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Applying Traditional and Proportional Aspects of Form to Atonal Music

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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 it. It takes a considerable amount of time to understand the complexity, wit, and aesthetic thought of the composer who uses 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 *Kiavierstück*, Opus 33a. However, this method may be used with other 20th-century pieces in order to pique the novice's interest in the structure of atonal music. By relating Schoenberg's piece to sonata form, the following additional questions might also be treated:

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?

The second approach will examine organic features that are inherent in nature and, consequently, music.[2] Specifically, the same method of visual aid used in Part I will be used to display symmetry, summation series, and the Golden Section in Part II. As a final twist, 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 that will be presented is adapted from Richard Parks's *The Music of Claude Debussy*.[3] While Parks applied this type of graph specifically to Debussy's repertoire, I have used it in this discussion 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 twelve-tone composition really is. In addition, students will be enabled to hear the actual shape of the music rather than, what some may initially perceive to be, a cluster of random notes.

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 not only encompasses just 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 basics of twelve-tone composition such as creation of the matrix, row subsets, normal form, and prime form.[7]

PART I: TRADITIONAL FORMAL FEATURES IN OP. 33A

Historical References to Sonata Form and Op. 33a

Before examining the analysis itself, a brief discussion of prior references to sonata form as it relates to this piece should be undertaken. Several scholars have noted the 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 too brief of a development section.

George Perle's discussion says everything but the word "sonata" to describe a sonata form! His brief analysis uses traditional terms like *first subject, second subject, development*, and *recap*. Perle does not appear biased against applying analogous terms for this piece but nevertheless 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 a parallel to sonata form altogether, but 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.' 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-Il-V-I."'[2] He immediately points out that the large-scale motion (B♭-C-F) composes out the initial melodic idea of the first row. John Glofcheskie's detailed analysis bluntly states that the piece is a movement in sonata form, whose proportions are three-fifths weighted towards the exposition."'[3]

He 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 analogies are appropriate for such a piece. The other authors listed in the bibliography go far beyond exploring the piece in a sonata setting, but they have interesting and complex observations nonetheless.

PC Relationships — Hexachordal Combinatoriality

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

Figure 1 - Matrix for Schoenberg's Op. 33a.

Row Unit A0, bars 1-27, 32-40

I

		Hex A - 012367						Hex B - 012367								
		Set A - 0127				Set B - 0258				Set C - 0146						
		0	7	2	1	11	8	3	5	9	10	4	6			
Set D - 0127	0	Bb	F	C	B	A	Gb	Db	Eb	G	Ab	D	E	0	Set D - 0127	Hex C - 012367
	5	Eb	Bb	F	E	D	B	Gb	Ab	C	Db	G	A	5		
	10	Ab	Eb	Bb	A	G	E	B	Db	F	Gb	C	D	10		
	11	A	E	B	Bb	Ab	F	C	D	Gb	G	Db	Eb	11		
Set E - 0258	1	B	Gb	Db	D	Bb	G	D	E	Ab	A	Eb	F	1	Set E - 0258	
P	4	D	A	E	Eb	Db	Bb	F	G	B	C	Gb	Ab	4		*R*
	9	G	D	A	Ab	Gb	Eb	Bb	C	E	F	B	Db	9		Hex D - 012367
	7	F	C	G	Gb	E	Db	Ab	Bb	D	Eb	A	B	7		
Set F - 0146	3	Db	Ab	Eb	D	C	A	E	Gb	Bb	B	F	G	3	Set F - 0146	
	2	C	G	D	Db	B	Ab	Eb	F	A	Bb	E	Gb	2		
	8	Gb	Db	Ab	G	F	D	A	B	Eb	E	Bb	C	8		
	6	E	B	Gb	F	Eb	C	G	A	Db	D	Ab	Bb	6		
		0	7	2	1	11	8	3	5	9	10	4	6			
		Set A - 0127				Set B - 0258				Set C - 0146						

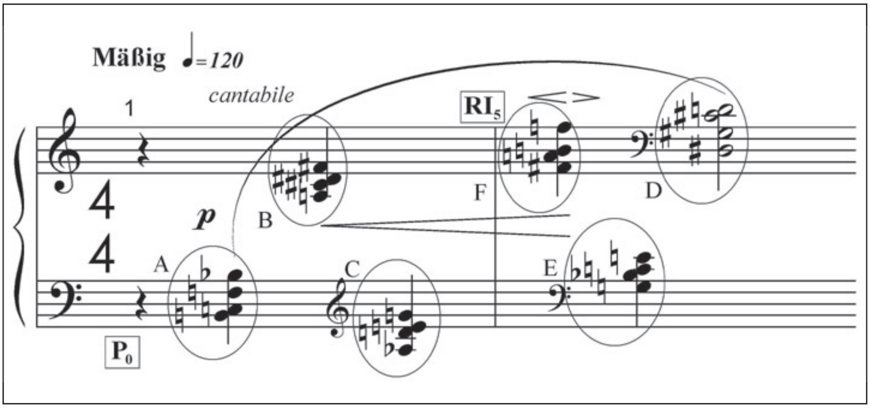
RI

Prime forms of both tetrachord and hexachord groupings are also included in Figure 1.14 Schoenberg utilizes three basic rows that are manipulated with their combinatorial counterparts. Each row can be broken down into hexachords that are combinatorial with the other row, thus the thought-process can be that of three *pairs* of rows used in this piano piece. The relationship of this "hexachordal combinatoriality" is demonstrated in Figure 2a, 2b, and 2c.

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

These examples demonstrate how the three pairs of rows relate to each other (P_0— 1_5; P_2— 1_7; and P_7 — I_0). It is understood that the prime row "maps" onto its complement (the inverted row.) These hexachords are aggregates since six pitches are all contained (not in order) in the first hexachord to the second hexachord of its complement row (see Figure 2).

Figure 3 **-** Tetrachords



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...) around each tetrachord correspond with the tetrachords found on the matrix in Figure 1.

Row Unit Relationship to Form

The transposition of these combinatorial rows creates a pattern that will be explored shortly. However, in order to identify this pattern, each change of rows must be distinguished from the others. This includes the combination of a row with its combinatorial opposite (i.e., P_0 is combinatorial with I_5 as well as their retrogrades). Thus, rather than referring to each individual 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 holds true 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

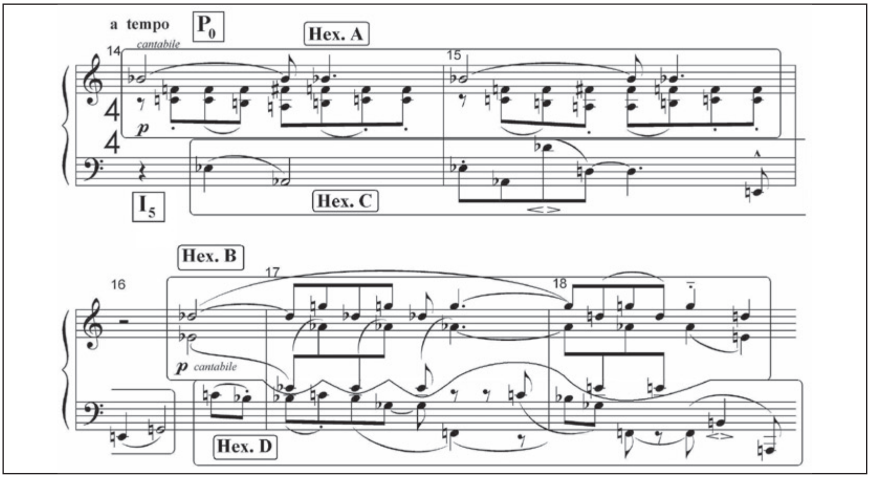
Referring to the above diagram, the two middle groups of rows, A_2 and A_7, last very briefly—approximately four measures and the first beat of m. 32. In a traditional setting, such a formal division might seem too brief to be justifiable. However, Glofeheskie and

Morgan explain that the development and recapitulation exhibit traits of both subjects in a succinct manner, justifying their length.[16] This includes 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.

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 subsets of 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 line 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 - Sectional Change



Here the pitches are clearly grouped in hexachords. The beginning of the development section, m. 28, has clusters of three 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 a traditional sonata form. Figure 6 will illustrate this relationship as well as row parsing and unit transposition, all related to the phrase structure of the piece.

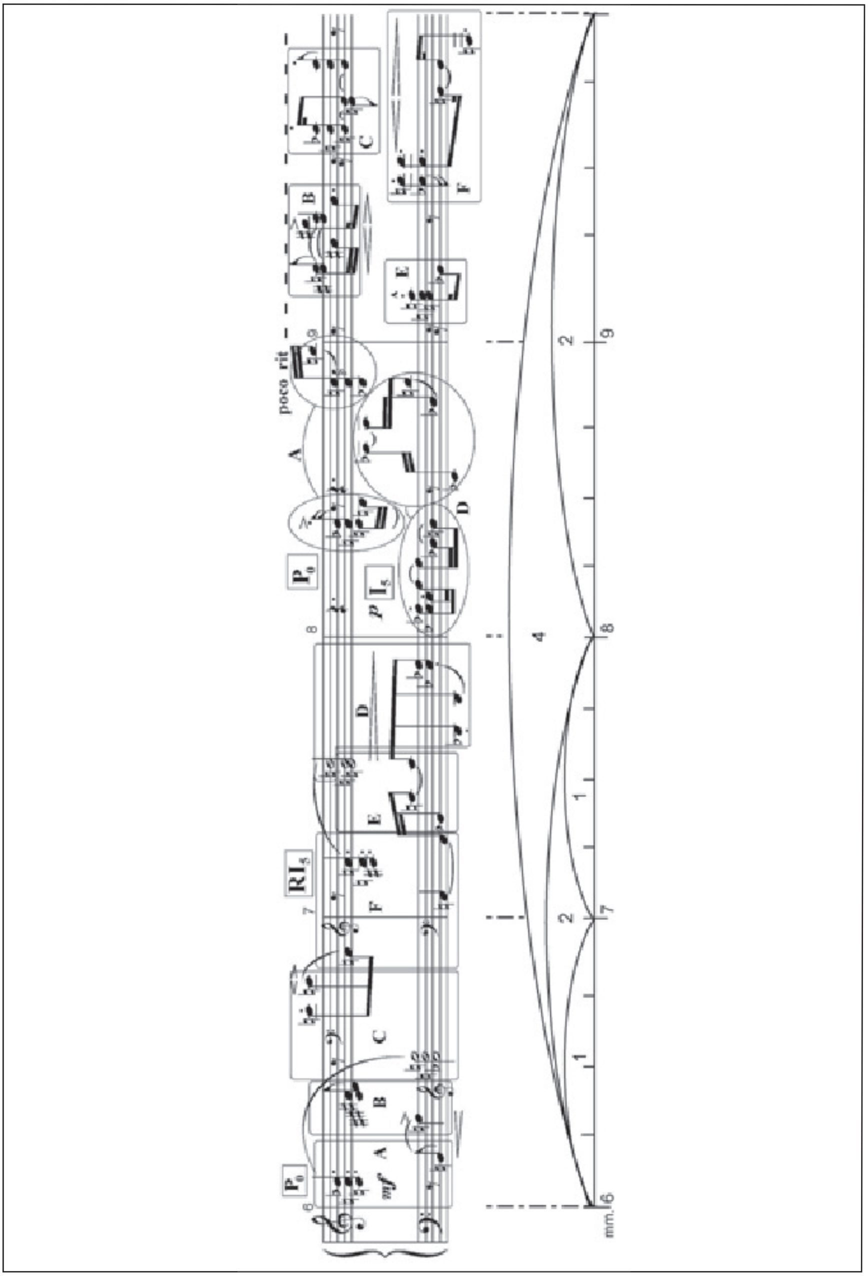


Figure 5 - Sectional Change

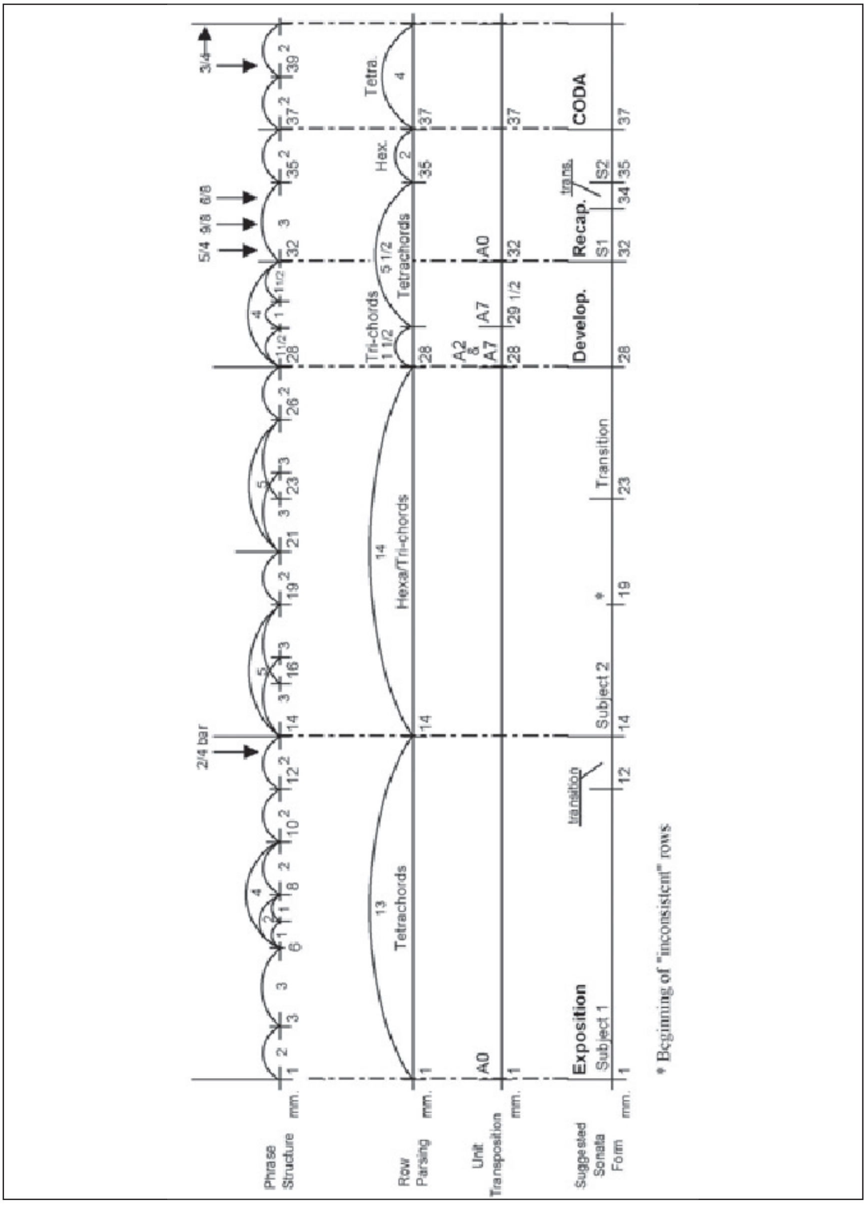
First, however, Figure 5 provides the approximations of phrases by isolating mm. 6-9 with a “zoomed-in” example of the graph coinciding with the score.

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 is apparent when viewing the score.

Deciding to demarcate half-measures in mm. 28-31 was a little more troublesome because it contradicted the use of approximations. In the end, however, my decision is based on the placement of row units halfway through the measures. This will become apparent when looking at 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") that emerges when all three graphs are shown together.

Figure 6 - Composite Graph



Thus far, this discussion has shown how two atonal devices-- row units and row subsets-- mark formal divisions in Op. 33a that 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/tri-chords begin at m. 14 (second subject) and continue into m. 29, beat 2 of the development, and tetrachords overlap with the tn-chords 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 that 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.

Addressing Limitations to Sonata Form Analysis and Inconsistencies in the Twelve-tone Method

While the observations help to connect the form in 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 make the observation that this piece obviously exhibits no "modulation" between first and second themes that were observed to occur at mm. 1 and 14, respectively.'[7]

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 Glofeheskie points out, the departure from the rules of twelve-tone composition can serve as an expressive gesture, while at the same time, help provide a contrast from the sections that adhere strictly to the rules.[18]

To conclude, in the case of atonal music, where the traditional concept of modulation does not apply, the transition from tetrachords to hexachords is just as dramatic as the contrast between opposing themes in different keys.

While on Figure 6, m. 23 is labeled as the beginning of the transition, the first incomplete row occurs four mm. 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 too strongly resembles the second theme to be labeled the beginning of a transition.

In other words, other parameters (melodic contour and rhythmic consistency) must be considered in order 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. 33 a.

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, the students should be given a brief lesson on the golden mean (also termed golden ratio and golden section).'[9] It is an irrational number represented by the formula 1/2(5 - 1) and most commonly rounded to 0.618. Figure 7 provides a geometric illustration of the golden mean.[20]

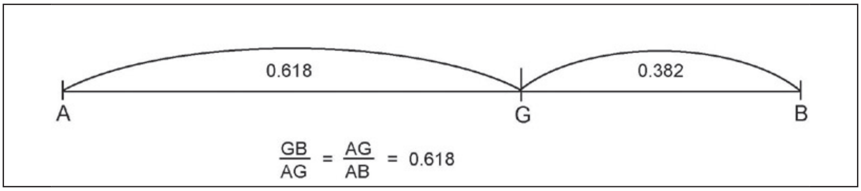


Figure 7- The Golden Mean

In addition, 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,...). If a ratio is made of each successive pair of numbers, that ratio approaches the golden mean (8/13 = 0.615, 13/21 0.619, 21/34 = 0.618, etc..[21] This particular example is the Fibonacci series, named for the 13th-century mathematician. Subsequently, all summation series, and not just the one shown above, 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]

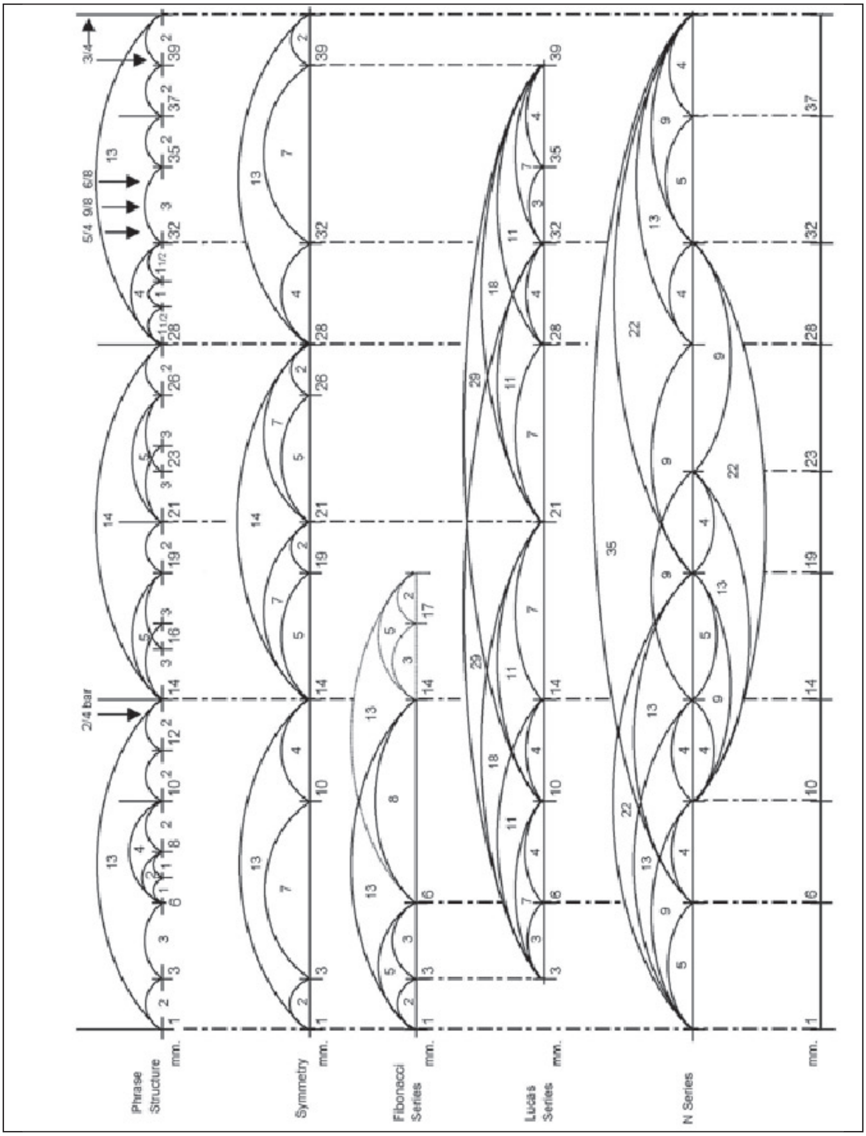


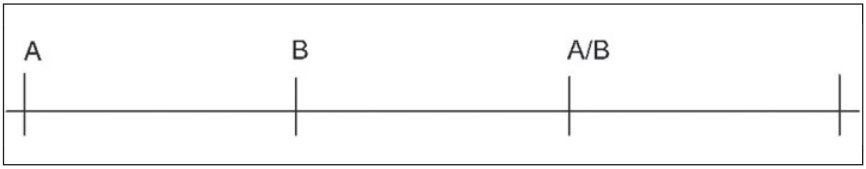
Figure 8 - Summation Series

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 indicates that the phrase structure is only implied due to the elision of phrases at m. 16, thus yielding a 5-mm. unit consisting of two 3-mm. phrases.

The diagrams show the arcs weaving together as each summation 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. That 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 symmetry that emerges over the whole form in Op. 33a. In illustrating this symmetry, it reveals the basic archetype for a tripartite structure that, for this discussion, is associated with sonata form. In this case, the proportions are heavily weighted towards 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.

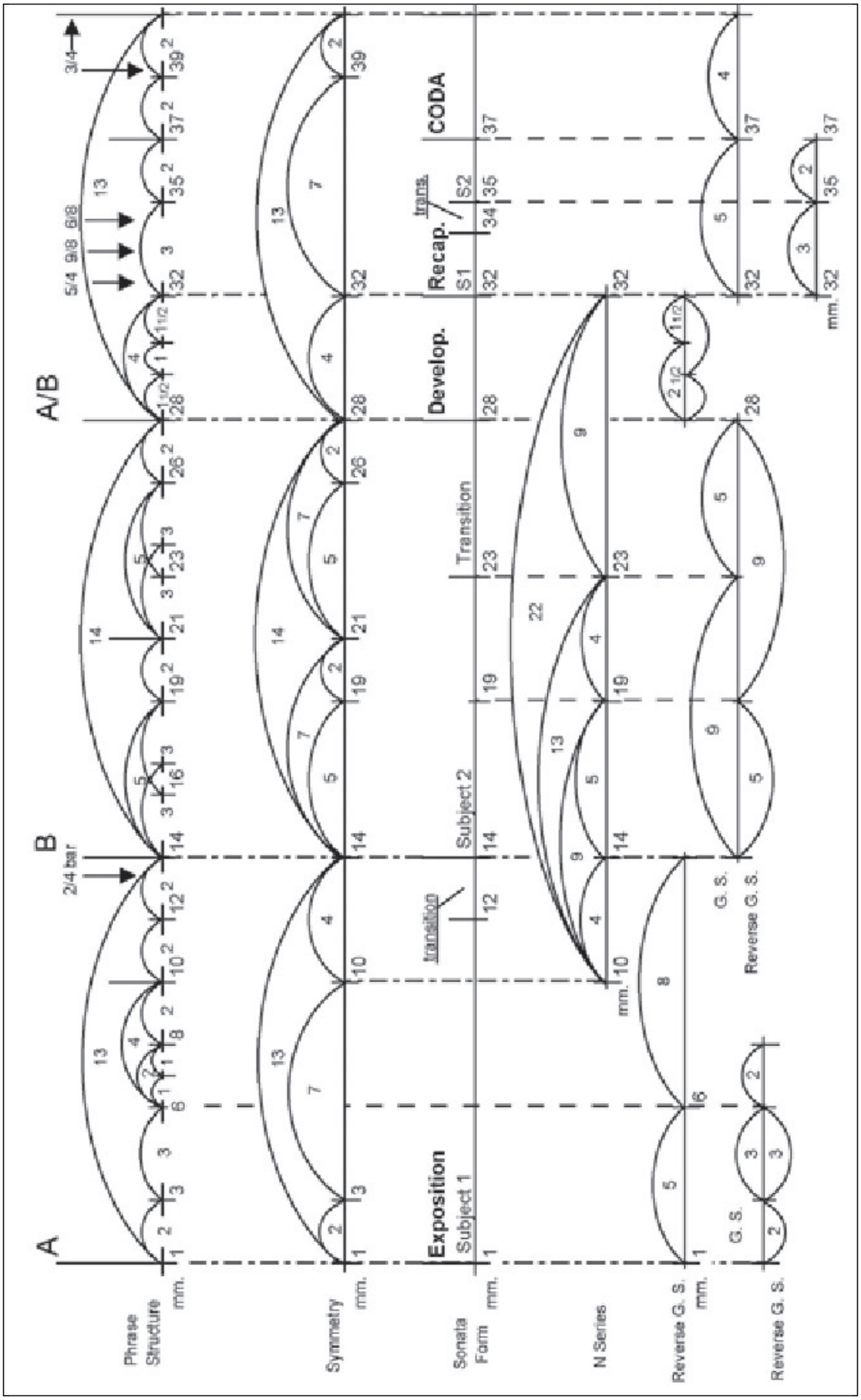


Figure 10 - Sonata Form

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. Interestingly, the middle pattern of the N series reveals demarcations over mm. 19 and 23, the two troublesome measures to which analysts have given much attention. Interestingly, in the middle section alone, the golden section and its reverse 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 simply 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-natural that according to the row should be an A-flat— 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 making 5 the golden section of either 8 (Fibonacci-based) or 9 (N Series-based). While mathematically the error-rate increases considerably with this flexibility, as Lendvai pointed out, "Formal logic (controlled by the eye) and real experience (controlled by the ear) differ."[24]

Thus, it is important to go back and listen to the piece while following along with 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.

Conclusion

This application of Parks's method of diagramming offers a convenient way for teachers to show their students how deeply grounded Schoenberg's music is in the formal conventions of the earlier, traditional styles.

Furthermore, this music exhibits proportional traits explained by summation series and the golden section.[26] In addition to the music of Schoenberg and his pupils, other 20th-century repertoire, including that of Bartók, Debussy, or Hindemith, might be illuminated by the approach presented here.

Since all 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.[27]

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 will undoubtedly be revealed.

My analysis of Op. 33a provides an example of this approac 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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