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Applying Traditional and Proportional Aspects of Form to Atonal Music

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Editor's note: An earlier draft of this article containing numerous errors and omissions was inadvertently published in JMTP Volume 17 (2003). To rectify this oversight, we are reprinting the corrected final draft and extending sincere apologies to the author and our readers.

Applying Traditional and Proportional Aspects of Form to Atonal Music

Daniel J. Arthurs

Theory teachers can encounter several problems when presenting atonal (and more specifically, twelve-tone) techniques to their students for the first time. Among these problems is the need to find creative ways to motivate student interest in styles which may be unfamiliar, or with which they may be less than favorably disposed. Many students close their ears to the music of Schoenberg, Berg, and Webern when first exposed to that repertoire. One must invest a considerable amount of time to understand the complexity, wit, and aesthetic thought of composers who use twelve-tone technique.

This discussion will present two possible ways to encourage student enthusiasm for twelve-tone music. In the first approach, familiar, traditional aspects of form are related to similar formal features in a twelve-tone piece by Schoenberg.[1] For the purpose of this discussion, I will use a method of graphic representation that shows similarities between sonata form and the form of Schoenberg's Klavierstück, Opus 33a. This method may also be used with other 20th-century pieces in order to pique a novice's interest in the structure of atonal music. By relating Schoenberg's piece to sonata form, the following additional questions might also be posed:

Why does Schoenberg change rows?
What accounts for the different groupings of row subsets?
Why does Schoenberg change meter?
Why do certain passages contain irregular phrase lengths?

[1]A paper on this approach was given October 12, 2001 at the annual Oklahoma Music Theory Roundtable hosted by The University of Tulsa. I would like to express my gratitude to Dr. Teresa Reed and Dr. Joseph Rivers for their constructive criticism and encouragement.

The second approach will examine organic features that are common in nature and music.[2] Specifically, the same visual aid from Part I will be used to display symmetry, summation series, and the Golden Section in Part II. Finally, the diagram of sonata form from Part I will be juxtaposed with Part II to further illustrate the usefulness of proportions inherent in Op. 33a with regard to the traditional aspects of form.

The diagram to be presented is adapted from Richard Parks's *The Music of Claude Debussy*.[3] While Parks applied this type of graph to Debussy's repertoire, I have used it to show how rows relate to form, in particular, how the manipulation of rows coincides with major sectional changes. If students can see the analogy between sonata form and what happens in this piece, then they can see, by means of the graph, how well thought-out this twelve-tone composition really is. In addition, students will be enabled to hear the actual shape of the music rather than a cluster of random notes.

[2]More specifically, I refer to the Golden Mean, which will be discussed later in the article. While this proportion is found in both nature and music, its relationship to music is coincidental in certain pieces and is not a requisite for any musical form or structure.

[3]Richard S. Parks, *The Music of Claude Debussy*, (New Haven: Yale University Press, 1989). In particular, see Chapters 9 and 10.

Interestingly, it would appear that Schoenberg wanted this piece performed in the Romantic style.[4] He emphasized that the technique of composing with twelve tones was meant to serve the process of composition, and not the other way around.[5] Therefore, an analysis of phrase structure in this piece encompasses not only the notes and slurs, but also row units, rhythms, dynamics, tempo changes, and other aspects of the final musical product.[6]

It should be understood that this discussion, until the actual presentation of the graph, is mainly intended for the instructor's study, and that the graph itself is intended for the students. When the graph is first introduced to the students, they should be familiar with combinatoriality and other basic concepts of twelve-tone composition such as the matrix of row forms, row subsets, normal form, and prime form.[7]

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[4]For references on Schoenberg's traditional influences, see John Glofcheskie, "'Wrong' Notes in Schoenberg's Op. 33a," *Studies in Music from the University of Western Ontario* 1(1976): 91; Adrian Jack, "The Meaning of Serial," *Music and Musicians* 22 (1973): 43, 45; and George Perle, *Serial Composition and Atonality*, 6th ed., (Berkeley: University of California Press, 1991), 111. These three scholars were quick to point out that Schoenberg was deeply influenced by and aware of the past Viennese masters when conceiving the overall organization of his twelve-tone music. On page 45, Jack even compares the melodic content of mm. 14-18 to patterns "reminiscent of Brahms." When the piece is performed, based on the many specific instructions marked in the score and the several tempo fluctuations, it resembles a neo-Romantic piece.

[5]In "The Meaning of Serial," 46, Jack quotes a letter Schoenberg wrote to Rudolph Kolisch in 1932 stating, "You have dug out the series of my string quartet correctly.... That must have been a great effort, and I do not think I should have mustered the patience for it. Do you think that it is useful to know this? I cannot really imagine it. According to my conviction, to be sure, it might be stimulating to a composer who is not yet well trained in the use of series. But the aesthetic qualities do not open up from this, or at most parallel it. I cannot warn often enough against overvaluing these analyses, for they lead only to what I have always opposed: to recognition of how it is done; while I have always assisted people to recognize what it is!. . . I cannot say it often enough: my works are twelve-tone *compositions*, not *twelve-tone* compositions. In this respect I am being confused again with Hauer, for whom composition is a matter of secondary importance." More eloquently said, see Arnold Schoenberg, "Brahms the Progressive" in *Style and Idea*, ed. Leonard Stein, trans. Leo Black (New York: St. Martin's Press, 1975), 408. Schoenberg states, "... No space [in music] should be devoted to mere formal purposes."

[6]For more on these form-defining parameters, see Parks, *The Music of Claude Debussy*, 207.

[7]Joseph Straus's *Introduction to Post-Tonal Theory* 2d ed., (Upper Saddle River, New Jersey: Prentice-Hall, 2000) makes a good supplement for this analysis, especially for the undergraduate student.

Part I: Traditional Formal Features in Op. 33a

Historical References to Sonata Form and Op. 33a

Before examining the analysis, a brief discussion of prior references to sonata form as it relates to this piece should be undertaken. Several scholars have noted similarities between sonata form and Schoenberg's treatment of form in Opus 33a. Both Adrian Jack and Robert Morgan engage in a possible sonata analysis of this piece, but both refute the idea due to a lack of modulation as well as a brief development section.[8]

George Perle says everything but the word "sonata" to describe a sonata form! His brief analysis uses traditional terms like first subject, second subject, development, and recapitulation. Perle does not appear biased against applying analogous terms for this piece, but nevertheless he uses the form-labeling terms generically.[9] Eric Salzman identifies a "kind of development section" but goes no further in exploring the form with traditional terms.[10]

In one of the more interesting analyses, Joseph Straus avoids drawing a parallel to sonata form altogether, but he retains an analogy to a tonal progression with the pattern created by the transposition of row units: A_0 to A_2 to A_7 back to A_0.[11]

Quoting Straus, "In traditional terms, this is a motion up a whole-step, then up a perfect fourth, then a final descent by perfect fifth. Obviously Schoenberg has in mind some kind of analogy to the tonal motion I-II-V-I."[12]

[8]In "The Meaning of Serial," 46, Jack initially describes the shape as being "the same as that of a text-book sonata movement," before refuting this comment based on a lack of modulation. See also Robert P. Morgan, *Anthology of Twentieth-Century Music*, (New York: Norton, 1991), 70.

[9]See Perle, *Serial Composition and Atonality*, 113.

[10]See Eric Salzman, *Twentieth-Century Music: An Introduction*, 2d ed., (Englewood Cliffs, New Jersey: Prentice-Hall, 1974), 222.

[11]For an explanation of the row units, refer to Figures 1 and 2 in the preceding section, "PC Relationships – Hexachordal Combinatoriality."

[12]See Straus, *Post-Tonal Theory*, 220.

He immediately points out that the large-scale motion (B♭-C-F) composes out the initial melodic idea of the first row. John Glofcheskie bluntly states that the piece is "a movement in sonata form, whose proportions are three-fifths weighted towards the exposition."[13]

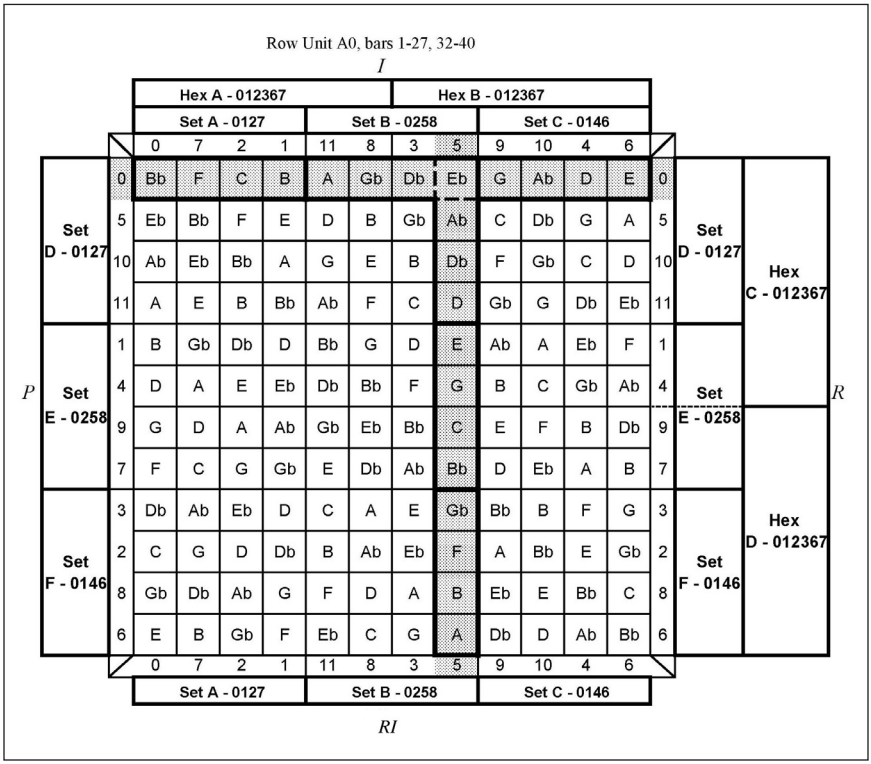
Glofcheskie focuses much of his discussion on the question of whether this piece was formally or organically conceived to be sonata form, thus going beyond the argument of whether the analogy is appropriate for such a piece. Other authors listed in the bibliography go far beyond exploring the piece in a sonata setting, but they make interesting and complex observations nonetheless.

[13]See Glofcheskie, "'Wrong' Notes," 88.

PC Relationships - Hexaxhordal Combinatoriality

Figure 1 shows the matrix of row forms for Schoenberg's Op. 33a. This matrix will be referenced throughout the analysis.

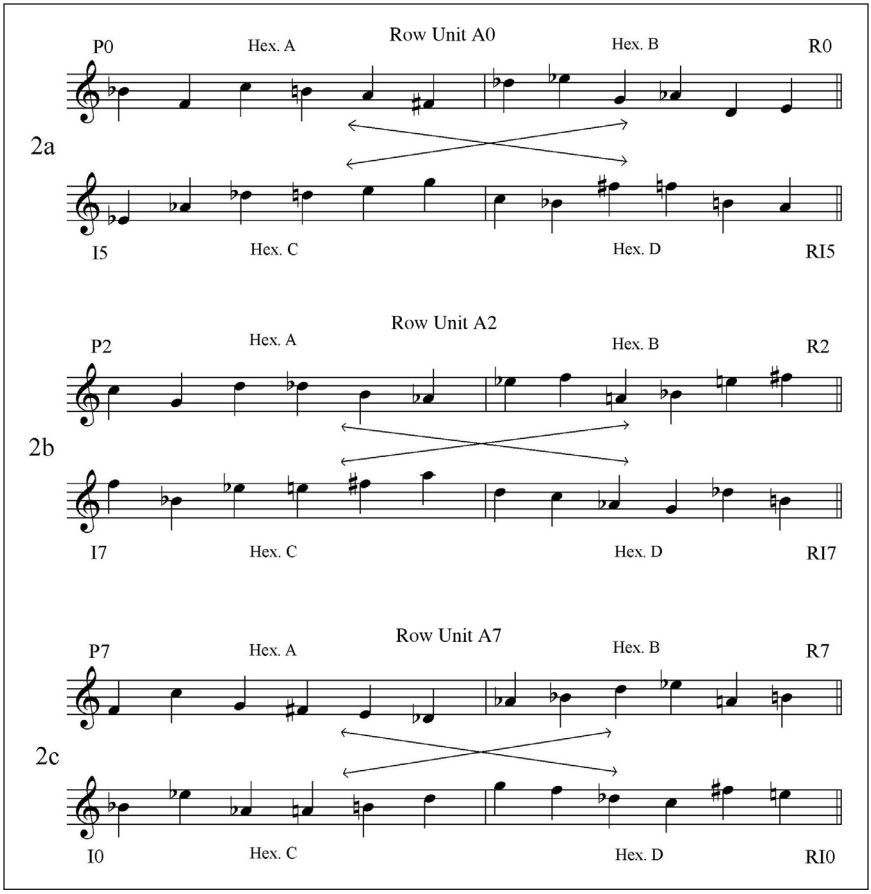
Figure 1 - Matrix of row forms for Schoenberg's Piano Piece, Op. 33a



Prime forms of both tetrachord and hexachord groupings are also included in Figure 1.[14] Schoenberg utilizes three basic rows which are manipulated with their combinatorial counterparts. Each row can be parsed into two hexachords which are combinatorial with those of the other row, thus three pairs of rows are used in this piano piece. The relationship of this "hexachordal combinatoriality" is shown in Figure 2a, 2b, and 2c.

[14]Note the symmetrical relationships of prime forms between hexachords as well as the commonality of prime forms in tetrachords when comparing Prime rows to Inverse rows.

Figure 2a, 2b, and 2c - Hexachordal Combinatoriality

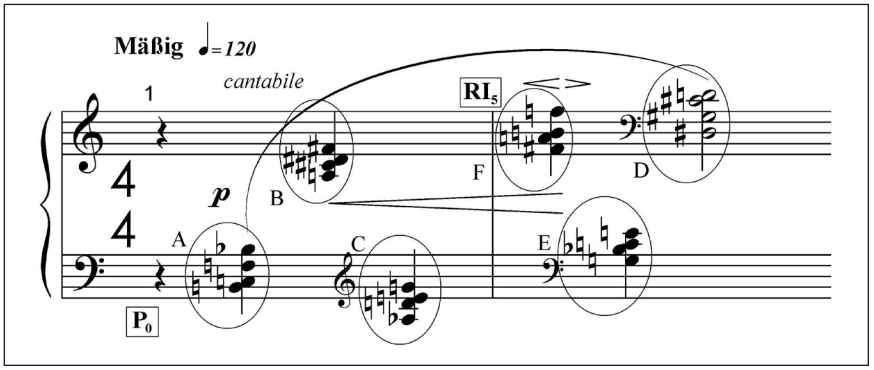


These examples demonstrate how the three pairs of rows are related ($P_0 - I_5$; $P_2 - I_7$; and $P_7 - I_0$). It is understood that the prime row "maps" onto its counterpart (the inverted row). These two hexachords form aggregates since all six pitch classes of the first hexachord are contained (not in order) in the second hexachord of their I_5-related rows (see Figure 2).

With this in mind, it is more appropriate to relate P_0 to RI_5 with regard to pitch class order (Figure 3, mm. 1-2[15]). The labels ('A', 'B', 'C', etc...) for each tetrachord correspond to those on the matrix in Figure 1.

[15]All music examples used by permission of Belmont Music Publishers.

Figure 3 - Tetrachords in Schoenberg's Op. 33a, mm. 1-2



Row Unit Relationship to Form

The transposition of these combinatorial rows creates a pattern that will be explored shortly. In order to identify this pattern, one must distinguish each change of rows, which includes the combination of a row with its combinatorial partner (i.e., P_0 is combinatorial with I_5). Thus, rather than referring to each row as a separate entity, I will label the four rows (P_0, I_5, R_0, and RI_5) A_0, based on the first pitch class of the prime: 0. This practice will hold for the other combinatorial rows based on P_2 and P_7, which will be referred to as row units, A_2 and A_7, respectively (see Figure 2).

The previously mentioned groups (A_0, A_2, and A_7) can be applied to the form:

A_0	A_2&A_7	A_7	A_0
mm. 1-27	28-29 $^1/_2$	29 $^1/_2$-31	32-40

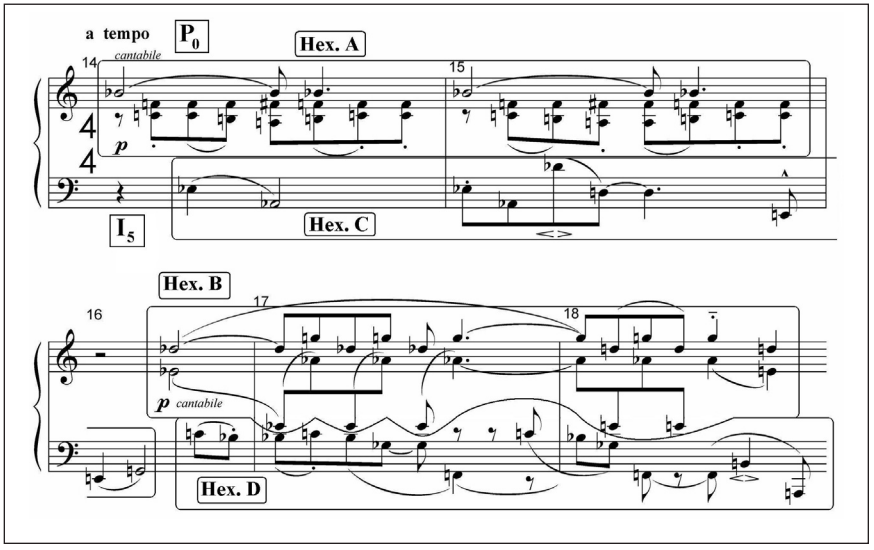
Referring to the above diagram, the two middle groups of rows, A_2 and A_7, last very briefly – approximately four measures and the first beat of m. 32. In a traditional setting, such a formal division might seem too brief to be defensible. However, Glofcheskie and Morgan explain that the development and recapitulation exhibit traits of both subjects in a succinct manner, justifying their length.[16] They cite the parsing of rows (into tetrachords and hexachords) as well as the melodic nature of the section. The large-scale motion of the row units throughout the piece creates an interesting pattern that will be discussed shortly.

[16]See Glofcheskie, "'Wrong' Notes," 89 and Morgan, *Anthology*, 70.

Subset Relationship to Form

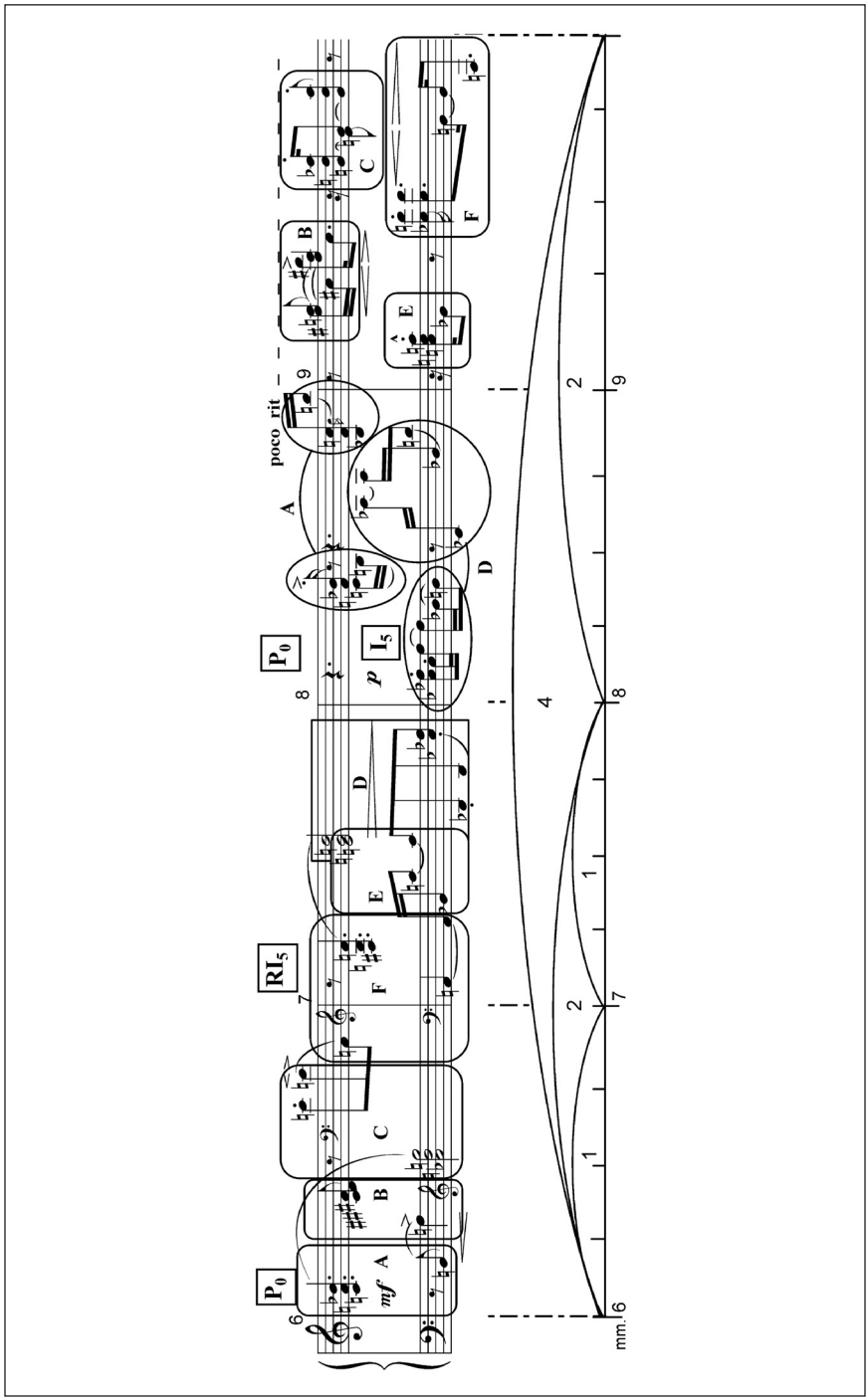
Just as row units can account for formal divisions in twelve-tone music, subsets can also account for aspects of form. In this piece, Schoenberg favors tetrachords and hexa/trichords. Referring back to mm. 1 and 2 (Figure 3), groupings of tetrachords are established in the opening measures, and while the texture becomes more linear thereafter, the groupings consistently stay in four until m. 14: the next major section. Figure 4 illustrates this sectional change.

Figure 4 - Hexachords in Op. 33a, mm. 14-18



Here the pitches are clearly grouped in hexachords. The beginning of the development section, m. 28, has clusters of three notes while still maintaining a hexachord division concurrently. In this piece, the contrast between tetrachordal and hexachordal groupings is analogous to the contrast between first and second themes in traditional sonata form. Figure 6 will illustrate the relationship between row parsing, row-unit transposition, and the phrase structure of the piece. First, however, Figure 5 provides the approximations of phrases by isolating mm. 6-9 with a closer view of the graph coinciding with the score.

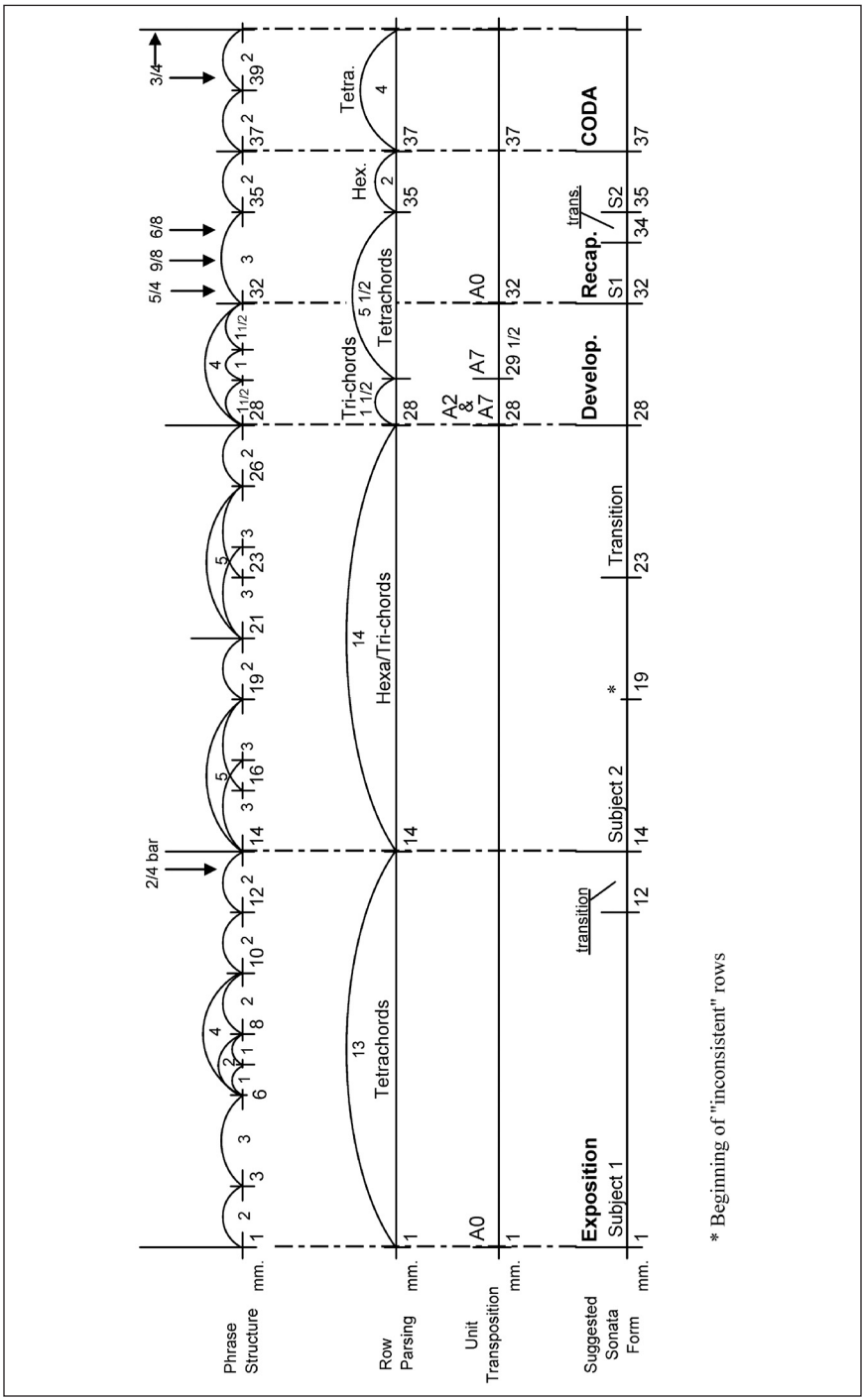
Figure 5 - Op. 33a, mm. 6-9



For the purpose of the graph as a whole, I chose to demarcate phrases to the nearest measure. However, there are two exceptions: the two elisions in mm. 16 and 23 and the use of half-measures in mm. 28-31. My reasoning for demarcating the two elisions becomes apparent when viewing the score. My decision to demarcate half-measures in mm. 28-31 was a bit more problematic because it contradicted the use of approximations. In the end, however, my decision was based on the placement of row units halfway through the measures. This aspect will become apparent from viewing the "Unit Transposition" graph in Figure 6. In addition, when this section is isolated, one can see that its phrasing is treated in a way that clearly demarcates half-measure divisions.

Figure 6 illustrates all the aspects of form discussed up to this point: the basic phrase structure, row parsing (into tetrachords or hexachords), row unit transposition, and finally, a tripartite form (labeled "suggested sonata form"), which emerges when all three graphs are shown together.

Figure 6 - Phrase Structure and Formal Divisions in Op. 33a



Thus far, the discussion has shown how two atonal devices – row units and row subsets – mark formal divisions which are analogous to divisions in a traditional sonata form. Referring back to Figure 6, Schoenberg's row parsing demarcates subsections within the sonata formal scheme: Tetrachords begin at m. 1 (first subject), hexa/trichords begin at m. 14 (second subject) and continue into m. 29, beat 2 of the development, and tetrachords overlap with the trichords in m. 28, beat 3, left hand; tetrachords continue into the recapitulation appropriately associated with the first subject, but are then grouped as hexachords for the second subject in m. 35; finally, they return to tetrachords for the coda in m. 37. Similarly, notice that movement from row transpositions A_0, to A_2 and A_7, and back to A_0 approximates the way a traditional sonata form would move from an exposition, to a development, and then to a recapitulation, with these demarcations occurring at mm. 1, 28, and 32, respectively.

Addessing Limitations to Sonata-Form Analysis and Inconsistencies in the Twelve-Tone Method

While the above observations help to connect the form of this piece to the major divisions of sonata form, the analogy between Schoenberg's form and traditional sonata form obviously has certain limits. For example, Jack and Morgan observe that this piece obviously exhibits no "modulation" between its first and second themes, which occur at mm. 1 and 14, respectively.[17] A looseness of the twelve-tone rules could suggest a change of major formal sections: The first occurrences of incomplete rows beginning in m. 19 could represent the first "inconsistencies" that stray from the initial row unit. In addition, the development section is filled with incomplete rows, and with the first signs occurring at m. 19, this creates continuity in the piece. As Glofcheskie points out, departure from the rules of twelve-tone composition can serve as an expressive gesture, while at the same time, provide a contrast from the sections that adhere strictly to the rules.[18]

[17]See Jack, "The Meaning of Serial," 46 and Morgan, *Anthology*, 70.

[18]See Glofcheskie, "'Wrong' Notes," 92.

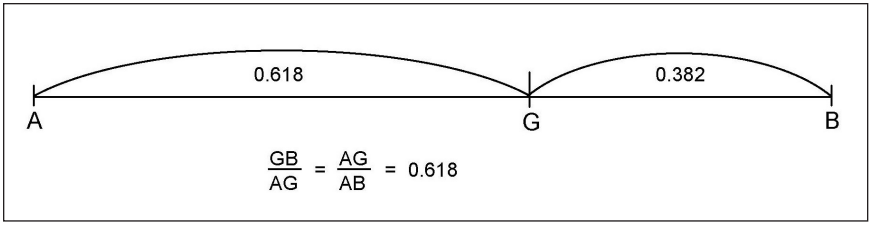
To conclude, in the case of atonal music, where the traditional concept of modulation does not apply, the transition from tetrachords to hexachords could be as dramatic as the contrast between opposing themes in different keys. While m. 23 (on Figure 6) is labeled as the beginning of the transition, the first incomplete row occurs four measures earlier. The question may arise, "Why not label the beginning of the transition in m. 19?" The melodic nature of m. 19 is still very close to the character of the second subject, and paired with its phrasing, it resembles the second theme too strongly to be labeled the beginning of a transition. In other words, other parameters (melodic contour and rhythmic consistency) must be considered to determine more specific sections in the form. Part II will reveal an interesting relationship between these two measures with regard to proportionality in Op. 33a.

Part II: Organic Aspects in Op. 33a

Proportional/Symmetrical Aspects

To heighten students' interest and convince them of the organic nature in Op. 33a, I have provided another diagram illustrating the occurrences of three summation series as well as symmetrical phenomena. First, students should be given a brief lesson on the Golden Mean (also termed Golden Ratio and Golden Section).[19] This irrational number is more commonly rounded to 0.618. Figure 7 provides a geometric illustration of the Golden Mean.[20]

Figure 7 - The Golden Mean.



[19]See Michael Rogers, "Rehearings: Chopin, Prelude in A Minor, Op. 28, No. 2," *19th-Century Music* 4, no. 3 (1981): 246. In footnote 5, Rogers provides technical distinctions between the terms "Golden Mean," "Golden Ratio," and "Golden Section."

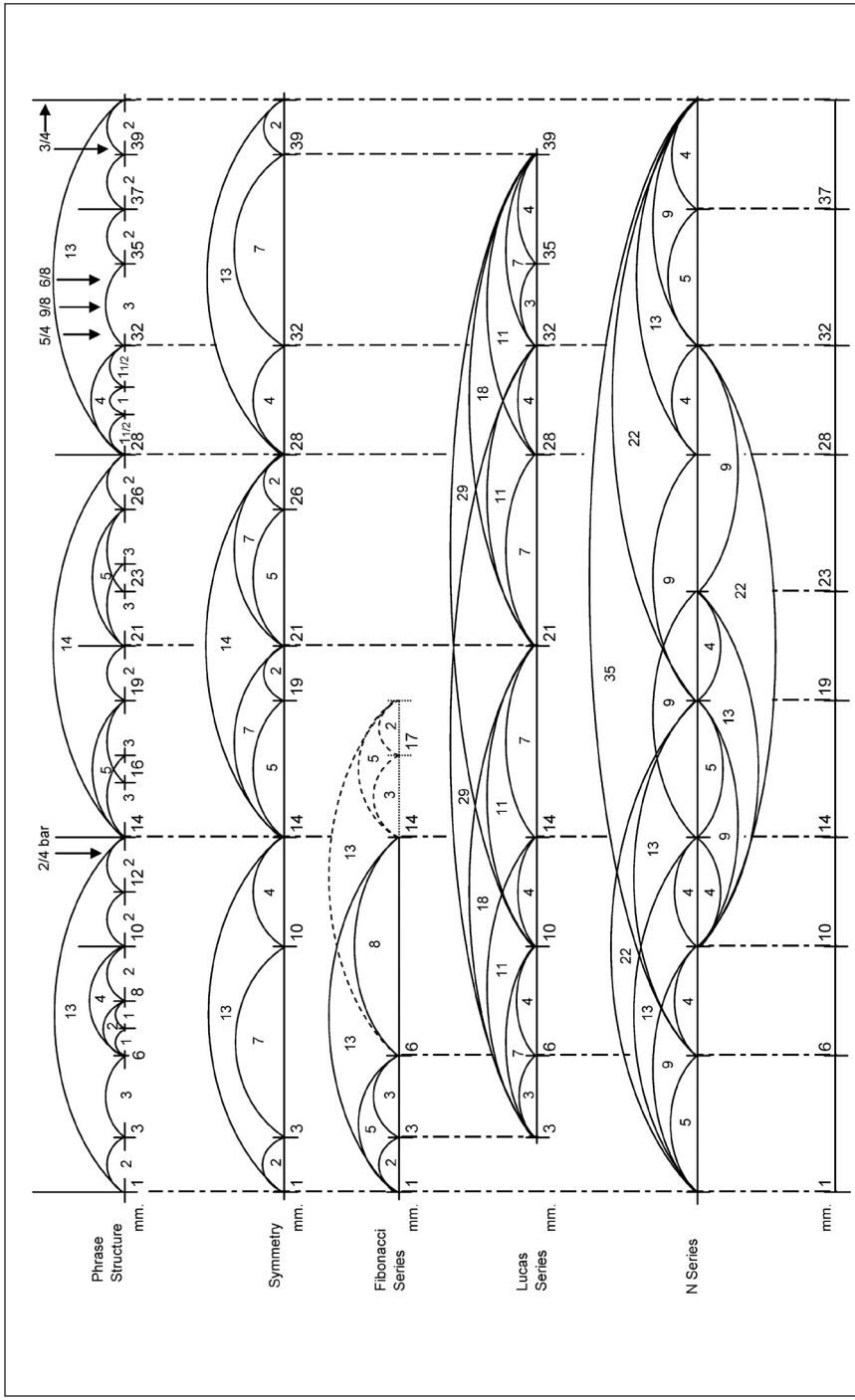
[20]See Ernö Lendvai's *Béla Bartók: An Analysis of His Music*, (London: Kahn & Averill, 1971), 17 and 30-34. The former page gives a definition while the latter pages cite examples found in nature. Appendix III gives more geometric examples as well as examples based on architectural structures. Also, Rogers's "Rehearings" gives a brief but thorough lesson on the Golden Section and applies it to pitch sets in addition to form.

Summation series are patterns of numbers whose next number is the sum of the two previous numbers (i.e. 1,1,2,3,5,8,13,21,34, ...). The ratio between each successive pair of numbers approaches the Golden Mean (5/8 = 0.625, 8/13 = 0.615, 13/21 = 0.619, 21/34 = 0.618, etc...).[21] This example is the Fibonacci series, named for the 13th-century mathematician. In fact, successive pairs of all summation series approach the Golden Mean when expressed as ratios. Figure 8 illustrates three summation series that emerge from the phrase structure: Fibonacci, Lucas (1,3,4,7,11,18,29, ...) and a series found in the music of Debussy that Parks calls the 'N' Series (5,4,9,13,22,35, ...).[22]

[21]See Parks, *The Music of Claude Debussy*, 209.

[22]Ibid., 210.

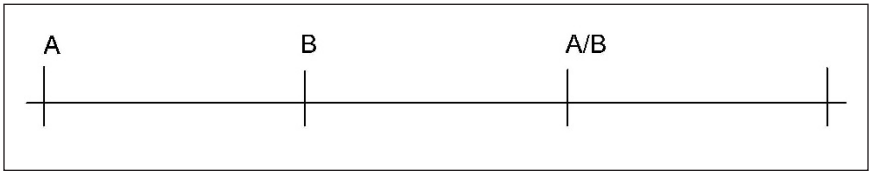
Figure 8 - Symmetry and Proportion in Op. 33a



The three summation-series graphs offer several different starting points. In all three, starting points were conceived from the beginning as well as the end. All demarcations on the three summation graphs are based on phrase structure. The dotted lines in the second half of the Fibonacci graph indicate that the phrase structure is only implied due to the elision of phrases at m. 16, thus yielding a 5-measure unit consisting of two 3-measure phrases. The diagrams show the arcs weaving together as each series unfolds, a process that can be read either from left to right or from right to left. The N series also has a pattern placed beneath the two series in order to avoid confusion. This middle series will have a part in explaining the phenomena of mm. 19 and 23 shortly. Interestingly, it is easy to see symmetrical relationships from the proportion-derived graphs.

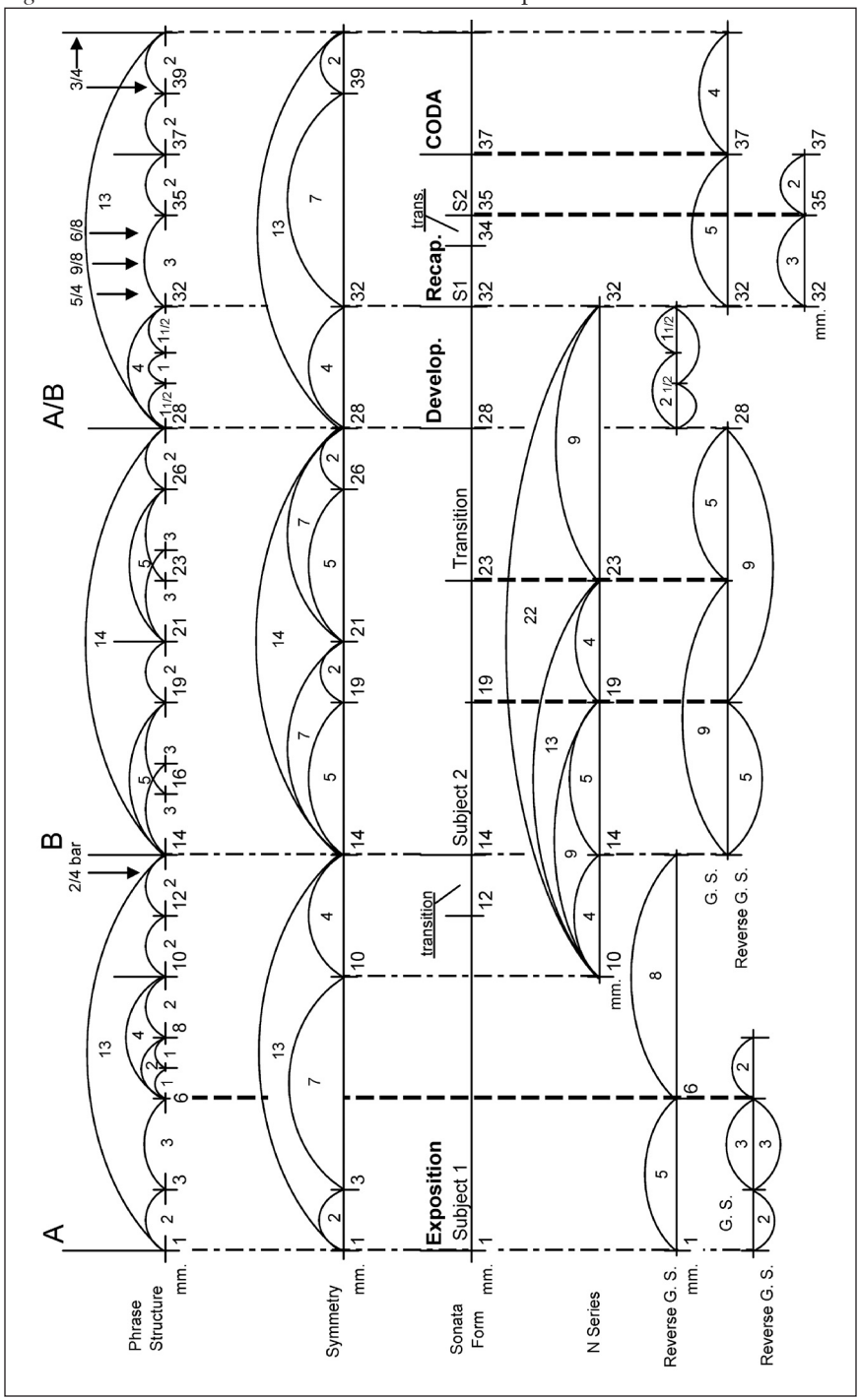
Also included in Figure 8 is a diagram of the symmetrical pattern which emerges over the whole of Op. 33a. In illustrating this symmetry, it reveals the basic archetype for the tripartite structure associated with sonata form. In this case, the proportions are heavily weighted toward the exposition: 'A' represents the first subject, 'B' represents the second subject, and the return to 'A' represents a combination of both 'A' and 'B' sections with the development, recapitulation, and brief coda. Figure 9 illustrates this tripartite archetype.

Figure 9 - Tripartite Archetype



To illustrate how elements from Part I and Part II cohere, Figure 10 provides a graph of the sonata form with phrase structure, symmetry, and a few Golden Section ratios that occur amidst the phrase structure.

Figure 10 - Sonata Form and Golden Sections in Op. 33a



With the diagram of sonata form included, Golden Section ratios are revealed in each of the three major sections of Op. 33a. Schoenberg seems to favor the Lucas and 'N' series over the Fibonacci series. Interestingly, the middle pattern of the N series reveals demarcations over mm. 19 and 23, the two troublesome measures to which analysts have devoted much attention. In the middle section alone, the Golden Section and its retrograde fall on mm. 19 and 23. As mentioned earlier, m. 19 represents the first "inconsistencies" of incomplete rows. The actual Golden Section boundary of this middle section really occurs on m. 22, beat 3; however, the demarcation is rounded to the nearest measure (m. 23). Before overlooking this approximation on the diagram, it should be noted that the "wrong" note which has been the subject of much speculation – an A♮ which, according to the row, should be an A♭ –occurs almost exactly on the Golden Section boundary (m. 22, beat 3, second eighth note, right hand).[23] Needless to say, this "wrong" note has an aesthetic quality inherent in its natural placement in the music with regard to the occurrence of other "inconsistencies" in m. 19.

Figure 10 illustrates several instances of Golden-Section proportions. With the exception of the development section, each instance is based on whole numbers from their respective summation series. For example, in the Fibonacci series, while 21 would be the Golden Section for 34, smaller numbers like 3 would be the Golden Section of 5 (despite a 2 percent error). Similarly, for this discussion, I have taken the liberty of regarding 5 as the Golden Section of either 8 (Fibonacci-based) or 9 (N Series-based). While the error rate increases considerably with this flexibility, as Lendvai has pointed out, "Formal logic (controlled by the eye) and real experience (controlled by the ear) differ."[24] Thus, it is important to listen to the piece while following these diagrams. A rubato performance may alter the placement of these more approximate Golden Sections. Aural perception is one of the most important methods of validating Golden-Section proportions.

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[23]While Morgan regards the "wrong" notes as possible printer's errors (*Anthology*, 69), Perle suggests the A♮ serves a cadential effect over the sustained pitches F, C, and G♭ (*Serial Composition and Atonality*, 113). The most thorough treatment of these "wrong" notes is, however, found in Glofcheskie's article (as its title suggests).

[24]See Ernö Lendvai, "Remarks on Howat's 'Proportional Analysis,"' *Music Analysis* 3 (October 1984): 257.

Conclusion

Parks's method of diagramming offers a convenient way for teachers to show their students how Schoenberg's music is deeply grounded in the formal conventions of the earlier, traditional styles. Furthermore, this music exhibits proportional traits found in the summation series and the Golden Section.[25] In addition to the music of Schoenberg and his pupils, other 20th-century repertoire, including works of Bartók, Debussy, or Hindemith, might be illuminated by the approach presented here. Since some atonal music is not based on the method of using twelve-tones, other form-defining parameters must be considered. While I have used unit transposition and row parsing (derived from twelve-tone rules) as a basis for determining demarcations in the form of Op. 33a, similar patterns of pitch-class content commonly emerge in analyses of music by Debussy and Bartók.[26] Other chromatic-based scales, such as the octatonic scale, will reveal patterns for creating one's own diagram. In order to convey the patterns and traditional formal schemes in atonal music, the instructor's imagination should guide the process when developing diagrams. While sonata form may not emerge from every piece studied, more basic archetypes such as binary and ternary forms may be revealed.

My analysis of Op. 33a provides an example of this approach, one that may be helpful in convincing students that atonal composers were deeply influenced by past traditions. Students sometimes insist upon inventing their own systems of composing before having a well-rounded knowledge of past methods. The visual representations in this study show that innovative compositional methods are often deeply rooted in tradition. Furthermore, instructors can challenge their students to hear traditional aspects of form while following along with graphs and the score in order to better ascertain the aesthetic nature of the music. As students become aware of the connection between earlier and more recent styles, they may be encouraged to expand their own horizons in repertoire, analysis, and even composition.

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[25]This evidence supports the argument that this piece was conceived organically, that is, not composed to fit the sonata-form mold. Consequently, this ideal would be compatible with Schoenberg's sentiments (see Footnote 3).

[26]Lendvai's *Béla Bartók: An Analysis of His Music* gives a wealth of examples that strongly support the occurrence of organic traits discussed in Part II of this article.

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