trills begin. Varying roll and trill speeds are important for phrase distinction.

The rolls transform into trills during the tenth and eleventh sixteenth notes' worth of time, which are then supported simultaneously by the dynamic swell and *decrescendo* found within the previous sixteenth note's worth of time. The uppermost trill extends into the last sixteenth note's worth of time.

The timbre utilizes abstract formations that riddle individual notes and consistent instruments for rolls and trills.

#### **4.2.11. Phrase eleven**

The eleventh phrase utilizes a hierarchy of T.N.D.A. and consists of measures thirty-four through forty. Three transitions exist in this phrase, which would almost be separate phrases except for dynamics being the only major distinction. The first transition is measure thirty-eight, the second transition is measure thirty-nine, and the third transition is measure forty. Other elements seem quite similar in texture and density.

The timbre at the beginning of the phrase is dense and abstract, which greatly contrasts with the prior phrase. The slight rise in pitch during measure thirty-six and the fall in measure thirty-seven represent some of the only noticeable pitch patterns (albeit as a dense mass of notes). The accents ornament, at times, a separate timbre melody that peaks while entering measure thirty-six due to the dynamic contrast of the upper rhythmic line.

The note density increases at this phrase despite the lower tempo in comparison to the previous phrase. Assuming the trills at the end of the previous phrase vary in speed, phrase distinction should be clear. This phrase remains quite dense except for a slight reduction in the transitions.

The dynamics begin quietly and increase dramatically during the last two sixteenth notes' worth of measure thirty-six. Measure thirty-seven remains quite loud, which is contrasted with dynamic behavior in measure thirty-eight (the first transition). The dynamics have a greater range of contrast between quiet and loud dynamics in measure thirty-eight, which is again contrasted by the subtle dynamics of measure thirty-nine (the second transition). Measure forty, the third transition, provides a return to loud dynamics at a fortississimo level. The length of these measures support the existence of three transitions, but separate phrases are not possible due to the similar use of other elements.

The rooftop accents emphasize rhythmic structures (as a subset of note density). Although these accents occur often in the top rhythmic line, specific instruments are mixed with other notes and theoretically obfuscate most perceptive attempts at separate timbre melodies.

#### **4.2.12. Phrase twelve**

The twelfth phrase utilizes a hierarchy of A.N.D.T. and consists of measures forty-one through forty-nine. This unusual phrase contains several measures that could be isolated as separate phrases on their own, but within the context these measures are still too heavily related (especially with regard to the articulations and ornaments). This phrase contains two transitions. The first transition is comprised of measures forty-four through forty-seven, and the second transition is comprised of measures forty-eight through forty-nine.

The initial flam and accents within measure forty-one present the climax of the phrase. The theme presents rolls, flams, additional grace notes, and other articulations. The first transition contains primarily flams and accents while rolls are incorporated in measure forty-seven and lead into the second transition. Measure forty-eight contains accents, flams, rolls, deadstrokes, and other articulations. Measure forty-nine utilizes accents and a few other articulation marks.

The note density is increased significantly despite the lower tempo of this phrase; this major distinction clearly establishes phrase boundaries. The first transition maintains a high tension until the rolls lead into the second transition. The second transition behaves in a similar manner; the note density begins heavily, which diminishes once rolls are introduced in measure forty-eight. Measure forty-nine incorporates high density with a *rallentando* to confirm the end of the phrase. The note density strongly supports the articulations and ornaments in this phrase.

The dynamics do not begin the phrase with a climax despite utilizing loud dynamics. The dynamic levels reduce to low and medium tiers in measures forty-two and forty-three. The first transition utilizes a variety of dynamic levels while the second transition retreats back to low and medium levels. The dynamics typically support the rhythms and articulations but do not establish significant contrasts with the previous phrase.

The timbre remains abstract throughout the entire phrase except when the instrumentation becomes minimized to one or two instruments during roll segments; the only exception is in measure forty-three, which contains rolls that overlap with rhythmic figures and ornaments.

#### **4.2.13. Phrase thirteen**

The thirteenth phrase utilizes a hierarchy of D.T.N.A. and consists of measures fifty through fifty-four. Measure fifty-four is a transition into the next phrase. The opening dynamics begin with a forte climax despite being unaccented. The dynamics are homogeneous in groups of notes rather than almost always using different dynamics for each note. Loud dynamics return for a few notes near the initial bar lines of measure fifty-one and measure fifty-three.

The timbre is sparse and melodic (timbre melody); wide leaps and smooth lines both characterize the timbre of this phrase. Dyads are an occasional occurrence. The timbre appears to correlate well with the dynamics. The note density is quite sparse until the transition measure fifty-four; this measure contains an increase in note density that brings the tension into the next phrase. A lower note density is utilized, compared to the previous phrase, despite the tempo increase and following a rallentando. The articulations, devoid of ornaments, emphasize the dynamics frequently.

#### **4.2.14. Phrase fourteen**

The fourteenth phrase utilizes a hierarchy of N.T.D.A. and consists of measure fifty-five. The note density of this measure is extremely sparse in comparison to prior phrases. The tempo is also greatly reduced when compared to the previous phrase.

The timbre appears monophonic (timbre monophony), linear, and melodic (timbre melody) with clear and ascending pitch patterns. The timbre supports the note density by maintaining consistent instrumentation on long note values and an ascending instrumentation during shorter note values.

The dynamics are very low for the entire phrase, which is not a major distinction from the previous phrase (during the transition measure fifty-four). The rolls emphasize long note values between smaller clusters with each initiating a rhythmic ratio.

#### **4.2.15. Phrase fifteen**

The fifteenth phrase utilizes a hierarchy of D.N.A.T. and consists of measures fifty-six through sixty. A transition occurs at measure sixty.

The initial mezzo forzando creates the dynamic climax. Multiple crescendos to this dynamic level are seen throughout the phrase except for the transition. A crescendo is followed by a group of fortississimo notes in measure sixty which leads into the next phrase.

The note density increases during the transition toward the next phrase; otherwise, the rest of the phrase follows similar rhythmic patterns in each measure. The tempo increases significantly in comparison to the previous phrase and reveals phrase boundaries.

Accents highly correlate with the dynamic peaks during a mezzo forzando. Additional articulations also frequent crescendos during the first two measures of the phrase.

The timbre tends to support the dynamics by utilizing linear notes (either on the same instrument or in a wave pattern) toward a minor point of interest in this phrase. Emphasizing the dynamics in this phrase would include taking advantage of the linear nature of timbre melodies when they occur.

#### **4.2.16. Phrase sixteen**

The sixteenth phrase utilizes a hierarchy of D.N.A.T. and consists of measures sixty-one through sixty-four. This phrase begins with a repeated descending figure from the end of the previous phrase; these two figures are separated merely by a single breath mark. The breath mark

in measure sixty is the key component to producing a dynamic climax level of fortississimo; otherwise, the meager additional notes and drop in tempo would serve as a poor substitute for a climax. Rolls and trills are often initiated by loud dynamics.

The note density changes frequently due to tempo alterations that occur every measure. This series of rallentandos, abrupt tempo changes, and an accelerando significantly alter roll speeds and trill speeds. The changes in tempo enhance note density as a defining characteristic for phrase boundaries. Dense note clusters, such as the beginning of measure sixty-one, contrast with less tense segments, such as measure sixty-four.

Every measure in this phrase contains a group of accents that are inevitably followed by rolls or trills. Accents enhance loud dynamics and often outline rhythms. Varying roll and trill speeds, which support note density, are extremely important as a distinguishing feature in this phrase.

The timbre of each measure typically consists of accent clusters (measure sixty-three is an exception) followed by a homogeneous instrumentation during rolls and trills. These clusters are similar to the transition behavior of the previous phrase (measure sixty).

#### **4.2.17. Phrase seventeen**

The seventeenth phrase utilizes a hierarchy of D.N.A.T. and consists of measure sixty-five. The dynamics begin with a mezzo forzando climax while establishing a decrescendo toward the end of the measure. The note density presents a moderate tension and remains consistent throughout the measure. The tempo of this phrase is slightly faster than the previous phrase, which supports the importance of note density as a defining feature of phrase boundaries. The articulations and ornaments often correlate with dynamic levels, especially in regard to the

bottom rhythmic line. The timbre is abstract with wide leaps, which contrast with the long note values (rolls and trills) of the previous phrase; however, the abstract clusters resemble behavior from the previous phrase.

#### **4.2.18. Phrase eighteen**

The eighteenth phrase utilizes a hierarchy of A.T.D.N. and consists of measures sixty-six through sixty-eight. The transition occurs during measures sixty-seven through sixty-eight. The first roll in measure sixty-six is the climax of the phrase. Rolls pervade the entire phrase but fragment during the transition. Deadstrokes are present during measure sixty-eight.

The timbre is established as a single instrument; this is a behavior not encountered prior to this phrase. However, a great length of time is required to confirm this phrase distinction when compared to the assertive rolls, accents, dead strokes, and other techniques. Despite both elements being distinct in comparison to surrounding phrases, articulations and ornaments provide more information than the timbre.

The dynamics utilize simultaneous crescendos and decrescendos. The dynamics become louder with fragmented rolls during the transition while maintaining the simultaneous crescendos and decrescendos. The note density has a gradual increase at the end of each measure. The tempo increase in this phrase is obfuscated by the rolls and results in ambiguity.

#### **4.2.19. Phrase nineteen**

The nineteenth phrase utilizes a hierarchy of D.T.N.A. and consists of measures sixty-nine through seventy-one. The transition occurs at measure seventy-one. This phrase is likely to be the climax of the entire work in regard to the intensity and duration of dynamics.



The initial fortississimo is the climax of the measure. The loud dynamics maintain a strong presence until the crescendo in measure seventy-one (the transition), which leads into the next phrase.

The timbre is extremely dense, abstract, and occasionally contains general pitch directions. The pitch ascends in measure seventy, mostly within the first sixteenth note's worth of time, and descends during the third and fourth sixteenth notes' worth of time.

The note density contains small moments of rest during measure seventy between oppressive clusters of notes. Despite the slower tempo in this phrase, the note density is still greater than the previous phrase in regard to individual strikes (omitting techniques such as rolls). Accents tend to emphasize rhythms; however, due to the proliferation of accents, the note density can also correlate with dynamics.

#### **4.2.20. Phrase twenty**

The twentieth phrase utilizes a hierarchy of T.N.D.A. and consists of measures seventy-two through seventy-eight. The transition occurs at measure seventy-eight. The timbre is initiated on a dyad into a linear timbre melody with wide leaps. This behavior continues until measure seventy-three when the timbre gradually becomes more abstract in the note clusters of measure seventy-four and seventy-five. This behavior is followed by groups of repeated notes (on the same instrument) in measure seventy-six. Measure seventy-seven becomes abstract while the repetitions of instrument one in measure seventy-eight resemble the timbre behavior of measure twenty-six.

The note density tends to increase with each passing measure, especially during the transition. This note density increase during the transition provides a clear drive into the next

phrase. This phrase is separated from the prior phrase by a breath mark. The increase in tempo does not alter the analysis of the note density since this phrase is still less dense than the prior phrase.

The dynamics follow the timbre melody in a variety of shades, which incorporates many decrescendos during measure seventy-six. A crescendo in measure seventy-seven leads into the transition. The upper rhythmic line is enhanced with crescendos during the transition. This enhancement also follows the timbre since most of this rhythmic pattern remains on the first instrument.

Accents and flams adorn the theme, but only accents remain during the transition. Accents often embellish the dynamic levels.

#### **4.2.21. Phrase twenty-one**

The twenty-first phrase utilizes a hierarchy of D.T.N.A. and consists of measure seventy-nine. This phrase begins with a sforzato climax, a dynamic level repeated throughout the first six sixteenth notes' worth of time. A variety of dynamic shades are utilized in this phrase and applied to individual notes.

The timbre is abstract and makes use of the full instrumentation. The note density, supported by the reduced tempo, produces less tension in this phrase in comparison with the previous measures. Certain notes (all sforzato past the crescendo) are struck with two sticks at the same time as a kind of articulation (often called a double stop). Articulations and ornaments typically support rhythmic structures and dynamics while manifesting an arch formation for this phrase.

#### **4.2.22. Phrase twenty-two**

The twenty-second phrase utilizes a hierarchy of A.T.N.D. and consists of measure eighty. This phrase begins with rolls and eventually incorporates trills, which are techniques that have not been present for several phrases. Deadstrokes occur in the second and fifth sixteenth notes' worth of time. The timbre only involves three instruments and consists of long rolls and trills. The note density is also mostly comprised of rolls and trills. The reduced tempo, in comparison to the previous phrase, is obfuscated by rolls and trills. The dynamics loosely form an arch while emphasizing the fifth sixteenth note's worth of time in this measure.

#### **4.2.23. Phrase twenty-three**

The twenty-third phrase utilizes a hierarchy of D.T.N.A. and consists of measure eighty-one. This measure begins with a fortissimo climax followed by short crescendos that each lead into successively lower dynamic levels on the bottom rhythmic line. The top rhythmic line injects sforzatos and other dynamic levels.

The timbre results in a timbre melody that forms in periods of dense notes and sparse connective material. The resulting effect is a melody with wide leaps and a varying note density.

The note density itself supports the dynamics on the bottom rhythmic line with consistent rhythms, and predictable dynamics on the top rhythmic line that increase with repetitious behavior. The higher tempo of this phrase is obfuscated by the rolls and trills of the previous phrase, which does not change the analysis.

The accents support loud dynamics and often appear at the end of a crescendo or at a sforzato. The general combined effect of all the elements in this phrase is a simultaneous decrescendo and crescendo structure.

#### **4.2.24. Phrase twenty-four**

The twenty-fourth phrase utilizes a hierarchy of T.D.N.A. and consists of measure eighty-two. This phrase contains a surprising change in timbre in comparison to the previous phrase. Each linear timbre melody in this phrase ascends in pitch.

The dynamic level remains at pianississimo for the entire phrase and creates distinct phrase boundaries. The note density is similar to the previous phrase but also provides greater consistency between note spacings in comparison to the uneven clusters of phrase twenty-three. The reduced tempo is nearly balanced by the increase in notes and therefore does not alter the analysis significantly. There are no articulations or ornaments in this phrase.

#### **4.2.25. Phrase twenty-five**

The twenty-fifth phrase utilizes a hierarchy of D.T.A.N. and consists of measures eighty-three and eighty-four. The transition begins on measure eighty-four.

The dynamics initiate a climax at mezzo forzando, with accents emphasizing every succeeding mezzo forzando throughout the first measure. Decrescendos and loud dynamic levels occur during the transition. These dynamic level behaviors contrast greatly with the previous phrase.

The timbre primarily utilizes the sixth instrument with ornaments occurring on the fifth and seventh instruments. Dyads are found in measure eighty-three. The transition measure contains one note on instrument seven with the remaining notes occurring only on the sixth instrument.

Attacks with two mallets on the same instrument (double stops), dyads, and flams occur during the first measure of the phrase. The transition utilizes rolls, accented notes (which

emphasize the dynamics and rhythms), and a single flam that embellishes a sforzato. The note density is quite thick in measure eighty-three despite the slightly reduced tempo when compared to the previous phrase. The transition focuses on rolls more than individual note strikes.

#### **4.2.26. Phrase twenty-six**

Phrase twenty-six utilizes a hierarchy of T.N.D.A. and consists of measures eighty-five through eighty-eight. The first immediate distinction of this phrase is the instrumentation. The timbre is abstract and manifests clusters that form silhouettes of general pitch directions.

The sparse note density is a major distinction in comparison to the previous phrase, which helps establish phrase boundaries. The note density increases slightly in measures eighty-six through eighty-eight, but other element behaviors do not change significantly enough to warrant the label of transition. The slight tempo reduction, in comparison to the previous phrase, does not alter the analysis.

The dynamic levels are typically maintained in the low and medium ranges with a significant cluster of notes in measure eighty-eight that leads into the next phrase. The articulations and ornaments often correlate with note density and dynamics.

#### **4.2.27. Phrase twenty-seven**

The twenty-seventh phrase utilizes a hierarchy of D.N.T.A. and consists of measures eighty-nine through ninety-seven. This phrase is easily identified in the score by the number of simultaneous rhythmic lines (two, in this case) and the rhythmic ostinatos isolated in each measure. Measures eighty-nine through ninety are the theme. Measures ninety-one through ninety-three are the first transition. Measures ninety-four through ninety-seven are the second transition.

The initial climax of forte is brief and cannot be expressed properly without the breath mark from the previous phrase. The theme contains mostly low and medium dynamic levels while the first transition utilizes high and medium levels. The second transition uses a wide variety of dynamic ranges within lengthy meters.

Despite the higher tempo marking and moderate note density of this phrase, the result is a lower note density in comparison to the previous phrase. Measure eighty-nine contains a condensed timbre melody followed by a phased set of rhythms in measure ninety. The first transition utilizes a moderate note density with abstract behavior. The second transition maintains a sparse note density in comparison to the rest of the phrase.

The timbre begins with an abstract melody followed by a phased motive within the theme. The first transition tends to emphasize the seventh instrument (the lowest pitch), which hints at a timbre harmony. The second transition reveals abstract segments despite linear ascending pitch patterns within measure ninety-five and ninety-six. Measure ninety-seven emphasizes the fifth instrument and is accompanied by accented notes with sforzato dynamics. The rhythmic behavior of this instrument emphasis foreshadows the repetitive rhythms in the following phrase.

Flams and additional grace notes ornament rhythmic structures within the theme. Every note is accented in the first transition, but the second transition contains accents and other articulations that adorn specific rhythmic structures (such as the beginning of consistent note clusters in measure ninety-four).

#### **4.2.28. Phrase twenty-eight**

The twenty-eighth phrase utilizes a hierarchy of D.T.N.A. and consists of measures ninety-eight through 101. The opening dynamic climax occurs at fortissississimo; this dynamic level recurs in measure 100 and is increased at measure 101 (to fortississississimo), which leads into the next phrase.

The timbre remains consistent within each separate measure, and the highest pitches occur in measure 101. The note density is sparse, likely due to the physical limitations when performing extreme dynamics for percussion instruments. The ostinato rhythms are consistent within each separate measure. The slight tempo increase, in comparison to the previous phrase, does not alter the analysis. All measures contain accents at the beginning of each (often repeated) rhythm except for measure ninety-nine, which also contains deadstrokes.

#### **4.2.29. Phrase twenty-nine**

The twenty-ninth phrase utilizes a hierarchy of A.T.N.D. and consists of measures 102 through 105. This phrase highly resembles the style of phrase nine (beginning with measure twenty-seven). The initial climax is the existence of mordents in this phrase. The first mordent occurs in measure 102 and is followed by four mordents in each successive measure until measure 105, which contains six mordents.

The timbre of this phrase is very linear (timbre melody and timbre monophony) and follows a very mordent-laden wave pattern throughout the entire phrase. Multiple notes occur successively on individual instruments, which augment the length of the melody.

The note density is a thick texture for the first two measures of the phrase but then relaxes with a sparse texture in measure 104. The reduced tempo, in comparison to the previous

phrase, does not alter the analysis. The final measure of this phrase begins with a thin texture that increases to a moderate density. The dynamics remain at low and medium levels for the entire phrase.

#### **4.2.30. Phrase thirty**

The thirtieth phrase utilizes a hierarchy of D.A.N.T. and consists of measures 106 through 111. This phrase has two transitions: the first transition occurs at measure 108, and the second at measure 110.

The initial dynamic begins with a sforzando climax. Crescendos and decrescendos occur simultaneously into additional sforzandos in measure 106. Dynamic ranges reduce to low levels during measure 107. The first transition begins with a sforzando, and the second transition begins with a forte; both transitions demonstrate a variety of dynamic levels.

Rolls pervade this entire phrase. Rolls are often initiated closely in time during measure 106, which produces dyads; however, measure 107 contains rolls that are initiated further apart for an overlapping effect on the same instrument. The transition (measure 108) returns the rolls to dyads. Measure 110 begins with dyadic rolls and measure 111 contains individual rolls accompanied by notes on the lower three instruments (instruments five through seven).

Note density remains fairly consistent until the additional notes in measure 111 that increase the tension into the next phrase. The note density is sparse due to the length of rolls in this phrase. The tempo increase, in comparison to the previous phrase, does not affect the analysis unless all notes within a roll are considered individual strikes. The timbre forms dyadic



rolls that result in distinct textures in comparison to other phrases. The individual rolls found within the final measure of this phrase are often accompanied by unaccented notes on the seventh instrument; however, this does not seem to create a stable timbre harmony due to the dynamic intensity of the higher instrumentation.

#### **4.2.31. Phrase thirty-one**

The thirty-first phrase utilizes a hierarchy of N.T.D.A. and consists of measure 112. The extreme note density is more surprising than the mere mezzo piano accent that initiates the measure. The note density begins with a simultaneous four-mallet strike followed by a simultaneous three-mallet strike at the beginning of each sixteenth note's worth of time until the end of the phrase. The tempo decrease, in comparison to the previous phrase, does not alter the note density increase in this phrase.

The timbre contains wave patterns and linear behaviors; however, these characteristics are obscured by the underlying accompanying material to a confusing result. The dynamic levels occur mostly in the low range with some accented notes at medium levels.

#### **4.2.32. Phrase thirty-two**

The thirty-second phrase utilizes a hierarchy of D.T.N.A. and consists of measures 113 through 115. The transition begins at measure 114. The initial sforzando is the dynamic climax of the phrase. Additional dynamic peaks are emphasized by clusters of notes.

The behavior of the timbre in this phrase is drastically different from the prior phrase. The timbre of measure 113 consists of note clusters separated by rests. The timbre in measure 114 begins with a continuous abstract behavior that maintains until the end of the phrase.

The note density is greatly increased at the transition when compared to the sporadic clusters of the theme. Note groupings and rhythmic ostinatos (contained in each measure) embellish the dynamics. The tempo is significantly increased in comparison to the previous phrase. This tempo increase does not alter the decreased note density at the beginning of this phrase; however, the drive of the transition is enhanced by the tempo.

Accents enhance rhythms and dynamics simultaneously in this phrase, often due to different dynamic markings for individual notes. A deadstroke is found within the last sixteenth note's worth of time in measure 115.

#### **4.2.33. Phrase thirty-three**

The thirty-third phrase utilizes a hierarchy of D.A.T.N. and consists of measures 116 and 117. The initial material of measure 116 and 117 is similar to the previous measure; however, a breath mark and a small amount of rest (less than a sixteenth note's worth of time) from the previous measure allows the sforzata to produce the initial climax of this phrase. The crescendo to a sforzando is followed by a decrescendo until the end of measure 116. Measure 117 begins with a fortississimo followed by a decrescendo from forte to piano; this low dynamic level initiates a crescendo toward the last sixteenth note of time in this measure, which overlaps with a swell in the bottom rhythmic line.

The rolls in measure 116 lead into the next measure and are later mimicked by trills in measure 117. The timbre alternates abstract note clusters and rolls (or trills), which enhances the accents and dynamics. Despite beginning the phrase with a dyad, the timbre is too similar to the previous phrase to be an initial surprise.

The note density enhances the timbre since individual strikes are found in dense clusters while overlapping rolls and trills occur on fewer instruments. The note density begins at a lower tempo than the previous phrase and slows to a significant degree by the end of this phrase. Although the *rallentando* is a distinct behavior in this phrase, the result is merely a change in roll and trill speeds.

#### **4.2.34. Phrase thirty-four**

The thirty-fourth phrase utilizes a hierarchy of D.T.N.A. and consists of measures 118 through 123. The first transition begins at measure 120 while the second transition begins at measure 122. The initial dynamic of *fortissimo* creates the climax of the phrase. The dynamics revert primarily to low and medium levels at the first transition with occasional accents at the *forte* and *sforzando* level.

The timbre begins with ascending correlations in the theme, which is followed by abstract behavior in the first transition. The second transition contains individual strikes in descending pitch patterns as well as long note values with rolls.

The note density begins with a sparse texture in the theme while the first transition contains moderate densities. The second transition is accompanied by rolls and a moderate note density. The tempo is increased when compared to the previous phrase, but this distinction is obfuscated by the trills of the previous phrase.

The accents in measures 118 and 119 enhance the rhythmic figures that support the dynamics. Accents and other articulations in measure 120 emphasize rhythms and also dynamics localized to individual notes in measure 121. Flammed rolls and individual rolls accompany the crescendos found in the second transition.

#### **4.2.35. Phrase thirty-five**

The thirty-fifth phrase utilizes a hierarchy of A.T.N.D. and consists of measures 124 through 126. The transition is measure 126. The opening trills in measure 124 provide the initial climax, which is followed by different combinations in measure 125. Rolls and trills have been completely replaced by flams in the transition.

The timbre is comprised only of instruments three, four, and five. This provides an effect that is quite distinct from the surrounding phrases.

The note density is reduced by the lower tempo and fewer initial roll attacks in comparison to the previous phrase. In addition, the rolls and trills have an expanded duration compared to the rolls of the previous phrase. The dynamic levels are generally at medium and low levels with few loud dynamics.

#### **4.2.36. Phrase thirty-six**

The thirty-sixth phrase utilizes a hierarchy of D.T.N.A. and consists of measure 127. The initial sforzando is the climax, followed by a small swell and a cluster of fortissimo notes that lead into the next phrase.

The timbre is abstract, contains dyads, and utilizes an immediate instrumentation distinction in comparison to the previous phrase. The note density is thick due to the increased number of notes and quicker tempo when compared to the previous phrase. The accents emphasize rhythmic structures, loud dynamics, and dyadic behavior.

#### **4.2.37. Phrase thirty-seven**

The thirty-seventh phrase utilizes a hierarchy of T.D.N.A. and consists of measures 128 through 136. Transitions begin at measures 132 and 134. The initial climax is a four-mallet strike

at the beginning of the phrase. This is followed by three-mallet strikes and dyads as measure 128 progresses. Similar behavior is found through measures 129 and 130, but a significant increase in timbre polyphony occurs from measures 131 through 136.

The dynamics are primarily at low and medium levels with crescendos that lead into the first transition. The first transition mostly utilizes medium and high dynamic levels with a crescendo in measure 133 that leads into the second transition. The second transition begins with a subito fortississimo followed by low dynamic levels.

The note density contains a sparse group of clusters in the theme. The tension increases in measure 131 toward the first transition but relaxes shortly after the first two sixteenth notes' worth of measure 134. The initial tempo is slower than the previous phrase; however, the accelerando attempting to drive into the next phrase is betrayed by low dynamics and a reduced note density in the second transition.

No accents or articulations exist in measure 128, but measures 129 and 130 support the rhythms. Measure 131 provides accents that support the timbre polyphony and rhythmic polyphony. The accents and articulations support the timbre (timbre polyphony with thicker textures) during both transitions.

#### **4.2.38. Phrase thirty-eight**

The thirty-eighth phrase utilizes a hierarchy of D.N.T.A. and consists of measures 137 through 139. The dynamic climax begins with the initial fortississimo. This climax is followed by additional loud dynamics that persist until the fortississimo level in measure 138, which exists simultaneously with a decrescendo from the same dynamic level.

The note density is thick for the majority of the phrase. The increased tempo in comparison to the previous phrase helps establish note density as a more prominent distinction than timbre. The timbre contains less timbre polyphony than the previous phrase but still displays abstract behavior. Flams occur more frequently with each passing measure, and all notes, except grace notes, are accented or utilize rooftop accents.

#### **4.2.39. Phrase thirty-nine**

The thirty-ninth phrase utilizes a hierarchy of T.D.N.A. and consists of measures 140 through 142. A transition exists at measure 142. The timbre supports a wider texture and instrumentation compared to the previous phrase, which is manifested with wide leaps.

Dynamics exist primarily in low levels with some medium levels. High dynamic levels are sparse except for the fortissimo levels at initial rhythmic points in the transition. This behavior in the dynamics differs significantly from surrounding phrases. The note density is slightly reduced when compared to the previous phrase due to the lower tempo. There are no articulations or ornaments in this phrase.

#### **4.2.40. Phrase forty**

The fortieth phrase utilizes a hierarchy of A.T.N.D. and consists of measure 143. This phrase is very similar to phrase nine (measures twenty-seven through thirty-two) and phrase twenty-nine (measures 102 through 105).

The mordents and other articulations represent the initial climax. The timbre is linear, melodic (timbre melody), and contains wide leaps. The note density, despite an increased tempo, is slightly less tense than the transition of the prior phrase; however, the texture is still thick. Note density is not a major distinction in comparison with articulations, ornaments, and timbre.

The dynamics provide a new level (gradually more quiet) with almost each passing articulation or accent. The initial mezzo piano is a weak dynamic level and is deemed too similar to the previous phrase to represent a climax.

Despite the fact phrases would often present different hierarchies depending on the surrounding phrases, this particular phrase is extremely brief, which adds to the difficulty of analysis and interpretation. The analysis becomes clearer when comparing similar phrases with mordents that have already been encountered.

#### **4.2.41. Phrase forty-one**

The forty-first phrase utilizes a hierarchy of D.T.N.A. and consists of measures 144 through 146. The phrase begins with a fortississimo climax and is followed by loud dynamic levels nearly for the rest of the phrase. The fortississimo in measure 146 leads into the next phrase.

The timbre is abstract and linear with occasional dyads and frequent wide leaps. The timbre reveals the silhouette of an arch in measure 144 and another arch during measures 145 and 146 (the last four sixteenth notes' worth of time in measure 145 combined with the first three sixteenth notes' worth of time in measure 146). The note density is sparse with moderate clusters despite the tempo increase in comparison to the previous phrase. Most notes are accented, which correlates with accents, other articulations, and loud dynamics.

#### **4.2.42. Phrase forty-two**

The forty-second phrase utilizes a hierarchy of A.N.D.T. and consists of measures 147 through 149. The initial ruff of this phrase is the climax. The variety of articulations and ornaments present in this phrase is prolific and supported by the rhythms. The note density is

moderate and dispersed more evenly than in the previous phrase, a behavior supported by the lower tempo. The dynamics are expressed in a wider variety of levels than the previous phrase. The small cluster of loud dynamic levels in measure 149 lead into the next phrase but do not provide enough contrast to establish a transition.

The timbre is abstract and linear with wave patterns throughout measure 148 despite the similarity of this behavior in the previous phrase.

#### **4.2.43. Phrase forty-three**

The forty-third phrase utilizes a hierarchy of T.N.D.A. and consists of measures 150 and 151. The timbre consists of note groups that are consistently struck on the same instrument, which foreshadows behavior found in the next phrase. The tension is more consistent than the previous phrase due to fewer clusters. Due to the lower tempo of this phrase, the note density is reduced when compared to the previous phrase. The dynamics decrescendo at the end of each measure with an additional swell in measure 151. The dynamics support specific rhythmic lines. The accents and articulations support rhythms and enhance decrescendos.

#### **4.2.44. Phrase forty-four**

The forty-fourth phrase utilizes a hierarchy of D.T.N.A. and consists of measure 152. The dynamics provide the initial climax at fortissississimo. The timbre utilizes only two instruments, which significantly distinguishes phrase boundaries. The note density is very clear and consistent due to the repeated rhythms despite the similarity of repeated notes and rhythms from the previous measure. The note density is increased largely due to the higher tempo when compared to the previous phrase. Flams enhance rhythms in groups of three as well as every woodblock note.



#### **4.2.45. Phrase forty-five**

The forty-fifth phrase consists of measures 153 through 156. Each of these measures has enough significant contrasting material to be a separate phrase; as a result, they will be treated as four separate phrases. It seems this phrase is intended to resurrect previous material from the work as a penultimate source of interest.

Measure 153 utilizes a hierarchy of T.N.D.A. and consists of dyads in the timbre, an uneven note density, a fortississimo segment leading into the following phrase, and the articulations and ornaments that support the timbre and note density. This measure resembles the behavior found in measure 145. Due to the lower tempo, the note density is reduced when compared to the previous phrase.

Measure 154 utilizes a hierarchy of A.T.D.N., which consists of flams and rolls as a climax and major distinction in comparison to the previous phrase. This measure utilizes the range of only three instruments, dynamics that support rhythms and timbre, and moderate clusters of tension supported by the same tempo. This measure resembles the behavior found in measure seventeen or measure 111.

Measure 155 utilizes a hierarchy of D.T.N.A., which consists of an initial fortississimo climax, dyads for every mallet strike, dense note clusters, and accents on every strike (including a few rooftop accents segregated by rhythmic lines). This measure resembles the behavior found at the beginning of measure 134.

Measure 156 utilizes a hierarchy of T.D.N.A., which consists of abstract pitch patterns (including a few dyads and a wave pattern), loud dynamics that are followed by soft dynamics on nearly every rhythm, a poco rallentando that reduces the tempo, and accents to enhance the high

dynamic levels. This measure contains wave patterns that resemble the behavior found in measure fifty-eight.

#### **4.2.46. Phrase forty-six**

The forty-sixth phrase utilizes a hierarchy of A.N.D.T. and consists of measures 157 and 158. All of the notes in this phrase are grace notes attached with rests. These clusters of notes are spaced with longer rest durations and at a lower tempo than the previous phrase. Only low dynamic levels are presented in an abstract timbre formation.

### **4.3. Discussion**

Dynamics, as a general strategy, tend to matter more often for the climaxes of phrases than other elements in *Bone Alphabet*. Although one possible reason for this dominance is the instrumentation chosen by the performer, a factor less specifically determined by the composer, it is more likely due to the fact that fewer notes are required to produce a dynamic climax; only one note is necessary for a dynamic climax (if it is loud enough), whereas other elements may require multiple notes to achieve the desired effect.

The double bars indicated in the score seem to match the analysis due to the density of detail and segmented nature of the work, with the exception of the penultimate phrase. The penultimate phrase recovers some element behavior used previously in the work; this behavior itself is a kind of pattern but should be interpreted as four separate, measure-long phrases due to the highly contrasting material in each measure. If this kind of material were more recognizable, then the effect would be more of a traditional close to the work (like a coda).

Several phrases of *Bone Alphabet* can seem difficult to interpret without breaking each phrase into components and understanding the behavior and tactics of each component. Once this

is accomplished, combining the elements to create an informed interpretation is possible. Phrases that may be difficult to interpret include phrases three, five, six, seven, nine, ten, eleven, twelve, thirteen, fifteen, sixteen, eighteen, twenty-four, twenty-five, twenty-six, twenty-seven, thirty-three, thirty-four, thirty-eight, thirty-nine, forty-one, and forty-two. The hierarchy analysis appears particularly useful for these phrases, as it clarifies information for phrase interpretation.

Due to the complexity of *Bone Alphabet*, a hierarchy analysis is a useful tool for performance practice. This is especially true due to the lack of driving tension between many phrases caused by note densities that do not typically increase into a following phrase. This fragile characteristic could easily result in the effect of an esoteric mélange of isolated phrases connected haphazardly if misinterpreted. To help prevent this incorrect perception, knowledge from this hierarchy analysis can yield significant tactical and strategic information in *Bone Alphabet* for an improved performance practice.

## 5. CONCLUSIONS

This analysis requires deductive reasoning and persistence. Many phrases contain a variety of features that, at first glance, appear to have a large number of tenable interpretations; however, the reality of these three selected works does not provide such a flexible fantasy. The importance of a performance practice hierarchy analysis is significant since information can be obfuscated through complexity until components are separated and organized. Solutions for interpretation may appear clear without analysis, but this behavior is often attempted through negligence rather than a self-perpetuated mystic, or instantaneous, perception of music works.

The placement of phrases matter. The context of a situation affects a phrase just as a phrase affects surrounding material. A good example of this phenomenon is the penultimate phrase of *Bone Alphabet*; these four measures are combined into a single phrase in the score with resurrected components from earlier phrases and different respective hierarchies. If any of these measures were placed in a different location within *Bone Alphabet*, the hierarchy result may change completely.

It appears as though a bias toward dynamics was observed in *Cold Pressed* and *Bone Alphabet* in which the D.T.N.A. hierarchy was approximately twice as frequent as the next most common hierarchy. The source of this bias is partially due to the intrinsic qualities of each element and subsequent components; in other words, a dynamic climax may only require a single note whereas other elements may require multiple notes to establish the perception of a non-dynamic climax.

Common performance alterations for dynamics include swells or exaggerations to emphasize the shape of a phrase. Aspects that influence timbre include mallet choices and

instrument selection. Modifications of note density include lengthening or shortening pauses, adding a minor rubato to enhance tension, varying tempos, and keeping the pulse ahead or behind the beat. Additional changes to articulations and ornaments include stick angles during attacks, ornament spacings, sticking selection, and alternative techniques (such as different roll types and speeds).

Although the level of detail used in these analyses may seem too intricate of an analytical tool for some performers, the specific strategies and tactics revealed in each analysis may be useful for studio instructors, performers, performance analysts, and composers.

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## APPENDIX. GLOSSARY

*Articulations and ornaments* – Articulations and ornaments are collectively an element comprised of rolls, trills, tremolos, flams, additional grace notes, accent varieties, and other techniques. This element is abbreviated “A.”

*Climax* – Climaxes are the greatest surprise or contrast in a segment of music when compared to previous material. This usually occurs at the beginning of a phrase and helps form the beginning boundary, which establishes the evidence for the existence of a new phrase. Any element can be responsible for the climax of a phrase depending upon the contrasting material from the previous phrase.

*D.T.N.A.* – This is an abbreviation for *dynamics* (primary hierarchy position), *timbre* (secondary position), *note density* (tertiary position), and *articulations and ornaments* (quaternary position). This ordering of elements can be rearranged to indicate different hierarchy positions but uses the same terms.

*Dynamics* – Dynamics are collectively considered an element comprised of the entire dynamic range, crescendos, decrescendos, and terms that affect the loudness of notes. They can be presented in lower resolutions of low (piano or lower), medium, or high (forte or above) levels when contrasts occur often. This element is abbreviated as “D.”

*Elements* – Elements are a collection of empirical music components that achieve a similar influence, effect, or relation. See *dynamics*, *note density*, *timbre*, or *articulations and ornaments*.

*Note density* – Note density is an element comprised of tempo, metric modulations, note bases, complicated rhythms, ostinatos, rhythmic lines, rhythmic monophony (a single mallet strike at a time), and rhythmic polyphony (two or more mallets striking simultaneously). Note density appears in sparse, moderate, and very dense ranges, and is abbreviated as “N.”

*Phrase* – Phrases are partitions of music that contain a climax and a theme. At times, one or more transitions are used to provide a drive into the next phrase, but this is not essential.

*Point of interest* – These refer to climaxes in phrases or sections that are not clearly partitioned as segments in a work, which specifically reference both movements of *Rebonds*. See *climax* for a comparison.

*Polyrhythm* – Polyrhythms are two rhythms occurring simultaneously. Technically, all overlapping rhythmic lines referenced in this document are considered polyrhythmic, but the term tends to specifically refer to simple ratios such as 4:3 or 3:2. In this research document, polyrhythms will typically refer to rhythms that overlap for a short duration and involve simple rhythmic ratios. Complicated overlapping rhythms (such as those found in *Bone Alphabet*) will typically be referenced from the perspective of rhythmic lines.

*Rhythmic line* – Rhythmic lines refer to the number of written parts (“lines”) containing separate rhythms. *Bone Alphabet* frequently accesses a range of one to four rhythmic lines simultaneously.



*Rhythmic monophony* – Rhythmic monophony refers to the use of one mallet at a time, either in a linear or abstract form (using wide leaps), with the focus on the note density as opposed to the timbre.

*Rhythmic polyphony* – Rhythmic polyphony refers to the use of multiple mallets on multiple instruments simultaneously, which creates dyads, three-note rolls, quad strikes, and other combinations with the focus on note density rather than timbre.

*Section* – A section refers specifically to a characteristic in *Rebonds B* where short motivic variations are patched together to a significant size (like a mosaic) that are too lengthy to resemble phrases but contain all other properties of a phrase.

*Theme* – A theme is the beginning material of a phrase that contains the climax. This material forms the initial boundary of a phrase or section as well as the end boundary if no transition is present. Enough significant contrasting material must exist to determine if a new phrase results; therefore, a theme must have significantly contrasting material compared to the prior material.

*Timbre* – Timbre is an element comprised of different music components such as timbre harmony, timbre melody, timbre monophony, timbre polyphony, instrumentation, general pitch pattern directions, instrument materials (e.g., heads, wood, metal, stone, ceramic), and repeated strikes on the same instrument. This element is abbreviated as “T.”

*Timbre harmony* – Timbre harmony refers to the frequent use of an instrument to the point it seemingly becomes the most important instrument out of a group; this is common in *Rebonds* where variations are played with different accents that bring out a sense of

closure to small partitions. In other words, the number of occurring accents can provide a sense of harmony out of a group of non-specific pitches due to persistent occurrence.

*Timbre melody* – Timbre melody is a type of timbre monophony when one mallet is used after another; however, the form must be linear (seemingly melodic) rather than abstract (with bizarre and frequent leaps).

*Timbre modulation* – Timbre modulation refers to a movement between one timbre tonic to another. This is similar to a modulation but utilizes non-specific pitches.

*Timbre monophony* – Timbre monophony is the use of one mallet after another in any pattern on one or more instruments. This can range from abstract forms (seemingly random with bizarre leaps) to timbre melody (a linear pattern resembling a melody without specific pitches).

*Timbre polyphony* – Timbre polyphony is the use of multiple mallets on multiple instruments at once (struck at the same time). As a result, dyads, three-note rolls, and quad strikes produce a sense of harmony without specific pitches in either a dense, abstract pattern (seemingly random) or separated and more predictable. The act of using multiple mallets at the same time on the same instrument is considered a separate articulation and ornament technique.

*Timbre tonic* – Timbre tonic refers to the most important note of a passage (or large segment of a work) within the timbre harmony. This is similar to a tonic within a harmonic key that utilizes non-specific pitches.

*Transition* – A transition is a significant amount of optional material added to the end of a theme, which contrasts with thematic material (but not enough to warrant a new phrase) and functions by leading into the next phrase.